

**Appendix D:
Biological Resources Supporting Information**

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D.1 - Biological Resources Assessment, Revised 2017

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November 29, 2017

Aaron Ross-Swain
Richland Communities
3000 Lava Ridge Court, Suite 115
Roseville, CA 95661

RE: *Response to Live Oak Associates, Inc. Peer Review Comments for The Ranch Biological Resources Assessment*

Dear Mr. Ross-Swain,

Richland Communities requested that ECORP Consulting, Inc. respond to peer review comments provided by Live Oak Associates, Inc. (LOA) on the Biological Resources Assessment that ECORP prepared for The Ranch in Antioch (Project). This letter includes a table (Attachment A) with a response to LOA's comments, as well as the revised Biological Resources Assessment (Attachment B).

If you have any questions or require additional information, please contact Kathleen Ports at kports@ecorpconsulting.com.

Sincerely,

Kathleen Ports

Staff Biologist/Project Manager
ECORP Consulting, Inc.

Attachments

LIST OF ATTACHMENTS

Attachment A – Response to Comments Table

Attachment B – Revised Biological Resources Assessment

ATTACHMENT A

Response to Comments Table



Comment Number	Live Oak Associates, Inc. Comment	Response ¹
1	That ECORP review the Sand Creek Specific Plan (2002) and modify their 2017 report to address/include these previous these findings. This document was presented to the City Council in 2002 and the proposed development was rejected. Significant background information was collected for this document, including previous surveys onsite and in the vicinity of the site, as the Sand Creek Specific Plan covered a large area including the Cowan Ranch, and large amounts of properties to the east, west, and south of Cowan Ranch.	Noted. The Sand Creek Specific Plan findings were not incorporated as it is a 15-year-old document and more recent site investigations, as well as current database searches (Attachment B), were conducted.
2	That ECORP add a discussion on consistency with the Antioch General Plan, including conformance to Appendix A of the General Plan: Framework for Resource Management Plan for Sand Creek Focus Area (Live Oak Associates, Inc. 2003) and the Draft General Plan Update Environmental Impact Report (LSA 2003).	Under Section 5.0 of the BRA, a subsection was added with a statement describing consistency with the Antioch General Plan.
3	Include an analysis of whether the project will have a substantial adverse effect to each biotic resource, and provide avoidance, minimization, and compensation measures should the potential impact be significant.	See revisions in Section 5.0 (Recommendations).
4	Revise Figures to remove "DRAFT".	Figures revised.
5	Include a figure with the biotic habitats map.	Vegetation communities and land cover types figures for the Project Area and Offsite Infrastructure Areas are included in the report as Figures 2 and 3, respectively.
6	Include a figure for with locations for special status species observed onsite or in the vicinity of the site.	We only observed bird species flying overhead – we are not able to map these. Monk & Associates' rare plant survey results figure was added to the BRA as Attachment F. Regarding CNDDDB data, CDFW requires that users who share the mapping information only summarize the species records and not show exact locations of occurrences. Therefore, we no longer include species occurrence maps.
7	Include a figure with the site plans.	A site plan figure is included in the report as Attachment A.
8	That ECORP modify their 2017 report to discuss the potential impacts to wildlife movement corridors. Add a discussion on whether potential impacts are considered to be significant.	Section 4.8 was revised and Section 5.5 was added to discuss potential impacts to wildlife movement corridors.
9	Revise the report to evaluate the significance of loss of habitat for native wildlife.	A section was added in the recommendations to discuss impacts to native wildlife (Section 5.3).
10	That ECORP modify their 2017 report to discuss potential impacts to riparian habitat including potential light and noise impacts and the potential downstream effects of the project. Potential impacts of stormwater should be discussed as well.	Measures to mitigate light and noise impacts as well as downstream stormwater impacts are discussed under Section 5.4.1 and 5.4.2.



Comment Number	Live Oak Associates, Inc. Comment	Response ¹
11	Discuss proposed setbacks from Sand Creek and other sensitive habitats.	Section 1.2 was revised to describe the proposed setbacks from Sand Creek.
12	That ECORP revise the tree section to include how many trees are protected as a "mature tree" or "landscaped tree". Include expected replacement ratios or fees the City may require for each tree removed.	The Project is not currently proposing to remove trees. Section 5.2 was revised to include the requested discussion.
13	Include in the special status plants section, the existence of big tarplant onsite along the Sand Creek Corridor, as noted in the Sand Creek Specific Plan (2002). Ensure recent surveys were conducted within this species' blooming period, and include this species the discussion of special status plants existing on the project site. Include in the discussion additional species have previously been observed within FUA-1 of which the Cowan Ranch is a part: 1) there was a historical occurrence (1938-1941) of showy madia on the adjacent (to the east) Kaiser property; 2) brittlescale and San Joaquin saltbrush were previously observed on the Albers property; and 3) Mt. Diablo Manzanita, Brewers dwarf flax, Contra Costa manzanita, and crowscale were previously observed on the Zeka/Higgins property adjacent to the west of Cowan Ranch. As FUA-1 has had previous surveys, the results of these surveys should be included and discussed in the BRA.	Big tarplant was not identified during the 2015 Monk & Associates' rare plant surveys. Additional, current, rare plant surveys will be conducted for the Offsite Infrastructure Areas prior to construction. Results of surveys from 15+ years ago were not added to the report. A section (Section 3.3) was added to the report detailing the methods of the rare plant surveys conducted by Monk & Associates.
14	Revise the report to include a rare plant location map from the rare plant surveys to provide better information the amount of area impacted and its relative location to the proposed development.	A figure was attached (Attachment F) showing the current locations of rare plants on-site, as determined by Monk & Associates surveys.
15	Include a figure of historical and current locations for rare plants onsite and in the vicinity of the site.	A figure was attached (Attachment F) showing the current locations of rare plants on-site, as determined by Monk & Associates surveys. Historical occurrences were not included due to the reasons discussed in the response to comments 6 and 13.
16	Include a measure for surveys and for take of the Valley elderberry longhorn beetle. The survey protocol should follow CDFW's Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (2017).	The survey protocol is a USFWS protocol, not CDFW. CDFW does not regulate valley elderberry longhorn beetle. The survey/site assessments that were conducted are sufficient. No additional surveys are needed. The elderberry shrub will be avoided by 100 feet. If impacts occur within 100 feet of the shrub, they will be mitigated as necessary. The text of the document (Section 5.5.2) already explains this. No further measures are necessary.
17	Include in the fairy shrimp section a discussion of previous records and onsite records, including a figure to show where these observations are onsite and in the vicinity of the site.	See response to comment 6.



Comment Number	Live Oak Associates, Inc. Comment	Response ¹
18	Revise the measures for Foothill yellow-legged frog to either include acquiring a take permit or including measures to avoid take.	The potential for this species is very low. We do not believe a take permit will be required; however, if foothill yellow-legged frog are observed, consultation with CDFW will be required. The measures that are proposed are sufficient.
19	Revise the measures for Alameda whipsnake to establish appropriate measures should this species be observed onsite, so consultation with CDFW would not be necessary.	If Alameda whipsnake is observed onsite, consultation with USFWS and CDFW will be required because this species is both state and federally listed. The biological resources assessment recommends consultation with USFWS and CDFW since there are several nearby occurrences of the species and they have potential to disperse through the Study Area. During consultation regarding other species, Alameda whipsnake should also be discussed. At that time, appropriate mitigation/minimization/avoidance will be determined.
20	Revise the measures for Blainville's horned lizard, northwestern pond turtle, and silvery legless lizard to establish appropriate measures should this species be observed onsite, so consultation with CDFW would not be necessary.	Section 5.5.5 was revised to recommend relocation of these species if they are seen onsite.
21	Revise the report to specifically call out Swainson's hawk and include protocol-level surveys for this species.	The buffer for Swainson's hawk is 0.5 mile and is sufficient for this species. The surveys for this species do not need to be discussed separately. Protocol-level surveys are not required unless CDFW specifically requests them.
22	Revise the report to specifically call out tricolored blackbird and include appropriate measures for this species.	A survey buffer for tricolored blackbird (500') was added to Section 5.5.6.
23	Revise the measures for burrowing owl to reference the CDFW's Staff Report on Burrowing Owl Mitigation (CDFG 2012) guidelines as the protocol to use for preconstruction (take avoidance) surveys.	The CDFW protocol is a recommended protocol and is not required. The proposed measures are adequate.
24	Revise the measures for American badger to establish appropriate measures should this species be observed onsite, so consultation with CDFW would not be necessary.	If American badger is observed onsite and the species is unable to leave on its own (i.e., if it is denning onsite), consultation with CDFW will be required. CDFW will need to approve burrow excavation and/or relocation methods prior to any action. Text was added to Section 5.5.7 to clarify why consultation would be needed.



Comment Number	Live Oak Associates, Inc. Comment	Response ¹
25	Revise the measures for San Joaquin kit fox to establish appropriate measures should this species be observed onsite, including preconstruction surveys following the U.S. Fish and Wildlife Service San Joaquin Kit Fox Survey Protocol for the Northern Range (USFWS 1999), and construction-free buffer distances so consultation with CDFW would not be necessary.	If San Joaquin kit fox is observed onsite, consultation with USFWS and CDFW will be required because this species is both state and federally listed. The biological resources assessment recommends consultation with USFWS and CDFW since there are nearby occurrences of the species and they have potential to occur within the Study Area. During consultation regarding other species, San Joaquin kit fox should also be discussed. At that time, appropriate mitigation/minimization/avoidance will be determined.
26	Revise the report to include a discussion on potential impacts to mastiff bats and include appropriate avoidance and mitigation measures.	Greater mastiff bat was added to Table 3 and to the preceding mammal sections.
27	Revise the report to include a discussion on potential impacts to ringtails and include appropriate avoidance and mitigation measures.	Ringtail was added to Table 3 and to the preceding mammal sections.
Wildlife Comment, Page 3	We suggest the full list of observed wildlife be incorporated into the body of the BRA.	The full list is provided as Attachment D and does not need to be in the body of the report.
Soils Comment, Page 3	We suggest the BRA include whether or not the soils have other characteristics such as being alkaline or characteristics which would indicate a particular type of plant species may or may not occur.	During ECORP's analysis of the site, ECORP botanists reviewed soils information and made plant determinations with those factors in mind. This does not need to be described in the biological resources report.

¹Section numbers, figure numbers, and attachment letters are represented in this table as the revised numbers and letters. When referring to the sections, figures, and attachments described above, use the revised document.

ATTACHMENT B

Revised Biological Resources Assessment

Biological Resources Assessment

The Ranch in Antioch

Contra Costa County, California



Prepared For:

Richland Planned Communities, Inc.

November 2017

FINAL

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- Attachment C – Representative Site Photographs
- Attachment D – Wildlife Species Observed within the Study Area during the 2017 Site Visits
- Attachment E – Live Oak and Associates, Inc. Jurisdictional Delineation of Waters of the U.S. for the Project Area
- Attachment F – U.S. Army Corps of Engineers Approved Jurisdictional Determination for the Project Area
- Attachment G – Monk & Associates’ Project Area Rare Plant Survey Results Figure

LIST OF ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
BA	Biological Assessment
BO	Biological Opinion
BCC	Birds of Conservation Concern
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CNPS	California Native Plant Society
CNDDDB	California Natural Diversity Database
CRPR	California Rare Plant Rank
CRLF	California red-legged frog
CTS	California tiger salamander
General Plan	City of Antioch General Plan

LIST OF ACRONYMS AND ABBREVIATIONS

CWA	Clean Water Act
DPS	Distinct Population Segment
ESA	Endangered Species Act
EFH	Essential Fish Habitat
ESU	Evolutionarily Significant Unit
FYLF	foothill yellow-legged frog
HCP	Habitat Conservation Plan
M&A	Monk & Associates, Inc.
MSL	mean sea level
MBTA	Migratory Bird Treaty Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
OHWM	ordinary high water mark
RWQCB	Regional Water Quality Control Board
SSC	Species of Special Concern
SAA	Streambed Alteration Agreement
Project	The Ranch in Antioch
TRBL	tricolored blackbird
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VELB	valley elderberry longhorn beetle

1.0 INTRODUCTION

At the request of Richland Planned Communities, Inc., ECORP Consulting, Inc. conducted a biological resources assessment for The Ranch in Antioch (Project) located in Contra Costa County. The Project Area as well as the Project's potential offsite infrastructure areas (Offsite Infrastructure Areas) are collectively referred to as the Study Area.

1.1 Study Area Location

The ±632.9-acre Study Area is generally located south of Lone Tree Way and west of California State Route (SR) 4 in the southern limits of the City of Antioch, Contra Costa County California. The Study Area corresponds to a portion of Sections 1, 5, 6, 7, 8, 9, and 12, Township 1 North, and Ranges 1 and 2 East (Mount Diablo Base and Meridian) of the "Antioch South, California" 7.5-minute quadrangle (U.S. Geological Survey [USGS] 1978) (Figure 1. *Study Area Location and Vicinity*). The approximate center of the Study Area is located at latitude 37.949989 and longitude -121.792847 within the San Joaquin Delta Watershed (Hydrologic Unit Code #18040003, Natural Resources Conservation Service [NRCS], USGS, and U.S. Environmental Protection Agency [USEPA] 2016).

1.2 Project Description

The Project Area consists of ±550.8 acres where Richland Planned Communities, Inc. plans to process entitlements that will allow up to 1,338 residential units divided into various neighborhoods that will be arranged into two villages separated by Sand Creek, accompanied by parks, a system of improved and natural pedestrian trails, a trail staging area, a private recreation facility, a fire station, a series of roads throughout the development, a vehicular bridge, a pedestrian bridge, two storm drain basins with outfalls into the creek, and a village center located across from Kaiser Hospital. The Project proponent is proposing a minimum 50 foot no-disturbance setback from Sand Creek. A conceptual site plan is included as Attachment A.

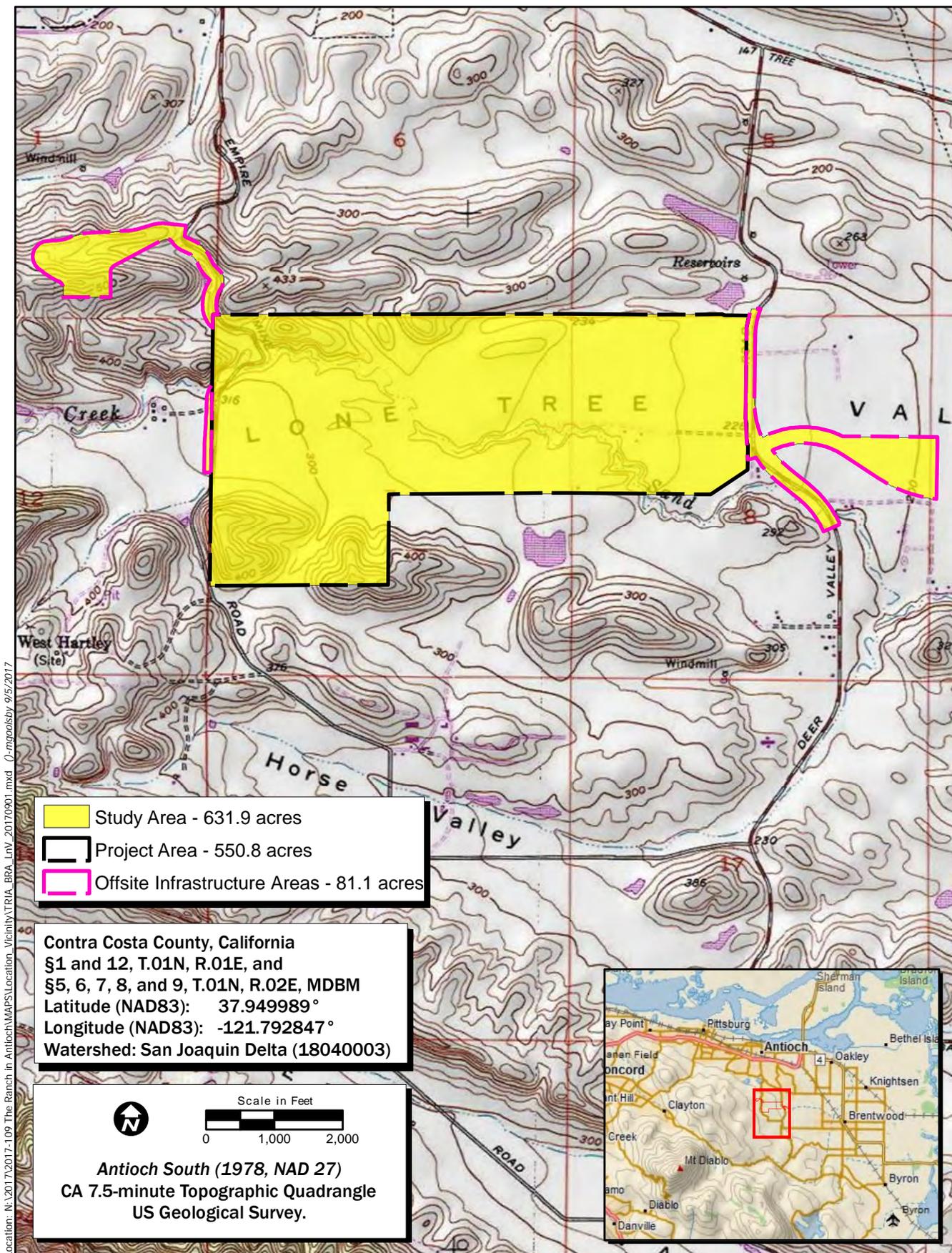
The Offsite Infrastructure Areas consist of ±81.1 acres and represent an area that may be used for the installation of water pump stations, water tanks, sewer lines, or other necessary infrastructure improvements that may be required to support the residential community.

1.3 Purpose of this Biological Resources Assessment

The purpose of this Biological Resources Assessment is to assess the potential for occurrence of special-status plant and animal species or their habitat, and sensitive habitats such as wetlands within the Study Area. This assessment does not include determinate field surveys conducted according to agency-promulgated protocols, and the conclusions and recommendations presented in this report are based upon a literature review, database queries, and limited site reconnaissance.

For the purposes of this assessment, special-status species are defined as plants or animals that:

- are listed, proposed for listing, or candidates for future listing as threatened or endangered under the federal Endangered Species Act (ESA);
- are listed or candidates for future listing as threatened or endangered under the California ESA;

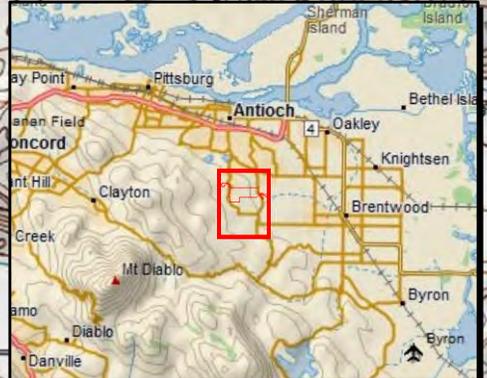


- Study Area - 631.9 acres
- Project Area - 550.8 acres
- Offsite Infrastructure Areas - 81.1 acres

Contra Costa County, California
 §1 and 12, T.01N, R.01E, and
 §5, 6, 7, 8, and 9, T.01N, R.02E, MDBM
 Latitude (NAD83): 37.949989°
 Longitude (NAD83): -121.792847°
 Watershed: San Joaquin Delta (18040003)

Scale in Feet

Antioch South (1978, NAD 27)
CA 7.5-minute Topographic Quadrangle
US Geological Survey.



Location: N:\2017\2017-109 The Ranch in Antioch\MAPS\Location_Vicinity\TRIA_BRA_LnV_20170901.mxd (L-mapolsby 9/5/2017)

Map Date: 9/5/2017
 iService Layer Credits: Copyright© 2015 DeLorme
 Copyright© 2013 National Geographic Society, I-cubed

Figure 1. Study Area Location and Vicinity

- meet the definitions of endangered or rare under Section 15380 of the California Environmental Quality Act (CEQA) Guidelines;
- are identified as a Species of Special Concern (SSC) by the California Department of Fish and Wildlife (CDFW);
- are fully protected in California in accordance with the California Fish and Game Code, §§ 3511 (birds), 4700 (mammals), 5050 (amphibians and reptiles), and 5515 (fishes);
- are plants considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California" [California Rare Plant Rank (CRPR) 1 and 2];
- are plants listed by CNPS as species about which more information is needed to determine their status (CRPR 3), and plants of limited distribution (CRPR 4); or
- are plants listed as rare under the California Native Plant Protection Act (NPPA, California Fish and Game Code, § 1900 et seq.).

Only species that fall into one of the above-listed groups were considered for this assessment. Birds identified as Birds of Conservation Concern (BCC) by the U.S. Fish and Wildlife Service (USFWS), without other special status, were not included in this analysis. Other species without special status that are sometimes found in database or literature searches were not included within this analysis.

2.0 REGULATORY SETTING

2.1 Federal Regulations

2.1.1 Federal Endangered Species Act

The federal ESA protects plants and animals that are listed as endangered or threatened by USFWS and the National Marine Fisheries Service (NMFS). Section 9 of the federal ESA prohibits the taking of listed wildlife, where take is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct" (50 Code of Federal Regulations [CFR] 17.3). For plants, this statute governs removing, possessing, maliciously damaging, or destroying any listed plant on federal land and removing, cutting, digging up, damaging, or destroying any listed plant on nonfederal land in knowing violation of state law (16 U.S. Code [USC] 1538). Under Section 7 of federal ESA, federal agencies are required to consult with the USFWS if their actions, including permit approvals or funding, could adversely affect a listed (or proposed) species (including plants) or its critical habitat. Through consultation and the issuance of a Biological Opinion (BO), the USFWS may issue an incidental take statement allowing take of the species that is incidental to an otherwise authorized activity provided the activity will not jeopardize the continued existence of the species. Section 10 of federal ESA provides for issuance of incidental take permits where no other federal actions are necessary provided a Habitat Conservation Plan (HCP) is developed.

Section 7

Section 7 of the federal ESA mandates that all federal agencies consult with USFWS and/or NMFS to ensure that federal agencies' actions do not jeopardize the continued existence of a listed species or adversely modify critical habitat for listed species. If direct and/or indirect effects will occur to Critical

Habitat that appreciably diminish the value of critical habitat for both the survival and recovery of a species, the adverse modifications will require formal consultation with USFWS or NMFS. If adverse effects are likely, the applicant must conduct a Biological Assessment (BA) for the purpose of analyzing the potential effects of the project on listed species and critical habitat to establish and justify an "effect determination." The federal agency reviews the BA; if it concludes that the project may adversely affect a listed species or its habitat, it prepares a BO. The BO may recommend "reasonable and prudent alternatives" to the project to avoid jeopardizing or adversely modifying habitat.

Section 10

When no discretionary action is being taken by a federal agency but a project may result in the take of listed species, an incidental take permit under Section 10 of the federal ESA is necessary. The purpose of the incidental take permit is to authorize the take of federally listed species that may result from an otherwise lawful activity, not to authorize the activities themselves. In order to obtain an incidental take permit under section 10, an application must be submitted that includes an HCP. In some instances, applicants, USFWS, and/or NMFS may determine that an HCP is necessary or prudent, even if a discretionary federal action will occur. The purpose of the HCP planning process associated with the permit application is to ensure that adequate minimization and mitigation for impacts to listed species and/or their habitat will occur.

Critical Habitat and Essential Habitat

Critical Habitat is defined in Section 3 of the federal ESA as

1. The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the federal ESA, on which are found those physical or biological features essential to the conservation of the species and that may require special management considerations or protection; and
2. Specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

For inclusion in a Critical Habitat designation, habitat within the geographical area occupied by the species at the time it was listed must first have features that are essential to the conservation of the species. Critical Habitat designations identify, to the extent known and using the best scientific data available, habitat areas that provide essential life cycle needs of the species (areas on which are found the primary constituent elements). Primary constituent elements are the physical and biological features that are essential to the conservation of the species and that may require special management considerations or protection. These include, but are not limited to, the following elements:

- Space for individual and population growth and for normal behavior;
- Food, water, air, light, minerals, or other nutritional or physiological requirements;
- Cover or shelter;
- Sites for breeding, reproduction, or rearing (or development) of offspring; or
- Habitats that are protected from disturbance or are representative of the historic, geographical, and ecological distributions of a species.

Excluded essential habitat is defined as areas that were found to be essential habitat for the survival of a species and assumed to contain at least one of the primary constituent elements for the species but were excluded from the Critical Habitat designation. The USFWS has stated that any action within the excluded essential habitat that triggers a federal nexus will be required to undergo the Section 7(a)(1) process, and the species covered under the specific Critical Habitat designation would be afforded protection under Section 7(a)(2) of the federal ESA.

Essential Fish Habitat

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), federal agencies are required to consult with NMFS for activities that may affect Essential Fish Habitat (EFH). EFH are the waters and substrate necessary for fish spawning, breeding, feeding, or growth to maturity, and include several important components: adequate substrate; water quality and quantity, depth, and velocity; channel gradient and stability; food; cover and habitat complexity; space; access and passage; and habitat connectivity (Pacific Fishery Management Council 2000).

2.1.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements international treaties between the United States and other nations devised to protect migratory birds, any of their parts, eggs, and nests from activities such as hunting, pursuing, capturing, killing, selling, and shipping, unless expressly authorized in the regulations or by permit. As authorized by the MBTA, the USFWS issues permits to qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, education, migratory game bird propagation, and salvage), take of depredating birds, taxidermy, and waterfowl sale and disposal. The regulations governing migratory bird permits can be found in 50 CFR part 13 General Permit Procedures and 50 CFR part 21 Migratory Bird Permits. The State of California has incorporated the protection of birds of prey in Sections 3800, 3513, and 3503.5 of the California Fish and Game Code.

2.1.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940 (as amended) provides for the protection of bald eagle and golden eagle by prohibiting the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit [16 USC 668(a); 50 CFR 22]. The USFWS may authorize take of bald eagles and golden eagles for activities where the take is associated with, but not the purpose of, the activity and cannot practicably be avoided (50 CFR 22.26).

2.1.4 Federal Clean Water Act

The federal Clean Water Act's (CWA's) purpose is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." Section 404 of the CWA prohibits the discharge of dredged or fill material into Waters of the United States (U.S.) without a permit from the U.S. Army Corps of Engineers (USACE). The definition of Waters of the U.S. includes rivers, streams, estuaries, the territorial seas, ponds, lakes, and wetlands. Wetlands are defined as 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” (33 CFR 328.3 7b). The USEPA also has authority over wetlands and may override a USACE permit.

Substantial impacts to wetlands may require an individual permit. Projects that only minimally affect wetlands may meet the conditions of one of the existing Nationwide Permits. A Water Quality Certification or waiver pursuant to Section 401 of the CWA is required for Section 404 permit actions; this certification or waiver is issued by the Regional Water Quality Control Board (RWQCB).

2.2 State or Local Regulations

2.2.1 California Fish and Game Code

California Endangered Species Act

The California ESA (California Fish and Game Code §§ 2050-2116) generally parallels the main provisions of the federal ESA, but unlike its federal counterpart, the California ESA applies the take prohibitions to species proposed for listing (called “candidates” by the state). Section 2080 of the California Fish and Game Code prohibits the taking, possession, purchase, sale, and import or export of endangered, threatened, or candidate species, unless otherwise authorized by permit or in the regulations. Take is defined in Section 86 of the California Fish and Game Code as “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.” The California ESA allows for take incidental to otherwise lawful development projects. State-led agencies are required to consult with CDFW to ensure that any action they undertake is not likely to jeopardize the continued existence of any endangered, threatened or candidate species or result in destruction or adverse modification of essential habitat.

Fully Protected Species

The State of California first began to designate species as “fully protected” prior to the creation of the federal and California ESAs. Lists of fully protected species were initially developed to provide protection to those animals that were rare or faced possible extinction and included fish, amphibians and reptiles, birds, and mammals. Most fully protected species have since been listed as threatened or endangered under the federal and/or California ESAs. The regulations that implement the Fully Protected Species Statute (California Fish and Game Code, § 4700 for mammals, § 3511 for birds, § 5050 for reptiles and amphibians, and § 5515 for fish) provide that fully protected species may not be taken or possessed at any time. Furthermore, CDFW prohibits any state agency from issuing incidental take permits for fully protected species. CDFW will issue licenses or permits for take of these species for necessary scientific research or live capture and relocation pursuant to the permit.

Native Plant Protection Act

The NPPA of 1977 was created with the intent to “preserve, protect and enhance rare and endangered plants in this State.” The NPPA is administered by CDFW and provided in California Fish and Game Code §§ 1900-1913. The Fish and Wildlife Commission has the authority to designate native plants as “endangered” or “rare” and to protect endangered and rare plants from take. The California ESA of 1984 (California Fish and Game Code §§ 2050-2116) provided further protection for rare and endangered plant species, but the NPPA remains part of the California Fish and Game Code.

Birds of Prey

Sections 3800, 3513, and 3503 of the California Fish and Game Code specifically protect birds of prey. Section 3800 states that it is unlawful to take nongame birds such as those occurring naturally in California that are not resident game birds, migratory game birds, or fully protected birds, except when in accordance with regulations of the commission or a mitigation plan approved by CDFW for mining operations. Section 3513 specifically prohibits the take or possession of any migratory nongame bird as designated in the MBTA.

Section 3503 of the California Fish and Game Code prohibits the take, possession, or needless destruction of the nest or eggs of any bird. Additionally, Subsection 3503.5 prohibits the take, possession, or destruction of any birds and their nests in the orders Strigiformes (owls) or Falconiformes (hawks and eagles). These provisions, along with the federal MBTA, serve to protect nesting native birds.

California Streambed Alteration Notification/Agreement

Section 1602 of the California Fish and Game Code requires that a Streambed Alteration Agreement (SAA) be submitted to CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." CDFW reviews the proposed actions and, if necessary, submits proposed for measures to protect affected fish and wildlife resources to the applicant. The final proposal that is mutually agreed upon by CDFW and the Applicant is the SAA. Often, projects that require an SAA also require a permit from USACE under Section 404 of the CWA. In these instances, the conditions of the Section 404 permit and the SAA overlap.

2.2.2 Species of Special Concern

The SSC are defined by CDFW as a species, subspecies, or distinct population of an animal native to California that are not legally protected under the federal or California ESAs or the California Fish and Game Code, but currently satisfies one or more of the following criteria:

- The species has been completely extirpated from the state or, as in the case of birds, it has been extirpated from its primary seasonal or breeding role.
- The species is listed as federally (but not state) threatened or endangered, or meets the state definition of threatened or endangered but has not formally been listed.
- The species has or is experiencing serious (nonscyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for state threatened or endangered status.
- The species has naturally small populations that exhibit high susceptibility to risk from any factor that if realized, could lead to declines that would qualify it for state threatened or endangered status.

SSC are typically associated with habitats that are threatened. Project-related impacts to SSC, state-threatened or endangered species are considered "significant" under CEQA.

2.2.3 California Plant Ranks

The CNPS maintains the *Inventory of Rare and Endangered Plants of California* (CNPS 2017), which provides a list of plant species native to California that are threatened with extinction, have limited distributions, and/or low populations. Plant species meeting one of these criteria are assigned to one of six CRPRs. The rank system was developed in collaboration with government, academia, nongovernmental organizations, and private sector botanists, and is jointly managed by CDFW and the CNPS. The California Rare Plant Ranks are currently recognized in the California Natural Diversity Database (CNDDDB). The following are definitions of the CNPS CRPRs:

- Rare Plant Rank 1A – presumed extirpated in California and either rare or extinct elsewhere
- Rare Plant Rank 1B – rare, threatened, or endangered in California and elsewhere
- Rare Plant Rank 2A – presumed extirpated in California, but more common elsewhere
- Rare Plant Rank 2B – rare, threatened, or endangered in California but more common elsewhere
- Rare Plant Rank 3 – a review list of plants about which more information is needed
- Rare Plant Rank 4 – a watch list of plants of limited distribution

Additionally, the CNPS has defined Threat Ranks that are added to the CRPR as an extension. Threat Ranks designate the level of threat on a scale of one through three, with one being the most threatened and three being the least threatened. Threat Ranks are generally present for all plants ranked 1B, 2B, or 4, and for the majority of plants ranked 3. Plant species ranked 1A and 2A (presumed extirpated in California), and some species ranked 3, which lack threat information, do not typically have a Threat Rank extension. The following are definitions of the CNPS Threat Ranks:

- Threat Rank 0.1 – Seriously threatened in California (more than 80 percent of occurrences threatened/high degree and immediacy of threat)
- Threat Rank 0.2 – Moderately threatened in California (20 - 80 percent occurrences threatened/moderate degree and immediacy of threat)
- Threat Rank 0.3 – Not very threatened in California (less than 20 percent of occurrences threatened/low degree and immediacy of threat or no current threats known)

Factors such as habitat vulnerability and specificity, distribution, and condition of occurrences, are considered in setting the Threat Rank, and differences in Threat Ranks do not constitute additional or different protection (CNPS 2017). Depending on the policy of the lead agency, substantial impacts to plants ranked 1A, 1B, or 2 are typically considered significant under CEQA Guidelines § 15380. Significance under CEQA is typically evaluated on a case-by-case basis for plants ranked 3 or 4.

2.2.4 Porter-Cologne Water Quality Act

The RWQCB implements water quality regulations under the federal CWA and the Porter-Cologne Water Quality Act. These regulations require compliance with the National Pollutant Discharge Elimination System (NPDES), including compliance with the California Storm Water NPDES General Construction Permit for discharges of stormwater runoff associated with construction activities. General Construction Permits for projects that disturb one or more acres of land require development

and implementation of a Storm Water Pollution Prevention Plan. Under the Porter-Cologne Water Quality Act, the RWQCB regulates actions that would involve “discharging waste, or proposing to discharge waste, with any region that could affect the water of the state” (Water Code 13260(a)). Waters of the State are defined as “any surface water or groundwater, including saline waters, within the boundaries of the state” (Water Code § 13050 (e)). Where dredging, filling, or discharging materials into the Waters of the State will occur pursuant to a federal permit (i.e., a 404 permit), the RWQCB must issue a water quality certification (i.e., a 401 permit). The RWQCB regulates all such activities, as well as dredging, filling, or discharging materials into Waters of the State, that are not regulated by USACE due to a lack of connectivity with a navigable water body. The RWQCB may require issuance of a Waste Discharge Requirements for these activities.

2.2.5 California Environmental Quality Act

In accordance with the California Environmental Quality Act (CEQA) Guidelines section 15380 (d), a species not protected on a federal or state list may be considered rare or endangered if the species meets certain specified criteria. These criteria follow the definitions in federal and California ESAs and sections 1900-1913 of the California Fish and Game Code, which deal with rare or endangered plants or animals. Section 15380 was included in the Guidelines primarily to deal with situations where a project under review may have a significant effect on a species that has not yet been listed by either USFWS or CDFW.

CEQA Significance Criteria

Sections 15063-15065 of the CEQA Guidelines address how an impact is identified as significant, and are particularly relevant to species with special status. Generally, impacts to listed (rare, threatened, or endangered) species are considered significant and require lead agencies to prepare an Environmental Impact Report to thoroughly analyze and evaluate the impacts. Assessment of "impact significance" to populations of nonlisted species (e.g., SSC) usually considers the proportion of the species' range that will be affected by a project, impacts to habitat, and the regional and population level effects.

Specifically, Section 15064.7 of the CEQA Guidelines encourages local agencies to develop and publish the thresholds that the agency uses in determining the significance of environmental effects caused by projects under its review. However, agencies may also rely upon the guidance provided by the expanded Initial Study checklist contained in Appendix G of the CEQA Guidelines. Appendix G provides examples of impacts that would normally be considered significant. Based on these examples, impacts to biological resources would normally be considered significant if the project would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by CDFW or USFWS;
- Have a substantial adverse effect on federally protected Waters of the U.S. including wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, and coastal) through direct removal, filling, hydrological interruption, or other means;

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

An evaluation of whether an impact on biological resources would be substantial must consider both the resource itself and how that resource fits into a regional or local context. Substantial impacts would be those that would diminish, or result in the loss of, an important biological resource, or those that would obviously conflict with local, state, or federal resource conservation plans, goals, or regulations. Impacts are sometimes locally important but not significant according to CEQA. The reason for this is that although the impacts would result in an adverse alteration of existing conditions, they would not substantially diminish, or result in the permanent loss of an important resource on a population-wide or region-wide basis.

2.2.6 City of Antioch General Plan

The City of Antioch General Plan (General Plan) contains several objectives and policies related to biological resources under the Resource Management section. Specifically, the biological resources objectives and policies pertain to CDFW sensitive natural communities such as: native grasslands, vernal pools, stabilized interior dunes, seasonal wetlands, freshwater seeps, freshwater marshes, coastal brackish marshes, alkaline floodplains, alkali seeps, valley oak woodlands, and riparian woodland. The biological resources objectives and policies also pertain to special-status species (City of Antioch 2003).

The General Plan biological resources policies emphasize compliance with federal policies regarding no net loss of wetlands through avoidance and creation; preserving and/or restoring existing wetlands and riparian resources along natural streams; requiring development setbacks adjacent to natural streams; requiring development projects to protect and/or mitigate for impacts to sensitive habitats through environmental review process; limiting uses within preserves (e.g., implementing passive recreation and public trails); permitting removal of healthy oaks only when necessary; preserving heritage trees; limiting introduction of invasive species and incorporating native vegetation in the planting plans; avoiding creation of perennial flows within urban streams; and, when presence/absence determinations are being made for threatened, endangered, or special of special concern, requiring protocol-level surveys prior to a final determination of absence for the species (City of Antioch 2003).

2.2.7 City of Antioch Tree Ordinance

Title 9: Planning and Zoning, Chapter 5 Zoning, Article 12: Tree Preservation and Regulation establishes the requirement for a permit or development application required prior to the removal of protected trees (City of Antioch 2017). Article 12 defines protected trees as:

- "(a) any tree required to be preserved as a condition of an approval from a "regular development application" as defined by this section, and/or any tree that is shown to be preserved on an approved development plan as submitted by the applicant and subsequently approved by the city.
- (b) All established indigenous trees as defined by this section.
- (c) all street trees as defined by this section.
- (d) all mature and landmark trees as defined by this section."

Indigenous trees are defined as: blue oak (*Quercus douglasii*), valley oak (*Q. lobata*), coast live oak (*Q. agrifolia*), canyon live oak (*Q. chrysolepis*), interior live oak (*Q. wislizeni*), California buckeye (*Aesculus californica*), and California bay (*Umbellularia californica*).

Street trees are defined as "any tree planted within either the public right-of-way and/or planting easement, where applicable."

Landmark trees are defined as "any tree which is at least 48 inches in diameter and/or in excess of 40 feet in height."

Mature trees are defined as "any tree which is at least 26 inches in diameter, as measured four and one half feet above natural grade."

3.0 METHODS

3.1 Literature Review

Prior to conducting the field portion of the assessment, the following species lists were queried to determine the special-status species that had been documented within or in the vicinity of the Study Area. Results of the database searches are included as Attachment B:

- CDFW CNDDDB for the "Antioch South, California" and surrounding eight 7.5-minute USGS quadrangles (CDFW 2017);
- USFWS IPaC Resource Report List for the Study Area (USFWS 2017a); and
- CNPS electronic *Inventory of Rare and Endangered Plants of California* was queried for the "Antioch South, California" 7.5-minute USGS quadrangle, and the eight surrounding USGS topographic quadrangles (CNPS 2017).

Additional background information was reviewed regarding the documented or potential occurrence of special-status species within or near the Study Area from the following sources:

- The Status of Rare, Threatened, and Endangered Plants and Animals of California 2000-2004 (CDFG 2005);
- California Bird Species of Special Concern (Shuford and Gardali 2008);
- Amphibian and Reptile Species of Special Concern in California (Thompson, Wright, and Shaffer 2016);
- Mammalian Species of Special Concern in California (Williams 1986);

- California's Wildlife, Volumes I-III (Zeiner, et al. 1988, 1990a, 1990b); and
- A Guide to Wildlife Habitats of California (Mayer and Laudenslayer Jr., eds. 1988).

Other reports and verifications previously prepared for the Project Area that were reviewed for this assessment include the following:

- Tree Preservation Report for The Ranch Project, Antioch California (Brennan 2015);
- Investigation of Waters of the United States, Cowan Property, Contra Costa County, California (Live Oak Associates, Inc. 2014).
- U.S. Army Corps of Engineers Approved Jurisdictional Determination for the Ranch Residential Development Site (USACE 2016).
- DRAFT Biological Assessment for The Ranch, City of Antioch, Contra Costa County (Monk & Associates, Inc. [M&A] 2015). This draft report also documents the methods and results of protocol-level special-status plant surveys conducted in 2015 by M&A.

3.2 Site Reconnaissance

ECORP biologists Ariel Miller, Dustin Brown, Clay DeLong, and Emily Mecke conducted the site assessments on April 12, 2017 and August 22, 2017. The Study Area was systematically surveyed on foot using a Trimble GPS unit with sub-meter accuracy, topographic maps, and aerial imagery to ensure total site coverage. Special attention was given to identifying those portions of the site with the potential to support special-status species and sensitive habitats. During the field survey, biological communities occurring within the Study Area were characterized and the following biological resource information was collected:

- Potential Waters of the U.S. (Offsite Infrastructure Areas only);
- Plant and animal species directly observed;
- Animal evidence (e.g., scat, tracks);
- Elderberry (*Sambucus nigra* ssp. *caerulea*) shrub locations;
- Burrows and any other special habitat features; and
- Representative site photographs (Attachment C).

In addition, soil types were identified using the NRCS Web Soil Survey (NRCS 2017a).

3.3 Rare Plant Surveys Conducted By Monk & Associates

M&A biologists conducted rare plant surveys within the Project Area on March 23 and 25, April 28 and 29, and July 14 and 15, 2015 (M&A 2015). M&A biologists Sarah Lynch, Christy Owens, Bridgett Downs and Sadie McGarvey completed focused surveys that followed CDFW (CDFG 2009), USFWS Guidelines (USFWS 2000), and CNPS (2001) published survey guidelines. The plant species found in the Project Area were identified to species. A list of all vascular plant taxa encountered within the Project Area was recorded in the field. Plants that needed further evaluation were collected and keyed at the M&A

lab. Final determinations for collected plants were made by keying specimens using standard references such as The Jepson Manual Second Edition (Baldwin et al. 2012) (M&A 2015).

3.4 Special-Status Species Considered for the Project

Based on species occurrence information from the CNDDDB, the literature review, and observations in the field, a list of special-status plant and animal species that have the potential to occur within the Project Area and/or Offsite Infrastructure Areas was generated (Table 4 in Section 4.7). Only special-status species as defined in Section 1.3 were included in this analysis. Each of these species' potential to occur within the Project Area and/or Offsite Infrastructure Areas was assessed based on the following criteria:

- **Present** - Species was observed during the site visits or is known to occur within the Project Area and/or Offsite Infrastructure Areas based on documented occurrences within the CNDDDB or other literature.
- **Potential to Occur** - Habitat (including soils and elevation requirements) for the species occurs within the Project Area and/or Offsite Infrastructure Areas.
- **Low Potential to Occur** - Marginal or limited amounts of habitat occurs and/or the species is not known to occur in the vicinity based on CNDDDB records and other available documentation.
- **Absent** - No suitable habitat (including soils and elevation requirements) and/or the species is not known to occur in the vicinity based on CNDDDB records and other documentation.

4.0 RESULTS

4.1 Site Characteristics and Land Use

The Study Area is bounded by suburban residential development to the north, undeveloped land, a hospital, and a high school on the east, and undeveloped land to the south and west. Topography within the Study Area ranges from rolling hills to flat terrain, with elevations ranging from approximately 200 feet to 500 feet above mean sea level. The majority of the Study Area is undeveloped and is used primarily for livestock grazing. A rural residence and several outbuildings occur in the central-eastern portion of the Project Area. A water tank and paved road occur within the northwestern Offsite Infrastructure Area. Portions of Deer Valley Road and Sand Creek Road occur within the eastern Offsite Infrastructure Area.

4.2 Vegetation Communities and Land Cover Types

Three vegetation communities and land cover types were documented within the Study Area. These include annual grassland, ruderal community, and developed. These vegetation communities and land cover types are described below. Figures 2 and 3 show the vegetation communities, land cover types, and aquatic resources within the Study Area. Table 1 below provides the approximate percent cover of each of these features within the Project Area and Offsite Infrastructure Areas. Waters of the U.S. are discussed in detail under Section 4.6. Separate waters of the U.S. figures and acreages are also provided in Section 4.6.

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Figure 2. Project Area Vegetation Communities and Land Cover Types

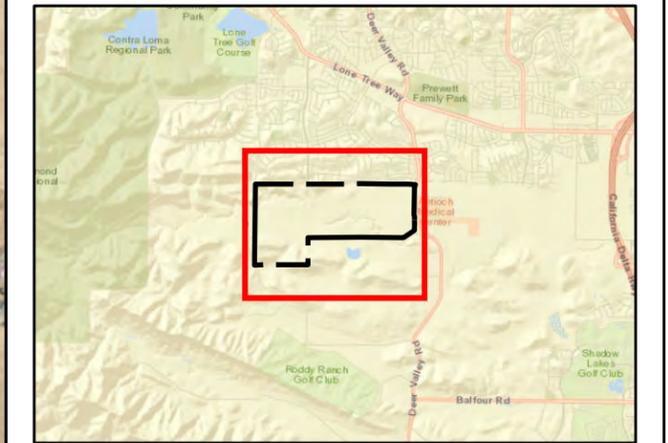
Map Features

Project Boundary (550.8 acres)

Land Cover Type

- Annual Grassland (478.8 acres)
- Developed (9.6 acres)
- Ruderal (6.4 acres)
- Sand Creek (1.9 acres)
- Sand Creek Corridor (51.7 acres)
- Aquatic/Wetlands Complex (2.3 acres)

Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community



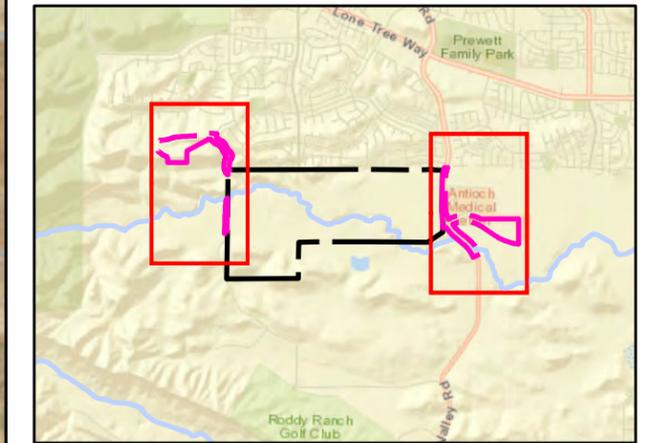
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Figure 3. Offsite Infrastructure Areas Vegetation Communities and Land Cover Types

- Map Features**
- Offsite Infrastructure Areas (81.1 acres)
- Land Cover Type**
- Annual Grassland (56.5 acres)
 - Developed (21.2 acres)
 - Ruderal (2.7 acres)
 - Sand Creek (0.2 acre)
 - Aquatic/Wetlands Complex (0.6 acre)

Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community



Type	Acres ¹	Approximate Percent Cover ¹
Project Area	550.8	N/A
Annual Grassland	478.8	86.9%
Developed	9.6	1.7%
Ruderal	6.4	1.2%
Sand Creek	1.9	0.3%
Sand Creek Corridor ²	51.7	9.4%
Aquatic/Wetlands Complex	2.3	0.4%
Offsite Infrastructure Areas	81.1	N/A
Annual Grassland	56.5	69.7%
Developed	21.2	26.1%
Ruderal Community	2.7	3.3%
Sand Creek ³	0.2	0.2%
Aquatic/Wetlands Complex	0.6	0.7%

¹The individual acre and/or percentage amounts may not add up to the total acres/100% due to rounding.

²For the Project Area, the Sand Creek Corridor boundary is mapped as the approved CDFW jurisdictional limit.

³For the Offsite Infrastructure Areas, the Sand Creek boundary is mapped as the OHWM (consultation with CDFW regarding their jurisdictional along Sand Creek has not yet occurred for the Offsite Infrastructure Areas).

4.2.1 Annual Grassland

The majority of the Study Area is composed of annual grassland. Annual grasslands within the Study Area are dominated primarily by nonnative annual grass species, including ripgut brome (*Bromus diandrus*), soft brome (*Bromus hordeaceus*), wild oat (*Avena fatua*), foxtail barley (*Hordeum murinum*), and Italian ryegrass (*Festuca perennis*). Common forb species within the annual grasslands include common gumplant (*Grindelia camporum*), bur clover (*Medicago polymorpha*), and red-stemmed filaree (*Erodium cicutarium*). Annual grasslands within the Study Area also include scattered native trees, which occur at low density in the southwestern portion of the Project Area, and along Sand Creek. Native trees species within annual grasslands in the Study Area include California buckeye, blue oak, valley oak, and interior live oak.

4.2.2 Ruderal

Ruderal vegetation occurs adjacent to Deer Valley Road and Sand Creek Road within the eastern Offsite Infrastructure Area, and surrounding the rural residence within the Project Area. This vegetation community is composed primarily of nonnative forbs and grasses characteristic of recently disturbed sites. Dominant plant species within the ruderal vegetation communities in the Study Area include yellow star-thistle (*Centaurea solstitialis*), stinkwort (*Dittrichia graveolens*), Russian thistle (*Salsola tragus*), Italian ryegrass, and wild oat. A grove of planted blue gum (*Eucalyptus globulus*) also occurs along the western boundary of the Project Area.

4.2.3 Developed

Developed portions of the Study Area include roads, landscaped areas, the rural residence in the Project Area, the water tank in the northwestern Offsite Infrastructure Area, and other paved or recently disturbed areas. These areas do not contain appreciable native or naturalized vegetation.

4.2.4 Sand Creek and Sand Creek Corridor

Sand Creek is located within portions of the Offsite Infrastructure Areas and also runs east/west through the Project Area. Within the Project Area, Sand Creek and the associated approved CDFW 1602 jurisdictional area are referred to as the Sand Creek Corridor. The Sand Creek boundary within the Offsite Infrastructure Areas only includes the mapped OHWM since these areas have not been subject to agency review. See Section 4.6 for a detailed description of Sand Creek.

4.2.5 Aquatic/Wetlands Complex

Aquatic/wetlands complex within the Study Area includes all the mapped Waters of the U.S. and State with the exception of Sand Creek and the Sand Creek Corridor (described above). See Section 4.6 for a detailed description of the Waters of the U.S. and State within the Study Area.

4.3 Trees

A tree survey was conducted for the Project Area in July 2015 (Brennan 2015). During this survey, 16 tree species and 255 individual trees were mapped, identified, and evaluated for indicators of health within the Project Area. A large majority of the trees identified within the Project Area belonged to five species, including 73 blue oaks, 60 valley oaks, 54 blue gums, 29 California buckeyes, and 13 interior live oaks (Brennan 2015). Tree surveys have not been conducted for the Offsite Infrastructure Area.

4.4 Wildlife

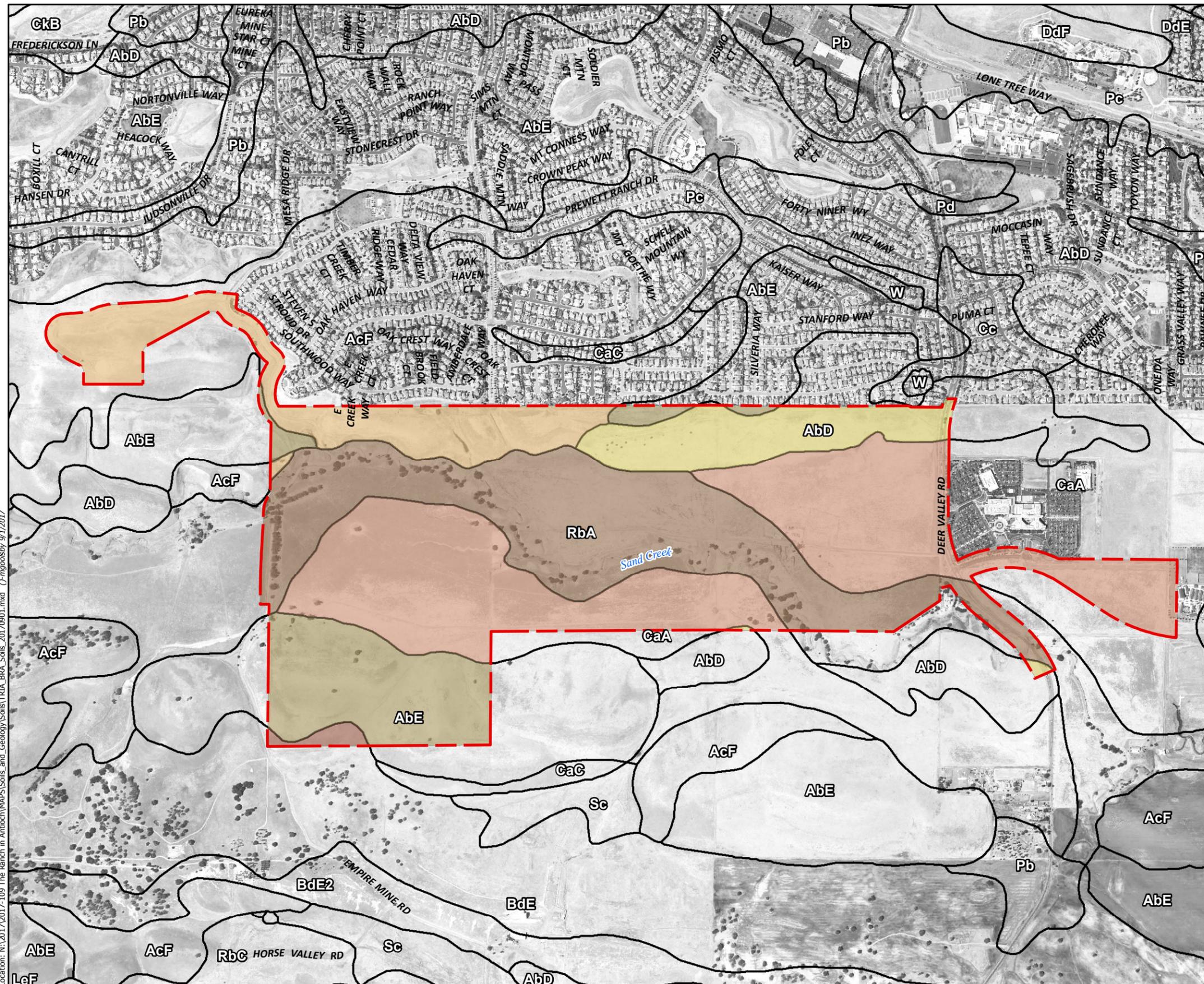
Wildlife species observed within the Study Area during the 2017 site visits include American crow (*Corvus brachyrhynchos*), American kestrel (*Falco sparverius*), killdeer (*Charadrius vociferus*), barn swallow (*Hirundo rustica*), western meadowlark (*Sturnella neglecta*), Bullock's oriole (*Icterus bullockii*), house finch (*Haemorhous mexicanus*), black phoebe (*Sayornis nigricans*), turkey vulture (*Cathartes aura*), and California ground squirrel (*Otospermophilus beecheyi*). A complete list of wildlife species observed within the Study Area during the 2017 site visits is provided as Attachment D.

4.5 Soils

According to the Web Soil Survey (NRCS 2017a), six soil units, or types, have been mapped within the Study Area (Figure 4. *Natural Resource Conservation Service Soil Types*):

- AbD – Altamont clay, 9 to 15 percent slopes
- AbE – Altamont clay, 15 to 30 percent slopes
- AcF – Altamont-Fontana complex, 30 to 50 percent slopes
- BdE – Briones loamy sand, 5 to 30 percent slopes
- CaA – Capay clay, 0 to 2 percent slopes
- RbA – Rincon clay loam, 0 to 2 percent slopes, MLRA 14

Figure 4. Natural Resources Conservation Service Soil Types



Map Features

Survey Boundary

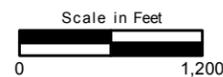
Series Number - Series Name

- AbD - Altamont clay, 9 to 15 percent slopes
- AbE - Altamont clay, 15 to 30 percent slopes
- AcF - Altamont-Fontana complex, 30 to 50 percent slopes
- BdE - Briones loamy sand, 5 to 30 percent slopes
- CaA - Capay clay, 0 to 2 percent slopes
- RbA - Rincon clay loam, 0 to 2 percent slopes, MLRA 14

Natural Resources Conservation Service (NRCS)
Soil Survey Geographic (SSURGO) Database for
Contra Costa County, CA



Location: N:\2017\2017-109 The Ranch in Antioch\Maps\Soils_and_Geology\Soils\TRIA_BRA_Soils_20170901.mxd (-)mgpoolsby 9/1/2017



Altamont clay, 15 to 30 percent slopes (AbE) is partially composed of the Clear Lake and Pescadero components, which are considered hydric when occurring in depressions and drainageways (NRCS 2017b). Altamont-Fontana complex, 30 to 50 percent slopes (AcF) is partially composed of the Pescadero component, which is considered hydric when occurring in depressions (NRCS 2017b). Capay clay, 0 to 2 percent slopes (CaA) is partially composed of the Marcuse component, which is considered hydric when occurring in depressions. None of the remaining soil types contain hydric components.

4.6 Potential Waters of the U.S.

4.6.1 Project Area

A jurisdictional delineation of Waters of the U.S. was conducted for the Project Area (Live Oak Associates, Inc. 2014; Attachment E), and an Approved Jurisdictional Determination was issued on 23 February 2016 (USACE 2016; Attachment F). Waters of the U.S. mapped within the Project Area include wetlands and other waters (See Table 2 and Figure 5. *Project Area Aquatic Resources*). A total of 3.948 acres of Waters of the U.S. were mapped within the Project Area. Jurisdictional wetlands consist of seasonal wetland pools and wetland seeps. Other jurisdictional waters include an intermittent tributary (Sand Creek), ephemeral tributaries, and impoundments. A total of 1.111 acres of non-jurisdictional, isolated waters and wetlands were also mapped within the Project Area. Non-jurisdictional wetlands within the Project Area include seasonal wetland pools and a wetland drainage. Other non-jurisdictional waters include ephemeral drainages. For further details regarding wetlands and other waters within the Project Area, see Attachments E and F.

Type	Acres ¹
Jurisdictional Waters	3.948
Wetlands	
Seasonal Wetland Pool	0.303
Wetland Seep	0.030
Other Waters	
Ephemeral Tributary (to Sand Creek)	0.340
Intermittent Tributary (Sand Creek)	1.901
Impoundment	1.372
Non-Jurisdictional Waters	1.111
Isolated Wetlands	
Wetland Drainage	0.286
Seasonal Wetland Pool	0.588
Non-Tributary Waters	
Ephemeral Drainage	0.132
Other Waters	
Non-Wetland Seasonal Pool	0.105
Total:	5.059

¹The individual acre amounts may not add up to the total acres due to rounding.

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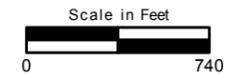
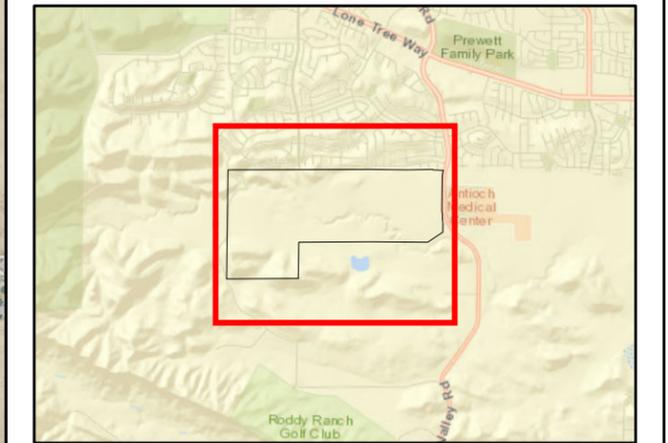


Figure 5. Project Area Aquatic Resources

- Map Features**
- Project Boundary - 550.8 acres
 - Jurisdictional Waters (3.948 acres) ¹ *
 - Wetlands (0.333 acres)
 - Seasonal Wetland Pool, Jurisdictional (0.303 acres)
 - Wetland Seep (0.030 acres)
 - Other Waters (3.613 acres)
 - Ephemeral Tributary (to Sand Creek) (0.340 acres)
 - Intermittent Tributary (Sand Creek) (1.901 acres)
 - Impoundment (1.372 acres)
 - Non-Jurisdictional Waters (1.111 acres) ¹ *
 - Non-Tributary Waters (0.132 acres)
 - Ephemeral Drainage (0.132 acres)
 - Isolated Wetlands (0.874 acres)
 - Wetland Drainage (0.286 acres)
 - Seasonal Wetland Pool, Non-Jurisdictional (0.588 acres)
 - Other Waters (0.105 acres)
 - Non-wetland Seasonal Pool (0.105 acres)

¹ The information depicted on this graphic represents a preliminary wetland assessment. The assessment was not conducted in accordance with the Corps of Engineers Wetland Delineation Manual and Sacramento District Minimum Standards. The project boundaries, wetland boundaries, and acreage values are approximate.
 * The acreage value for each feature has been rounded to the nearest 1/1000 decimal. Summation of these values may not equal the total potential Waters of the U.S. acreage reported.

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4.6.2 Offsite Infrastructure Areas

A jurisdictional delineation of Waters of the U.S. has not been conducted for the Offsite Infrastructure Areas. However, a preliminary wetland assessment was conducted for the Offsite Infrastructure Areas on August 22, 2017. Potential Waters of the U.S. mapped within the Offsite Infrastructure Areas include wetlands and other waters (See Table 3 and Figure 6a-c. *Offsite Infrastructure Areas Wetland Assessment*). A total of 0.692 acre of potential wetlands and other waters were mapped within the Offsite Infrastructure Areas. Wetlands and other waters include seasonal wetland, seasonal wetland swale, intermittent drainage, ephemeral drainage, ditch, and pond. These features are described below.

Type	Acres ¹
Wetlands	
Seasonal Wetland	0.141
Seasonal Wetland Swale	0.099
Other Waters	
Intermittent Drainage (Sand Creek)	0.135
Ephemeral Drainage	0.043
Ditch	0.041
Pond	0.233
Total	0.692

¹Acres represent a calculated estimation and are subject to modification following the USACE verification process.

Seasonal Wetland

Seasonal wetlands are ephemerally wet due to accumulation of surface runoff and rainwater within low-lying areas. Inundation periods tend to be relatively short and they are commonly dominated by nonnative annual and sometimes perennial hydrophytic species. Four seasonal wetlands occur within the eastern Offsite Infrastructure Area. These seasonal wetlands are shallow features dominated by Italian ryegrass and Mediterranean barley (*Hordeum marinum*).

Seasonal Wetland Swale

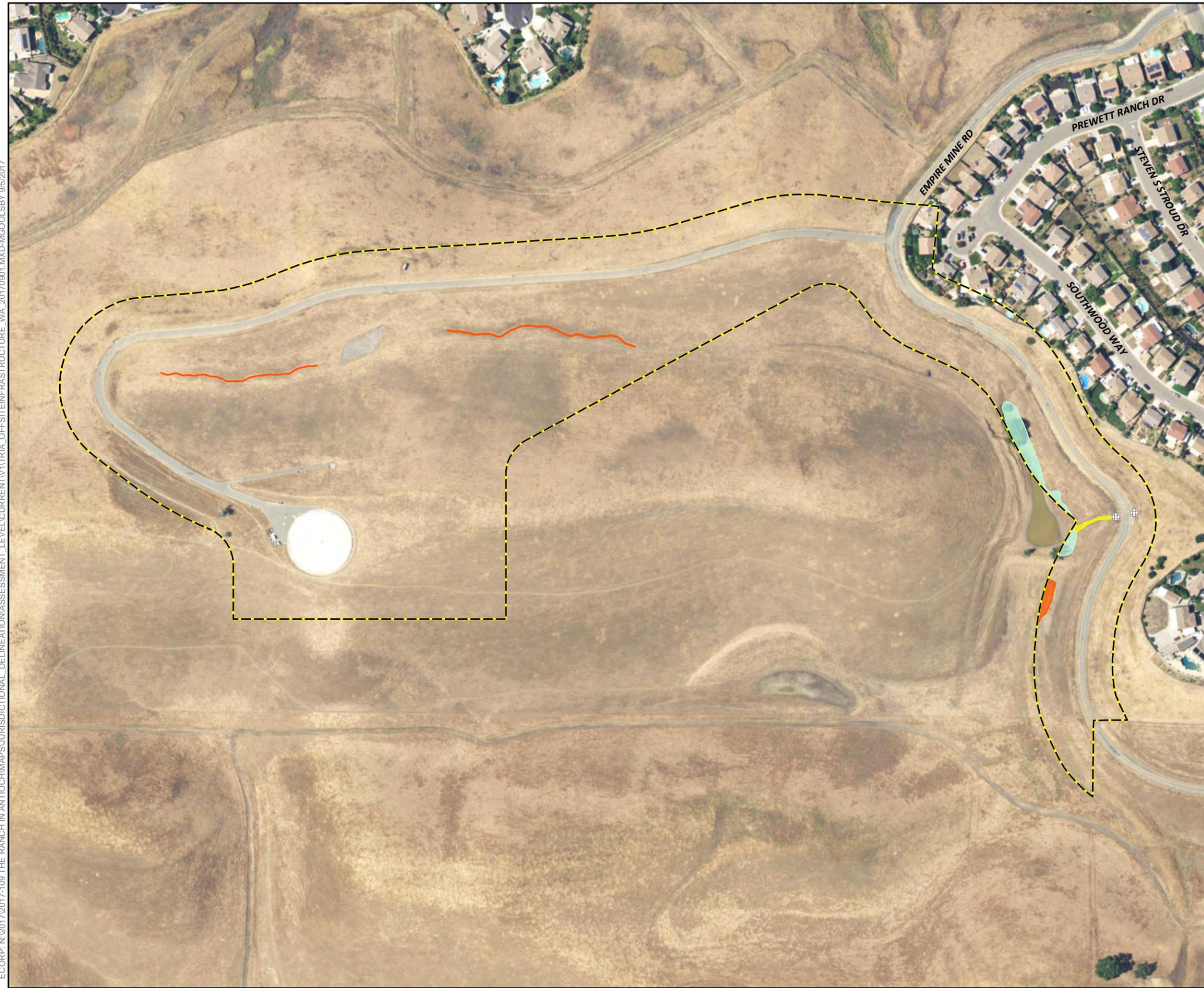
Seasonal wetland swales are generally linear wetland features that convey precipitation runoff and support a predominance of hydrophytic vegetation, but do not exhibit an ordinary high water mark (OHWM). These are typically inundated for short periods during and immediately after rain events, but usually maintain soil saturation for longer periods during the wet season. Three seasonal wetland swales occur in the northwestern Offsite Infrastructure Area. The two westernmost seasonal wetland swales occur in a steep drainage adjacent to the water tank, and are dominated by Italian ryegrass and soft brome. The easternmost seasonal wetland swale is a broad, low-gradient feature dominated by inland saltgrass (*Distichlis spicata*).

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Figure 6a. Offsite Infrastructure Areas Wetland Assessment

Map Features

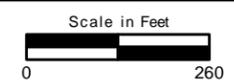
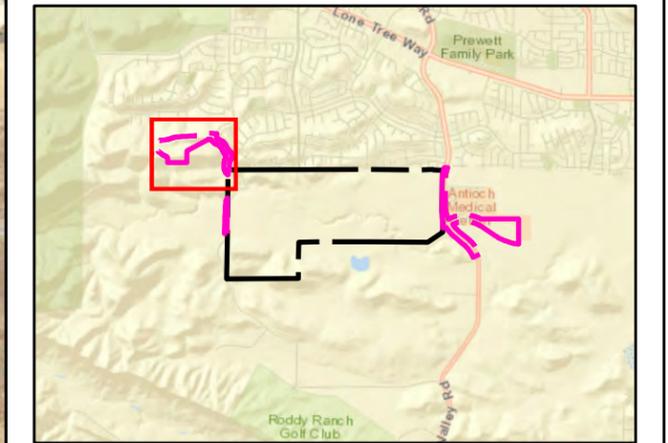
- Offsite Infrastructure Survey Areas - 81.1 acres
- Culvert
- Potential Waters of the U.S. (0.692 acres) ¹ ***
- Wetland (0.240 acres)**
 - Seasonal Wetland (0.141 acres)
 - Seasonal Wetland Swale (0.099 acres)
- Other Waters (0.452 acres)**
 - Intermittent Drainage (0.135 acres)
 - Ephemeral Drainage (0.043 acres)
 - Ditch (0.041 acres)
 - Pond (0.233 acres)



¹ The information depicted on this graphic represents a preliminary wetland assessment. The assessment was not conducted in accordance with the Corps of Engineers Wetland Delineation Manual and Sacramento District Minimum Standards. The project boundaries, wetland boundaries, and acreage values are approximate.

* The acreage value for each feature has been rounded to the nearest 1/1000 decimal. Summation of these values may not equal the total potential Waters of the U.S. acreage reported.

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Figure 6b. Offsite Infrastructure Areas Wetland Assessment

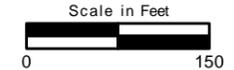
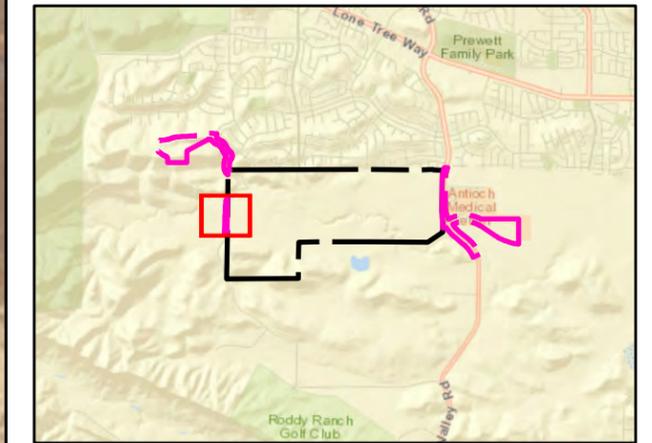
Map Features

- Offsite Infrastructure Survey Areas - 81.1 acres
 - Culvert
- Potential Waters of the U.S. (0.692 acres) ¹ *
- Wetland (0.240 acres)
- Seasonal Wetland (0.141 acres)
 - Seasonal Wetland Swale (0.099 acres)
- Other Waters (0.452 acres)
- Intermittent Drainage (0.135 acres)
 - Ephemeral Drainage (0.043 acres)
 - Ditch (0.041 acres)
 - Pond (0.233 acres)

¹ The information depicted on this graphic represents a preliminary wetland assessment. The assessment was not conducted in accordance with the Corps of Engineers Wetland Delineation Manual and Sacramento District Minimum Standards. The project boundaries, wetland boundaries, and acreage values are approximate.

* The acreage value for each feature has been rounded to the nearest 1/1000 decimal. Summation of these values may not equal the total potential Waters of the U.S. acreage reported.

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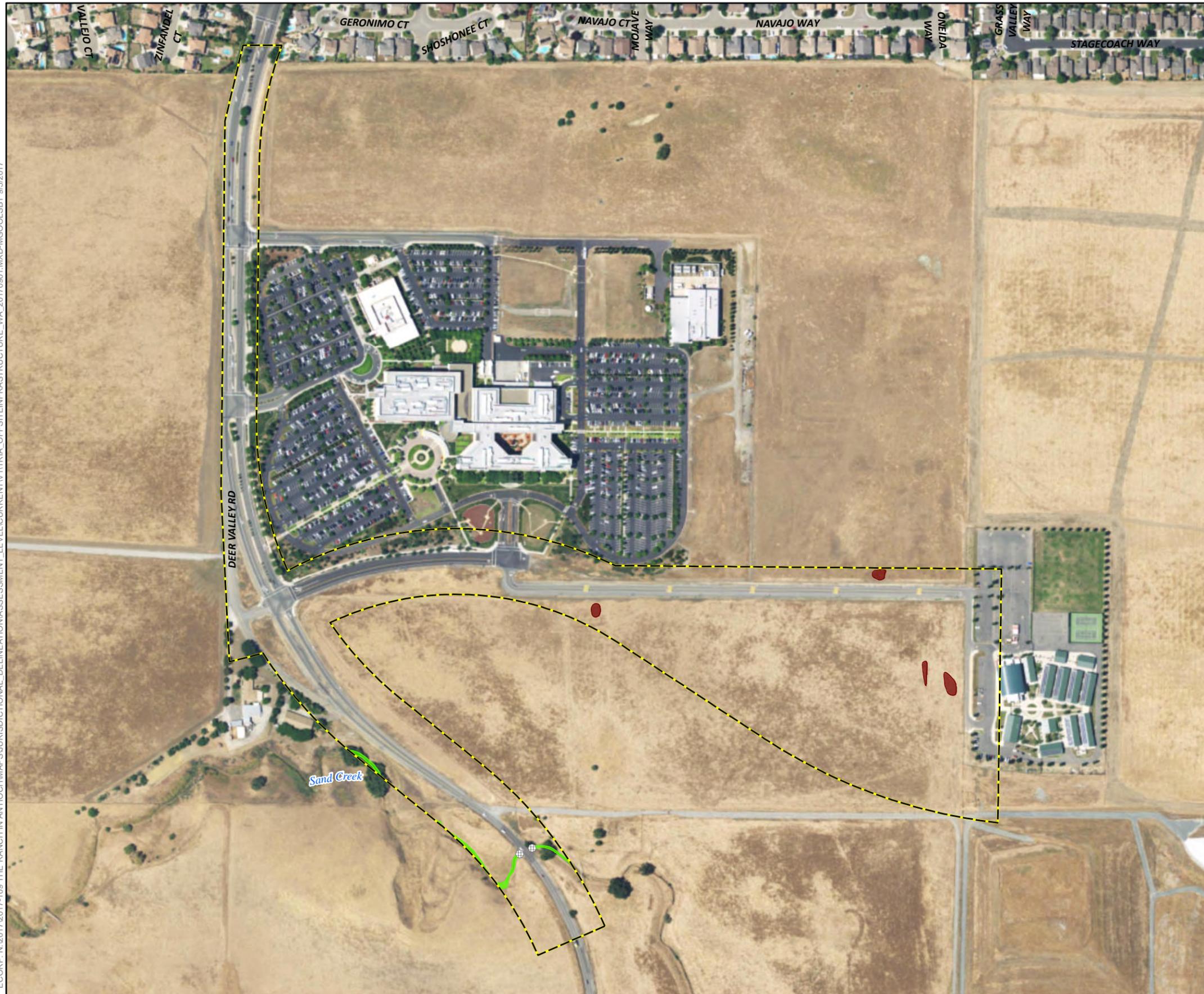


Figure 6c. Offsite Infrastructure Areas Wetland Assessment

Map Features

Offsite Infrastructure Survey Areas - 81.1 acres

Culvert

Potential Waters of the U.S. (0.692 acres) ¹ *

Wetland (0.240 acres)

Seasonal Wetland (0.141 acres)

Seasonal Wetland Swale (0.099 acres)

Other Waters (0.452 acres)

Intermittent Drainage (0.135 acres)

Ephemeral Drainage (0.043 acres)

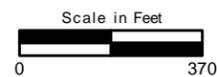
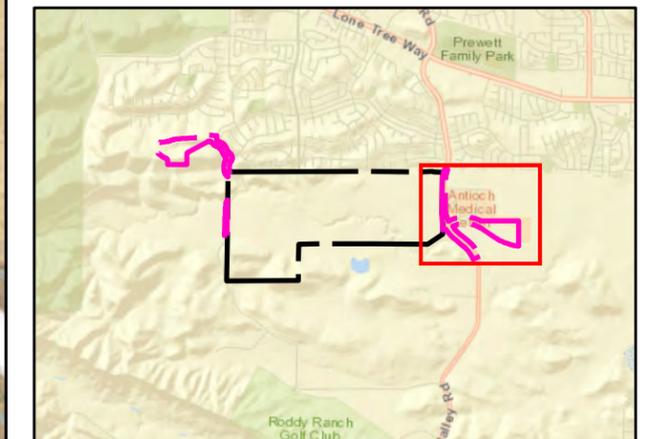
Ditch (0.041 acres)

Pond (0.233 acres)

¹ The information depicted on this graphic represents a preliminary wetland assessment. The assessment was not conducted in accordance with the Corps of Engineers Wetland Delineation Manual and Sacramento District Minimum Standards. The project boundaries, wetland boundaries, and acreage values are approximate.

* The acreage value for each feature has been rounded to the nearest 1/1000 decimal. Summation of these values may not equal the total potential Waters of the U.S. acreage reported.

Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community



Intermittent Drainage (Sand Creek)

Intermittent drainages are linear features that exhibit a bed and bank and an OHWM. Intermittent drainages differ from ephemeral drainages in that they flow for longer duration, typically weeks or months following rainfall events, and are often influenced by groundwater. This usually results in greater quantities and duration of flow relative to ephemeral drainages. One intermittent drainage, Sand Creek, occurs in the southeastern Offsite Infrastructure Area. Sand Creek is a highly incised intermittent drainage with steep banks and an unvegetated bed.

Ephemeral Drainage

Ephemeral drainages are linear features that exhibit a bed and bank and an OHWM. These features typically convey runoff for short periods of time, during and immediately following rain events, and are not influenced by groundwater sources at any time during the year. Ephemeral drainages occur in the two westernmost Offsite Infrastructure Areas. These features are sparsely vegetated. Vegetated portions of ephemeral drainages within the Offsite Infrastructure Area are dominated by alkali mallow (*Malvella leprosa*).

Ditch

Ditches are linear features constructed to convey storm water and/or irrigation water. One ditch occurs within the southwestern Offsite Infrastructure Area adjacent to Empire Mine Road. This feature is a maintained roadside drainage ditch with an unvegetated bed.

4.7 Evaluation of Potentially Occurring Special-Status Species

A list of all of the plant and wildlife species identified in the literature search as potentially occurring within the Project Area and/or Offsite Infrastructure Areas is provided in Table 4. Included in this table are the listing status for each species, a brief habitat description, and a determination on the potential to occur in the Project Area and Offsite Infrastructure Areas. Following the table is a brief description of each species.

Several species and sensitive habitat types came up in the database and literature searches (Attachment B) but are not included in Table 4. These species and habitat types were not included in Table 4 because the species have been formally delisted or are only tracked by the CNDDDB and possess no special-status, or because the identified sensitive habitats are not located within the Project Area and Offsite Infrastructure Areas. They are not discussed further in this report.

Table 4. Potentially Occurring Special-Status Species						
Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Plants						
Large-flowered fiddleneck <i>(Amsinckia grandiflora)</i>	FE	CE	1B.1	Cismontane woodland and valley and foothill grasslands (886' - 1,804').	March – May	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.
California androsace <i>(Androsace elongata ssp. acuta)</i>	-	-	4.2	Chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, and valley and foothill grassland (492' – 4,281).	March – June	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.
Slender silver moss <i>(Anomobryum julaceum)</i>	-	-	4.2	Damp rock and soil on outcrops, usually on road cuts in broadleaved upland forest, lower montane coniferous forest, and North Coast coniferous forest (328' – 3,281').	Any Season	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Coast rockcress <i>(Arabis blepharophylla)</i>	-	-	4.3	Rocky soils in broadleaved upland forest, coastal bluff scrub, coastal prairie, and coastal scrub (10' – 3,609').	February – May	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Mt. Diablo manzanita <i>(Arctostaphylos auriculata)</i>	-	-	1B.3	Sandstone chaparral and cismontane woodland (443' – 2,133').	January – March	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Contra Costa manzanita <i>(Arctostaphylos manzanita ssp. laevigata)</i>	-	-	1B.2	Rocky soils in chaparral (1,410' – 3,609').	January – April	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Alkali Milk-Vetch <i>(Astragalus tener var. tener)</i>	-	-	1B.2	Playas, mesic areas within valley and foothill grasslands, and alkaline vernal pools (3' – 197').	March – June	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.
Heartscale <i>(Atriplex cordulata var. cordulata)</i>	-	-	1B.2	Alkaline or saline valley and foothill grasslands, meadows and seeps, and chenopod scrub communities (0' – 1,837').	April – October	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Crownscale <i>(Atriplex coronata var. coronata)</i>	-	-	4.2	Alkaline, often clay, substrates in chenopod scrub, valley and foothill grassland, and vernal pools (3' – 1,936').	March – October	Present/Potential to Occur. This species was identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.
Brittlescale <i>(Atriplex depressa)</i>	-	-	1B.2	Chenopod scrub, meadows and seeps, playas, valley and foothill grasslands, and vernal pools, and is typically found on alkaline clay soils (3' – 1,050').	April – October	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.
Big tarplant <i>(Blepharizonia plumosa)</i>	-	-	1B.1	Valley and foothill grassland (98' – 1,657').	July – October	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (2015); this species has potential to occur within the Offsite Infrastructure Areas.
Brewer's calandrinia <i>(Calandrinia breweri)</i>	-	-	4.2	Sandy or loamy soils disturbed sites and burns within chaparral and coastal scrub (33' – 4,003').	January – June	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Round-Leaved filaree <i>(California macrophylla)</i>	-	-	1B.2	Clay soils in cismontane woodland and valley and foothill grassland communities. (49' – 3,937').	March – May	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Mt. Diablo fairy-lantern <i>(Calochortus pulchellus)</i>	-	-	1B.2	Chaparral, cismontane woodland, riparian woodland, and valley and foothill grassland (98' – 2,756').	April – June	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.
Oakland star-tulip <i>(Calochortus umbellatus)</i>	-	-	4.2	Often serpentinite substrates in broadleaved upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland (328' – 2,297').	March – May	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.
Chaparral harebell <i>(Campanula exigua)</i>	-	-	1B.2	Chaparral on rocky, usually serpentinite substrates (902' – 4,101').	May – June	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Congdon's Tarplant <i>(Centromadia parryi ssp. congdonii)</i>	-	-	1B.1	Valley and foothill grassland with alkaline soils (0' – 755').	May – November	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/NPPA	Other Status			
Soft bird's-beak <i>(Chloropyron molle</i> ssp. <i>molle)</i>	FE	CR	1B.2	Coastal salt marshes and swamps (0' – 10').	June – November	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Bolander's water-hemlock <i>(Cicuta maculata</i> var. <i>bolanderi)</i>	-	-	2B.1	Coastal, fresh, or brackish marshes and swamps (0' – 656').	July – September	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Serpentine collomia <i>(Collomia diversifolia)</i>	-	-	4.3	Serpentinite, rocky, or gravelly substrates in chaparral and cismontane woodland (656' – 1,969').	May – June	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Small-flowering morning-glory <i>(Convolvulus simulans)</i>	-	-	4.2	Clay, serpentinite seeps within chaparral, coastal scrub, and valley and foothill grassland (98' – 2,428').	March – July	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Mt. Diablo bird's-beak <i>(Cordylanthus nidularius)</i>	-	CR	1B.1	Serpentinite substrates in chaparral (1,969' – 2,625').	June – August	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Hoover's cryptantha <i>(Cryptantha hooveri)</i>	-	-	1A	Inland dunes, sandy substrates in valley and foothill grassland (30' – 492').	April – May	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.
Hospital Canyon larkspur <i>(Delphinium californicum ssp. interius)</i>	-	-	1B.2	Openings in chaparral, mesic areas in cismontane woodland, and coastal scrub (640' – 3,593').	April – June	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Recurved larkspur <i>(Delphinium recurvatum)</i>	-	-	1B.2	Alkaline soils within chenopod scrub, cismontane woodland, and valley and foothill grasslands (10' – 2,592').	March – June	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/NPPA	Other Status			
Western leatherwood <i>(Dirca occidentalis)</i>	-	-	1B.2	Mesic areas in broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, North Coast coniferous forest, riparian forest, and riparian woodland (82' – 1,394').	January – March (April)	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Dwarf downingia <i>(Downingia pusilla)</i>	-	-	2B.2	Mesic areas in valley and foothill grassland, and vernal pools. Species appears to have an affinity for slight disturbance (i.e., scraped depressions, ditches, etc.) (Baldwin et al. 2012) (3' – 1,460').	March – May	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.
Lime Ridge eriastrum <i>(Eriastrum erlterae)</i>	-	-	1B.1	Alkaline or semi-alkaline, sandy substrates in openings or along the edges of chaparral (656' – 951').	June – July	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Antioch Dunes buckwheat <i>(Eriogonum nudum var. psychicola)</i>	-	-	1B.1	Inland dunes (0' – 66').	July – October	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Mt. Diablo buckwheat <i>(Eriogonum truncatum)</i>	-	-	1B.1	Sandy soils in chaparral, coastal scrub, valley and foothill grassland (10' – 1,148').	April – September	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.
Jepson's woolly sunflower <i>(Eriophyllum jepsonii)</i>	-	-	4.3	Chaparral, cismontane woodland, and coastal scrub, sometimes on serpentinite (656' – 3,363').	April – June	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Jepson's coyote thistle <i>(Eryngium jepsonii)</i>	-	-	1B.2	Clay soils of valley and foothill grassland, and vernal pools (10' – 9,842').	April – August	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.
Spiny-sepaled button-celery <i>(Eryngium spinosepalum)</i>	-	-	1B.2	Vernal pools and valley and foothill grassland (262' – 3,199').	April – June	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Contra Costa wallflower <i>(Erysimum capitatum var. angustatum)</i>	FE	CE	1B.1	Inland dunes (10' – 66').	March – July	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Diamond-petaled California poppy <i>(Eschscholzia rhombipetala)</i>	-	-	1B.1	Valley and foothill grassland in alkaline and clay soils (0' – 3,199').	March – April	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.
San Joaquin spearscale <i>(Extriplex joaquinana)</i>	-	-	1B.2	Alkaline soils in chenopod scrub, meadows seeps, playas, and valley and foothill grassland (3' – 2,740').	April – October	Present/Potential to Occur. This species was identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.
Stinkbells <i>(Fritillaria agrestis)</i>	-	-	4.2	Clay and sometimes serpentinite soils in chaparral, cismontane woodland, Pinyon and juniper woodland, and valley and foothill grassland (33' – 5,102').	March – June	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/NPPA	Other Status			
Fragrant fritillary <i>(Fritillaria liliaceae)</i>	-	-	1B.2	Cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grassland, often on serpentinite substrates (10' – 1,345').	February – April	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.
Phlox-leaf serpentine bedstraw <i>(Galium andrewsii</i> ssp. <i>gatense)</i>	-	-	4.2	Serpentinite, rocky soils in chaparral, cismontane woodland, lower montane coniferous forest (492'– 4,757').	April – July	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Toren's grimmia <i>(Grimmia torenii)</i>	-	-	1B.3	Openings, rocky substrates, boulder and rock walls, carbonate substrates, and volcanic substrates in chaparral, cismontane woodland, and lower montane coniferous forest (1,066' – 3,806').	Any Season	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Diablo helianthella <i>(Helianthella castanea)</i>	-	-	1B.2	Usually rocky, axonal soils in broadleaved upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland, often in partial shade (197' – 4,265').	March – June	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/NPPA	Other Status			
Hogwallow starfish <i>(Hesperovax caulescens)</i>	-	-	4.2	Mesic areas with clay and sometimes alkaline soils within valley and foothill grassland and shallow vernal pools (0' - 1,657').	March – June	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.
Brewer's western flax <i>(Hesperolinon breweri)</i>	-	-	1B.2	Usually in serpentinite soils of chaparral, cismontane woodland, and valley and foothill grassland (98' – 3,100').	May – July	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.
Woolly rose-mallow <i>(Hibiscus lasiocarpus var. occidentalis)</i>	-	-	1B.2	Marshes and freshwater swamps (0' – 394').	June – September	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Carquinez goldenbush <i>(Isocoma arguta)</i>	-	-	1B.1	Alkaline soils in valley and foothill grasslands (3' – 66').	August – December	Low Potential to Occur/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); however, this species' bloom period falls outside of M&A's survey dates; therefore, this species has low potential to occur within the Study Area.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/NPPA	Other Status			
Contra Costa Goldfields <i>(Lasthenia conjugens)</i>	FE	-	1B.1	Mesic sites within cismontane woodland, playas with alkaline soils, valley and foothill grassland and vernal pools (0' – 1,542').	March – June	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.
Delta tule pea <i>(Lathyrus jepsonii var. jepsonii)</i>	-	-	1B.2	Freshwater and brackish marshes and swamps (0' – 17').	May – September	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Mason's lilaepsis <i>(Lilaeopsis masonii)</i>	-	CR	1B.1	Brackish or freshwater marshes or swamps and riparian scrub (0' – 33').	April – November	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Delta mudwort <i>(Limosella australis)</i>	-	-	2B.1	Usually mud banks in freshwater or brackish marshes and swamps and riparian scrub (0' – 10').	May – August	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Showy golden madia <i>(Madia radiata)</i>	-	-	1B.1	Cismontane woodland and valley and foothill grassland (82' – 3,986').	March – May	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.
Hall's bush-mallow <i>(Malacothamnus hallii)</i>	-	-	1B.2	Chaparral, coastal scrub (32' – 2,493').	May – October	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
San Antonio Hills monardella <i>(Monardella antonina</i> ssp. <i>antonina)</i>	-	-	3	Chaparral, cismontane woodland (1,050' – 3,281').	June – August	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Woodland woollythreads <i>(Monolopia gracilens)</i>	-	-	1B.2	Serpentinite substrates in openings in broadleaved upland forest and chaparral, cismontane woodland, openings in North Coast coniferous forest, and valley and foothill grassland (328' – 3,937').	(February) March – July	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Lime Ridge navarretia <i>(Navarretia gowenii)</i>	-	-	1B.1	Chaparral (591' – 1,001').	May – June	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Tehama navarretia <i>(Navarretia heterandra)</i>	-	-	4.3	Mesic areas in valley and foothill grassland and vernal pools (98' – 3,314').	April – June	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.
Adobe navarretia <i>(Navarretia nigelliformis ssp. nigelliformis)</i>	-	-	4.2	Clay and sometimes serpentinite soils in vernal mesic valley and foothill grasslands and sometimes in vernal pools (328' – 3,281').	April – June	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.
Shining navarretia <i>(Navarretia nigelliformis ssp. radians)</i>	-	-	1B.2	Vernal pools, cismontane woodland, and valley and foothill grassland (249' – 3,281').	April – July	Present/Potential to Occur. This species was identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/NPPA	Other Status			
Colusa Grass <i>(Neostapfia colusana)</i>	FT	CE	1B.1	Large vernal pools with adobe soils (16' – 656').	May – August	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Antioch Dunes evening-primrose <i>(Oenothera deltoides ssp. howellii)</i>	FE	CE	1B.1	Inland dunes (0' – 98').	March – September	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Mt. Diablo phacelia <i>(Phacelia phacelioides)</i>	-	-	1B.2	Rocky substrates in chaparral and cismontane woodland (1,640' – 4,495').	April – May	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Bearded popcornflower <i>(Plagiobothrys hystriculus)</i>	-	-	1B.1	Often in vernal swales, and in mesic areas of valley and foothill grassland and vernal pool margins (0' – 899').	April – May	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Eel-grass pondweed <i>(Potamogeton zosteriformis)</i>	-	-	2B.2	Assorted freshwater marshes and swamps (0' – 6,102').	June – July	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
California alkali grass <i>(Puccinellia simplex)</i>	-	-	1B.2	Alkaline, vernal mesic areas in sinks, flats and lake margins in chenopod scrub, meadows and seeps, valley and foothill grassland, and vernal pools (7' – 3,051').	March – May	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.
Lobb's aquatic buttercup <i>(Ranunculus lobbii)</i>	-	-	4.2	Mesic areas of cismontane woodland, North Coast coniferous forest, valley and foothill grassland, and vernal pools (49' – 1,542').	February – May	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.
Rock sanicle <i>(Sanicula saxatilis)</i>	-	CR	1B.2	Rocky, scree, and talus substrates in broadleaved upland forest, chaparral, and valley and foothill grassland (2,034' – 3,855').	April – May	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/NPPA	Other Status			
Chaparral ragwort <i>(Senecio aphanactis)</i>	-	-	2B.2	Sometimes alkaline soils in chaparral, cismontane woodland, coastal scrub (49' – 2,625').	January – April	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Sweet marsh ragwort <i>(Senecio hydrophiloides)</i>	-	-	4.2	Mesic areas in lower montane coniferous forest and meadows and seeps (0' – 9,186').	May – August	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Keck's checkerbloom <i>(Sidalcea keckii)</i>	FE	-	1B.1	Serpentinite clay soils within cismontane woodland and valley and foothill grasslands (246' – 2,133').	April – June	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.
Most beautiful jewelflower <i>(Streptanthus albidus ssp. peramoenus)</i>	-	-	1B.2	Serpentinite soils in chaparral, cismontane woodland, and valley and foothill grassland (312' – 3,281').	April – September	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/NPPA	Other Status			
Mt. Diablo jewelflower <i>(Streptanthus hispidus)</i>	-	-	1B.3	Rocky soils in chaparral and valley and foothill grassland (1,198' – 3,937').	March – June	Absent/Low Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has low potential to occur within the Offsite Infrastructure Areas.
Slender-leaved pondweed <i>(Stuckenia filiformis ssp. alpina)</i>	-	-	2B.2	Assorted shallow freshwater marshes and swamps (984' – 7,054').	May – July	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Suisun marsh aster <i>(Symphyotrichum lentum)</i>	-	-	1B.2	Brackish and freshwater marshes and swamps (0' – 10').	April – November	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Coastal triquetrella <i>(Triquetrella californica)</i>	-	-	1B.2	Soil in coastal bluff scrub and coastal scrub (33' – 328').	Any Season	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/NPPA	Other Status			
Caper-fruited tropidocarpum <i>(Tropidocarpum capparideum)</i>	-	-	1B.1	Alkaline hills in valley and foothill grassland (3' – 1,493').	March – April	Absent/Potential to Occur. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); this species has potential to occur within the Offsite Infrastructure Areas.
Oval-leaved viburnum <i>(Viburnum ellipticum)</i>	-	-	2B.3	Chaparral, cismontane woodland, and lower montane coniferous forest communities (705' – 4,593').	May – June	Absent/Absent. This species was not identified within the Project Area during protocol-level rare plant surveys conducted by M&A (M&A 2015); suitable habitat for this species does not occur within the Project Area or Offsite Infrastructure Areas.
Invertebrates						
Conservancy fairy shrimp <i>(Branchinecta conservatio)</i>	FE	-	-	Vernal pools/wetlands	November – April	Absent/Absent. This species has a highly restricted range and is not known from within 10 miles of the Study Area.
Lange's metalmark butterfly <i>(Apodemia mormo langei)</i>	FE	-	-	Requires specific sand dune habitat that is found only in Antioch Dunes National Wildlife Refuge. It is reliant on a specific subspecies of naked buckwheat for its diet as well as reproduction.	Late summer	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
Longhorn fairy shrimp <i>(Branchinecta longiantenna)</i>	FE	-	-	Vernal pools/wetlands.	November – April	Absent/Absent. This species has a highly restricted range and is not known from within 10 miles of the Study Area.
San Bruno elfin butterfly <i>(Callophrys mossii bayensis)</i>	FE	-	-	Inhabits rocky outcrops and cliffs in coastal scrub on the San Francisco peninsula.	Late February – mid-April	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/NPPA	Other Status			
Valley elderberry longhorn beetle <i>(Desmocerus californicus dimorphus)</i>	FT, FPD	-	-	Elderberry shrubs	Any Season	Potential to Occur/Absent. Suitable habitat for this species occurs within the Project Area, as one elderberry shrub was identified along Sand Creek during the site assessments; suitable habitat for this species does not occur within the Offsite Infrastructure Areas, as no elderberry shrubs were identified during the site assessments.
Vernal pool fairy shrimp <i>(Branchinecta lynchi)</i>	FT	-	-	Vernal pools/wetlands	November – April	Present/Potential to Occur. There is a CNDDDB-documented occurrence of this species within the Project Area (CDFW 2017) suitable habitat for this species occurs within the Offsite Infrastructure Areas.
Vernal pool tadpole shrimp <i>(Lepidurus packardii)</i>	FE	-	-	Vernal pools/wetlands	November – April	Present/Potential to Occur. There is a CNDDDB-documented occurrence of this species within the Project Area (CDFW 2017); suitable habitat for this species occurs within the Offsite Infrastructure Areas.
Fish						
Chinook salmon (Central Valley fall/late fall-run ESU) <i>(Oncorhynchus tshawytscha)</i>	-	-	SSC	Undammed rivers, streams, creeks.	N/A	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
Delta smelt <i>(Hypomesus transpacificus)</i>	FT	CE	-	Sac-San Joaquin delta	N/A	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
Longfin smelt <i>(Spirinchus thaleichthys)</i>	FC	CT	SSC	Freshwater and seawater estuaries.	N/A	Absent/Absent. Suitable habitat for this species does not occur within the Study Area; the Study Area is outside of the known range of this species (CDFW 2017).

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/NPPA	Other Status			
Sacramento perch <i>(Archoplites interruptus)</i>	-	-	SSC	Ponds, rivers, backwaters, and lakes	N/A	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
Steelhead (CA Central Valley ESU) <i>(Oncorhynchus mykiss)</i>	FT	-	-	Undammed rivers, streams, creeks.	N/A	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
Amphibians						
California red-legged frog <i>(Rana draytonii)</i>	FT	-	SSC	Lowlands or foothills at waters with dense shrubby or emergent riparian vegetation. Adults must have aestivation habitat to endure summer dry down.	May 1 – November 1	Present/Present. There is a CNDDDB-documented occurrence of this species located partially within the Project Area and partially within the Offsite Infrastructure Areas (CDFW 2017). Suitable habitat for this species occurs within the Study Area.
California tiger salamander (Central California DPS) <i>(Ambystoma californiense)</i>	FT	CT	SSC	Vernal pools, wetlands (breeding) and adjacent grassland or oak woodland; needs underground refuge (e.g., ground squirrel and/or gopher burrows). Largely terrestrial as adults.	March – May	Present/Present. There is a CNDDDB-documented occurrence of this species located partially within the Project Area and partially within the Offsite Infrastructure Areas (CDFW 2017). Suitable habitat for this species occurs within the Study Area.
Foothill yellow-legged frog <i>(Rana boylei)</i>	-	CC	SSC	Foothill yellow-legged frogs can be active all year in warmer locations, but may become inactive or hibernate in colder climates. At lower elevations, foothill yellow-legged frogs likely spend most of the year in or near streams. Adult frogs, primarily males, will gather along main-stem rivers during spring to breed.	May – October	Low Potential to Occur/Low Potential to Occur. Suitable habitat for this species occurs within the Study Area.

Table 4. Potentially Occurring Special-Status Species						
Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Reptiles						
Alameda whipsnake <i>(Masticophis lateralis euryxanthus)</i>	FT	CT	-	Occurs in coastal scrub and chaparral communities, but also forages in a variety of other communities in the inner Coast Range, including grasslands and open woodlands. Rock outcrops with deep crevices or abundant rodent burrows are important habitat components.	March – October	Low Potential to Occur/Low Potential to Occur. Suitable dispersal habitat for this species occurs within the Study Area.
Blainville's ("Coast") horned lizard <i>(Phrynosoma blainvillii)</i>	-	-	SSC	Formerly a wide-spread horned lizard found in a wide variety of habitats, often in lower elevation areas with sandy washes and scattered low bushes. Also occurs in Sierra Nevada foothills. Requires open areas for basking, but with bushes or grass clumps for cover, patches of loamy soil or sand for burrowing and an abundance of ants (Stebbins and McGinnis 2012). In the northern Sacramento area, this species appears restricted to the foothills between 1000 to 3000 feet from Cameron Park (El Dorado County) north and west to Grass Valley and Nevada City.	April – October	Low Potential to Occur/Low Potential to Occur. Marginally suitable habitat for this species occurs within the Study Area.
California glossy snake <i>(Arizona elegans occidentalis)</i>	-	-	SSC	Occurs from the eastern part of the San Francisco Bay Area south to northwestern Baja California. Inhabits arid scrub, rocky washes, grasslands, and chaparral Stebbins and McGinnis 2012)	Any Season	Absent/Absent. The Study Area is outside of the known range of this species.
Giant garter snake <i>(Thamnophis gigas)</i>	FT	CT	-	Freshwater ditches, sloughs, and marshes in the Central Valley. Almost extirpated from the southern parts of its range.	April – October	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Northwestern pond turtle <i>(Actinemys marmorata)</i>	-	-	SSC	Requires basking sites and upland habitats up to 0.5 km from water for egg laying. Uses ponds, streams, detention basins, and irrigation ditches.	Any Season	Potential to Occur/Potential to Occur. Suitable habitat for this species occurs within the Study Area.
Silvery legless lizard <i>(Anniella pulchra pulchra)</i>	-	-	SSC	Occurs in sandy or loose soils under sparse vegetation from Antioch south coastally and inland to Baja California. Bush lupine is often an indicator plant.	Any Season	Low Potential to Occur/Low Potential to Occur. Marginally suitable habitat for this species occurs within the Study Area.
San Joaquin coachwhip <i>(Masticophis flagellum ruddocki)</i>	-	-	SSC	Occurs in open, dry, usually flat habitats in valley Grassland and Saltbush Scrub with little to no shrub cover in the San Joaquin Valley. A dietary generalist.	March – October	Absent/Absent. The Study Area is outside of the known range of this species.
Birds						
American peregrine falcon (nesting) <i>(Falco peregrinus anatum)</i>	De-listed	De-listed	BCC, CFP	In California, breeds in coastal region, northern California, and Sierra Nevada. Nesting habitat includes cliff ledges and human-made ledges on towers and buildings. Wintering habitat includes areas where there are large concentrations of shorebirds, waterfowl, pigeons or doves.	CA Residents nest in February-June	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
Bank swallow (nesting) <i>(Riparia riparia)</i>	-	CT	-	Nests colonially along coasts, rivers, streams, lakes, reservoirs, and wetlands in vertical banks, cliffs, and bluffs in alluvial, friable soils. May also nest in sand, gravel quarries and road cuts. In California, breeding range includes northern and central California.	May – July	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.

Table 4. Potentially Occurring Special-Status Species

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Burrowing owl (burrow sites) <i>(Athene cunicularia)</i>	-	-	BCC, SSC	Nests in burrows or burrow surrogates in open, treeless, areas within grassland, steppe, and desert biomes. Often with other burrowing mammals (e.g. prairie dogs, California ground squirrels). May also use human-made habitat such as agricultural fields, golf courses, cemeteries, roadside, airports, vacant urban lots, and fairgrounds.	February – August	Present/Potential to Occur. This species was observed within the Project Area by M&A biologists during the fall and winter months from 2013 to 2015 (M&A 2015). Suitable habitat for this species occurs within the Offsite Infrastructure Areas.
California black rail <i>(Laterallus jamaicensis coturniculus)</i>	-	CT	BCC, CFP	Salt marsh, shallow freshwater marsh, wet meadows, and flooded grassy vegetation. In California, primarily found in coastal and Bay-Delta communities, but also in Sierran foothills (Butte, Yuba, Nevada, Placer counties)	March – September (breeding)	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
California horned lark <i>(Eremophila alpestris actia)</i>	-	-	WL	San Joaquin Valley, coast range from Sonoma County south to Baja California; grassland, agricultural	March – July	Potential to Occur/Potential to Occur. Suitable habitat for this species occurs within the Study Area.
California least tern (nesting colony) <i>(Sternula antillarum browni)</i>	FE	CE	CFP	Nests along Pacific Coast from San Francisco Bay south the Mexico; nests colonially, on sand or dried mudflats, sand or shell islands, and gravel and sand pits and rarely in agricultural fields, parking lots, airports, and flat/graveled rooftops.	April – August	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
Double-crested cormorant (nesting colony) <i>(Phalacrocorax auritus)</i>	-	-	WL	Nests near ponds, lakes, artificial impoundments, slow-moving rivers, lagoons, estuaries, and open coastlines and typically forages in shallow water. Non-nesters are found in many coastal and inland waters.	April – August	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/NPPA	Other Status			
Ferruginous hawk (wintering) <i>(Buteo regalis)</i>	-	-	BCC, WL	Rarely breeds in California (Lassen County); winter range includes grassland and shrubsteppe habitats from Northern California (except northeast and northwest corners) south to Mexico and east to Oklahoma, Nebraska, and Texas.	September – March	Potential to Occur/Potential to Occur. Suitable wintering habitat for this species occurs within the Study Area. The Study Area is outside of the nesting range of this species.
Golden eagle (nesting and wintering) <i>(Aquila chrysaetos)</i>	-	-	BCC, CFP	Nesting habitat includes mountainous canyon land, rimrock terrain of open desert and grasslands, riparian, oak woodland/savannah, and chaparral. Nesting occurs on cliff ledges, river banks, trees, and human-made structures (e.g. windmills, platforms, and transmission towers). Breeding occurs throughout California, except the immediate coast, Central Valley floor, Salton Sea region, and the Colorado River region, where they can be found during Winter.	Nest (February – August); winter CV (October – February)	Potential to Occur/Potential to Occur. Suitable habitat for this species occurs within the Study Area.
Grasshopper sparrow <i>(Ammodramus savannarum)</i>	-	-	SSC	In California, breeding range includes most coastal counties south to Baja California; western Sacramento Valley and western edge of Sierra Nevada region. Nests in moderately open grasslands and prairies with patchy bare ground. Avoids grasslands with extensive shrub cover; more likely to occupy large tracts of habitat than small fragments; removal of grass cover by grazing often detrimental.	May – August	Potential to Occur/Potential to Occur. Suitable habitat for this species occurs within the Study Area.

Table 4. Potentially Occurring Special-Status Species

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/NPPA	Other Status			
Loggerhead shrike <i>(Lanius ludovicianus)</i>	-	-	BCC, SSC	Found throughout California in open county with short vegetation, pastures, old orchards, grasslands, agricultural areas, open woodlands. Not found in heavily forested habitats.	March – July	Potential to Occur/Potential to Occur. Suitable habitat for this species occurs within the Study Area.
Northern harrier (nesting) <i>(Circus hudsonicus)</i>	-	-	SSC	Nests on the ground in open wetlands, marshy meadows, wet/lightly grazed pastures, (rarely) freshwater/brackish marshes, tundra, grasslands, prairies, croplands, desert, shrub-steppe, and (rarely) riparian woodland communities.	April – September	Potential to Occur/Potential to Occur. Suitable habitat for this species occurs within the Study Area.
Prairie falcon (nesting) <i>(Falco mexicanus)</i>	-	-	BCC, WL	Found in open habitat at all elevations up to 3,350 meters (Steenhof 2013). Nests on cliffs and bluffs in arid plains and steppes; In California, nesting throughout state except northwest corner, along immediate coast, and the Central Valley floor. Winters throughout California, in open habitats, such as grasslands in Central Valley.	March – July (breeding); September – February (wintering in Central Valley)	Present/Present. This species was observed foraging within the Study Area by ECORP biologists in 2017. Suitable wintering habitat for this species occurs within the Study Area. No suitable nesting habitat occurs within the Study Area.
Ridgway's rail (California clapper rail) <i>(Rallus obsoletus obsoletus)</i>	FE	CE	CFP	San Francisco and San Pablo Bay tidal marshes, sloughs, with pickleweed (<i>Salicornia</i> spp.), cordgrass (<i>Spartina</i> spp.), and gum plant (<i>Grindelia</i> spp.).	March – August	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
Saltmarsh common yellowthroat <i>(Geothlypis trichas sinuosa)</i>	-	-	BCC, SSC	Breeds in salt marshes of San Francisco Bay; winters San Francisco south along coast to San Diego County.	March – July	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
Short-eared owl (nesting) <i>(Asio flammeus)</i>	-	-	SSC	Nests in large expanses of prairie, coastal grasslands, heathlands, shrub-steppe, tundra, and agricultural areas.	March – July (breeding); August – March (wintering in Central Valley)	Potential to Occur/Potential to Occur. Suitable wintering habitat for this species occurs within the Study Area. No suitable nesting habitat occurs within the Study Area.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Song sparrow "Modesto" <i>(Melospiza melodia heermann)</i>	-	-	BCC, SSC	Resident in central and southwest California, including Central Valley; nests in marsh, scrub habitat.	April – June	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
Suisun song sparrow <i>(Melospiza melodia maxillaris)</i>	-	-	BCC, SSC	Resident of brackish marshes of Suisun Bay.	Year round resident; nests March – July	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
Swainson's hawk (nesting) <i>(Buteo swainson)</i>	-	CT	BCC	Nesting occurs in trees in agricultural, riparian, oak woodland, scrub, and urban landscapes. Forages over grassland, agricultural lands, particularly during disking/harvesting, irrigated pastures.	March – August	Present/Present. This species was observed foraging within the Study Area by M&A biologists during site visits conducted from 2013 to 2015; ECORP biologists also observed this species foraging in 2017. Suitable habitat for this species occurs within the Study Area.
Tricolored blackbird (nesting colony) <i>(Agelaius tricolor)</i>	-	CC	BCC, SSC	Breeds locally west of Cascade-Sierra Nevada and southeastern deserts from Humboldt and Shasta Cos south to San Bernardino, Riverside and San Diego Counties. Central California, Sierra Nevada foothills and Central Valley, Siskiyou, Modoc and Lassen Counties. Nests colonially in freshwater marsh, blackberry bramble, milk thistle, triticale fields, weedy (mustard, mallow) fields, giant cane, safflower, stinging nettles, tamarisk, riparian scrublands and forests, fiddleneck and fava bean fields.	March – August	Low Potential to Occur/Low Potential to Occur. Marginally suitable foraging habitat for this species occurs within the Study Area. No suitable nesting habitat occurs within the Study Area.
White-tailed kite (nesting) <i>(Elanus leucurus)</i>	-	-	CFP	Nesting occurs within trees in low elevation grassland, agricultural, wetland, oak woodland, riparian, savannah, and urban habitats.	March – August	Potential to Occur/Potential to Occur. Suitable habitat for this species occurs within the Study Area.

Table 4. Potentially Occurring Special-Status Species						
Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Mammals						
American badger <i>(Taxidea taxus)</i>	-	-	SSC	Drier open stages of most shrub, forest, and herbaceous habitats with friable soils.	Year round resident (breeds summer-early fall)	Potential to Occur/Potential to Occur. Suitable habitat for this species occurs within the Study Area.
Pallid bat <i>(Antrozous pallidus)</i>	-	-	SSC	Crevice in rocky outcrops and cliffs, caves, mines, trees (e.g. basal hollows of redwoods, cavities of oaks, exfoliating pine and oak bark, deciduous trees in riparian areas, and fruit trees in orchards). Also roosts in various human structures such as bridges, barns, porches, bat boxes, and human-occupied as well as vacant buildings (WBWG 2017).	April – September	Potential to Occur/Potential to Occur. Suitable habitat for this species occurs within the Study Area.
Ringtail <i>(Bassariscus astutus)</i>	-	-	FP	Most often found in riparian corridors in forested, shrubby habitats. Dens in rock outcrops, hollow trees and snags at low to middle elevations. Its range includes the North and South Coast Ranges, Sierra Nevada, Cascades, and the mountainous areas of the Mojave Desert.	Any season	Low Potential to Occur/Low Potential to Occur. Marginally suitable habitat for this species occurs within the Study Area.
Salt-marsh harvest mouse <i>(Reithrodontomys raviventris)</i>	FE	CE	CFP	Saline emergent marsh.	Any Season	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
San Francisco dusky-footed woodrat <i>(Neotoma fuscipes annectens)</i>	-	-	SSC	Dense chaparral, mixed deciduous forest with thick understory, coniferous forest, and coastal sage scrub (Reid 2006). Builds large houses that are made of twigs, leaves, and other debris (Reid 2006).	Any Season	Absent/Absent. Suitable habitat for this species does not occur within the Study Area.
San Joaquin kit fox <i>(Vulpes macrotis mutica)</i>	FE	CT	-	Grasslands, sagebrush scrub.	April 15 – July 15, September 1 – December 1	Potential to Occur/Potential to Occur. Suitable habitat for this species occurs within the Study Area.

Common Name (Scientific Name)	Status			Habitat Description ¹	Survey Period	Potential To Occur within the Project Area/Offsite Infrastructure Areas
	ESA	CESA/ NPPA	Other Status			
Townsend's big-eared bat <i>(Corynorhinus townsendii)</i>	-	-	SSC	Caves, mines, buildings, rock crevices, trees.	April – September	Potential to Occur/Potential to Occur. Suitable habitat for this species occurs within the Study Area.
Greater mastiff bat <i>(Eumops perotis californicus)</i>	-	-	SSC	Primarily a cliff-dwelling species, found in similar crevices in large boulders and buildings (WBWG 2017).	April – September	Low Potential to Occur/Absent. Marginally suitable habitat for this species occurs within the Project Area. Suitable habitat for this species does not occur within the Offsite Infrastructure Areas.
Western red bat <i>(Eumops perotis californicus)</i>	-	-	SSC	Roosts in 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. There may be an association with intact riparian habitat (particularly willows, cottonwoods, and sycamores) (WBWG 2017).	April – September	Potential to Occur/Potential to Occur. Suitable habitat for this species occurs within the Study Area.

Status Codes:

¹ Unless otherwise noted, all plant habitat descriptions were adapted from information provided by CNPS (CNPS 2017)

- 1A CRPR/Presumed extinct
- 1B CRPR/Rare or Endangered in California and elsewhere
- 2B CRPR /Rare or Endangered in California, more common elsewhere
- 3 CRPR /Plants About Which More Information is Needed - A Review List
- 4 CRPR /Plants of Limited Distribution – A Watch List
- 0.1 Threat Rank/Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
- 0.2 Threat Rank/Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
- 0.3 Threat Rank/Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)
- BCC USFWS Bird of Conservation Concern
- CC Candidate for California ESA listing as Endangered or Threatened
- CE California ESA or NPPA listed, Endangered
- CESA California Endangered Species Act
- CFP California Fully Protected
- CR California NPPA listed, Rare
- CT California ESA or NPPA listed, Threatened
- Delisted Delisted from the ESA
- ESA Endangered Species Act
- FC Candidate for ESA listing as Threatened or Endangered
- FE Federal ESA listed, Endangered.
- FPD Listed under ESA, but formally proposed for delisting
- FT Federal ESA listed, Threatened
- NPPA California Native Plant Protection Act
- SSC CDFW Species of Special Concern
- WL CDFW Watch List

4.7.1 Plants

A total of 75 special-status plant species were identified as having the potential to occur within the Study Area based on the literature review (Table 4). However, upon further analysis and after the site visits, 37 species were considered to be absent from the Study Area due to the lack of suitable habitat. In addition, M&A conducted protocol-level rare plant surveys in 2015 and identified three CNPS-ranked plants in the Project Area: shining navarretia (*Navarretia nigelliformis* ssp. *radians*) rank 1B.2; crownscale (*Atriplex coronata* var. *coronata*) rank 4.2; and San Joaquin spearscale (*Extriplex joaquinana*) rank 1B.2 (M&A 2015). With the exception of Carquinez goldenbush (*Isocoma arguta*), M&A's survey dates correspond with all rare plant survey periods; therefore, all other plants are absent from the Project Area. Brief descriptions of the four species that occur or have potential to occur within the Project Area and the 38 species that have the potential to occur within the Offsite Infrastructure Areas are presented below.

Large-Flowered Fiddleneck

Large-flowered fiddleneck (*Amsinckia grandiflora*) is listed as endangered pursuant to both the federal and California ESAs and is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs in cismontane woodland and valley and foothill grasslands (CNPS 2017). Large-flowered fiddleneck blooms from March to May and is known to occur at elevations ranging from 886 to 1,804 feet above mean sea level (MSL). Large-flowered fiddleneck is endemic to California; the current range of this species includes Alameda, Contra Costa, and San Joaquin counties (CNPS 2017).

There are four documented occurrences of large-flowered fiddleneck within 10 miles of the Study Area (CDFW 2017). Large-flowered fiddleneck was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. Large-flowered fiddleneck has potential to occur within the Offsite Infrastructure Areas.

There is no Critical Habitat for this species within the Study Area.

California Androsace

California androsace (*Androsace elongata* ssp. *acuta*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 4.2 species. This species is an herbaceous annual that occurs in chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, and valley and foothill grassland (CNPS 2017). California androsace blooms from March through June and is known to occur at elevations ranging from 492 to 4,281 feet above MSL (CNPS 2017). The current range of this species in California includes Alameda, Contra Costa, Colusa, Fresno, Glenn, Kern, Los Angeles, Merced, Riverside, San Bernardino, San Benito, Santa Clara, San Diego, Siskiyou, San Joaquin, San Luis Obispo, San Mateo, Stanislaus, and Tehama counties (CNPS 2017).

There are no documented occurrences of California androsace within 10 miles of the Study Area (CDFW 2017). California androsace was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. California androsace has low potential to occur within the Offsite Infrastructure Areas.

Alkali Milk-Vetch

Alkali milk-vetch (*Astragalus tener* var. *tener*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is an herbaceous annual that occurs in alkaline areas of playas, adobe clay valley and foothill grasslands, and vernal pools (CNPS 2017). Alkali milk-vetch blooms from March through June and is known to occur at elevations ranging from 3 to 197 feet above MSL (CNPS 2017). Alkali milk-vetch is endemic to California; the current range of this species includes Alameda, Contra Costa, Merced, Monterey, Napa, San Benito, Santa Clara, San Francisco, San Joaquin, Solano, Sonoma, Stanislaus, and Yolo counties and is likely extirpated from Contra Costa, Monterey, San Benito, Santa Clara, San Francisco, San Joaquin, Sonoma, and Stanislaus counties (CNPS 2017).

There are two documented occurrences of alkali milk-vetch within 10 miles of the Study Area (CDFW 2017). Alkali milk-vetch was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. Mesic areas and wetlands within the annual grassland in the Offsite Infrastructure Areas provide suitable habitat for this species. Alkali milk-vetch has potential to occur within the Offsite Infrastructure Areas.

Heartscale

Heartscale (*Atriplex cordulata* var. *cordulata*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is an herbaceous annual found within alkaline or saline sandy valley and foothill grasslands, meadows and seeps, and chenopod scrub communities. Heartscale flowers between April and October and is known to occur at elevations ranging from sea level to 1,837 feet above MSL (CNPS 2017). Heartscale is endemic to California; the current range of this species in California includes Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, Kern, Madera, Merced, San Joaquin, Solano, Stanislaus, Tulare, and Yolo counties and is considered extirpated from San Joaquin, Stanislaus, and Yolo counties (CNPS 2017).

There are no documented occurrences of heartscale within 10 miles of the Study Area (CDFW 2017). Heartscale was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. Heartscale has low potential to occur within the Offsite Infrastructure Areas.

Crownscale

Crownscale is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 4.2 species. This species is an herbaceous annual that occurs in alkaline and often clay soils within chenopod scrub, valley and foothill grassland, and vernal pools (CNPS 2017). Crownscale blooms from March through October and is known to occur at elevations ranging from 3 to 1,936 feet above MSL (CNPS 2017). Crownscale is endemic to California; the current range of this species includes Alameda, Contra Costa, Fresno, Glenn, Kings, Kern, Merced, Monterey, San Joaquin, San Luis Obispo, Solano, and Stanislaus counties; its distribution in San Joaquin County is uncertain (CNPS 2017).

There are no documented occurrences of crownscale within 10 miles of the Study Area (CDFW 2017). However, crownscale was identified in the Project Area during rare plant surveys conducted by M&A in 2015 (M&A 2015); this species is present in the Project Area. M&A's rare plant survey results map

is included as Attachment G. The annual grassland and wetlands within the Offsite Infrastructure Areas provide suitable habitat for this species. Crownscale has potential to occur within the Offsite Infrastructure Areas.

Brittlescale

Brittlescale (*Atriplex depressa*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is an herbaceous annual that occurs in alkaline and clay soils within chenopod scrub, meadows and seeps, playas, valley and foothill grasslands, and vernal pools, and is typically found on alkaline clay soils (CNPS 2017). Brittlescale blooms from April through October and is known to occur at elevations ranging from 3 to 1,050 feet above MSL (CNPS 2017). Brittlescale is endemic to California; the current range of this species includes Alameda, Contra Costa, Colusa, Fresno, Glenn, Kern, Merced, Solano, Stanislaus, Tulare, and Yolo counties (CNPS 2017).

There are six documented occurrences of brittlescale within 10 miles of the Study Area (CDFW 2017). Brittlescale was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland and wetlands within the Offsite Infrastructure Areas provide suitable habitat for this species. Brittlescale has potential to occur within the Offsite Infrastructure Areas.

Big Tarplant

Big tarplant (*Blepharizonia plumosa*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs in valley and foothill grassland, usually in clay soil (CNPS 2017). Big tarplant blooms from July through October and is known to occur from 98 to 1,657 feet above MSL (CNPS 2017). Big tarplant is endemic to California; the current range of the species includes Alameda, Contra Costa, San Joaquin, Solano, and Stanislaus counties and is considered extirpated from Solano County (CNPS 2017).

There are 22 documented occurrences of big tarplant within 10 miles of the Study Area (CDFW 2017). Big tarplant was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. Big tarplant has potential to occur within the Offsite Infrastructure Areas.

Round-Leaved Filaree

Round-leaved filaree (*California macrophylla*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is an herbaceous annual that occurs on clay soils in cismontane woodland and valley and foothill grassland communities (CNPS 2017). Round-leaved filaree blooms from March through May and is known to occur at elevations ranging from 49 to 3,937 feet above MSL (CNPS 2017). The current range of this species in California includes Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, Kings, Kern, Lake, Los Angeles, Merced, Monterey, Napa, Riverside, Santa Barbara, San Benito, Santa Clara, Santa Catalina Island, Santa Cruz Island, San Diego, San Joaquin, San Luis Obispo, San Mateo, Solano, Sonoma, Stanislaus, Tehama, Ventura, and Yolo counties (CNPS 2017). It is likely extirpated from Butte County and Santa Cruz Island (CNPS 2017).

There are 11 documented occurrences of round-leaved filaree within 10 miles of the Study Area (CDFW 2017). Round-leaved filaree was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. Round-leaved filaree has potential to occur within the Offsite Infrastructure Areas.

Mt. Diablo Fairy-Lantern

Mt. Diablo fairy-lantern (*Calochortus pulchellus*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is a perennial bulbiferous herb that occurs in chaparral, cismontane woodland, riparian woodland, and valley and foothill grassland (CNPS 2017). Mt. Diablo fairy-lantern blooms from April through June and is known to occur from 98 to 2,756 feet above MSL (CNPS 2017). Mt. Diablo fairy-lantern is endemic to California; the current range of the species includes Alameda, Contra Costa, and Solano counties (CNPS 2017).

There are 30 documented occurrences of Mt. Diablo fairy-lantern within 10 miles of the Study Area (CDFW 2017). Mt. Diablo fairy-lantern was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. Mt. Diablo fairy-lantern has potential to occur within the Offsite Infrastructure Areas.

Oakland Star-Tulip

Oakland star-tulip (*Calochortus umbellatus*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 4.2 species. This species is a perennial bulbiferous herb that occurs in broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland, often on serpentinite soils (CNPS 2017). Oakland star-tulip blooms from March through May and is known to occur from 328 to 2,297 feet above MSL (CNPS 2017). Oakland star-tulip is endemic to California; the current range of the species includes Alameda, Contra Costa, Lake, Marin, Santa Clara, San Mateo, and Stanislaus counties. It is presumed extirpated in Santa Cruz County (CNPS 2017).

There are no documented occurrences of Oakland star-tulip within 10 miles of the Study Area (CDFW 2017). Oakland star-tulip was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides marginally suitable habitat for this species. Oakland star-tulip has low potential to occur within the Offsite Infrastructure Areas.

Congdon's Tarplant

Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs in Valley and foothill grassland with alkaline soils (CNPS 2017). Congdon's tarplant blooms from May to October and is known to occur at elevations ranging from 0 to 755 feet above MSL (CNPS 2017). Congdon's tarplant is endemic to California; its current range includes Alameda, Contra Costa, Monterey, Santa Clara, Santa Cruz, San Luis Obispo, San Mateo, and Solano counties (CNPS 2017). However, it is likely extirpated from Santa Cruz and Solano counties (CNPS 2017).

There is one documented occurrence of Congdon's tarplant within 10 miles of the Study Area (CDFW 2017). Congdon's tarplant was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. Congdon's tarplant has potential to occur within the Offsite Infrastructure Areas.

Hoover's Cryptantha

Hoover's cryptantha (*Cryptantha hooveri*) is not listed as endangered pursuant to either the federal and California ESAs and is designated as a CRPR 1A species. This species is an herbaceous annual that occurs in inland dunes and sandy valley and foothill grassland (CNPS 2017). Hoover's cryptantha blooms between April and May and is known to occur at elevations ranging from 30 to 492 feet above MSL (CNPS 2017). Hoover's cryptantha is endemic to California; its current range includes Contra Costa, Kern, Madera, and Stanislaus counties; however, it is presumed extirpated in Contra Costa, Madera and Stanislaus counties (CNPS 2017).

There is one documented occurrence of Hoover's cryptantha within 10 miles of the Study Area (CDFW 2017). Hoover's cryptantha was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas lacks sandy soils and therefore provides marginally suitable habitat for this species. Hoover's cryptantha has low potential to occur within the Offsite Infrastructure Areas.

Recurved Larkspur

Recurved larkspur (*Delphinium recurvatum*) is not listed pursuant to either the federal or California ESAs, but is designated a CRPR 1B.2 species. This species is an herbaceous perennial that occurs in alkaline substrates in chenopod scrub, cismontane woodland, and valley and foothill grasslands (CNPS 2017). Recurved larkspur blooms from March through June and is known to occur at elevations ranging from 10 to 2,592 feet above MSL (CNPS 2017). Recurved larkspur is endemic to California; the current range of this species includes Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, Kings, Kern, Madera, Merced, Monterey, San Joaquin, San Luis Obispo, Solano, Sutter, and Tulare counties and is likely extirpated from Butte and Colusa counties (CNPS 2017).

There are no documented occurrences of recurved larkspur within 10 miles of the Study Area (CDFW 2017). Recurved larkspur was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. Recurved larkspur has low potential to occur within the Offsite Infrastructure Areas.

Dwarf Downingia

Dwarf downingia (*Downingia pusilla*) is not listed pursuant to either the federal or California ESAs, but has been identified by the CNPS as a List 2B.2 species. This species is an herbaceous annual that occurs in vernal pools and mesic areas in Valley and foothill grasslands (CNPS 2017). Dwarf downingia also appears to have an affinity for slight disturbance since it has been found in manmade features such as tire ruts, scraped depressions, stock ponds, and roadside ditches (Baldwin et al. 2012, CDFW 2017). This species blooms from March through May and is known to occur at elevations ranging from

3 to 1,460 feet above MSL (CNPS 2017). The current range of this species in California includes Amador, Fresno, Merced, Napa, Placer, Sacramento, San Joaquin, Solano, Sonoma, Stanislaus, Tehama, and Yuba counties (CNPS 2017).

There are no documented occurrences of dwarf downingia within 10 miles of the Study Area (CDFW 2017). Dwarf downingia was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. Mesic areas and wetlands within the annual grassland within the Offsite Infrastructure Areas provide marginally suitable habitat for this species. Dwarf downingia has low potential to occur within the Offsite Infrastructure Areas.

Mount Diablo Buckwheat

Mount Diablo buckwheat (*Eriogonum truncatum*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs in sandy substrates in chaparral, coastal scrub, and Valley and foothill grassland (CNPS 2017). Mount Diablo buckwheat blooms from April through December and is known to occur at elevations ranging from 10 to 1,148 feet above MSL (CNPS 2017). Mount Diablo buckwheat is endemic to California; the current range of this species includes Alameda, Contra Costa, and Solano counties, and is considered to be extirpated in Solano County (CNPS 2017).

There are five documented occurrences of Mount Diablo buckwheat within 10 miles of the Study Area (CDFW 2017). Mount Diablo buckwheat was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas lacks sandy soils and therefore provides marginally suitable habitat for this species. Mount Diablo buckwheat has low potential to occur within the Offsite Infrastructure Areas.

Jepson's Coyote Thistle

Jepson's coyote thistle (*Eryngium jepsonii*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is a perennial herb that occurs often in clay soils of valley and foothill grassland, and vernal pools (CNPS 2017). Jepson's coyote thistle blooms from April through August and is known to occur at elevations ranging from 10 to 9,842 feet above MSL (CNPS 2017). Jepson's coyote thistle is endemic to California; the current range of this species includes Alameda, Amador, Calaveras, Contra Costa, Fresno, Napa, San Mateo, Solano, Stanislaus, Tuolumne, and Yolo counties (CNPS 2017).

There is one documented occurrence of Jepson's coyote thistle within 10 miles of the Study Area (CDFW 2017). Jepson's coyote thistle was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland and wetlands within the Offsite Infrastructure Areas provide suitable habitat for this species. Jepson's coyote thistle has potential to occur within the Offsite Infrastructure Areas.

Spiny-Sepaled Button-Celery

Spiny-sepaled button-celery (*Eryngium spinosepalum*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is an herbaceous annual/perennial that occurs in Valley and foothill grassland and vernal pools (CNPS 2017). Spiny-

sepaled button-celery blooms from April through June and is known to occur at elevations ranging from 262 to 3,199 feet above MSL (CNPS 2017). Spiny-sepaled button-celery is endemic to California; the current range of this species includes Contra Costa, Fresno, Kern, Madera, Merced, San Luis Obispo, Stanislaus, Tulare, and Tuolumne counties (CNPS 2017).

There are no documented occurrences of spiny-sepaled button-celery within 10 miles of the Study Area (CDFW 2017). Spiny-sepaled button-celery was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland and wetlands within the Offsite Infrastructure Areas provide suitable habitat for this species. Spiny-sepaled button-celery has low potential to occur within the Offsite Infrastructure Areas.

Diamond-Petaled California Poppy

Diamond-petaled California poppy (*Eschscholzia rhombipetala*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs in alkaline and clay soils within Valley and foothill grassland (CNPS 2017). Diamond-petaled California poppy blooms from March through April and is known to occur at elevations ranging from sea level to 3,199 feet above MSL (CNPS 2017). Diamond-petaled California poppy is endemic to California; the current range of this species includes Alameda, Contra Costa, Colusa, San Joaquin, San Luis Obispo, and Stanislaus counties, and is considered to be extirpated in Contra Costa, Colusa, and Stanislaus counties (CNPS 2017).

There are two documented occurrences of diamond-petaled California poppy within 10 miles of the Study Area (CDFW 2017). Diamond-petaled California poppy was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. Diamond-petaled California poppy has potential to occur within the Offsite Infrastructure Areas.

San Joaquin Spearscale

San Joaquin spearscale is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is an annual herb that occurs often in alkaline soils in chenopod scrub, meadows seeps, playas, and valley and foothill grassland (CNPS 2017). San Joaquin spearscale blooms from April through October and is known to occur at elevations ranging from 3 to 2,740 feet above MSL (CNPS 2017). San Joaquin spearscale is endemic to California; the current range of this species includes Alameda, Contra Costa, Colusa, Fresno, Glenn, Merced, Monterey, Napa, San Benito, Santa Clara, San Joaquin, San Luis Obispo, Solano, Tulare, and Yolo counties, and is considered to be extirpated from Santa Clara, San Joaquin, and uncertain in San Luis Obispo and Tulare counties (CNPS 2017).

There are 22 documented occurrences of San Joaquin spearscale within 10 miles of the Study Area (CDFW 2017). San Joaquin spearscale was identified in the Project Area during rare plant surveys conducted by M&A in 2015 (M&A 2015, Attachment G); this species is present in the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. San Joaquin spearscale has potential to occur within the Offsite Infrastructure Areas.

Stinkbells

Stinkbells (*Fritillaria agrestis*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 4.2 species. This species is a perennial bulbiferous herb that occurs in clay, sometimes serpentine areas in chaparral, cismontane woodland, pinyon and juniper woodland, and Valley and foothill grassland (CNPS 2017). Stinkbells bloom from March to June and is known to occur at elevations ranging from 33 to 5,102 feet above MSL (CNPS 2017). The current range of this species in California includes Alameda, Contra Costa, Fresno, Kern, Mendocino, Merced, Monterey, Mariposa, Placer, Sacramento, Santa Barbara, San Benito, Santa Clara, Santa Cruz, San Luis Obispo, San Mateo, Stanislaus, Tuolumne, Ventura, and Yuba counties, and is considered to be extirpated from Santa Cruz and San Mateo counties (CNPS 2017).

There are seven documented occurrences of stinkbells within 10 miles of the Study Area (CDFW 2017). Stinkbells was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. Stinkbells has potential to occur within the Offsite Infrastructure Areas

Fragrant Fritillary

Fragrant fritillary (*Fritillaria liliacea*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is a perennial bulbiferous herb that occurs often on serpentine soils in cismontane woodland, coastal prairie, coastal scrub, and Valley and foothill grassland (CNPS 2017). Fragrant fritillary blooms from February through April and is known to occur from 10 to 1,345 feet above MSL (CNPS 2017). Fragrant fritillary is endemic to California; the current range of this species includes Alameda, Contra Costa, Monterey, Marin, San Benito, Santa Clara, San Francisco, San Mateo, Solano, and Sonoma counties (CNPS 2017).

There are no documented occurrences of fragrant fritillary within 10 miles of the Study Area (CDFW 2017). Fragrant fritillary was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides marginally suitable habitat for this species. Fragrant fritillary has low potential to occur within the Offsite Infrastructure Areas.

Diablo Helianthella

Diablo helianthella (*Helianthella castanea*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is an herbaceous perennial that occurs usually on rocky, axonal soils, often in partial shade, in broadleaved upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, and Valley and foothill grassland (CNPS 2017). Diablo helianthella blooms from March through June and is known to occur from 197 to 4,265 feet above MSL (CNPS 2017). Diablo helianthella is endemic to California; the current range of this species includes Alameda, Contra Costa, Marin, San Francisco, and San Mateo counties, and it is considered to be extirpated in Marin and San Francisco counties (CNPS 2017).

There are 38 documented occurrences of diablo helianthella within 10 miles of the Study Area (CDFW 2017). Diablo helianthella was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite

Infrastructure Areas provides marginally suitable habitat for this species. Diablo helianthella has low potential to occur within the Offsite Infrastructure Areas.

Hogwallow Starfish

Hogwallow starfish (*Hesperevax caulescens*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 4.2 species. This species is an herbaceous annual that occurs in mesic, clay areas within Valley and foothill grassland, and shallow vernal pools, sometimes in alkaline areas (CNPS 2017). Hogwallow starfish blooms from March through June and is known to occur from sea level to 1,657 feet above MSL (CNPS 2017). Hogwallow starfish is endemic to California; the current range of this species includes Alameda, Amador, Butte, Contra Costa, Colusa, Fresno, Glenn, Kern, Merced, Monterey, Napa, Sacramento, San Diego, San Joaquin, San Luis Obispo, Solano, Stanislaus, Sutter, Tehama, and Yolo counties, and is considered to be extirpated in Napa and San Diego counties (CNPS 2017).

There are no documented occurrences of hogwallow starfish within 10 miles of the Study Area (CDFW 2017). Hogwallow starfish was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. Mesic areas and wetlands within the annual grassland in the Offsite Infrastructure Areas provide suitable habitat for this species. Hogwallow starfish has low potential to occur within the Offsite Infrastructure Areas.

Brewer's Western Flax

Brewer's western flax (*Hesperolinon breweri*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is an herbaceous annual that occurs in chaparral, cismontane woodland, and valley and foothill grassland, usually in serpentine substrates (CNPS 2017). Brewer's western flax blooms from May through July and is known to occur from 98 to 3,100 feet above MSL (CNPS 2017). Brewer's western flax is endemic to California; the current range of this species includes Contra Costa, Napa, and Solano counties (CNPS 2017).

There are 17 documented occurrences of Brewer's western flax within 10 miles of the Study Area and one documented occurrence within the Study Area (CDFW 2017). Brewer's western flax was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. Brewer's western flax has potential to occur within the Offsite Infrastructure Areas.

Carquinez Goldenbush

Carquinez goldenbush (*Isocoma arguta*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.1 species. This perennial shrub typically occurs on alkaline soils in valley and foothill grasslands (CNPS 2017). Carquinez goldenbush blooms from August through December and is known to occur at elevations ranging from 3 to 66 feet above MSL (CNPS 2017). Carquinez goldenbush is endemic to California; the current range of this species is Solano County (CNPS 2017).

There are no documented occurrences of Carquinez goldenbush within 10 miles of the Study Area (CDFW 2017). Carquinez goldenbush's survey period occurs outside of the survey dates of the rare

plant surveys conducted in the Project Area by M&A in 2015. The annual grassland within the Study Area provides suitable habitat for this species. Carquinez goldenbush has low potential to occur within the Study Area.

Contra Costa Goldfields

Contra Costa goldfields (*Lasthenia conjugens*) is listed as endangered pursuant to the federal ESA, and is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs in mesic sites within cismontane woodland, playas with alkaline soils, Valley and foothill grassland and vernal pools (CNPS 2017). Contra Costa goldfields blooms between March and June and is known to occur at elevations ranging from 0 to 1,542 feet above MSL (CNPS 2017). Contra Costa goldfields is endemic to California; its current range includes Alameda, Contra Costa, Mendocino, Monterey, Marin, Napa, Santa Barbara, Santa Clara, Solano, and Sonoma counties (CNPS 2017). It is likely extirpated from Mendocino, Santa Barbara, and Santa Clara counties (CNPS 2017).

There is one documented occurrence of Contra Costa goldfields within 10 miles of the Study Area (CDFW 2017). Contra Costa goldfields was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. Mesic areas and wetlands within the annual grassland in the Offsite Infrastructure Areas provide suitable habitat for this species. Contra Costa goldfields has potential to occur within the Offsite Infrastructure Areas.

There is no Critical Habitat for this species within the Study Area.

Showy Golden Madia

Showy golden madia (*Madia radiata*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs in cismontane woodland and valley and foothill grassland (CNPS 2017). Showy golden madia blooms between March and May and is known to occur at elevations ranging from 82 to 3,986 feet above MSL (CNPS 2017). Showy golden madia is endemic to California; its current range includes Contra Costa, Fresno, Kings, Kern, Monterey, Santa Barbara, San Benito, Santa Clara, San Joaquin, San Luis Obispo, and Stanislaus counties, and is considered to be extirpated in Contra Costa, Kings, Monterey, Santa Barbara, and San Joaquin counties (CNPS 2017).

There is one documented occurrence of showy golden madia within 10 miles of the Study Area and one documented occurrence within the Study Area (CDFW 2017). Showy golden madia was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. Showy golden madia has potential to occur within the Offsite Infrastructure Areas.

Woodland Woollythreads

Woodland woollythreads (*Monolopia gracilens*) is not listed as endangered pursuant to either the federal and California ESAs and is designated as a CRPR 1B.2 species. This species is an herbaceous annual that occurs in serpentinite substrates in openings in broadleaved upland forest and chaparral, cismontane woodland, openings in North Coast coniferous forest, and valley and foothill grassland (CNPS 2017). Woodland woollythreads blooms between March and July and is known to occur at

elevations ranging from 328 to 3,937 feet above MSL (CNPS 2017). Woodland woollythreads is endemic to California; its current range includes Alameda, Contra Costa, Monterey, San Benito, Santa Clara, Santa Cruz, San Luis Obispo, and San Mateo counties (CNPS 2017).

There are four documented occurrences of woodland woollythreads within 10 miles of the Study Area (CDFW 2017). Woodland woollythreads was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides marginally suitable habitat for this species. Woodland woollythreads has low potential to occur within the Offsite Infrastructure Areas.

Tehama Navarretia

Tehama navarretia (*Navarretia heterandra*) is not listed as endangered pursuant to either the federal and California ESAs and is designated as a CRPR 4.3 species. This species is an herbaceous annual that occurs in mesic areas in valley and foothill grassland and vernal pools (CNPS 2017). Tehama navarretia blooms between April and June and is known to occur at elevations ranging from 98 to 3,314 feet above MSL (CNPS 2017). The current range of Tehama navarretia in California includes Butte, Colusa, Lake, Napa, Shasta, Tehama, Trinity, and Yuba counties (CNPS 2017).

There are no documented occurrences of Tehama navarretia within 10 miles of the Study Area (CDFW 2017). Tehama navarretia was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. Mesic areas and wetlands within the annual grassland in the Offsite Infrastructure Areas provide suitable habitat for this species. Tehama navarretia has low potential to occur within the Offsite Infrastructure Areas.

Adobe Navarretia

Adobe navarretia (*Navarretia nigelliformis* ssp. *nigelliformis*) is not listed as endangered pursuant to either the federal and California ESAs and is designated as a CRPR 4.2 species. This species is an herbaceous annual that occurs in clay and sometimes serpentinite substrates in mesic areas in valley and foothill grassland and sometimes in vernal pools (CNPS 2017). Adobe navarretia blooms between April and June and is known to occur at elevations ranging from 328 to 3,281 feet above MSL (CNPS 2017). Adobe navarretia is endemic to California; its current range includes Alameda, Butte, Contra Costa, Colusa, Fresno, Kern, Merced, Monterey, Placer, Sutter and Tulare counties (CNPS 2017).

There are no documented occurrences of adobe navarretia within 10 miles of the Study Area (CDFW 2017). Adobe navarretia was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. Mesic areas and wetlands within the annual grassland in the Offsite Infrastructure Areas provide suitable habitat for this species. Adobe navarretia has low potential to occur within the Offsite Infrastructure Areas.

Shining Navarretia

Shining navarretia is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is an herbaceous annual that occurs in vernal pools within cismontane woodland and Valley or foothill grassland (CNPS 2017). Shining navarretia blooms April through July and is known to occur at elevations ranging from 213 to 3,281 feet above MSL (CNPS 2017). Shining navarretia is endemic to California; the current range of this species includes Alameda,

Contra Costa, Colusa, Fresno, Madera, Merced, Monterey, San Benito, San Joaquin, and San Luis Obispo counties (CNPS 2017).

There are three documented occurrences of shining navarretia within 10 miles of the Study Area (CDFW 2017). Shining navarretia was identified in the Project Area during rare plant surveys conducted by M&A in 2015 (M&A 2015, Attachment G); this species is present in the Project Area. Mesic areas and wetlands within the annual grassland in the Offsite Infrastructure Areas provide suitable habitat for this species. Shining navarretia has potential to occur within the Offsite Infrastructure Areas.

Bearded Popcornflower

Bearded popcornflower (*Plagiobothrys hystriculus*) is not listed as endangered pursuant to either the federal and California ESAs and is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs in mesic areas in valley and foothill grassland and vernal pool margins, often in vernal swales (CNPS 2017). Bearded popcornflower blooms between April and May and is known to occur at elevations ranging from 0 to 899 feet above MSL (CNPS 2017). Bearded popcornflower is endemic to California; its current range includes Napa, Solano, and Yolo counties (CNPS 2017).

There are no documented occurrences of bearded popcornflower within 10 miles of the Study Area (CDFW 2017). Bearded popcornflower was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. Mesic areas and wetlands within the annual grassland in the Offsite Infrastructure Areas provide suitable habitat for this species. Bearded popcornflower has low potential to occur within the Offsite Infrastructure Areas.

California Alkali Grass

California alkali grass (*Puccinellia simplex*) is not listed as endangered pursuant to either the federal and California ESAs and is designated as a CRPR 1B.2 species. This species is an herbaceous annual that occurs in alkaline, vernal mesic chenopod scrub, meadows and seeps, Valley and foothill grassland, and vernal pools along sinks, flats and lake margins (CNPS 2017). California alkali grass blooms between March and May and is known to occur at elevations ranging from 7 to 3,051 feet above MSL (CNPS 2017). the current range for alkali grass' in California includes Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, Kings, Kern, Lake, Los Angeles, Madera, Merced, Napa, San Bernardino, Santa Clara, Santa Cruz, San Luis Obispo, Solano, Stanislaus, Tulare and Yolo counties; however, it is presumed extirpated in Kings counties (CNPS 2017).

There is one documented occurrence of California alkali grass within 10 miles of the Study Area (CDFW 2017). California alkali grass was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. Mesic areas and wetlands within the annual grassland in the Offsite Infrastructure Areas provide suitable habitat for this species. California alkali grass has potential to occur within the Offsite Infrastructure Areas.

Lobb's Aquatic Buttercup

Lobb's aquatic buttercup (*Ranunculus lobbii*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 4.2 species. This species is an aquatic annual herb that occurs in mesic areas of cismontane woodland, North Coast coniferous forest, valley and foothill grassland, and

vernal pools (CNPS 2017). Lobb's aquatic buttercup blooms from February through May and is known to occur at elevations ranging from 49 to 1,542 feet above MSL (CNPS 2017). The current range of this species in California includes Alameda, Contra Costa, Mendocino, Marin, Napa, Santa Cruz, San Mateo, Solano, and Sonoma counties (CNPS 2017).

There are no documented occurrences of Lobb's aquatic buttercup within 10 miles of the Study Area (CDFW 2017). Lobb's aquatic buttercup was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. Mesic areas and wetlands within the annual grassland in the Offsite Infrastructure Areas provide suitable habitat for this species. Lobb's aquatic buttercup has low potential to occur within the Offsite Infrastructure Areas.

Keck's checkerbloom

Keck's checkerbloom (*Sidalcea keckii*) is listed as endangered as pursuant to the ESA, not listed pursuant to the California ESA and is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs in serpentinite clay soils in cismontane woodlands and Valley and foothill grasslands (CNPS 2017). Keck's checkerbloom blooms from April through June and is known to occur at elevations ranging from 246 to 2,133 feet above MSL (CNPS 2017). Keck's checkerbloom is endemic to California; the current range of this species includes Colusa, Fresno, Merced, Napa, Solano, Tulare and Yolo counties; distribution or identity is uncertain in Colusa, Napa, Solano and Yolo counties (CNPS 2017).

There are no documented occurrences of Keck's checkerbloom within 10 miles of the Study Area (CDFW 2017). Keck's checkerbloom was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides marginally suitable habitat for this species. Keck's checkerbloom has low potential to occur within the Offsite Infrastructure Areas.

There is no Critical Habitat for this species within the Study Area.

Most Beautiful Jewelflower

Most beautiful jewelflower (*Streptanthus albidus ssp. peramoenus*) is not listed as endangered pursuant to either the federal and California ESAs and is designated as a CRPR 1B.2 species. This species is an herbaceous annual that occurs in serpentinite substrates in chaparral, cismontane woodland, and valley and foothill grassland (CNPS 2017). Most beautiful jewelflower typically blooms between April and September and occasionally blooms between March and October. It is known to occur at elevations ranging from 312 to 3,281 feet above MSL (CNPS 2017). Most beautiful jewelflower is endemic to California; its current range includes Alameda, Contra Costa, Monterey, Santa Clara, and San Luis Obispo counties (CNPS 2017).

There are three documented occurrences of most beautiful jewelflower within 10 miles of the Study Area (CDFW 2017). Most beautiful jewelflower was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides marginally suitable habitat for this species. Most beautiful jewelflower has low potential to occur within the Offsite Infrastructure Areas.

Mt. Diablo Jewelflower

Mt. Diablo jewelflower (*Streptanthus hispidus*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.3 species. This species is an herbaceous annual that occurs in rocky soils in chaparral and valley and foothill grassland (CNPS 2017). Mt. Diablo jewelflower blooms March through June and is known to occur at elevations ranging from 1,198 to 3,937 feet above MSL (CNPS 2017). Mt. Diablo jewelflower is endemic to California; the current range of this species includes Contra Costa County (CNPS 2017).

There are seven documented occurrences of Mt. Diablo jewelflower within 10 miles of the Study Area (CDFW 2017). Mt. Diablo jewelflower was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides marginally suitable habitat for this species. Mt. Diablo jewelflower has low potential to occur within the Offsite Infrastructure Areas.

Caper-Fruited Tropidocarpum

Caper-fruited tropidocarpum (*Tropidocarpum capparideum*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs in alkaline hills in Valley and foothill grassland (CNPS 2017). Caper-fruited tropidocarpum blooms March through April and is known to occur at elevations ranging from 3 to 1,493 feet above MSL (CNPS 2017). Caper-fruited tropidocarpum is endemic to California; the current range of this species includes Alameda, Contra Costa, Fresno, Glenn, Monterey, Santa Clara, San Joaquin, and San Luis Obispo counties, and is considered to be extirpated in Alameda, Contra Costa, Glenn, Santa Clara, and San Joaquin counties (CNPS 2017).

There are three documented occurrences of caper-fruited tropidocarpum within 10 miles of the Study Area (CDFW 2017). Caper-fruited tropidocarpum was not identified in the Project Area during rare plant surveys conducted by M&A in 2015; this species is absent from the Project Area. The annual grassland within the Offsite Infrastructure Areas provides suitable habitat for this species. Caper-fruited tropidocarpum has potential to occur within the Offsite Infrastructure Areas.

4.7.2 Invertebrates

A total of seven special-status invertebrate species were identified as having the potential to occur within the Study Area based on the literature review (Table 4). However, upon further analysis and after the site visits, four species were considered to be absent from the Study Area due to the lack of suitable habitat. No further discussion of these species is provided in this analysis. Brief descriptions of the remaining three species that are present or have the potential to occur within the Project Area and/or Offsite Infrastructure Areas are presented below.

Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*) is listed as threatened in accordance with the federal ESA (USFWS 1980). The VELB is completely dependent on its host plant, elderberry (*Sambucus* species), which occurs in riparian and other non-riparian vegetation communities (USFWS 2017b). Elderberry shrubs are most common in riparian areas or in areas that were historically riparian or floodplain terraces.

The adult flight season extends from late March through June. During that time, the adults feed on foliage and perhaps flowers; they also mate and females lay eggs on living elderberry plants (Barr 1991). The first instar larvae bore into live elderberry stems, where they develop for one to two years feeding on the pith. The fifth instar larvae create exit holes in the stems and then plug the holes and remain in the stems through pupation (Talley et al. 2007). The beetle's current distribution is patchy throughout California's Central Valley, from Shasta County in the north to Fresno County in the south. The majority of VELB occurrences have been recorded below 500 feet; however, if there is suitable VELB habitat and known VELB occurrences in a riparian corridor that is lower in elevation and connected to the area in question, it may contain VELB (USFWS 2017b).

There are no documented occurrences of VELB within 10 miles of the Study Area (CDFW 2017). One elderberry shrub was observed in the western central portion of the Project Area, along Sand Creek; the elderberry shrub within the Project Area provides suitable habitat for this species. VELB has potential to occur within the Project Area. No elderberry shrubs were observed within the Offsite Infrastructure Areas; therefore, VELB is absent from the Offsite Infrastructure Areas.

Vernal Pool Fairy Shrimp

The vernal pool fairy shrimp (*Branchinecta lynchi*) is listed as threatened in accordance with the federal ESA. Vernal pool fairy shrimp may occur in seasonal ponds, vernal pools, and swales during the wet season, which generally occurs from December through May. This species can be found in a variety of pool sizes, ranging from less than 0.001 to over 24.5 acres (Eriksen and Belk 1999). The shrimp hatch from cysts when colder water (10°C [50°F] or less) fills the pool and mature in as few as 18 days, under optimal conditions (Eriksen and Belk 1999). At maturity, mating takes place and cysts are dropped. Vernal pool fairy shrimp occur in disjunct patches dispersed across California's Central Valley from Shasta County to Tulare County, the central and southern portions of the Coast Ranges from northern Solano County to Ventura County, and three areas in Riverside County (USFWS 2003a).

There are 14 documented occurrences of vernal pool fairy shrimp within 10 miles of the Study Area and one documented occurrence within the Project Area (CDFW 2017). Wetlands within the Study Area provide suitable habitat for this species. Vernal pool fairy shrimp is present within the Project Area and has potential to occur within the Offsite Infrastructure Areas.

There is no Critical Habitat for this species within the Study Area.

Vernal Pool Tadpole Shrimp

The vernal pool tadpole shrimp (*Lepidurus packardii*) is listed as endangered pursuant to the federal ESA. This species inhabits vernal pools containing clear to highly turbid water, ranging in size from 0.001 to 89.0 acres (USFWS 1994). Vernal pool tadpole shrimp are distinguished from other vernal pool branchiopods discussed in this report by a large, shield like carapace that covers the anterior half of their body (USFWS 2003a). Cysts hatch during the wet season and the shrimp reach maturity in a few weeks. This species matures slowly and is long-lived, relative to other species. Vernal pool tadpole shrimp will continue to grow as long as the pools they occur in remain inundated, and in some instances can survive for six months or longer (USFWS 2003a). The geographic range of vernal pool tadpole shrimp extends from Shasta County to northern Tulare County in California's Central Valley, and in the central coast range from Solano County to Alameda County (USFWS 2003a).

There is one documented occurrence of vernal pool tadpole shrimp within 10 miles of the Study Area and one documented occurrence within the Project Area (CDFW 2017). Wetlands within the Study Area provide suitable habitat for this species. Vernal pool tadpole shrimp is present within the Project Area and has potential to occur within the Offsite Infrastructure Areas.

There is no Critical Habitat for this species within the Study Area.

4.7.3 Fish

A total of five special-status fish species were identified as having the potential to occur within the Study Area based on the literature review (Table 4). However, upon further analysis and after the site visits, all were considered to be absent from the Study Area due to the lack of suitable habitat. No further discussion of these species is provided in this report.

4.7.4 Amphibians

A total of three special-status amphibian species were identified as having the potential to occur within the Study Area based on the literature review (Table 4). Brief descriptions of the three species that are present or have the potential to occur within the Project Area and/or Offsite Infrastructure Areas are presented below.

California Red-Legged Frog

The California red-legged frog (CRLF, *Rana draytonii*) was listed as threatened by USFWS on May 23, 1996 (Federal Register Vol. 61, No. 101:25813) and is a CDFW SSC. Critical habitat was designated pursuant to the ESA across ±1,636,609 acres in 27 counties including Alameda, Butte, Calaveras, Contra Costa, El Dorado, Marin, Napa, Nevada, Placer, Solano, and Yuba counties.

CRLF is the largest native frog in the western United States, ranging from 3.8 to 12.7 cm (1.5 to 5 inches) in length. Their historic range extends through Pacific slope drainages and parts of the Central Valley from Shasta County, California, to Baja, Mexico. This area includes the Coast Ranges and the west slope of the Sierra Nevada at elevations below 1,548 m (5,000 feet). The current range is greatly reduced, with most remaining populations occurring along the coast from Marin County to Ventura County and in isolated locations in the foothills of the western slope of the Sierra Nevada (Fellers 2005; Barry and Fellers 2013).

CRLF occur in different habitats depending on life stage, season, and weather conditions. Breeding habitat includes coastal lagoons, marshes, springs, permanent and semi-permanent natural ponds, and ponded and backwater portions of streams. California red-legged frogs also breed in artificial impoundments including stock ponds, irrigation ponds, and siltation ponds. Creeks and ponds with dense growths of woody riparian vegetation, especially willows (*Salix* spp.) are used disproportionately (Hayes and Jennings 1988). The absence of vegetation at an aquatic site does not rule out the possibility of occupancy. Adult CRLF are most often found in areas of dense, shrubby or emergent riparian vegetation near deep [$\geq 0.6 - 0.9$ m (2 - 3 feet)], still or slow-moving water, especially where dense stands of overhanging willow and an intermixed fringe of cattail (*Typha* sp.) occur adjacent to open water. CRLF breed from November through April (Jennings and Hayes 1994), and larvae generally metamorphose by mid to late summer.

Upland and riparian areas provide important habitat during summer when CRLF are known to aestivate in dense vegetation, burrows and leaf litter. CRLF often disperse from breeding habitats to forage and seek upland refugia, and are often found within close proximity to a pond or deep pool in a creek where emergent vegetation, undercut banks, or semi-submerged rootballs afford shelter (USFWS 2005). The diet of CRLF is highly variable. Larvae probably graze on algae, whereas invertebrates are the most common food items of adult frogs. Vertebrates, such as Sierra chorus frogs (*Pseudacris sierra*) and California mice (*Peromyscus californicus*) are frequently eaten by larger frogs. Juvenile frogs are active both during the day and at night, whereas adult frogs are largely nocturnal.

There are 113 documented occurrences of CRLF within 10 miles of the Study Area, including one documented occurrence located partially within the Project Area and partially within the Offsite Infrastructure Areas (CDFW 2017). The occurrence in the Study Area was documented in 1998; adults and larvae were observed along Sand Creek within the northwestern portion of the Study Area.

The ponds/impoundments and large main channel pools within Sand Creek provide potential suitable breeding habitat for California red-legged frog. Sand Creek, other aquatic features, and the annual grassland within the Study Area provide suitable dispersal habitat for this species. CRLF is present within the Study Area.

There is no Critical Habitat for this species within the Study Area.

California Tiger Salamander

The Central Valley Distinct Population Segment (DPS) of California tiger salamander (CTS, *Ambystoma californiense*) was listed as threatened by USFWS on 4 August 2004 (Federal Register Vol. 69, No. 149: 47212). The Santa Barbara County and Sonoma County DPS, both of which are disjunct from the larger range of the salamander, are federally listed as endangered. As of August 19, 2010, the CTS is listed as a threatened species under the California ESA throughout its range. Populations at the north and south edges of the historical distribution are extirpated, many populations within the interior of the range have been lost, and abundance has been reduced in many areas. Large areas of habitat conversion to agriculture and urban infrastructure have caused extirpations throughout Central California. Conversion of ephemeral breeding waters to perennial ponds and streams allows the introduction of predators and competitors including fish, crayfish (*Procambarus clarkii*), American bullfrogs (*Lithobates catesbeianus*), and (in some locations) introduced tiger salamanders (*Ambystoma tigrinum*) (Ryan et al. 2009). Hybridization with introduced tiger salamanders is a major threat, and in some populations hybrid vigor is leading to landscape-scale conservation problems (Fitzpatrick and Shaffer 2007). The distribution of hybrid tiger salamanders has been increasing quickly, such that researchers are very concerned for the genetic integrity of native populations (Ryan et al. 2009). On August 23, 2005, the USFWS published a final rule designating Critical Habitat for the Central Population of CTS (Federal Register Vol. 70, No. 162:49380). Critical Habitat was designated in 19 counties within four geographic regions of the Central population, for a total of ±199,109 acres (80,576 ha). The Study Area is not designated as Critical Habitat for the CTS.

CTS is a member of the family Ambystomatidae, a group of salamanders confined to North America. This species is most commonly associated with intact annual grassland habitats and vernal pool landscapes but may also occur within open woodlands in low hills and valleys. CTS is endemic to

California's Central Valley from Yolo County south to Kern County, and from Santa Barbara County north through the inner Coast Range to Sonoma County (USFWS 2003b, USFWS 2015).

Necessary habitat components for CTS include intact open terrestrial landscapes used by adults for most of their life history, and ponded aquatic features where reproduction occurs. CTS spend most of their adult life within terrestrial subterranean refuges such as California ground squirrel or Botta's pocket gopher (*Thomomys bottae*) burrows (Stebbins 1972, Loredó et al. 1996). Foraging takes place within these subterranean refugia and out in the open at night or during rains. Suitable breeding sites include vernal pools, seasonal wetlands, stock ponds, or, rarely, slow-moving streams. They may use permanent manmade ponds if predatory species (e.g., fish, crayfish) are absent.

Adult California tiger salamanders are generally nocturnal and may migrate over long distances (up to 1.8 miles) from upland habitats to breeding ponds (Trenham and Shaffer 2005, Searcy and Shaffer 2008). Breeding and egg-laying typically occurs between November and February (Shaffer and Fisher 1991) following relatively warm rain events. Eggs are laid singly or in small clumps on both submerged and emergent vegetation and debris in shallow water (Stebbins 1972, Shaffer and Fisher 1991, Barry and Shaffer 1994, Jennings and Hayes 1994). Adult females will usually remain at the pond for only a few days following egg-laying, whereas adult males may stay for several weeks. Larvae feed upon various aquatic invertebrates and occasionally on larvae of other amphibian species. Salamander larvae metamorphose during late spring or early summer, usually by the first week of July. The minimum length of time required for egg-laying through metamorphosis (requiring continuous inundation) is 10 weeks, usually extending into April. However, 12 weeks is more typical.

There are 115 documented occurrences of CTS within 10 miles of the Study Area, including one documented occurrence located partially within the Project Area and partially within the Offsite Infrastructure Areas (CDFW 2017). The occurrence in the Study Area was documented in 1989 in the northwestern portion of the Study Area. No additional information is available regarding this documented occurrence.

The deeper depressional wetlands and ponds/impoundments within the Study Area provide suitable potential breeding habitat for this species. In addition, rodent burrows were observed within the annual grassland in the Study Area; therefore, the annual grasslands within the Study Area provide potential suitable dispersal habitat for CTS. CTS is present within the Study Area.

There is no Critical Habitat for this species within the Study Area.

Foothill Yellow-Legged Frog

The foothill yellow-legged frog (FYLF, *Rana boylei*) is not listed pursuant to the federal ESA but is a candidate for listing under the California ESA. It is also designated as a CDFW SSC. The species occurs in the Coast Ranges, from the Oregon border south to the Transverse Mountains in Los Angeles County, west of the Cascade crest in most of northern California, and in the Sierra Nevada foothills south to Kern County, from sea level to 6,000 feet (Stebbins, 1985). FYLF occupy rocky streams in valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow plant communities. The FYLF is a small [3.7 – 7.1 cm (1.5 – 2.8 inches)], highly aquatic frog that occurs almost exclusively in shallow, flowing streams with cobble substrates at elevations below 1,830 m (6,000 feet) (Stebbins 1985,

Jennings and Hayes 1994). They are rarely found far from water and will often dive into water to take refuge under rocks or sediment when disturbed (Zeiner et al., 1988).

There is one documented occurrence of FYLF within 10 miles of the Study Area (CDFW 2017). Sand Creek within the Study Area provides marginally suitable habitat for this species. Thus, FYLF has low potential to occur within the Study Area.

4.7.5 Reptiles

A total of seven special-status reptile species were identified as having the potential to occur within the Study Area based on the literature review (Table 4). However, upon further analysis and after the site visits, three species were considered to be absent from the Study Area due to the lack of suitable habitat. No further discussion of these species is provided in this analysis. Brief descriptions of the remaining four species that have the potential to occur within the Study Area are presented below.

Alameda Whipsnake

The Alameda whipsnake (*Masticophis lateralis euryxanthus*), also known as the Alameda striped racer, (*Coluber lateralis euryxanthus*) is a narrow, medium-sized (to 1.5 m), snake of the widespread family Colubridae (Ernst and Ernst 2003). Known from Alameda and Contra Costa counties, and tentatively in Santa Clara and San Joaquin counties (USFWS 2002), this snake is an isolated subspecies of the much more widespread California striped racer (*C. l. lateralis*), which is found throughout chaparral and foothill transition zones in California and northern Baja (Stebbins and McGinnis 2012). Because of its limited distribution and the extensive loss of habitat to residential development in Alameda and Contra Costa counties, in 1997 the Alameda whipsnake was listed as threatened under the federal ESA (1973 as amended). Preceding the federal listing, in 1971 California listed the Alameda whipsnake as threatened under the California ESA. Critical Habitat was designated in 2006 (71 FR No. 190, October 2). In total, approximately 154,800 acres (62,700 ha) of Critical Habitat was designated in Alameda, Contra Costa, Santa Clara, and San Joaquin counties.

The Alameda whipsnake is active and diurnal (Ernst and Ernst 2003). Like all Coluber, the Alameda whipsnake is an active forager and uses visual cues to a larger extent than many other snakes, and often forages with its head held high (Stebbins 2003). Although to some degree they are dietary generalists, eating frogs, snakes, birds, and mammals, the majority of their diet consists of lizards, particularly western fence lizard (*Sceloporus occidentalis*), whose activity cycles correspond with those of the whipsnake. Prey are tracked and may be actively run down, grabbed in the jaws, and swallowed alive (Stebbins 2003). No constriction is used, although loops of the body may be used to subdue prey while manipulating for swallowing.

This is a snake of foothills, chaparral, and scrub habitats in the eastern San Francisco Bay Area. Common microhabitat associations include rocky outcrops and talus slopes in an open or broken canopy, usually with a south-, southeastern-, southwestern- or northeast-facing aspect (Stebbins and McGinnis 2012). Alameda whipsnakes also use grasslands and oak woodlands, but the degree to which they use them, as well as the timing and duration of excursions into these habitats, is unknown. Even in grasslands and woodlands, rock outcrops are considered an essential feature of Alameda whipsnake habitat, as they provide retreats and positively favor lizard populations. They can often go into trees,

and may flee there when pursued (USFWS 2002). There is some evidence that their use of grasslands is higher in the spring (Swaim 1994).

There are 47 documented occurrences Alameda whipsnake within 10 miles of the Study Area (CDFW 2017). The annual grassland within the Study Area provides suitable dispersal habitat for this species. The Study Area and immediate vicinity lack coastal scrub and chaparral communities, which have been found to serve as the center of home ranges for the species (Swaim 1994). Although Alameda whipsnake have been found to utilize and disperse through annual grasslands, they are frequently found within 500 feet of coastal scrub and chaparral (Swaim 1994; Alvarez, Shea, and Murphy 2005). Alameda whipsnake have been found to use grasslands further from coastal scrub and chaparral, although this is less common. Since there is no coastal scrub or chaparral in the immediate vicinity of the Study Area, Alameda whipsnake has low potential to occur within the Study Area.

There is no Critical Habitat for this species within the Study Area.

Blainville's (Coast) Horned Lizard

Blainville's horned lizard (*Phrynosoma blainvillii*) is considered an SSC by CDFW. This species is a relatively large (to 105 mm in snout-vent length, dorsoventrally flattened, rounded lizard found historically from Redding, California, to Baja, Mexico (Jennings and Hayes 1994). Formally considered the coast horned lizard (*P. coronatum*), the species has gone through a long period of taxonomic instability (Jennings and Hayes 1994; Montanucci 2004, Leaché et al. 2009). This diurnal species can occur within a variety of habitats including scrubland, annual grassland, valley-foothill woodlands and coniferous forests, though it is most common along lowland desert sandy washes and chaparral (Stebbins 2003). In the Coast Ranges it occurs from Sonoma County south into Baja California (CDFG 1988). It occurs from sea level to 8,000 feet above MSL and an isolated population occurs in Siskiyou County (Stebbins 2003).

Like all horned lizards, Blainville's horned lizard is adorned with pointed and keeled scales, head spines, and parallel lateral fringes of scales, all of which serve to dissuade predators and aid in crypsis (Sherbrooke 2003). This is a ground-dwelling lizard, which does not use vertical structures except where they shade the ground (Stebbins and McGinnis 2012).

Blainville's horned lizard is found in open microhabitats such as sandy washes with scattered shrubs or firebreaks in chaparral, where they forage for ants, small beetles and other insects (Jennings and Hayes 1994). Horned lizards (*Phrynosoma*) are native ant specialists and daily activities are centered on above-ground activity patterns of ants, with lizards active generally in mornings and later in the afternoon in the summer. They generally emerge from hibernation in March or April, and are active until September or later. Mating takes place in April through early May (Jennings and Hayes 1994), and an average of 12 (but up to 21) eggs are laid from April to June (Stebbins and McGinnis 2012). Hatchlings 25–27 mm in length emerge from July through September (Stebbins and McGinnis 2012). Periods of daily or seasonal inactivity are spent within rodent burrows or underneath the soil or surface objects (CDFG 1988).

There are three documented occurrences of Blainville's horned lizard within 10 miles of the Study Area (CDFW 2017). However, the annual grassland within the Study Area provides only marginally suitable

habitat for this species. Thus, Blainville's horned lizard has low potential to occur within the Study Area.

Northwestern Pond Turtle

The northwestern pond turtle (*Actinemys marmorata*) is not listed pursuant to either the California or federal ESAs; however, it is designated as a CDFW SSC. Northwestern pond turtles occur in a variety of fresh and brackish water habitats including marshes, lakes, ponds, and slow moving streams (Jennings and Hayes 1994). This species is primarily aquatic; however, they typically leave aquatic habitats in the fall to reproduce and to overwinter (Jennings and Hayes 1994). Deep, still water with abundant emergent woody debris, overhanging vegetation, and rock outcrops are optimal for basking and thermoregulation. Although adults are habitat generalists, hatchlings and juveniles require shallow edgewater with relatively dense submergent or short emergent vegetation in which to forage. Northwestern pond turtles are typically active between March and November. Mating generally occurs during late April and early May and eggs are deposited between late April and early August (Jennings and Hayes 1994). Eggs are deposited within excavated nests in upland areas, with substrates that typically have high clay or silt fractions (Jennings and Hayes 1994). The majority of nesting sites are located within 650 feet (200 m) of the aquatic sites; however, nests have been documented as far as 1,310 feet (400 m) from the aquatic habitat.

There are 31 documented occurrences of northwestern pond turtle within 10 miles of the Study Area (CDFW 2017). Sand Creek and the ponds/impoundments within the Study Area provide suitable habitat for this species. Thus, northwestern pond turtle has potential to occur within the Study Area.

Silvery Legless Lizard

The silvery legless lizard (*Anniella pulchra pulchra*) is one of five species of legless lizard in California (Papenfuss and Parham 2013). This species is not listed pursuant to the California or Federal ESAs, but is designated as a CDFW SSC. Although lacking legs, the legless lizards (*Anniella*) are decidedly lizards as shown by their eyelids, which are lacking in all snakes. Like snakes, however, these species lack external ear openings. The species ranges from sites in and around Antioch, in the East Bay, south to northern San Luis Obispo County.

There are six documented occurrences of silvery legless lizard within 10 miles of the Study Area (CDFW 2017). However, the annual grasslands within the Study Area provide only marginally suitable habitat for this species. Thus, the silvery legless lizard has low potential to occur within the Study Area.

4.7.6 Birds

A total of 21 special-status bird species were identified as having the potential to occur within the Study Area based on the literature review (Table 4). However, upon further analysis and after the site visits, nine species were considered to be absent from the Study Area due to the lack of suitable habitat. No further discussion of these species is provided in this analysis.

ECORP biologists observed two special-status bird species, prairie falcon (*Falco mexicanus*) and Swainson's hawk (*Buteo swainsoni*), foraging in the vicinity of the Study Area during the 2017 site visits. M&A observed Swainson's hawk foraging during their Project Area site visits from 2013 to 2015 (M&A 2015). They also observed one lone burrowing owl along the banks of Sand Creek during the

fall and winter months; burrowing owls were not observed within the Project Area in the spring or summer months (M&A 2015). Brief descriptions of the 12 species that are present or have the potential to occur within the Project Area and/or Offsite Infrastructure Areas are presented below.

Burrowing Owl

The burrowing owl (*Athene cunicularia*) is not listed pursuant to either the federal or California ESAs; however, it is designated as a BCC by USFWS and an SSC by CDFW. Burrowing owls inhabit dry open rolling hills, grasslands, desert floors, and open bare ground with gullies and arroyos. They can also inhabit developed areas such as golf courses, cemeteries, road sides within cities, airports, vacant lots in residential areas, school campuses, and fairgrounds (Poulin et al. 2011). This species typically uses burrows created by fossorial mammals, most notably the California ground squirrel, but may also use manmade structures such as cement culverts or pipes; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement (CDFG 2012). The breeding season typically occurs between February 1 and August 31 (CDFG 2012).

There are 75 documented occurrences of burrowing owl within 10 miles of the Study Area (CDFW 2017). M&A observed one lone burrowing owl along the banks of Sand Creek during the fall and winter months from 2013 to 2015; burrowing owls were not observed nesting within the Project Area in the spring or summer months (M&A 2015). Burrowing owl is present wintering within the Project Area and has potential to winter within the Offsite Infrastructure Areas. Burrows within the annual grassland and ruderal areas in the Study Area provide suitable nesting habitat for this species. Burrowing owl has potential to nest within the Study Area.

California Horned Lark

The horned lark (*Eremophila alpestris*) is widely distributed throughout North America with 21 recognized subspecies (American Ornithologists' Union 1957). The California horned lark (*E. a. actia*) is one of approximately nine subspecies that breeds and/or winters in California, and is found in the Coast Range and southern San Joaquin Valley south into northern Baja California (Beason 1995). The California horned lark is resident and non-migratory. They are found in grasslands and other open habitats with sparse vegetation. Nests are grass-lined and built on the ground. Breeding season includes March through July, with a peak of activity in May.

There are no documented occurrences of California horned lark within 10 miles of the Study Area (CDFW 2017). However, because the annual grassland in the Study Area provides suitable nesting habitat for this species, California horned lark has potential to occur within the Study Area.

Ferruginous Hawk

Ferruginous hawks (*Buteo regalis*) are not listed pursuant to either the California or federal ESAs. However, they are a CDFW watch list species and USFWS BCC. This species typically occurs in open environments and nests from Oregon to Canada, though nesting has recently been documented in Lassen County, California (Small 1994). For the remainder of the state, including the Central Valley, ferruginous hawk occurrences are restricted to the nonbreeding season (approximately September through March) (Small 1994). Winter foraging habitat includes a variety of open communities including annual grasslands, agricultural areas, deserts, and savannahs. Ferruginous hawks do not nest in the

region but may occasionally forage within grassland and other open vegetation communities within the Study Area during winter or migration.

There is one documented occurrence of ferruginous hawk within 10 miles of the Study Area (CDFW 2017). The annual grassland in the Study Area provides suitable winter foraging habitat for this species, although the Study Area is outside of the nesting range of this species. Ferruginous hawk has potential to migrate through or winter within the Study Area.

Golden Eagle

The golden eagle (*Aquila chrysaetos*) is not listed pursuant to either the California or federal ESAs. However, it is fully protected according to § 3511 of the California Fish and Game Code and the federal Bald and Golden Eagle Protection Act. Golden eagles generally nest on cliff ledges and/or large lone trees in rolling to mountainous terrain. Golden eagles nest throughout California except the Central Valley, the immediate coast, and portions of southeastern California (Kochert et al 2002). Occurrences within the Central Valley are usually dispersing post-breeding birds, non-breeding sub-adults, or migrants. Foraging habitat includes open grassland and savannah. Nesting occurs during February through August.

There are 11 documented occurrences of golden eagle within 10 miles of the Study Area (CDFW 2017). Trees within the annual grassland in the Study Area provide suitable nesting habitat for this species. Thus, the golden eagle has potential to occur within the Study Area.

Grasshopper Sparrow

The grasshopper sparrow (*Ammodramus savannarum*) is not listed pursuant to either the California or federal ESAs, but it is designated as an SSC by CDFW. The grasshopper sparrow is an uncommon and local summer resident and breeder along the western edge of the Sierra Nevada and most coastal counties south to Baja California (Small 1994, Vickery 1996). This species generally inhabits moderately open grasslands and prairies with patchy bare ground and scattered shrubs (Vickery 1996). Grasshopper sparrows are more likely to occupy large tracts of habitat than small fragments (Samson 1980, Herkert 1994, Vickery et al. 1994 as cited in Vickery 1996). Breeding generally occurs from early May through August.

There are no documented occurrences of grasshopper sparrow within 10 miles of the Study Area (CDFW 2017). However, because the annual grassland within the Study Area provides suitable nesting habitat for this species the grasshopper sparrow has potential to occur within the Study Area.

Loggerhead shrike

The loggerhead shrike (*Lanius ludovicianus*) is not listed pursuant to either the federal or California ESAs, but is considered a BCC by USFWS and an SSC by CDFW. Loggerhead shrikes nest throughout California except the northwestern corner, montane forests, and high deserts (Small 1994). Loggerhead shrikes nest in small trees and shrubs in open country with short vegetation such as pastures, old orchards, mowed roadsides, cemeteries, golf courses, agricultural fields, riparian areas, and open woodlands (Yosef 1996). The nesting season extends from March through June.

There is one documented occurrence of loggerhead shrike within 10 miles of the Study Area (CDFW 2017). Shrubs and trees within the annual grassland in the Study Area provide suitable nesting habitat for this species; thus, the loggerhead shrike has potential to occur within the Study Area.

Northern Harrier

The northern harrier (*Circus cyaneus*) is not listed pursuant to either the California or federal ESAs; however, it is considered to be an SSC by CDFW. This species is known to nest within the Central Valley, along the Pacific Coast, and in northeastern California. The northern harrier is a ground-nesting species and typically nests in emergent wetland/marsh, open grasslands, or savannah communities usually in areas with dense vegetation (Smith et al. 2011). Foraging occurs within a variety of open environments such as marshes, agricultural fields, and grasslands. Nesting occurs during April through September.

There are no documented occurrences of northern harrier within 10 miles of the Study Area (CDFW 2017). Wetlands and annual grassland within the Study Area provide suitable nesting habitat for this species. Northern harrier has potential to occur within the Study Area.

Prairie Falcon

Prairie falcons are not listed pursuant to either the California or federal ESAs; however, they are considered to be a CDFW watch list species and a USFWS BCC. The breeding distribution of prairie falcons includes the entire state except the extreme northwestern part of the state and coastal areas (Steenhof 2013). Nesting occurs during March through July. However, prairie falcons have not been documented to nest in the Central Valley but may occur as migrants and wintering birds. They nest primarily on shelves, ledges, or potholes in cliffs, but may also use trees, power line structures, buildings, mine highwalls, caves, or stone quarries (Steenhof 2013). Breeding habitat includes open habitat at all elevation up to 3,350m in arid plains and stepped, wherever cliffs or bluffs are present (Steenhof 2013). Nesting occurs during March through July.

There are seven documented occurrences of prairie falcon within 10 miles of the Study Area (CDFW 2017). A prairie falcon was observed flying overhead by ECORP biologists during the 2017 Study Area site visits. The annual grassland in the Study Area provides suitable migration or winter foraging habitat for this species, although the Study Area does not provide suitable nesting habitat. Prairie falcon is present migrating through or wintering within the Study Area; however, this species does not nest in this region.

Short-Eared Owl

Short-eared owls (*Asio flammeus*) are not listed pursuant to either the California or federal ESAs, but is designated as an SSC by CDFW. The breeding range of this species extends from Alaska south to central California, including the San Francisco Bay region and irregularly in the Sacramento Valley (Holt and Leasure 2006). In the Central Valley, short-eared owls are a wintering species. Wintering habitat includes large open areas within woodlots, weedy areas, stubble fields, and marsh and shrub thickets. Nesting occurs during March through July.

There are no documented occurrences of short-eared owl within 10 miles of the Study Area (CDFW 2017). The annual grassland in the Study Area provides suitable winter foraging habitat for this

species, although the Study Area does not provide suitable nesting habitat. Short-eared owl has potential to migrate through or winter within the Study Area.

Swainson's Hawk

Swainson's hawk is listed as a threatened species and is protected pursuant to the California ESA. This species nests in North America (Canada, western United States, and Mexico) and typically winters from South America north to Mexico. However, a small population has been observed wintering in the Sacramento-San Joaquin River Delta (Bechard et al. 2010). In California, the nesting season for Swainson's hawk ranges from mid-March to late August.

Swainson's hawks nest within tall trees in a variety of wooded communities including riparian, oak woodland, roadside landscape corridors, urban areas, and agricultural areas, among others. Foraging habitat includes open grassland, savannah, low-cover row crop fields, and livestock pastures. In the Central Valley, Swainson's hawks typically feed on a combination of California vole (*Microtus californicus*), California ground squirrel, ring-necked pheasant (*Phasianus colchicus*), many passerine birds, and grasshoppers (*Melanoplus* species). Swainson's hawks are opportunistic foragers and will readily forage in association with agricultural mowing, harvesting, discing, and irrigating (Estep 1989). The removal of vegetative cover by such farming activities results in more readily available prey items for this species.

There are 28 documented occurrences of Swainson's hawk within 10 miles of the Study Area (CDFW 2017). M&A observed Swainson's hawk foraging during their Project Area site visits from 2013 to 2015 (M&A 2015). A Swainson's hawk was also observed flying overhead by ECORP biologists during the 2017 Study Area site visits. The annual grassland and large trees within the Study Area provide suitable foraging and nesting habitat for this species. Swainson's hawk is present foraging within the Study Area and has potential to nest within the Study Area.

Tricolored Blackbird

The tricolored blackbird (TRBL, *Agelaius tricolor*) was granted emergency listing for protection under the California ESA in December 2014 but the listing status was not renewed in June 2015. It is currently considered a candidate for listing under the California ESA and undergoing a status review by the CDFW. It is currently considered a USFWS BCC and is designated as an SSC by CDFW. This colonial nesting species is distributed widely throughout the Central Valley, Coast Range, and into Oregon, Washington, Nevada, and Baja California (Meese et al. 2014). TRBL nest in colonies that can range from several pairs to several thousand pairs, depending on prey availability, the presence of predators, or level of human disturbance. TRBL nesting habitat includes emergent marsh, riparian woodland/scrub, blackberry thickets, densely vegetated agricultural and idle fields (e.g., wheat, triticale, safflower, fava bean fields, thistle, mustard, cane, and fiddleneck), usually with some nearby standing water or ground saturation (Meese et al. 2014). They feed mainly on grasshoppers during the breeding season, but may also forage upon a variety of other insects, grains, and seeds in open grasslands, wetlands, feedlots, dairies, and agricultural fields (Meese et al. 2014). The nesting season is generally from March through August.

There are five documented occurrences of TRBL within 10 miles of the Study Area (CDFW 2017). The annual grassland within the Study Area provides marginally suitable foraging habitat, although the

Study Area does not provide suitable nesting habitat. TRBL has low potential to occur within the Study Area.

White-Tailed Kite

White-tailed kite (*Elanus leucurus*) is not listed pursuant to either the federal or California ESAs; however, the species is fully protected pursuant to § 3511 of the California Fish and Game Code. This species is a common resident in the Central Valley and the entire length of the California coast, and all areas up to the Sierra Nevada foothills and southeastern deserts (Dunk 1995). In northern California, white-tailed kite nesting occurs from March through early August, with nesting activity peaking from March through June. Nesting occurs in trees within riparian, oak woodland, savannah, and agricultural communities that are near foraging areas such as low elevation grasslands, agricultural, meadows, farmlands, savannahs, and emergent wetlands (Dunk 1995).

There are four documented occurrences of white-tailed kite within 10 miles of the Study Area (CDFW 2017). The annual grassland and large trees within the Study Area provide suitable nesting habitat for this species. White-tailed kite has potential to occur within the Study Area.

4.7.7 Mammals

A total of nine special-status mammal species were identified as having the potential to occur within the Study Area based on the literature review (Table 4). However, upon further analysis and after the site visits, two species were considered to be absent from the Study Area due to the lack of suitable habitat. No further discussion of these species is provided in this analysis. Brief descriptions of the remaining seven species that have the potential to occur within the Study Area are presented below.

American Badger

The American badger (*Taxidea taxus*) is designated as an SSC by CDFW. The species historically ranged throughout much of the state except in humid coastal forests. Badgers were once numerous in the Central Valley; however, populations now occur in low numbers in the surrounding peripheral parts of the valley and in the adjacent lowlands of eastern Monterey, San Benito, and San Luis Obispo counties (Williams 1986). Badgers occupy a variety of habitats, including grasslands and savannas. The principal requirements seem to be significant food supply friable soils, and relatively open uncultivated ground (Williams, 1986).

There are five documented occurrences of American badger within 10 miles of the Study Area (CDFW 2017). The annual grassland within the Study Area provides suitable habitat for this species. American badger has potential to occur within the Study Area.

Pallid Bat

The pallid bat (*Antrozous pallidus*) is not listed pursuant to either the federal or California ESAs; however, this species is considered an SSC by CDFW. The pallid bat is a large, light-colored bat with long, prominent ears and pink, brown, or grey wing and tail membranes. This species ranges throughout North America from the interior of British Columbia, south to Mexico, and east to Texas. The pallid bat inhabits low elevation (below 6,000 feet) rocky arid deserts and canyonlands, shrub-steppe grasslands, karst formations, and higher elevation coniferous forest (above 7,000 feet). This

species roosts alone or in groups in the crevices of rocky outcrops and cliffs, caves, mines, trees, and in various human structures such as bridges, and barns. Pallid bats are feeding generalists that glean a variety of arthropod prey from surfaces as well as capturing insects on the wing. Foraging occurs over grasslands, oak savannahs, ponderosa pine forests, talus slopes, gravel roads, lava flows, fruit orchards, and vineyards. Although this species utilizes echolocation to locate prey, often they use only passive acoustic cues. This species is not thought to migrate long distances between summer and winter sites (WBWG 2017).

There are three documented occurrences of pallid bat within 10 miles of the Study Area (CDFW 2017). Trees and structures within the Study Area provide suitable roosting habitat for this species. Pallid bat has potential to occur within the Study Area.

Ringtail

Ringtail is not listed pursuant to the federal or California ESAs, but is designated as Fully Protected in California by CDFW. This is a smallish procyonid, related to the widespread raccoon (*Procyon lotor*) and neotropical white-nosed coati (*Nasua narica*). Ringtails are mesocarnivores of riparian areas, especially with abundant rocky outcrops, in low- to middle elevation drainages in blue oak woodlands, foothill pine/oak forests, chaparral, ponderosa pine woodlands, black oak woodlands, riparian deciduous forests, and mixed coniferous forest (Verner and Boss 1980). Highly nocturnal, ringtails consume small rodents, snakes, birds and their eggs, invertebrates, and some fruits, nuts, and carrion (Zeiner et al. 1990b).

There are no documented occurrences of ringtail within 10 miles of the Study Area because ringtail is not tracked by the CNDDDB (CDFW 2017). Trees along Sand Creek within the Study Area provide marginally suitable habitat for this species. Ringtail has potential to occur within the Study Area.

San Joaquin Kit Fox

The San Joaquin kit fox is listed as threatened under the California ESA and as endangered under the federal ESA. Although the precise historical range of the San Joaquin kit fox is unknown, Grinnell et al. (1937) believed that prior to 1930, San Joaquin kit fox occupied most of the San Joaquin Valley from southern Kern County north to Tracy, San Joaquin County, on the west side, and near La Grange, Stanislaus County, on the east side. Since then the San Joaquin kit fox population has declined primarily as a result of habitat loss to agricultural, urban, industrial and mineral development in the San Joaquin Valley. San Joaquin kit fox has been listed as endangered for over 30 years; yet despite the loss of habitat and apparent decline in numbers since the early 1970s, there has never been a comprehensive survey of its entire range or habitat that was once thought to be occupied (USFWS 1983; Morrell 1975). Despite the lack of a comprehensive data set, local surveys, research projects and incidental sightings indicate that kit foxes currently inhabit some areas of suitable habitat on the San Joaquin Valley floor and in the surrounding foothills of the coastal ranges, Sierra Nevada, and Tehachapi Mountains, from southern Kern County north to Contra Costa, Alameda, and San Joaquin Counties on the west, and near La Grange, Stanislaus County on the east side of the Valley (Williams in litt. 1990), and some of the larger scattered islands of natural land on the Valley floor in Kern, Tulare, Kings, Fresno, Madera, and Merced Counties (USFWS 1998).

In the southern portion of the range, the kit fox is commonly associated with Valley Sink Scrub, Valley Saltbush Scrub, Upper Sonoran Subshrub Scrub, and Annual Grassland. Kit foxes also inhabit grazed grasslands, petroleum fields (Morrell 1971, O'Farrell 1980), and survive adjacent to tilled or fallow fields (Jensen 1972, Ralls and White 1991). In the central portion of the range, which includes Madera County, the kit fox is associated with Valley Sink Scrub, Interior Coast Range Saltbush Scrub, Upper Sonoran Subshrub Scrub, Annual Grassland and the remaining native grasslands. Agriculture dominates this region where kit foxes mostly inhabit grazed, non-irrigated grasslands, but also live next to and forage in tilled or fallow fields, irrigated row crops, orchards, and vineyards (USFWS 1998). In the northern portion of their range, kit foxes commonly are associated with annual grassland (Hall 1983) and Valley Oak Woodland (Bell 1994). Kit foxes inhabit grazed grasslands, grasslands with wind turbines, and also live adjacent to and forage in tilled and fallow fields, and irrigated row crops (Bell 1994). They usually inhabit areas with loose-textured (friable) soils, suitable for den excavation (USFW 1983). Where soils make digging difficult, the foxes frequently use and modify burrows built by other animals (Orloff et al. 1986). Structures such as culverts, abandoned pipelines, and well casings also may be used as den sites (USFWS 1983).

Kit foxes are primarily nocturnal and carnivorous, but are commonly seen during the day in the late spring and early summer (Orloff et al. 1986). Major prey includes kangaroo rats, black-tailed hares, desert cottontails, deer mice, California ground squirrels, ground nesting birds, and insects (Scrivener et al. 1987).

There are 17 documented occurrences of San Joaquin kit fox within 10 miles of the Study Area (CDFW 2017). Annual grassland and ruderal areas within the Study Area provide suitable habitat for this species. San Joaquin kit fox has potential to occur within the Study Area.

Townsend's Big-Eared Bat

The Townsend's big-eared bat (*Corynorhinus townsendii*) is not listed pursuant to either the federal or California ESAs; however, this species is considered an SSC by CDFW. Townsend's big-eared bat is a fairly large bat with prominent bilateral nose lumps and large rabbit-like ears. This species occurs throughout the west and ranges from the southern portion of British Columbia south along the Pacific coast to central Mexico and east into the Great Plains. This species has been reported from a wide variety of habitat types and elevations from sea level to 10,827 feet. Habitats used include coniferous forests, mixed mesophytic forests, deserts, native prairies, riparian communities, active agricultural areas, and coastal habitat types. Its distribution is strongly associated with the availability of caves and cave-like roosting habitat including abandoned mines, buildings, bridges, rock crevices, and hollow trees. This species is readily detectable when roosting due to their habit of roosting pendant-like on open surfaces. Townsend's big-eared bat is a moth specialist with over 90 percent of its diet composed of Lepidoptera. Foraging habitat is generally edge habitats along streams adjacent to and within a variety of wooded habitats. This species often travels long distances when foraging and large home ranges have been documented in California (WBWG 2017).

There are two documented occurrences of Townsend's big-eared bat within 10 miles of the Study Area (CDFW 2017). Trees and structures within the Study Area provide suitable roosting habitat for this species. Townsend's big-eared bat has potential to occur within the Study Area.

Greater Mastiff Bat

The greater mastiff bat (*Eumops perotis californicus*) is not listed pursuant to either the California or federal Endangered Species Acts; however, this species is considered a species of special concern by CDFW (CDFW 2017). The greater mastiff bat is the largest North American molossid (free-tailed bat) with a forearm length of 73-83 mm. This species has a disjunct distribution and ranges from central Mexico across the southwestern United States, and throughout California to within a few miles of the Oregon border. The greater mastiff bat can be found in a variety of habitats, including desert scrub, chaparral, oak woodland, the ponderosa pine belt, and at high elevation meadows and mixed conifer forests. This species is primarily a cliff-dwelling species and roosting colonies are generally found on under exfoliating rock slabs. Roosts have also been identified in similar crevices in large boulders and buildings. Foraging has been documented as high as 2000 feet above the ground, although 100 to 200 feet is more typical. This species is most commonly encountered in open broad open areas including dry desert washes, flood plains, chaparral, oak woodland, open ponderosa pine forest, grassland, and agricultural areas. The diet of the greater mastiff bat consists primarily of moths, but also includes beetles, crickets, and katydids (WBWG 2017).

There are no documented occurrences of greater mastiff bat within 10 miles of the Study Area (CDFW 2017). Structures within the Project Area provide marginally suitable roosting habitat for this species, however the Offsite Infrastructure Areas do not provide suitable roosting habitat. Greater mastiff bat has low potential to occur within the Project Area.

Western Red Bat

The western red bat (*Lasiurus blossevillii*) is not listed pursuant to either the California or federal ESAs; however, this species is considered an SSC by CDFW. The western red bat is easily distinguished from other western bat species by its distinctive red coloration. This species is broadly distributed, its range extending from southern British Columbia in Canada through Argentina and Chile in South America, and including much of the western United States. This solitary species day roosts primarily in the foliage of trees or shrubs in edge habitats bordering streams or open fields, in orchards, and occasionally urban areas. They may be associated with intact riparian habitat, especially with willows, cottonwoods, and sycamores. This species may occasionally utilize caves for roosting as well. They feed on a variety of insects, and generally begin to forage one to two hours after sunset. This species is considered highly migratory; however, the timing of migration and the summer ranges of males and females may be different. Winter behavior of this species is poorly understood (WBWG 2017).

There is one documented occurrence of western red bat within 10 miles of the Study Area (CDFW 2017). Trees within the Study Area provide suitable roosting habitat for this species. Western red bat has potential to occur within the Study Area.

4.8 Wildlife Movement/Corridors

The annual grassland within the Project Area provides a large area of open space along a creek (Sand Creek). The annual grassland and Sand Creek may be used by both aquatic and terrestrial species as a wildlife movement corridor. A large portion of the annual grassland within the Project Area will be converted to development; however, wildlife that use the annual grassland as a movement corridor will be able to use the Sand Creek corridor or the annual grassland surrounding the Project Area for

dispersal. The Sand Creek corridor will not be developed for the Project. Two bridges (a vehicular bridge and a pedestrian bridge) over Sand Creek are planned, but the bridges will not impede wildlife movement. The Offsite Infrastructure Areas are small, disjunct areas along existing roads and infrastructure and are not likely used as major wildlife movement corridors.

5.0 PROJECT IMPACTS AND RECOMMENDATIONS

5.1 City of Antioch General Plan

The Project proponent will collaborate with the City of Antioch to ensure the Project is compliant with the General Plan's biological resources policies.

5.2 City of Antioch Tree Ordinance

Approximately 181 of the 255 trees identified within the Project Area are indigenous trees as identified in the City of Antioch Tree Ordinance (City of Antioch 2017; Brennan 2015). The indigenous trees in the Project Area consist of native oaks (coast live oak, blue oak, valley oak, and interior live oak) and California buckeye (Brennan 2015). There are also various planted and ornamental trees such blue gum eucalyptus, manna gum (*Eucalyptus viminalis*), black locust (*Robinia pseudoacacia*), and others (Brennan 2015). Some of these planted and ornamental trees are protected under the City of Antioch Tree Ordinance as "mature trees" or "landmark trees" because they are over 26 inches dbh or 48 inches dbh, respectively (City of Antioch 2017; Brennan 2015).

Although a tree survey was not conducted for the Offsite Infrastructure Areas, trees that would be protected under the City of Antioch Tree Ordinance were observed during the site visit. In particular, several large eucalyptus trees and several indigenous oak trees were observed.

The Project is not currently proposing to remove protected trees. However, if any protected trees within the Study Area (i.e., indigenous trees, street trees, mature trees, and/or landmark trees) require removal due to Project-related activities, a tree permit/authorization must be acquired from the City of Antioch. It is recommended that grade cuts and fills, hardscapes, structures, and utility lines be located outside of the drip line of any trees being preserved within the Study Area.

5.2.1 Impact Determination

Implementation of the mitigation measures described above would reduce potentially adverse impacts to protected trees to a less-than-significant level. Therefore, these impacts are less than significant with mitigation incorporated.

5.3 Wildlife

Native wildlife species were observed within the Study Area and likely use the Study Area for foraging, dispersal, nesting, permanent residence, etc. Although the Project will result in permanent disturbance of annual grassland, the Project proponent is proposing to preserve two mitigation properties of comparable habitat value. These mitigation properties will serve to offset impacts to native wildlife species. In addition, within the Project Area, Sand Creek Corridor will be almost entirely preserved as open space. Two bridges (a vehicular bridge and a pedestrian bridge) over Sand Creek are planned,

but the bridges will not impede wildlife movement and will provide suitable dispersal habitat through the Project Area.

5.3.1 Impact Determination

Implementation of the mitigation measures described above would reduce potentially adverse impacts to native wildlife species to a less-than-significant level. Therefore, these impacts are less than significant with mitigation incorporated.

5.4 Waters of the U.S. and State

5.4.1 Project Area

A total of 3.948 acres of Waters of the U.S. have been mapped and verified by USACE within the Project Area (USACE 2016). This includes 1.901 acres of intermittent tributary (Sand Creek), 0.340 acre of ephemeral tributary (tributaries to Sand Creek), 1.372 acres of impoundment, 0.303 acre of seasonal wetland pool, and 0.030 acre of wetland seep (Figure 5; USACE 2016).

The following measures are recommended to minimize potential impacts to Waters of the U.S.:

- A permit authorization to fill wetlands under the Section 404 of the federal CWA (Section 404 Permit) must be obtained from USACE prior to discharging any dredged or fill materials into any Waters of the U.S. Mitigation measures will be developed as part of the Section 404 Permit to ensure no net loss of wetland function and values. An application for a Section 404 Permit for the Project will be prepared and submitted to USACE, and will include an assessment of directly impacted, avoided, and preserved acreages to Waters of the U.S. Mitigation for direct impacts to Waters of the U.S. within the Project Area would occur at a minimum of 1:1 ratio for direct impacts; however, final mitigation requirements will be developed in consultation with USACE.
- A Water Quality Certification or waiver pursuant to Section 401 of the CWA must be obtained for Section 404 permit actions.

An additional 1.111 acres of Waters of the U.S. were verified by USACE as non-jurisdictional wetlands/Waters within the Project Area (USACE 2016). This includes 0.132 acre of non-tributary ephemeral drainage, 0.286 acre of isolated wetland drainage, 0.588 acre of isolated seasonal wetland pool, and 0.105 acre of non-wetland seasonal pool (Figure 5; USACE 2016).

The following measures are recommended to minimize potential impacts to Waters of the State (i.e., wetlands/Waters of the U.S. that were considered as non-jurisdictional by USACE):

- Pursuant to the Porter-Cologne Water Quality Act, a permit authorization from the RWQCB is required prior to the discharge of material in an area that could affect Waters of the State. Mitigation requirements for discharge to Waters of the State within the Project Area will be developed in consultation with the RWQCB.
- Features that may be subject to CDFW Section 1602 jurisdiction were identified in the Project Area (e.g., intermittent tributary [Sand Creek], ephemeral tributaries, and non-tributary ephemeral drainages) (USACE 2016). The following measure is recommended to minimize potential impacts to the bed, bank, or channel of rivers, streams, or lakes within the Project Area:

- An SAA pursuant to Section 1602 of the California Fish and Game Code must be obtained for any activity that will impact the bed, bank, or channel of any river, stream or lake. Mitigation measures will be developed during consultation with CDFW as part of the SAA permit process to ensure protections for affected fish and wildlife resources.
- The Project will be designed to maintain pre-Project flows and prevent sedimentation downstream of the Project.
- Potential light and noise impacts to Sand Creek will be minimized through the use of setback buffers (minimum of 50 feet) as well as native plantings and landscaping. Lights will be directed and/or shaded away from Sand Creek. The vehicular bridge crossing over Sand Creek will have native plantings to reduce light pollution.

5.4.2 Offsite Infrastructure Areas

A total of 0.692 acre of potential Waters of the U.S. has been mapped within the Offsite Infrastructure Areas. This includes ±0.141 acre of seasonal wetland, 0.099 acre of seasonal wetland swale, 0.135 acre of intermittent drainage, 0.043 acre of ephemeral drainage, 0.041 acre of ditch, and 0.233 acre of pond (Figure 6a-c). Prior to any impacts to these features, a request for a jurisdictional determination for the Offsite Infrastructure Areas will need to be prepared and submitted to USACE for verification. If any potential Waters of the U.S. and State would be impacted by the infrastructure improvements, the following measures would be recommended to minimize potential impacts to Waters of the U.S.:

- A permit authorization to fill wetlands under the Section 404 of the federal CWA (Section 404 Permit) must be obtained from USACE prior to discharging any dredged or fill materials into any Waters of the U.S. Mitigation measures will be developed as part of the Section 404 Permit to ensure no net loss of wetland function and values. If impacts to verified Waters of the U.S. will occur, an application for a Section 404 Permit for the Offsite Infrastructure Areas will be prepared and submitted to USACE and will include an assessment of directly impacted, avoided, and preserved acreages to Waters of the U.S. within the Offsite Infrastructure Areas. Mitigation for direct impacts to Waters of the U.S. within the Offsite Infrastructure Area is proposed at a minimum 1:1 ratio, however final mitigation requirements will be developed in consultation with USACE.
- A Water Quality Certification or waiver pursuant to Section 401 of the CWA must be obtained for Section 404 permit actions from the Regional Water Quality Control Board. If Waters of the State are present, (i.e., wetlands/Waters of the U.S. that were considered non-jurisdictional by USACE), Waste Discharge Requirements or a waiver from RWQCB under the Porter-Cologne Water Quality Act will be required prior to the discharge of material in an area that could affect Waters of the State. Mitigation requirements for discharge to Waters of the State within the Offsite Infrastructure Areas will be developed in consultation with the RWQCB.
- An SAA pursuant to Section 1602 of the California Fish and Game Code must be obtained for any activity that will impact the bed, bank, or channel of any river, stream or lake. If the offsite infrastructure improvements will impact features pursuant to Section 1602, mitigation measures will be developed during consultation with CDFW as part of the SAA permit process to ensure protections for affected fish and wildlife resources.

- The Project will be designed to maintain pre-Project flows and prevent sedimentation downstream of the Project.
- Potential light and noise impacts to Sand Creek within the Offsite Infrastructure Areas will be minimized through the use of setback buffers as well as native plantings and landscaping. Lights will be directed and/or shaded away from Sand Creek.

5.4.3 Impact Determination

Implementation of the mitigation measures described above in sections 5.4.1 and 5.4.2 would reduce potentially adverse impacts to waters of the U.S. and State to a less-than-significant level. Therefore, these impacts are less than significant with mitigation incorporated.

5.5 Special-Status Species

5.5.1 Plants

Thirty-eight special-status plant species (large-flowered fiddleneck, California androsace, alkali milk-vetch, heartscale, crownscale, brittlescale, big tarplant, round-leaved filaree, Mt. Diablo fairy-lantern, Oakland start-tulip, Congdon's tarplant, serpentine collomia, Hoover's cryptantha, recurved larkspur, dwarf downingia, Mount Diablo buckwheat, Jepson's coyote thistle, spiny-sealed button-celery, diamond-petaled California poppy, San Joaquin spearscale, stinkbells, fragrant fritillary, Diablo helianthella, hogwallow starfish, Brewer's western flax, Carquinez goldenbush, Contra Costa goldfields, showy golden madia, woodland woolythreads, Tehama navarretia, adobe navarretia, shining navarretia, bearded popcornflower, California alkali grass, Lobb's aquatic buttercup, Keck's checkerbloom, most beautiful jewelflower, Mt. Diablo jewelflower, and caper-fruited tropidocarpum) have potential to occur within the Offsite Infrastructure Areas. No special-status plant surveys have been conducted in the Offsite Infrastructure Areas.

Three special-status plant species (shining navarretia, crownscale, and San Joaquin spearscale) were identified in the Project Area during the 2015 protocol-level rare plant surveys (M&A 2015). One special-status plant species (Carquinez goldenbush) has a bloom period outside of M&A's survey dates and has low potential to occur within the Project Area.

The following measures are recommended to minimize potential impacts to special-status plants:

- Special-status plant species were identified within the Project Area; therefore, if feasible, it is recommended that avoidance zones around plant populations be established to clearly demarcate areas for avoidance. If the populations cannot be avoided, seed collection, transplantation, and/or other mitigation measures may be developed in consultation with the CEQA Lead Agency to reduce impacts to the identified special-status plant populations.
- Prior to construction a qualified botanist will conduct protocol-level floristic surveys for Carquinez goldenbush within the Project Area. The surveys shall be conducted during the appropriate bloom period. If Carquinez goldenbush is found during the surveys within the Project Area and avoidance of the species is not possible, seed collection, transplantation, and/or other mitigation measures may be developed in consultation with appropriate resource agencies to reduce impacts to special-status plant populations.

- Special-status plant surveys have not been conducted for the Offsite Infrastructure Areas. Therefore, focused special-status plant surveys of the Offsite Infrastructure Areas are recommended. Focused surveys should be performed according to USFWS, CDFW, and CNPS protocols. Surveys should be timed according to the blooming period for target species and known reference populations, if available, and/or local herbaria should be visited prior to surveys to confirm the appropriate phenological state of the target species.
- If special-status plant species are found during future surveys in the Offsite Infrastructure Areas, avoidance zones may be established around plants to clearly demarcate areas for avoidance. Avoidance measures and buffer distances may vary between species and the specific avoidance zone distance will be determined in coordination with appropriate resource agencies (i.e., CDFW, USFWS, and/or the CEQA Lead Agency).
- If special-status plant species are found during future surveys within the Offsite Infrastructure Areas and avoidance of the species is not possible, seed collection, transplantation, and/or other mitigation measures may be developed in consultation with appropriate resource agencies to reduce impacts to special-status plant populations.
- If no special-status plants are found within the Offsite Infrastructure Areas, no further measures pertaining to special-status plants in the Offsite Infrastructure Areas are necessary.

Impact Determination

Implementation of the mitigation measures described above would reduce potentially adverse impacts to special-status plants to a less-than-significant level. Therefore, these impacts are less than significant with mitigation incorporated.

5.5.2 Invertebrates

One special-status invertebrate (VELB) has potential to occur within the Project Area but is absent from the Offsite Infrastructure Areas. Two special-status invertebrates (vernal pool fairy shrimp, and vernal pool tadpole shrimp) are present within the Project Area and have potential to occur within the Offsite Infrastructure Areas.

The following measures are recommended to minimize potential impacts to special-status invertebrates:

Valley Elderberry Longhorn Beetle

- One elderberry shrub was identified within the Project Area. To ensure no direct or indirect effects to VELB, it is recommended that a minimum 100-foot no-disturbance buffer be maintained from the elderberry shrub.
- High-visibility Environmental Sensitive Area fencing and signage should be placed at least 100 feet from the dripline of each elderberry shrub. If the elderberry shrub cannot be avoided by 100 feet, consultation with USFWS is recommended.

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

- These species are known to occur within the Project Area and have potential to occur within the Offsite Infrastructure Areas. Take coverage from USFWS (under Sections 7 or 10 of the federal

ESA) would be required for any impacts to these species and/or their habitat. Any required mitigation would be determined during consultation with USFWS.

- If the Project assumes presence for vernal pool fairy shrimp and vernal pool tadpole shrimp in all Waters of the U.S. within the Study Area that provide habitat for these species, take coverage from USFWS (under Sections 7 or 10 of the federal ESA) may be required for any impacts to these species and/or their habitat.

Impact Determination

Implementation of the mitigation measures described above would reduce potentially adverse impacts to special-status invertebrates to a less-than-significant level. Therefore, these impacts are less than significant with mitigation incorporated.

5.5.3 Fish

No special-status fish species have potential to occur within the Study Area; therefore, no recommendations or measures are proposed.

5.5.4 Amphibians

Two special-status amphibian species (CRLF and CTS) are present within the Study Area. One special-status amphibian species (FYLF) has low potential to occur within the Study Area.

The following measures are recommended to minimize potential impacts to special-status amphibians:

California Red-Legged Frog and California Tiger Salamander

- Prior to construction activities, take coverage from USFWS under Sections 7 or 10 of the federal ESA may be required for any impacts to CRLF and CTS and/or their habitat. In addition, take coverage from CDFW under Section 2081 of the California Fish and Game Code may be required for any impacts to CTS and/or its habitat. Any required compensatory mitigation would be determined during consultation with USFWS and CDFW.
- To the maximum extent possible, avoid impacts to aquatic habitat, which includes Sand Creek and seasonal impoundments within the Study Area.

Foothill Yellow-Legged Frog

- To the maximum extent possible, avoid impacts to aquatic habitat, which includes Sand Creek within the Study Area.
- Conduct a preconstruction FYLF clearance survey within 48 hours prior to construction activities within the vicinity of Sand Creek. If FYLF are found within the Project Area or Offsite Infrastructure Areas during the preconstruction surveys or during Project implementation, consultation with CDFW will occur and a 2081 Incidental Take Permit will be required. If no FYLF are found, no further measures pertaining to this species are necessary.

Impact Determination

Implementation of the mitigation measures described above would reduce potentially adverse impacts to special-status amphibians to a less-than-significant level. Therefore, these impacts are less than significant with mitigation incorporated.

5.5.5 Reptiles

Four special-status reptile species (Alameda whipsnake, Blainville's horned lizard, northwestern pond turtle, and silvery legless lizard) have potential to occur within the Study Area.

The following measures are recommended to minimize potential impacts to special-status reptiles:

Alameda Whipsnake

- Prior to construction activities, consultation with USFWS and CDFW is recommended to determine appropriate avoidance and minimization measures and/or mitigation for potential impacts to Alameda whipsnake and/or its habitat.

Blainville's Horned Lizard, Northwestern Pond Turtle, and Silvery Legless Lizard

- Conduct preconstruction surveys for Blainville's horned lizard, northwestern pond turtle, and silvery legless lizard within 14 days prior to construction activities. If Blainville's horned lizard, northwestern pond turtle, or silvery legless lizard are found, a qualified biologist will relocate them outside of the Study Area and will be available during construction to relocate these species if necessary.

Impact Determination

Implementation of the mitigation measures described above would reduce potentially adverse impacts to special-status reptiles to a less-than-significant level. Therefore, these impacts are less than significant with mitigation incorporated.

5.5.6 Special-Status Birds and MBTA Protected Birds

Three special-status bird species (burrowing owl, prairie falcon, and Swainson's hawk) are present within the Project Area and nine special-status bird species (California horned lark, ferruginous hawk, golden eagle, grasshopper sparrow, loggerhead shrike, northern harrier, short-eared owl, TRBL, and white-tailed kite) have potential to occur within the Project Area. Two special-status bird species are present within the Offsite Infrastructure Areas (prairie falcon and Swainson's hawk) and ten special-status bird species (burrowing owl, California horned lark, ferruginous hawk, golden eagle, grasshopper sparrow, loggerhead shrike, northern harrier, short-eared owl, TRBL, and white-tailed kite) have potential to occur within the Offsite Infrastructure Areas.

In addition to the above listed special-status birds, all native birds, including raptors, are protected under the California Fish and Game Code and migratory birds are protected pursuant to the Federal MBTA.

Burrowing Owl

If burrowing owl or evidence of burrowing owl is observed in the Study Area or within 300 feet of the Study Area during pre-construction surveys, then the following will occur:

- During Breeding Season: If the approved biologist finds evidence of burrowing owls within the Study Area during the breeding season (February 1 through August 31), all Project-related activities will avoid nest sites during the remainder of the breeding season or while the nest remains occupied by adults or young (nest occupation includes individuals or family groups foraging on or near the site following fledging). Avoidance is establishment of a minimum 300-foot buffer zone around nests. Construction and other Project-related activities may occur outside of the 300-foot buffer zone. Construction and other Project-related activities may be allowed inside of the 300-foot non-disturbance buffer during the breeding season if the nest is not disturbed, and the Project activities are monitored by a qualified biologist.
- If monitoring by the approved biologist indicates that the nest is abandoned prior to the end of nesting season and the burrow is no longer in use, the non-disturbance buffer zone may be removed if approved by CDFW. The approved biologist will excavate the burrow in accordance with the latest CDFW guidelines for burrowing owl to prevent reoccupation after receiving approval from CDFW.
- During Non-Breeding Season: During the non-breeding season (September 1 through January 31), the approved biologist will establish a minimum 300-foot non-disturbance buffer around occupied burrows. Construction activities outside of this 300-foot buffer will be allowed. Construction activities within the non-disturbance buffer will be allowed if the following criteria are met to prevent owls from abandoning over-wintering sites:
 - A burrowing owl exclusion plan shall be developed for the Project and approved by CDFW. This plan will include the results of the preconstruction surveys and proposed methods for the installation and monitoring of one-way doors and the exclusion of burrowing owls;
 - Upon approval by CDFW a qualified biologist will install one-way door at the entrance of each occupied burrow. The Project will then be monitored twice daily for 48 hours to ensure that the owls have vacated the burrow. After the burrows have been vacated at the end of the 48-hour monitoring period the one way doors shall be removed and the burrow will be hand-excavated to its terminus and completely backfilled. The site will then be monitored daily for one week to ensure that the site is not reoccupied by burrowing owls.

Special-Status Birds and MBTA Protected Birds

The following measures are recommended to minimize potential impacts to all special-status birds (with the exception of burrowing owl which is discussed above) and birds protected by the MBTA:

- Conduct a preconstruction nesting bird survey of all suitable habitat within the Study Area within 14 days of the commencement of construction during the nesting season (February 1 – August 31). Surveys should be conducted within 0.5 mile of the Study Area for Swainson's hawk, 300 feet of the Study Area for nesting raptors, 500 feet for TRBL, and 100 feet of the Study Area for nesting songbirds.

- If active nests are found, a no-disturbance buffer around the nest shall be established. The buffer distance shall be established by a qualified biologist in consultation with CDFW, but is recommended to be 300 feet for raptors and 50 feet for nonraptor songbirds. The buffer shall be maintained until the fledglings are capable of flight and become independent of the nest. Once the young are independent of the nest, no further measures are necessary.
- Preconstruction nesting bird surveys are not required for construction activity outside the nesting season.

Impact Determination

Implementation of the mitigation measures described above would reduce potentially adverse impacts to protected bird species to a less-than-significant level. Therefore, these impacts are less than significant with mitigation incorporated.

5.5.7 Mammals

Seven special-status mammal species (American badger, San Joaquin kit fox, ringtail, pallid bat, Townsend's big-eared bat, and western red bat) have potential to occur within the Study Area. One special-status mammal species (greater mastiff bat) has potential to occur within the Project Area but is absent from the Offsite Infrastructure Areas.

The following measures are recommended to minimize potential impacts to special-status mammals:

American Badger

- Conduct a pre-construction American badger survey 48 hours prior to construction activities. It is anticipated that these surveys could be completed concurrently with the above nesting surveys. If American badgers or burrows with American badger sign are found, consultation with CDFW is recommended prior to initiation of construction activities to determine an appropriate burrow excavation and/or relocation method.

San Joaquin Kit Fox

- Prior to construction activities, consultation with USFWS and CDFW is recommended to determine appropriate avoidance and minimization measures and/or mitigation for potential impacts to San Joaquin kit fox and/or its habitat. Any required mitigation would be determined during consultation with USFWS and CDFW.

Ringtail

- Prior to ground disturbance and removal of suitable habitat (e.g. trees and large snags), the Study Area will be surveyed for the presence of ringtail by a qualified biologist. Occupied dens will be marked and mapped and a 200-foot avoidance buffer will be mapped around the site. To passively relocate this species from impact areas, occupied dens will be monitored on a regular basis by a qualified biologist and destroyed after they are confirmed to be abandoned by ringtails.

Pallid Bat, Townsend's Big-Eared Bat, Greater Mastiff Bat, and Western Red Bat

- If suitable roosting habitat for special-status bats (i.e., trees and manmade structures) will be impacted during construction activities, conduct pre-construction roosting bat surveys for all suitable roosting habitat prior to construction activities. If suitable roosting habitat is identified, a qualified biologist will conduct an evening bat emergence survey that may include acoustic monitoring to determine whether bats are present. If pallid bat, Townsend's big eared bat, greater mastiff bat, and/or western red bat are found, consultation with CDFW may be required prior to initiation of construction activities. If special-status bats are not found during the preconstruction surveys, no further measures are recommended.

Impact Determination

Implementation of the mitigation measures described above would reduce potentially adverse impacts to special-status mammals to a less-than-significant level. Therefore, these impacts are less than significant with mitigation incorporated.

5.6 Wildlife Movement/Corridors

A large portion of the annual grassland within the Project Area will be converted to development; however, wildlife that use the annual grassland as a movement corridor will be able to use the Sand Creek corridor or the annual grassland surrounding the Project Area for dispersal. The Sand Creek Corridor will not be developed for the Project. Two bridges (a vehicular bridge and a pedestrian bridge) over Sand Creek are planned, but the bridges will not impede wildlife movement. The Offsite Infrastructure Areas are small, disjunct areas along existing roads and infrastructure and are not likely used as major wildlife movement corridors.

5.6.1 Impact Determination

No mitigation measures are recommended because the proposed development will have a less than significant impact on wildlife movement/corridors.

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LIST OF ATTACHMENTS

Attachment A – Conceptual Site Plan

Attachment B – CNDDDB, USFWS IPAC, and CNPS Database Searches

Attachment C – Representative Site Photographs

Attachment D – Wildlife Species Observed within the Study Area during the 2017 Site Visits

Attachment E – Live Oak and Associates, Inc. Jurisdictional Delineation of Waters of the U.S. for the Project Area

Attachment F – U.S. Army Corps of Engineers Approved Jurisdictional Determination for the Project Area

Attachment G – Monk & Associates' Project Area Rare Plant Survey Results Figure

ATTACHMENT A

Conceptual Site Plan

The Ranch Concept Plan: Multi-Generational Community



Land Use: Multi-Generational Community



Development Summary		Acreeage	% Overall	% Res Ac	Density (du/ac)	Av. Lot Size (sqft)	#Units	% Res Units
Low Density - All-Ages	105.9	19.2%	37%	4.0	7,000	424	33%	
Medium Low Density - All-Ages	39.9	7.2%	14%	5.5	4,500	219	17%	
Low Density - Executive Housing (Hillside)	34.1	6.2%	12%	3.5	8,000	119	9%	
Low Density - Executive Housing (Lake view)	17.3	3.1%	6%	4.0	7,000	69	5%	
Low Density - 55+	91.7	16.6%	32%	5.0	5,000	459	36%	
RESIDENTIAL TOTAL	288.9	52.4%	100%			1,290	100%	
Mixed Use	5.7	1.0%						
Fire Station	2.2	0.4%						
Staging Area	1.3	0.2%						
Parks	19.8	3.6%						
Open Space	207.2	37.6%						
Major Roadways	26.4	4.8%						
TOTAL	551.5	100.0%						

*Note: LD within the 55+ community may include lot sizes ranging from 4,500 sqft. to 6,000 sqft. with an overall average lot size of 5,000 sqft.

ATTACHMENT B

CNDDDB, USFWS IPAC, and CNPS Database Searches



Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database



Query Criteria: Quad (Antioch South (3712187) OR Honker Bay (3812118) OR Clayton (3712188) OR Diablo (3712178) OR Antioch North (3812117) OR Tassajara (3712177) OR Jersey Island (3812116) OR Brentwood (3712186) OR Byron Hot Springs (3712176))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Agelaius tricolor</i> tricolored blackbird	ABPBXB0020	None	Candidate Endangered	G2G3	S1S2	SSC
<i>Alkali Meadow</i> Alkali Meadow	CTT45310CA	None	None	G3	S2.1	
<i>Alkali Seep</i> Alkali Seep	CTT45320CA	None	None	G3	S2.1	
<i>Ambystoma californiense</i> California tiger salamander	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
<i>Ammodramus savannarum</i> grasshopper sparrow	ABPBXA0020	None	None	G5	S3	SSC
<i>Amsinckia grandiflora</i> large-flowered fiddleneck	PDBOR01050	Endangered	Endangered	G1	S1	1B.1
<i>Andrena blennospermatis</i> Blennosperma vernal pool andrenid bee	IIHYM35030	None	None	G2	S2	
<i>Anniella pulchra pulchra</i> silvery legless lizard	ARACC01012	None	None	G3G4T3T4Q	S3	SSC
<i>Anomobryum julaceum</i> slender silver moss	NBMUS80010	None	None	G5?	S2	4.2
<i>Anthicus antiochensis</i> Antioch Dunes anthicid beetle	IICOL49020	None	None	G1	S1	
<i>Antrozous pallidus</i> pallid bat	AMACC10010	None	None	G5	S3	SSC
<i>Apodemia mormo langei</i> Lange's metalmark butterfly	IILEPH7012	Endangered	None	G5T1	S1	
<i>Aquila chrysaetos</i> golden eagle	ABNKC22010	None	None	G5	S3	FP
<i>Archoplites interruptus</i> Sacramento perch	AFCQB07010	None	None	G2G3	S1	SSC
<i>Arctostaphylos auriculata</i> Mt. Diablo manzanita	PDERI04040	None	None	G2	S2	1B.3
<i>Arctostaphylos manzanita ssp. laevigata</i> Contra Costa manzanita	PDERI04273	None	None	G5T2	S2	1B.2
<i>Ardea herodias</i> great blue heron	ABNGA04010	None	None	G5	S4	
<i>Arizona elegans occidentalis</i> California glossy snake	ARADB01017	None	None	G5T2	S2	SSC



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Asio flammeus</i> short-eared owl	ABNSB13040	None	None	G5	S3	SSC
<i>Astragalus tener</i> var. <i>tener</i> alkali milk-vetch	PDFAB0F8R1	None	None	G2T2	S2	1B.2
<i>Athene cunicularia</i> burrowing owl	ABNSB10010	None	None	G4	S3	SSC
<i>Atriplex cordulata</i> var. <i>cordulata</i> heartscale	PDCHE040B0	None	None	G3T2	S2	1B.2
<i>Atriplex depressa</i> brittlescale	PDCHE042L0	None	None	G2	S2	1B.2
<i>Blepharizonia plumosa</i> big tarplant	PDAST1C011	None	None	G2	S2	1B.1
<i>Bombus caliginosus</i> obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
<i>Bombus crotchii</i> Crotch bumble bee	IIHYM24480	None	None	G3G4	S1S2	
<i>Bombus occidentalis</i> western bumble bee	IIHYM24250	None	None	G2G3	S1	
<i>Branchinecta conservatio</i> Conservancy fairy shrimp	ICBRA03010	Endangered	None	G2	S2	
<i>Branchinecta longiantenna</i> longhorn fairy shrimp	ICBRA03020	Endangered	None	G1	S1S2	
<i>Branchinecta lynchi</i> vernal pool fairy shrimp	ICBRA03030	Threatened	None	G3	S3	
<i>Branchinecta mesovallensis</i> midvalley fairy shrimp	ICBRA03150	None	None	G2	S2S3	
<i>Buteo regalis</i> ferruginous hawk	ABNKC19120	None	None	G4	S3S4	WL
<i>Buteo swainsoni</i> Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
<i>California macrophylla</i> round-leaved filaree	PDGER01070	None	None	G3?	S3?	1B.2
<i>Callophrys mossii bayensis</i> San Bruno elfin butterfly	IILEPE2202	Endangered	None	G4T1	S1	
<i>Calochortus pulchellus</i> Mt. Diablo fairy-lantern	PMLIL0D160	None	None	G2	S2	1B.2
<i>Campanula exigua</i> chaparral harebell	PDCAM020A0	None	None	G2	S2	1B.2
<i>Centromadia parryi</i> ssp. <i>congdonii</i> Congdon's tarplant	PDAST4R0P1	None	None	G3T2	S2	1B.1
<i>Chloropyron molle</i> ssp. <i>molle</i> soft salty bird's-beak	PDSCR0J0D2	Endangered	Rare	G2T1	S1	1B.2



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Cicuta maculata</i> var. <i>bolanderi</i> Bolander's water-hemlock	PDAPI0M051	None	None	G5T4	S2	2B.1
<i>Circus cyaneus</i> northern harrier	ABNKC11010	None	None	G5	S3	SSC
<i>Cismontane Alkali Marsh</i> Cismontane Alkali Marsh	CTT52310CA	None	None	G1	S1.1	
<i>Coastal and Valley Freshwater Marsh</i> Coastal and Valley Freshwater Marsh	CTT52410CA	None	None	G3	S2.1	
<i>Coastal Brackish Marsh</i> Coastal Brackish Marsh	CTT52200CA	None	None	G2	S2.1	
<i>Coelus gracilis</i> San Joaquin dune beetle	IICOL4A020	None	None	G1	S1	
<i>Cordylanthus nidularius</i> Mt. Diablo bird's-beak	PDSCR0J0F0	None	Rare	G1	S1	1B.1
<i>Corynorhinus townsendii</i> Townsend's big-eared bat	AMACC08010	None	None	G3G4	S2	SSC
<i>Cryptantha hooveri</i> Hoover's cryptantha	PDBOR0A190	None	None	GH	SH	1A
<i>Delphinium californicum</i> ssp. <i>interius</i> Hospital Canyon larkspur	PDRAN0B0A2	None	None	G3T3	S3	1B.2
<i>Delphinium recurvatum</i> recurved larkspur	PDRAN0B1J0	None	None	G2?	S2?	1B.2
<i>Dipodomys heermanni berkeleyensis</i> Berkeley kangaroo rat	AMAFD03061	None	None	G3G4T1	S1	
<i>Downingia pusilla</i> dwarf downingia	PDCAM060C0	None	None	GU	S2	2B.2
<i>Efferia antiochi</i> Antioch efferian robberfly	IIDIP07010	None	None	G1G2	S1S2	
<i>Elanus leucurus</i> white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
<i>Emys marmorata</i> western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
<i>Eremophila alpestris actia</i> California horned lark	ABPAT02011	None	None	G5T4Q	S4	WL
<i>Eriastrum ertterae</i> Lime Ridge eriastrum	PDPLM030F0	None	None	G1	S1	1B.1
<i>Eriogonum nudum</i> var. <i>psychicola</i> Antioch Dunes buckwheat	PDPGN0849Q	None	None	G5T1	S1	1B.1
<i>Eriogonum truncatum</i> Mt. Diablo buckwheat	PDPGN085Z0	None	None	G2	S2	1B.1
<i>Eryngium jepsonii</i> Jepson's coyote-thistle	PDAPI0Z130	None	None	G2	S2	1B.2



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Eryngium spinosepalum</i> spiny-sepaled button-celery	PDAP10Z0Y0	None	None	G2	S2	1B.2
<i>Erysimum capitatum var. angustatum</i> Contra Costa wallflower	PDBRA16052	Endangered	Endangered	G5T1	S1	1B.1
<i>Eschscholzia rhombipetala</i> diamond-petaled California poppy	PDPAP0A0D0	None	None	G1	S1	1B.1
<i>Eucerceris ruficeps</i> redheaded sphecid wasp	IIHYM18010	None	None	G1G3	S1S2	
<i>Extriplex joaquinana</i> San Joaquin spearscale	PDCHE041F3	None	None	G2	S2	1B.2
<i>Falco mexicanus</i> prairie falcon	ABNKD06090	None	None	G5	S4	WL
<i>Falco peregrinus anatum</i> American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
<i>Fritillaria agrestis</i> stinkbells	PMLIL0V010	None	None	G3	S3	4.2
<i>Fritillaria liliacea</i> fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
<i>Geothlypis trichas sinuosa</i> saltmarsh common yellowthroat	ABPBX1201A	None	None	G5T3	S3	SSC
<i>Grimmia torenii</i> Toren's grimmia	NBMUS32330	None	None	G2	S2	1B.3
<i>Helianthella castanea</i> Diablo helianthella	PDAST4M020	None	None	G2	S2	1B.2
<i>Helminthoglypta nickliniana bridgesi</i> Bridges' coast range shoulderband	IMGASC2362	None	None	G3T1	S1S2	
<i>Hesperolinon breweri</i> Brewer's western flax	PDLIN01030	None	None	G2?	S2?	1B.2
<i>Hibiscus lasiocarpus var. occidentalis</i> woolly rose-mallow	PDMAL0H0R3	None	None	G5T3	S3	1B.2
<i>Hygrotus curvipes</i> curved-foot hygrotus diving beetle	IICOL38030	None	None	G1	S1	
<i>Hypomesus transpacificus</i> Delta smelt	AFCHB01040	Threatened	Endangered	G1	S1	
<i>Idiostatus middlekauffi</i> Middlekauff's shieldback katydid	IIORT31010	None	None	G1G2	S1	
<i>Lanius ludovicianus</i> loggerhead shrike	ABPBR01030	None	None	G4	S4	SSC
<i>Lasiurus blossevillii</i> western red bat	AMACC05060	None	None	G5	S3	SSC
<i>Lasiurus cinereus</i> hoary bat	AMACC05030	None	None	G5	S4	



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Lasthenia conjugens</i> Contra Costa goldfields	PDAST5L040	Endangered	None	G1	S1	1B.1
<i>Lateralus jamaicensis coturniculus</i> California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
<i>Lathyrus jepsonii var. jepsonii</i> Delta tule pea	PDFAB250D2	None	None	G5T2	S2	1B.2
<i>Lepidurus packardi</i> vernal pool tadpole shrimp	ICBRA10010	Endangered	None	G4	S3S4	
<i>Lilaeopsis masonii</i> Mason's lilaeopsis	PDAPI19030	None	Rare	G2	S2	1B.1
<i>Limosella australis</i> Delta mudwort	PDSCR10030	None	None	G4G5	S2	2B.1
<i>Linderiella occidentalis</i> California linderiella	ICBRA06010	None	None	G2G3	S2S3	
<i>Lytta molesta</i> molestan blister beetle	IICOL4C030	None	None	G2	S2	
<i>Madia radiata</i> showy golden madia	PDAST650E0	None	None	G2	S2	1B.1
<i>Malacothamnus hallii</i> Hall's bush-mallow	PDMAL0Q0F0	None	None	G2	S2	1B.2
<i>Masticophis flagellum ruddocki</i> San Joaquin coachwhip	ARADB21021	None	None	G5T2T3	S2?	SSC
<i>Masticophis lateralis euryxanthus</i> Alameda whipsnake	ARADB21031	Threatened	Threatened	G4T2	S2	
<i>Melospiza melodia</i> song sparrow ("Modesto" population)	ABPBXA3010	None	None	G5	S3?	SSC
<i>Melospiza melodia maxillaris</i> Suisun song sparrow	ABPBXA301K	None	None	G5T3	S3	SSC
<i>Metapogon hurdi</i> Hurd's metapogon robberfly	IIDIP08010	None	None	G1G3	S1S3	
<i>Monolopia gracilens</i> woodland woollythreads	PDAST6G010	None	None	G3	S3	1B.2
<i>Myrmosula pacifica</i> Antioch multilid wasp	IIHYM15010	None	None	GH	SH	
<i>Navarretia gowenii</i> Lime Ridge navarretia	PDPLM0C120	None	None	G1	S1	1B.1
<i>Navarretia nigelliformis ssp. radians</i> shining navarretia	PDPLM0C0J2	None	None	G4T2	S2	1B.2
<i>Neotoma fuscipes annectens</i> San Francisco dusky-footed woodrat	AMAFF08082	None	None	G5T2T3	S2S3	SSC
Northern Claypan Vernal Pool Northern Claypan Vernal Pool	CTT44120CA	None	None	G1	S1.1	



Selected Elements by Scientific Name
California Department of Fish and Wildlife
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Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Oenothera deltooides ssp. howellii</i> Antioch Dunes evening-primrose	PDONA0C0B4	Endangered	Endangered	G5T1	S1	1B.1
<i>Oncorhynchus mykiss irideus</i> steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	G5T2Q	S2	
<i>Perdita scitula antiochensis</i> Antioch andrenid bee	IIHYM01031	None	None	G1T1	S1	
<i>Perognathus inornatus</i> San Joaquin Pocket Mouse	AMAFD01060	None	None	G2G3	S2S3	
<i>Phacelia phacelioides</i> Mt. Diablo phacelia	PDHYD0C3Q0	None	None	G2	S2	1B.2
<i>Phalacrocorax auritus</i> double-crested cormorant	ABNFD01020	None	None	G5	S4	WL
<i>Philanthus nasalis</i> Antioch specid wasp	IIHYM20010	None	None	G1	S1	
<i>Phrynosoma blainvillii</i> coast horned lizard	ARACF12100	None	None	G3G4	S3S4	SSC
<i>Plagiobothrys hystriculus</i> bearded popcornflower	PDBOR0V0H0	None	None	G2	S2	1B.1
<i>Potamogeton zosteriformis</i> eel-grass pondweed	PM POT03160	None	None	G5	S3	2B.2
<i>Puccinellia simplex</i> California alkali grass	PMPOA53110	None	None	G3	S2	1B.2
<i>Rallus obsoletus obsoletus</i> California Ridgway's rail	ABNME05016	Endangered	Endangered	G5T1	S1	FP
<i>Rana boylei</i> foothill yellow-legged frog	AAABH01050	None	None	G3	S3	SSC
<i>Rana draytonii</i> California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
<i>Reithrodontomys raviventris</i> salt-marsh harvest mouse	AMAFF02040	Endangered	Endangered	G1G2	S1S2	FP
<i>Riparia riparia</i> bank swallow	ABPAU08010	None	Threatened	G5	S2	
<i>Sanicula saxatilis</i> rock sanicle	PDAP11Z0H0	None	Rare	G2	S2	1B.2
<i>Senecio aphanactis</i> chaparral ragwort	PDAST8H060	None	None	G3	S2	2B.2
<i>Serpentine Bunchgrass</i> Serpentine Bunchgrass	CTT42130CA	None	None	G2	S2.2	
<i>Sidalcea keckii</i> Keck's checkerbloom	PDMAL110D0	Endangered	None	G2	S2	1B.1
<i>Sphecodogastra antiochensis</i> Antioch Dunes halcitud bee	IIHYM78010	None	None	G1	S1	



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Spirinchus thaleichthys</i> longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	SSC
<i>Stabilized Interior Dunes</i> Stabilized Interior Dunes	CTT23100CA	None	None	G1	S1.1	
<i>Sternula antillarum browni</i> California least tern	ABNNM08103	Endangered	Endangered	G4T2T3Q	S2	FP
<i>Streptanthus albidus ssp. peramoenus</i> most beautiful jewelflower	PDBRA2G012	None	None	G2T2	S2	1B.2
<i>Streptanthus hispidus</i> Mt. Diablo jewelflower	PDBRA2G0M0	None	None	G2	S2	1B.3
<i>Stuckenia filiformis ssp. alpina</i> slender-leaved pondweed	PMPO03091	None	None	G5T5	S3	2B.2
<i>Symphotrichum lentum</i> Suisun Marsh aster	PDASTE8470	None	None	G2	S2	1B.2
<i>Taxidea taxus</i> American badger	AMAJF04010	None	None	G5	S3	SSC
<i>Thamnophis gigas</i> giant gartersnake	ARADB36150	Threatened	Threatened	G2	S2	
<i>Triquetrella californica</i> coastal triquetrella	NBMUS7S010	None	None	G2	S2	1B.2
<i>Tropidocarpum capparideum</i> caper-fruited tropidocarpum	PDBRA2R010	None	None	G1	S1	1B.1
<i>Valley Needlegrass Grassland</i> Valley Needlegrass Grassland	CTT42110CA	None	None	G3	S3.1	
<i>Valley Sink Scrub</i> Valley Sink Scrub	CTT36210CA	None	None	G1	S1.1	
<i>Viburnum ellipticum</i> oval-leaved viburnum	PDCPR07080	None	None	G4G5	S3?	2B.3
<i>Vulpes macrotis mutica</i> San Joaquin kit fox	AMAJA03041	Endangered	Threatened	G4T2	S2	

Record Count: 138



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To:

June 30, 2017

Consultation Code: 08ESMF00-2017-SLI-2515

Event Code: 08ESMF00-2017-E-06856

Project Name: The Ranch in Antioch

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to

utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office

Federal Building

2800 Cottage Way, Room W-2605

Sacramento, CA 95825-1846

(916) 414-6600

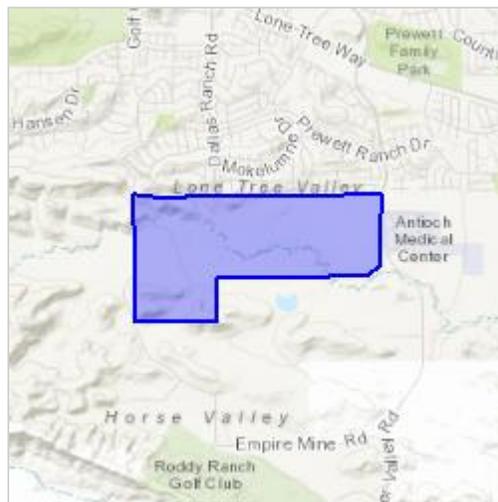
Project Summary

Consultation Code: 08ESMF00-2017-SLI-2515
Event Code: 08ESMF00-2017-E-06856
Project Name: The Ranch in Antioch
Project Type: DEVELOPMENT
Project Description: Project just south of the City of Antioch

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/37.948744865006795N121.79182431543035W>



Counties: Contra Costa, CA

Endangered Species Act Species

There is a total of 17 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area. Please contact the designated FWS office if you have questions.

Mammals

NAME	STATUS
San Joaquin Kit Fox (<i>Vulpes macrotis mutica</i>) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2873	Endangered

Birds

NAME	STATUS
California Clapper Rail (<i>Rallus longirostris obsoletus</i>) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4240	Endangered
California Least Tern (<i>Sterna antillarum browni</i>) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered

Reptiles

NAME	STATUS
Alameda Whipsnake (=striped Racer) (<i>Masticophis lateralis euryxanthus</i>) There is a final critical habitat designated for this species. Your location is outside the designated critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5524	Threatened
Giant Garter Snake (<i>Thamnophis gigas</i>) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog (<i>Rana draytonii</i>) There is a final critical habitat designated for this species. Your location is outside the designated critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander (<i>Ambystoma californiense</i>) Population: U.S.A. (Central CA DPS) There is a final critical habitat designated for this species. Your location is outside the designated critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
<p>Delta Smelt (<i>Hypomesus transpacificus</i>)</p> <p>There is a final critical habitat designated for this species. Your location is outside the designated critical habitat.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/321</p>	Threatened
<p>Steelhead (<i>Oncorhynchus (=Salmo) mykiss</i>)</p> <p>Population: Northern California DPS</p> <p>There is a final critical habitat designated for this species. Your location is outside the designated critical habitat.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/1007</p>	Threatened

Insects

NAME	STATUS
<p>San Bruno Elfin Butterfly (<i>Callophrys mossii bayensis</i>)</p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/3394</p>	Endangered
<p>Valley Elderberry Longhorn Beetle (<i>Desmocerus californicus dimorphus</i>)</p> <p>There is a final critical habitat designated for this species. Your location is outside the designated critical habitat.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/7850</p>	Threatened

Crustaceans

NAME	STATUS
<p>Conservancy Fairy Shrimp (<i>Branchinecta conservatio</i>)</p> <p>There is a final critical habitat designated for this species. Your location is outside the designated critical habitat.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/8246</p>	Endangered
<p>Vernal Pool Fairy Shrimp (<i>Branchinecta lynchi</i>)</p> <p>There is a final critical habitat designated for this species. Your location is outside the designated critical habitat.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/498</p>	Threatened
<p>Vernal Pool Tadpole Shrimp (<i>Lepidurus packardii</i>)</p> <p>There is a final critical habitat designated for this species. Your location is outside the designated critical habitat.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/2246</p>	Endangered

Flowering Plants

NAME	STATUS
Antioch Dunes Evening-primrose (<i>Oenothera deltoides ssp. howellii</i>) There is a final critical habitat designated for this species. Your location is outside the designated critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5970	Endangered
Contra Costa Goldfields (<i>Lasthenia conjugens</i>) There is a final critical habitat designated for this species. Your location is outside the designated critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7058	Endangered
Large-flowered Fiddleneck (<i>Amsinckia grandiflora</i>) There is a final critical habitat designated for this species. Your location is outside the designated critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5558	Endangered

Critical habitats

There are no critical habitats within your project area.

Plant List

Inventory of Rare and Endangered Plants

74 matches found. [Click on scientific name for details](#)

Search Criteria

Found in Quads 3812118, 3812117, 3812116, 3712188, 3712187, 3712186, 3712178 3712177 and 3712176;

[Modify Search Criteria](#)
[Export to Excel](#)
[Modify Columns](#)
[Modify Sort](#)
[Display Photos](#)

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Amsinckia grandiflora	large-flowered fiddleneck	Boraginaceae	annual herb	(Mar)Apr-May	1B.1	S1	G1
Androsace elongata ssp. acuta	California androsace	Primulaceae	annual herb	Mar-Jun	4.2	S3S4	G5?T3T4
Anomobryum julaceum	slender silver moss	Bryaceae	moss		4.2	S2	G5?
Arabis blepharophylla	coast rockcress	Brassicaceae	perennial herb	Feb-May	4.3	S4	G4
Arctostaphylos auriculata	Mt. Diablo manzanita	Ericaceae	perennial evergreen shrub	Jan-Mar	1B.3	S2	G2
Arctostaphylos manzanita ssp. laevigata	Contra Costa manzanita	Ericaceae	perennial evergreen shrub	Jan-Mar(Apr)	1B.2	S2	G5T2
Astragalus tener var. tener	alkali milk-vetch	Fabaceae	annual herb	Mar-Jun	1B.2	S2	G2T2
Atriplex cordulata var. cordulata	heartscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G3T2
Atriplex coronata var. coronata	crownscale	Chenopodiaceae	annual herb	Mar-Oct	4.2	S3	G4T3
Atriplex depressa	brittlescale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
Blepharizonia plumosa	big tarplant	Asteraceae	annual herb	Jul-Oct	1B.1	S2	G2
Calandrinia breweri	Brewer's calandrinia	Montiaceae	annual herb	(Jan)Mar-Jun	4.2	S4	G4
California macrophylla	round-leaved filaree	Geraniaceae	annual herb	Mar-May	1B.2	S3?	G3?
Calochortus pulchellus	Mt. Diablo fairy-lantern	Liliaceae	perennial bulbiferous herb	Apr-Jun	1B.2	S2	G2
Calochortus umbellatus	Oakland star-tulip	Liliaceae	perennial bulbiferous herb	Mar-May	4.2	S4	G4
Campanula exigua	chaparral harebell	Campanulaceae	annual herb	May-Jun	1B.2	S2	G2
Centromadia parryi ssp. congdonii	Congdon's tarplant	Asteraceae	annual herb	May-Oct(Nov)	1B.1	S2	G3T2
Chloropyron molle ssp. molle	soft bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jul-Nov	1B.2	S1	G2T1
Cicuta maculata var. bolanderi	Bolander's water-hemlock	Apiaceae	perennial herb	Jul-Sep	2B.1	S2	G5T4

<u>Collomia diversifolia</u>	serpentine collomia	Polemoniaceae	annual herb	May-Jun	4.3	S4	G4
<u>Convolvulus simulans</u>	small-flowered morning-glory	Convolvulaceae	annual herb	Mar-Jul	4.2	S4	G4
<u>Cordylanthus nidularius</u>	Mt. Diablo bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Aug	1B.1	S1	G1
<u>Cryptantha hooveri</u>	Hoover's cryptantha	Boraginaceae	annual herb	Apr-May	1A	SH	GH
<u>Delphinium californicum ssp. interius</u>	Hospital Canyon larkspur	Ranunculaceae	perennial herb	Apr-Jun	1B.2	S3	G3T3
<u>Delphinium recurvatum</u>	recurved larkspur	Ranunculaceae	perennial herb	Mar-Jun	1B.2	S2?	G2?
<u>Dirca occidentalis</u>	western leatherwood	Thymelaeaceae	perennial deciduous shrub	Jan-Mar(Apr)	1B.2	S2	G2
<u>Downingia pusilla</u>	dwarf downingia	Campanulaceae	annual herb	Mar-May	2B.2	S2	GU
<u>Eriastrum ertterae</u>	Lime Ridge eriastrum	Polemoniaceae	annual herb	Jun-Jul	1B.1	S1	G1
<u>Eriogonum nudum var. psychicola</u>	Antioch Dunes buckwheat	Polygonaceae	perennial herb	Jul-Oct	1B.1	S1	G5T1
<u>Eriogonum truncatum</u>	Mt. Diablo buckwheat	Polygonaceae	annual herb	Apr-Sep(Nov-Dec)	1B.1	S2	G2
<u>Eriophyllum jepsonii</u>	Jepson's woolly sunflower	Asteraceae	perennial herb	Apr-Jun	4.3	S3	G3
<u>Eryngium jepsonii</u>	Jepson's coyote thistle	Apiaceae	perennial herb	Apr-Aug	1B.2	S2?	G2?
<u>Eryngium spinosepalum</u>	spiny-sepaed button-celery	Apiaceae	annual / perennial herb	Apr-Jun	1B.2	S2	G2
<u>Erysimum capitatum var. angustatum</u>	Contra Costa wallflower	Brassicaceae	perennial herb	Mar-Jul	1B.1	S1	G5T1
<u>Eschscholzia rhombipetala</u>	diamond-petaled California poppy	Papaveraceae	annual herb	Mar-Apr	1B.1	S1	G1
<u>Extriplex joaquinana</u>	San Joaquin spearscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
<u>Fritillaria agrestis</u>	stinkbells	Liliaceae	perennial bulbiferous herb	Mar-Jun	4.2	S3	G3
<u>Fritillaria liliacea</u>	fragrant fritillary	Liliaceae	perennial bulbiferous herb	Feb-Apr	1B.2	S2	G2
<u>Galium andrewsii ssp. gatense</u>	phlox-leaf serpentine bedstraw	Rubiaceae	perennial herb	Apr-Jul	4.2	S3	G5T3
<u>Grimmia torenii</u>	Toren's grimmia	Grimmiaceae	moss		1B.3	S2	G2
<u>Helianthella castanea</u>	Diablo helianthella	Asteraceae	perennial herb	Mar-Jun	1B.2	S2	G2
<u>Hesperexax caulescens</u>	hogwallow starfish	Asteraceae	annual herb	Mar-Jun	4.2	S3	G3
<u>Hesperolinon breweri</u>	Brewer's western flax	Linaceae	annual herb	May-Jul	1B.2	S2?	G2?
<u>Hibiscus lasiocarpus var. occidentalis</u>	woolly rose-mallow	Malvaceae	perennial rhizomatous herb (emergent)	Jun-Sep	1B.2	S3	G5T3
<u>Isocoma arguta</u>	Carquinez goldenbush	Asteraceae	perennial shrub	Aug-Dec	1B.1	S1	G1
<u>Lasthenia conjugens</u>	Contra Costa goldfields	Asteraceae	annual herb	Mar-Jun	1B.1	S1	G1
<u>Lathyrus jepsonii var. jepsonii</u>	Delta tule pea	Fabaceae	perennial herb	May-Jul(Aug-	1B.2	S2	G5T2

				Sep)			
<u>Lilaeopsis masonii</u>	Mason's lilaeopsis	Apiaceae	perennial rhizomatous herb	Apr-Nov	1B.1	S2	G2
<u>Limosella australis</u>	Delta mudwort	Scrophulariaceae	perennial stoloniferous herb	May-Aug	2B.1	S2	G4G5
<u>Madia radiata</u>	showy golden madia	Asteraceae	annual herb	Mar-May	1B.1	S2	G2
<u>Malacothamnus hallii</u>	Hall's bush-mallow	Malvaceae	perennial evergreen shrub	(Apr)May-Sep(Oct)	1B.2	S2	G2
<u>Monardella antonina ssp. antonina</u>	San Antonio Hills monardella	Lamiaceae	perennial rhizomatous herb	Jun-Aug	3	S1S3	G4T1T3Q
<u>Monolopia gracilens</u>	woodland woollythreads	Asteraceae	annual herb	(Feb)Mar-Jul	1B.2	S3	G3
<u>Navarretia gowenii</u>	Lime Ridge navarretia	Polemoniaceae	annual herb	May-Jun	1B.1	S1	G1
<u>Navarretia heterandra</u>	Tehama navarretia	Polemoniaceae	annual herb	Apr-Jun	4.3	S4	G4
<u>Navarretia nigelliformis ssp. nigelliformis</u>	adobe navarretia	Polemoniaceae	annual herb	Apr-Jun	4.2	S3	G4T3
<u>Navarretia nigelliformis ssp. radians</u>	shining navarretia	Polemoniaceae	annual herb	(Mar)Apr-Jul	1B.2	S2	G4T2
<u>Neostapfia colusana</u>	Colusa grass	Poaceae	annual herb	May-Aug	1B.1	S1	G1
<u>Oenothera deltoides ssp. howellii</u>	Antioch Dunes evening-primrose	Onagraceae	perennial herb	Mar-Sep	1B.1	S1	G5T1
<u>Phacelia phacelioides</u>	Mt. Diablo phacelia	Hydrophyllaceae	annual herb	Apr-May	1B.2	S2	G2
<u>Plagiobothrys hystriculus</u>	bearded popcornflower	Boraginaceae	annual herb	Apr-May	1B.1	S2	G2
<u>Potamogeton zosteriformis</u>	eel-grass pondweed	Potamogetonaceae	annual herb (aquatic)	Jun-Jul	2B.2	S3	G5
<u>Puccinellia simplex</u>	California alkali grass	Poaceae	annual herb	Mar-May	1B.2	S2	G3
<u>Ranunculus lobbii</u>	Lobb's aquatic buttercup	Ranunculaceae	annual herb (aquatic)	Feb-May	4.2	S3	G4
<u>Sanicula saxatilis</u>	rock sanicle	Apiaceae	perennial herb	Apr-May	1B.2	S2	G2
<u>Senecio aphanactis</u>	chaparral ragwort	Asteraceae	annual herb	Jan-Apr(May)	2B.2	S2	G3
<u>Senecio hydrophiloides</u>	sweet marsh ragwort	Asteraceae	perennial herb	May-Aug	4.2	S3	G5
<u>Streptanthus albidus ssp. peramoenus</u>	most beautiful jewelflower	Brassicaceae	annual herb	(Mar)Apr-Sep(Oct)	1B.2	S2	G2T2
<u>Streptanthus hispidus</u>	Mt. Diablo jewelflower	Brassicaceae	annual herb	Mar-Jun	1B.3	S2	G2
<u>Stuckenia filiformis ssp. alpina</u>	slender-leaved pondweed	Potamogetonaceae	perennial rhizomatous herb (aquatic)	May-Jul	2B.2	S3	G5T5
<u>Symphotrichum lentum</u>	Suisun Marsh aster	Asteraceae	perennial rhizomatous herb	(Apr)May-Nov	1B.2	S2	G2
<u>Triquetrella californica</u>	coastal triquetrella	Pottiaceae	moss		1B.2	S2	G2
<u>Tropidocarpum capparideum</u>	caper-fruited tropidocarpum	Brassicaceae	annual herb	Mar-Apr	1B.1	S1	G1
<u>Viburnum ellipticum</u>	oval-leaved viburnum	Adoxaceae	perennial deciduous shrub	May-Jun	2B.3	S3?	G4G5

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ATTACHMENT C

Representative Site Photographs



Photo 1: Photo of annual grassland in the southwest portion of the Project Area, view north, 04/12/17.



Photo 2: Photo of the impoundment in the north-central portion of the Project Area, view north, 04/12/17.



Photo 3: Photo of an intermittent tributary (Sand Creek) in the western portion of the Project Area, view northwest, 04/12/17.



Photo 4: Photo of the cemented drainage channel in the northern portion of the Project Area, view east, 04/12/17.



Photo 5: Photo of a seasonal wetland pool, in the southcentral portion of the Project Area, view southwest, 04/12/17.



Photo 6: Photo of the bank along an intermittent tributary (Sand Creek) in the central portion of the Project Area, view west, 04/12/17.



Photo 7: Photo of a pond on the edge of the northwestern portion of the Offsite Infrastructure Areas, view south 08/22/17.



Photo 8: Photo of a drainage located in the southwestern portion of the Offsite Infrastructure Areas, view south, 08/22/17.



Photo 9: Photo the southwestern portion of the Offsite Infrastructure Areas, view west, 08/22/17.



Photo 10: Photo along the eastern edge of the southwestern portion of the Offsite Infrastructure Areas, view north, 08/22/17.



Photo 11: Photo of a seasonal wetland in the northwestern portion of the Offsite Infrastructure Areas, view south, 08/22/17.



Photo 12: Photo of a seasonal wetland swale in the northwestern portion of the Offsite Infrastructure Areas, view west, 08/22/17.

Wildlife Species Observed within the Study Area during the 2017 Site Visits

Attachment D

Wildlife Species Observed within the Study Area during the 2017 Site Visits

<u>Species Name</u>	<u>Scientific Name</u>
<u>Reptiles</u>	
California alligator lizard	<i>Elgaria multicarinata multicarinata</i>
<u>Amphibians</u>	
Sierran tree frog	<i>Pseudacris sierrae</i>
Western toad	<i>Anaxyrus boreas</i>
<u>Birds</u>	
American Crow	<i>Corvus brachyrhychos</i>
American kestrel	<i>Falco sparverius</i>
Anna's hummingbird	<i>Calypte anna</i>
Barn swallow	<i>Hirundo rustica</i>
Black phoebe	<i>Sayornis nigricans</i>
Bullock's oriole	<i>Icterus bullockii</i>
California scrub jay	<i>Aphelocoma californica</i>
European starling	<i>Sturnus vulgaris</i>
Great horned owl	<i>Bubo virginianus</i>
Green heron	<i>Butorides virescens</i>
House finch	<i>Haemorhous mexicanus</i>
Killdeer	<i>Charadrius vociferus</i>
Mallard	<i>Anas platyrhynchos</i>
Mourning dove	<i>Zenaida macroura</i>
Prairie falcon	<i>Falco mexicanus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Say's pheobe	<i>Sayornis saya</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Tree swallow	<i>Tachycineta bicolor</i>
Turkey vulture	<i>Cathartes aura</i>
Western bluebird	<i>Sialia mexicana</i>
Western kingbird	<i>Tyrannus verticalis</i>
Western meadowlark	<i>Sturnella neglecta</i>
<u>Mammals</u>	
Black-tailed jackrabbit	<i>Lepus californicus</i>
California ground squirrel	<i>Otospermophilus beecheyi</i>

ATTACHMENT E

Live Oak and Associates, Inc. Jurisdictional Delineation of Waters of the U.S.
for the Project Area



LIVE OAK ASSOCIATES, INC.

an Ecological Consulting Firm

INVESTIGATION OF WATERS OF THE UNITED STATES COWAN PROPERTY CONTRA COSTA COUNTY, CALIFORNIA



Live Oak Associates, Inc.

Rick Hopkins, Principal, Senior Conservation Ecologist
Jeff Gurule, Wildlife/Plant/Wetlands Ecologist, Senior Project Manager

Prepared for:

Molly Long
Dividend Homes
385 Woodview Avenue, Suite 101
Morgan Hill CA 95037

Aaron Ross-Swain
Richland Communities
3000 Lava Ridge Court, Suite 114
Roseville CA 95661

June 3, 2014

File No. 1852-01

EXECUTIVE SUMMARY

Live Oak Associates, Inc. (LOA) investigated a 546-acre property (i.e., the study area) in Contra Costa County, California for waters of the United States (also referred to as jurisdictional waters) during the spring of 2014. The study area is located west of the intersection of Deer Valley Road and Snodgrass Lane in Contra Costa County, California. Jurisdictional waters generally include navigable waters, interstate drainages, impoundments of jurisdictional waters, tributaries to navigable and interstate waters, and wetlands adjacent to such waters. The Regulatory Branch of the U.S. Army Corps of Engineers (USACE) has jurisdiction over such waters per Section 404 of the Clean Water Act.

The study methodology was consistent with the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corp of Engineers Wetland Delineation Manual, Arid West Region (Version 2.0)* (USACE 2008). LOA plant/wetland/wildlife ecologist Jeff Gurule reviewed two previous wetland delineations verified by the USACE, and conducted a detailed field survey within the entire study area for possible waters of the United States. Mr. Gurule gathered vegetation, soils, and hydrology data at five sampling locations within and adjacent to such waters during field surveys conducted on April 8 and 24, 2014.

LOA delineated 3.948 acres of potentially jurisdictional waters within the study area. Areas of Sand Creek within ordinary high water (OHW) are considered potentially jurisdictional tributary waters to the San Joaquin River, a known water of the United States. Ephemeral tributary channels and their impoundments that are tributary to Sand Creek are also considered potentially jurisdictional waters, as are seasonal wetland pools and seeps adjacent to Sand Creek ephemeral tributary waters. Because these features are tributary to the San Joaquin River, a known water of the United States, these waters appear to meet the USACE regulatory definition of a water of the United States.

Other waters of the study area hydrologically isolated from Sand Creek and its ephemeral tributaries are unlikely to be classified as waters of the United States. These isolated waters, consisting of a wetland drainage, ephemeral drainage, and five seasonal wetland pools, would likely be considered waters of the State of California, and thus subject to the jurisdiction of the RWQCB, but not the USACE. LOA delineated 0.601 acres of isolated waters within the study area. Since these features have no obvious hydrologic connection to downstream waters of the U.S., they do not themselves appear to meet the regulatory definition of such waters.

No other portion of the study area would be considered a water of the United States. The remainder of the study area supported California grassland habitat and a small area of ruderal habitat all containing dominant upland vegetation. These other areas did not meet any of the technical criteria of jurisdictional wetlands.

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1.0 INTRODUCTION

Live Oak Associates, Inc. (LOA) surveyed an approximately 546-acre property in Contra Costa County (hereafter referred to as the study area) for waters of the United States and other jurisdictional waters (hereafter referred to as “jurisdictional waters”) in April of 2014. The study area is located west of the intersection of Deer Valley Road and Snodgrass Lane in undeveloped lands located within the city limits of Antioch, California (Figure 1). The study area can be found on the Antioch South U.S. Geological Survey (USGS) 7.5 minute quadrangle in Township 1 North, Range 2 East, Sections 7 and 8 (Figure 2).

1.1 REGULATORY DEFINITION OF WATERS OF THE U.S.

Section 404 of the federal Clean Water Act (CWA) regulates the discharge of dredged or fill material into “navigable waters” (33 U.S.C. §1344), defined in the CWA as “the waters of the United States, including the territorial seas” (33 U.S.C. §1362(7)). By regulation, the U.S. Army Corps of Engineers (USACE) has defined “waters of the United States” to mean:

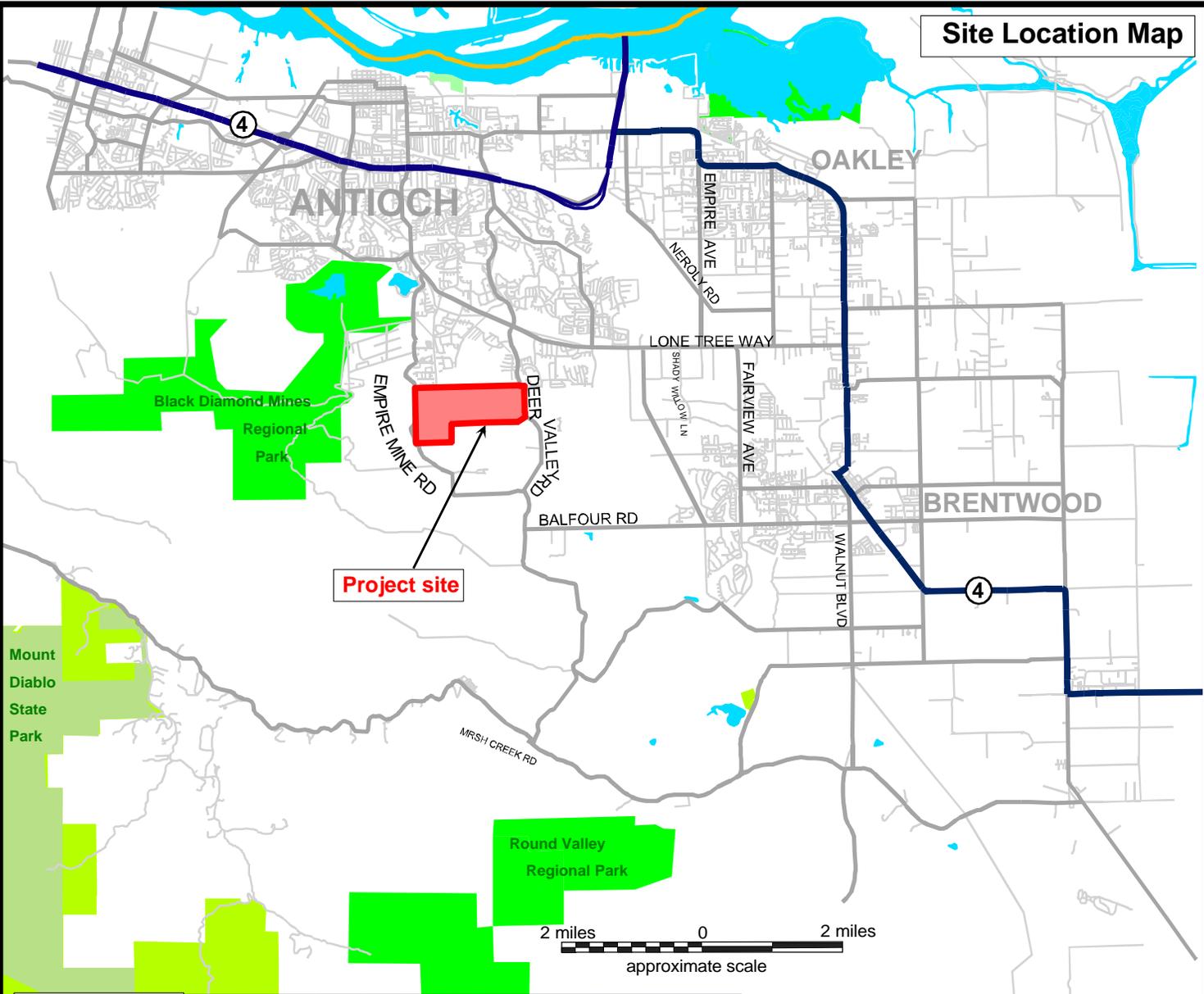
(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(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

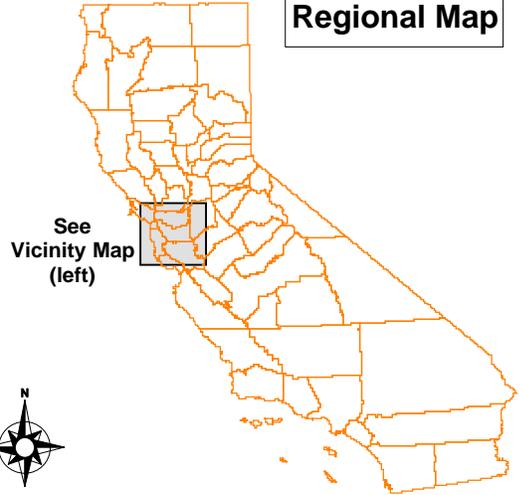
Site Location Map



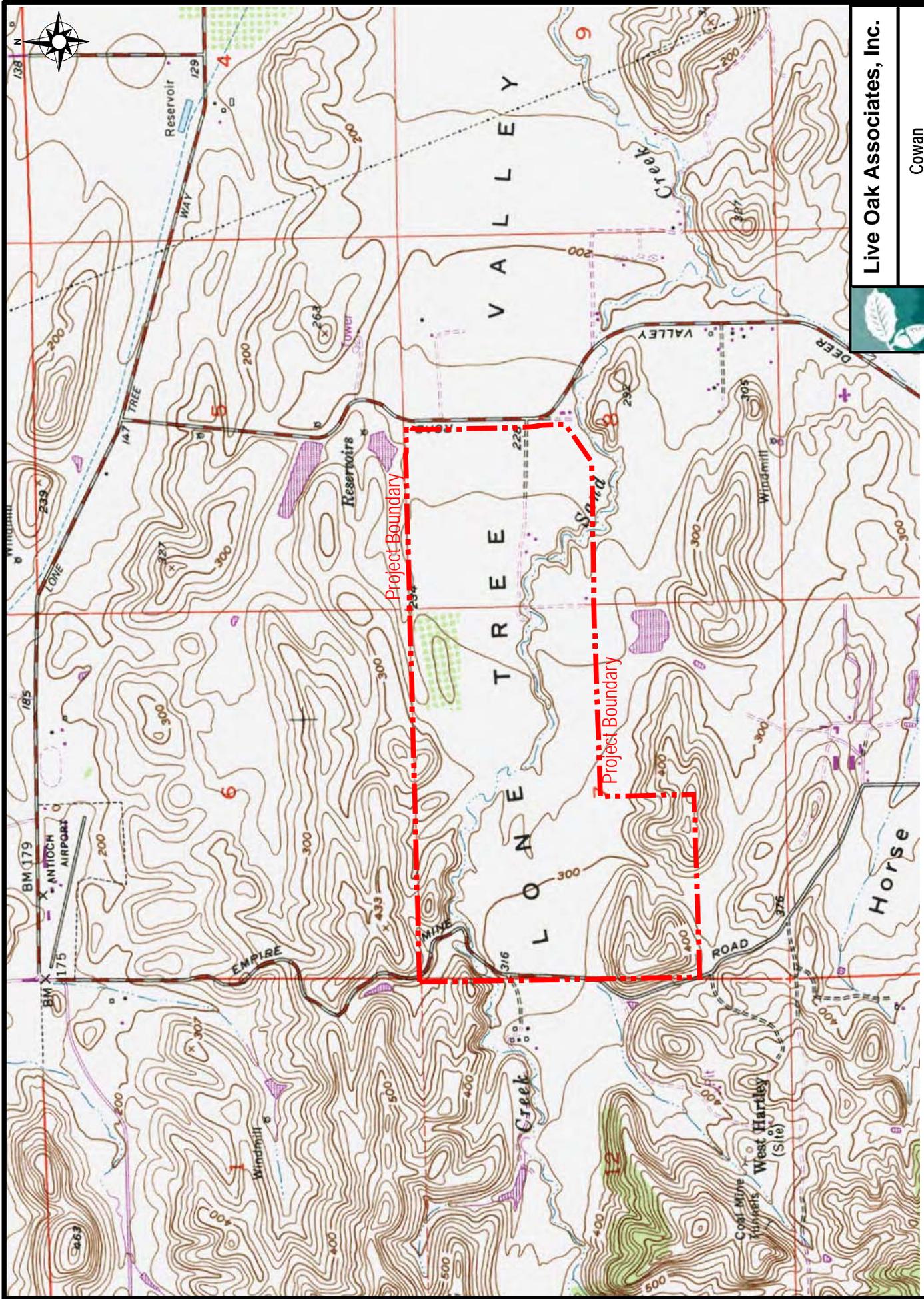
Vicinity Map



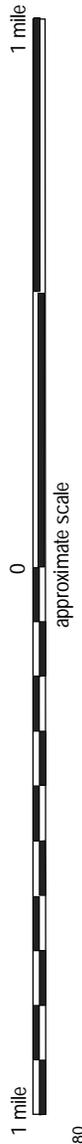
Regional Map



 Live Oak Associates, Inc.		
Cowan Site / Vicinity Map		
Date	Project #	Figure #
4/16/2014	1852-01	1



		Live Oak Associates, Inc.	
		Cowan U.S.G.S. Quadrangle	
Date 4/15/2014	Project # 1852-01	Figure # 2	



(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) through (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) through (6) of this section (33 CFR § 328.3(a) (3)).

“Waters of the United States” are subject to the jurisdiction of the USACE and, per provisions of Section 404 of the CWA, the discharge of fill into such waters requires a federal permit issued by the USACE.

1.2 SUPREME COURT DECISIONS AFFECTING THE DEFINITIONS OF WATERS OF THE UNITED STATES

A number of U.S. Supreme Court decisions have attempted to address the jurisdictional status of aquatic features that are not hydrologically connected to navigable waters or their tributaries, or where the hydrologic connection is so insignificant that destruction or modification of the aquatic feature would have little effect on downstream waters of the United States. These Supreme Court decisions are relevant to the analysis of aquatic features within the study area addressed by this report, because these aquatic features are not obviously connected to navigable waters downstream.

1.2.1 SWANCC Decision

In January of 2001, the U.S. Supreme Court ruled in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (the SWANCC decision) that “non-navigable, isolated,

intrastate” waters could not be claimed as jurisdictional by the USACE on the basis of their use by migratory birds. Although the Court did not specifically address the meaning of the word “isolated,” it upheld the jurisdictional status of “adjacent” wetlands (and other waters), which are by definition wetlands that are “bordering, contiguous, or neighboring” other jurisdictional waters. Therefore, the term “isolated wetland” has implicitly been defined as ‘wetlands that are not bordering, contiguous, or neighboring’ other jurisdictional waters. This definition does not, however, address the degree of proximity necessary to establish that one wetland (or other water) is “adjacent” to a known jurisdictional water. As established by the Supreme Court in the *United States v. Riverside Bayview Homes, Inc.* in 1985, “wetlands separated from other waters by man-made dikes or barriers, natural river berms, beach dunes, and the like are ‘adjacent wetlands.’”

1.2.2 Consolidated Carabell/Rapanos Decision

In June of 2006 the U.S. Supreme Court ruled in the consolidated cases of *June Carabell v. U.S. Army Corps of Engineers* and *John Rapanos v. United States* that wetlands are waters of the United States “if the wetlands, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as ‘navigable.’” When, in contrast, wetlands’ effects on water quality are speculative or insubstantial, they fall outside the zone fairly encompassed by the statutory term ‘navigable waters.’

On June 5, 2007, the Environmental Protection Agency (EPA) and the USACE jointly issued guidance in interpreting the Carabell/Rapanos cases as they apply to the extent of federal jurisdiction covered by Section 404 of the Clean Water Act. The agencies revised this guidance memorandum on December 2, 2008. The key points of this guidance are that the EPA and the USACE: 1) will assert jurisdiction over traditional navigable waters, wetlands adjacent to traditional navigable waters, relatively permanent non-navigable tributaries of traditional navigable waters where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months), and wetlands that directly abut such tributaries; 2) will decide jurisdiction over relatively impermanent non-navigable tributaries of navigable waters, wetlands adjacent to such tributaries, and wetlands adjacent to but not directly abutting a relatively permanent non-navigable tributary, based on a fact-specific analysis to determine

whether they have a “significant nexus” with a traditional navigable water; and 3) generally will not assert jurisdiction over swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow) or ditches excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water. In applying the “significant nexus” standard, the EPA and USACE will “assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters.” “Significant nexus” includes consideration of hydrologic and ecological factors.

1.3 STATE OF CALIFORNIA JURISDICTION OVER AQUATIC FEATURES

The State of California also asserts jurisdiction over certain drainages and wetlands. The limits of jurisdiction vary slightly from those of the USACE. The California Department of Fish and Wildlife (CDFW) and the Regional Water Quality Control Board (RWQCB) are the two state regulatory agencies responsible for implementing state regulations that identify and protect waters of the state.

According to Section 1602 of the California Fish and Game Code, public and private entities may not substantially divert or obstruct the natural flow of any river, stream, or lake within the state. This section of Fish and Game Code establishes the State’s interest in regulating construction activities in the “bed, channel, or bank” of a natural drainage or stream. A “stream” subject to the jurisdiction of the CDFW has been defined as “a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life” (California Code of Regulations, Title 14).

Since its inception, the RWQCB has had regulatory authority over activities affecting water quality in rivers, streams, lakes, and wetlands of the State. Shortly after the U.S. Supreme Court rendered its SWANCC Decision, the State Water Resources Control Board notified the Regional Boards that isolated waters, including wetlands, were subject to the jurisdiction of the State of California per provisions of the Porter-Cologne Water Quality Control Act (California Water

Code, Division 7). The Regional Boards, therefore, now assert jurisdiction over some isolated waters disclaimed as jurisdictional by the USACE.

2.0 METHODS

LOA wildlife/plant/wetland ecologist Jeff Gurule conducted surveys of the study area for jurisdictional waters on April 8 and 24, 2014. The field investigator used current and historical aerial photography, topographic maps, and two previously verified wetland delineation maps to guide the survey effort. The two previous delineation maps were created by two consulting firms other than LOA, one in 1998 and the other in 2003. The 1998 delineation was conducted by May Consulting Services during an El Nino year with above average rainfall amounts for the region. The 2003 delineation was conducted by Thomas Reid Associates during a year of normal to slightly above average rainfall for the region. The USACE verified both of the maps of jurisdictional waters generated at the time of the two previous investigations. Since LOA's jurisdictional waters investigation occurred during the third of three consecutive drought years, LOA deferred to the 2003 delineation in some instances when field indicators of hydrophytic vegetation were questionable. The verified 2003 delineation map prepared by Thomas Reid Associates is presented in Appendix A.

The surveys were consistent with guidelines found in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), *Minimum Standards for Acceptance of Preliminary Wetland Delineations* (USACE 2001), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008). These surveys have been described in more detail below.

2.1 SURVEY METHODS FOR AREAS MEETING THE TECHNICAL CRITERIA OF JURISDICTIONAL WETLANDS

Wetlands are defined as “those areas that are inundated or saturated by surface or ground water at a frequency and duration 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” (Environmental Laboratory 1987). The diagnostic environmental characteristics of wetlands include hydrophytic vegetation, hydric soils, and a hydrology characterized by an aquic or peraquic moisture regime. Accordingly, LOA surveyed the site for wetland indicator plants, positive indicators of hydric soils and wetland hydrology.

Five sampling locations were selected within the study area to assess and collect vegetation, hydrology, and soils information associated with observed and previously mapped hydrologic features and adjacent upland areas. The location of the sample point within each hydrologic feature was selected to best represent the predominant characteristics of the entire feature. Vegetation, hydrology, and soils data were entered onto standard data sheets patterned after those used by the USACE for the Arid West Region. The data sheet for each numbered sampling location can be found in Appendix B. The numbered sampling locations have been identified on the map depicting the areas meeting the technical criteria of jurisdictional wetlands. Color photographs of each sampling location are presented in Appendix C.

Plants observed within a five foot radius of each sampling location were identified to species using *The Jepson Manual: Vascular Higher Plants of California, Second Edition* (Baldwin et al, 2012). The wetland indicator status of each species was obtained from the *2014 National Wetland Plant List, California* (ERDC/CRREL 2014).

Wetland indicator species are so designated according to their frequency of occurrence in wetlands.

OBLIGATE (OBL)	Probability to occur in wetland is >99%
FACULTATIVE WETLAND (FACW)	Probability to occur in wetland is between 67-99%
FACULTATIVE (FAC)	Probability to occur in wetland is between 33 to 67%
FACULTATIVE UPLAND (FACU)	Probability to occur in wetland is between 1 to <33%.
UPLAND (UPL)	Probability to occur in wetland is <1%

Hydrophytic vegetation is considered present when more than 50% of the dominant species at a given location are composed of obligate, facultative wetland and facultative plant species. However, the Arid West Supplemental Guidelines also incorporate an alternate prevalence index to be calculated in determining the presence of wetland vegetation if the dominance test is not met. A complete list of vascular plants identified on the study area during LOA surveys of the study area can be found in Appendix D.

Each sampling location was also examined for positive indicators of wetland hydrology and hydric soils. Evidence of wetland hydrology consisted of primary indicators such as surface water, watermarks, drift lines, sediment deposits, etc. Secondary indicators of wetland hydrology include drainage patterns in wetlands, watermarks (Riverine), drift lines (Riverine), sediment

deposits (Riverine), etc. In accordance with USACE guidelines, a soil pit 10” to 12” in depth was dug at all sampling locations. The soils excavated from each pit were also examined for low chromas, gleying, mottling, concretions, sulfidic odors, etc.

The boundaries of likely jurisdictional wetlands were mapped using a Trimble Geo XT GPS unit. LOA prepared the maps depicting likely jurisdictional wetlands using information collected in the field plus information generated in the 2003 investigation. This information was then overlaid on a recent aerial photograph from Google Earth.

2.2 SURVEY METHODS FOR TRIBUTARY WATERS

In the absence of adjacent wetlands, the limit of jurisdiction in navigable rivers and their tributaries, whether inter- or intrastate, extends to “ordinary high water” (OHW). OHW refers to “that line on the shore established by the fluctuation of water and indicated by physical characteristics such as a clear natural line impressed on the bank, shelving, changes in the character 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.”

The term “channel” as used in this report refers to a drainage feature with a bed and defined bank. Where drainage channels are present on a given site, it is customary to walk the channel and take width measurements at a standard interval. Width measurements represent the channel width between OHW marks on opposing banks.

The field investigator visually inspected the site for physical characteristics of OHW in order to determine the extent of possible jurisdiction. Accumulation of leaf litter, debris and sediment along the banks of the drainages provided evidence of OHW.

The boundaries of likely tributary waters, like the boundaries for jurisdictional wetlands, were mapped using a Trimble Geo XT GPS unit. LOA prepared the maps depicting likely tributary waters using information collected in the field plus information generated in the 2003 investigation. This information was then overlaid on a recent aerial photograph from Google Earth.

3.0 RESULTS

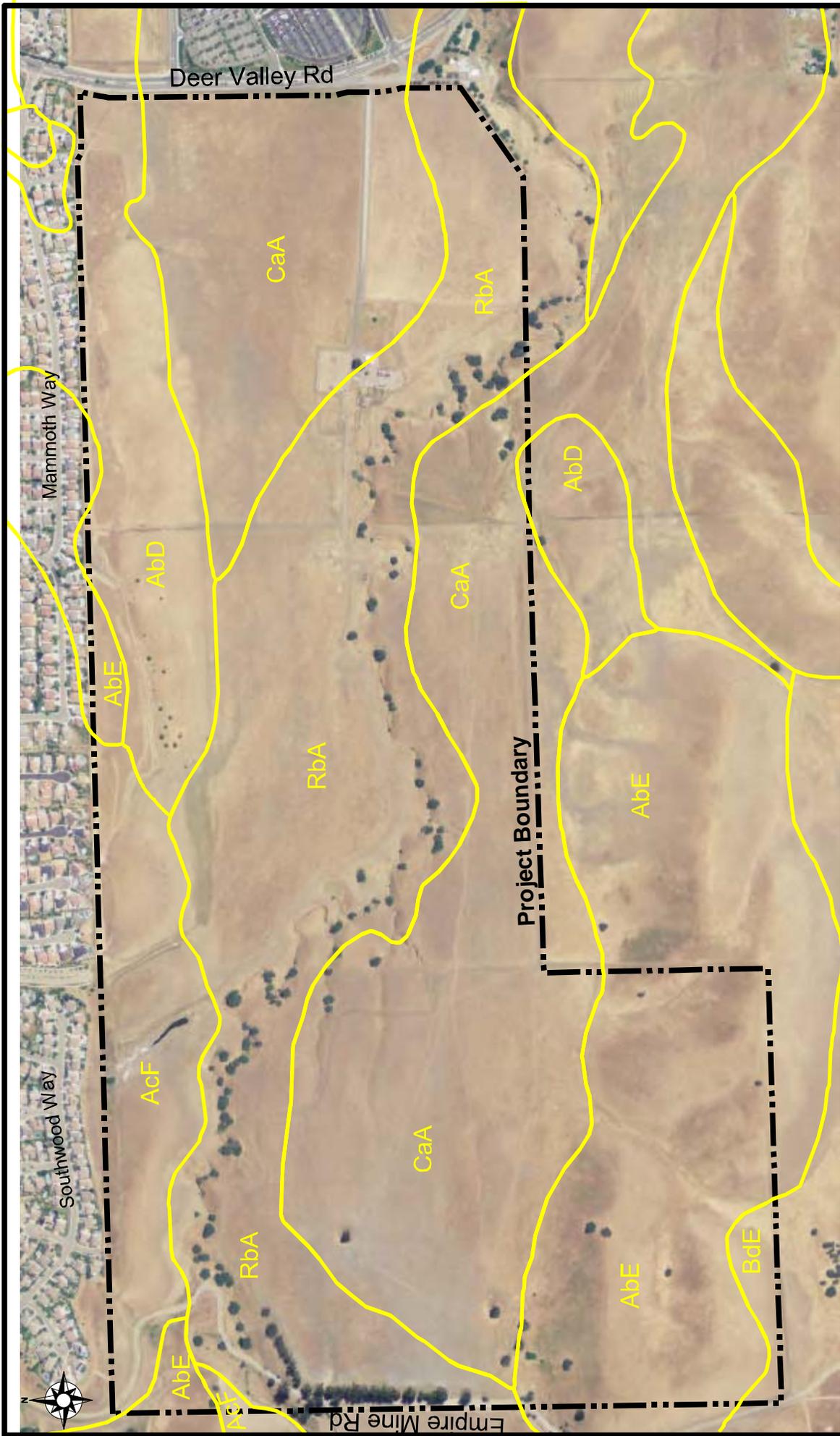
3.1 SETTING

The study area consists of a relatively broad valley containing non-native annual grassland with a few widely scattered trees. Elevations range from approximately 222 to 484 feet National Geodetic Vertical Datum (NGVD) (see Figure 4). The deeply incised Sand Creek channel and ephemeral tributaries occur within the valley floor. Oak trees occur sporadically along these drainage channels. Low hills occur north and south of the valley at the west end of the study area. Ruderal habitat occurs around an onsite ranch house, where soils are compacted and vegetation is limited to sparse weedy vegetation and limited landscape vegetation. A large eucalyptus tree was present in this ruderal area.

Current land use is cattle grazing. Land use directly adjacent to the study area is residential to the north, commercial to the east, and similar ranch land to the south and west.

The climatic conditions of the study area are typical of those found in San Joaquin/Sacramento River Delta region of California, where a Mediterranean climate prevails. Winters are cool and moist. Summers are hot and dry. Precipitation falls in the form of rain between October and May, with the heaviest amounts in December, January, February, and March. Annual precipitation is approximately 13 inches. The 2013/2014 precipitation year yielded only about 50% of average annual rainfall for the region, following two previous years of below average rainfall.

Six soil mapping units, Altamont clay, 9 to 15 percent slopes; Altamont clay, 15 to 30 percent slopes; Altamont-Fontana complex, 30 to 50 percent slopes; Briones loamy sand, 5 to 30 percent slopes; Capay clay, 0 to 2 percent slopes; and Rincon clay loam, 0 to 2 percent slopes, were located within the study area (NRCS 2014) (see Figure 3). Four of these six soils are considered hydric and, within depressions, may support hydrophytic vegetation. Soils at the northern edge of the study area have been modified through the placement of fill material over native soils, presumably during the construction of a large residential development immediately north of the study area (see Photo 6 in Appendix C).



LEGEND

- Abd** Altamont clay, 9 to 15% slopes
- AbE** Altamont clay, 15 to 30% slopes
- AcF** Altamont-Fontana complex, 30 to 50% slopes
- BdE** Briones loamy sand, 5 to 30% slopes
- CaA** Capay clay, 0 to 2% slopes
- RbA** Rincon clay loam, 0 to 2% slopes

Source:
 U.S. Dept. of Agriculture, Natural Resources Conservation Service
 U.S. Dept. of Agriculture, Aerial Photography Field Office



Live Oak Associates, Inc.

**Cowan
Soils**

Date **4/14/2014**
 Project # **1852-01**

Figure # **3**

TABLE 1. SOILS OF THE STUDY AREA					
SOIL	Map Symbol	Percent of Study Area	Parent Material	Drainage Class	Hydric
Altamont clay, 9 to 15 percent slopes	AbD	9.1	Residuum weathered from sandstone and shale	Well drained	No
Altamont clay, 15 to 30 percent slopes	AbE	14.1	Residuum weathered from sandstone and shale	Well drained	Yes
Altamont-Fontana complex, 30 to 50 percent slopes	AcF	7.8	Residuum weathered from sandstone and shale	Well drained	Yes
Briones loamy sand, 5 to 30 percent slopes	BdE	1.1	Residuum weathered from sandstone	Well drained	No
Capay clay, 0 to 2 percent slopes	CaA	37.0	Alluvium derived from sedimentary rock	Moderately well drained	Yes
Rincon clay loam, 0 to 2 percent slopes	RbA	30.9	Alluvium derived from sedimentary rock	Well drained	Yes

Detailed information pertaining to these soils can be found in Appendix E.

3.2 POTENTIAL WATERS OF THE UNITED STATES

Potential waters of the United States within the study area included tributary waters of the San Joaquin River (i.e. Sand Creek and its unnamed ephemeral tributaries and their impoundments) and adjacent wetlands with a hydrologic connection to tributary waters (i.e. vernal pools and wetland seeps) (Figure 4). The total area of potential waters of the United States delineated within the Study Area is 3.948 acres (Table 2).

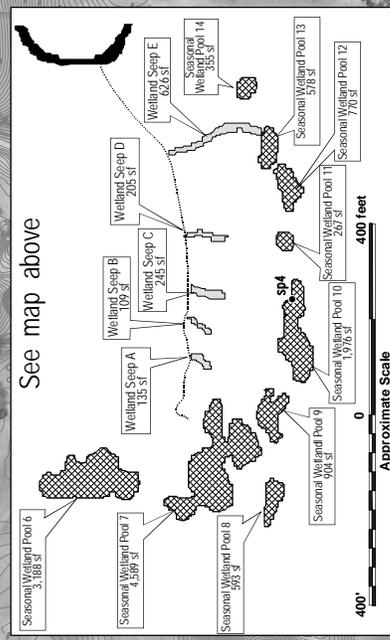
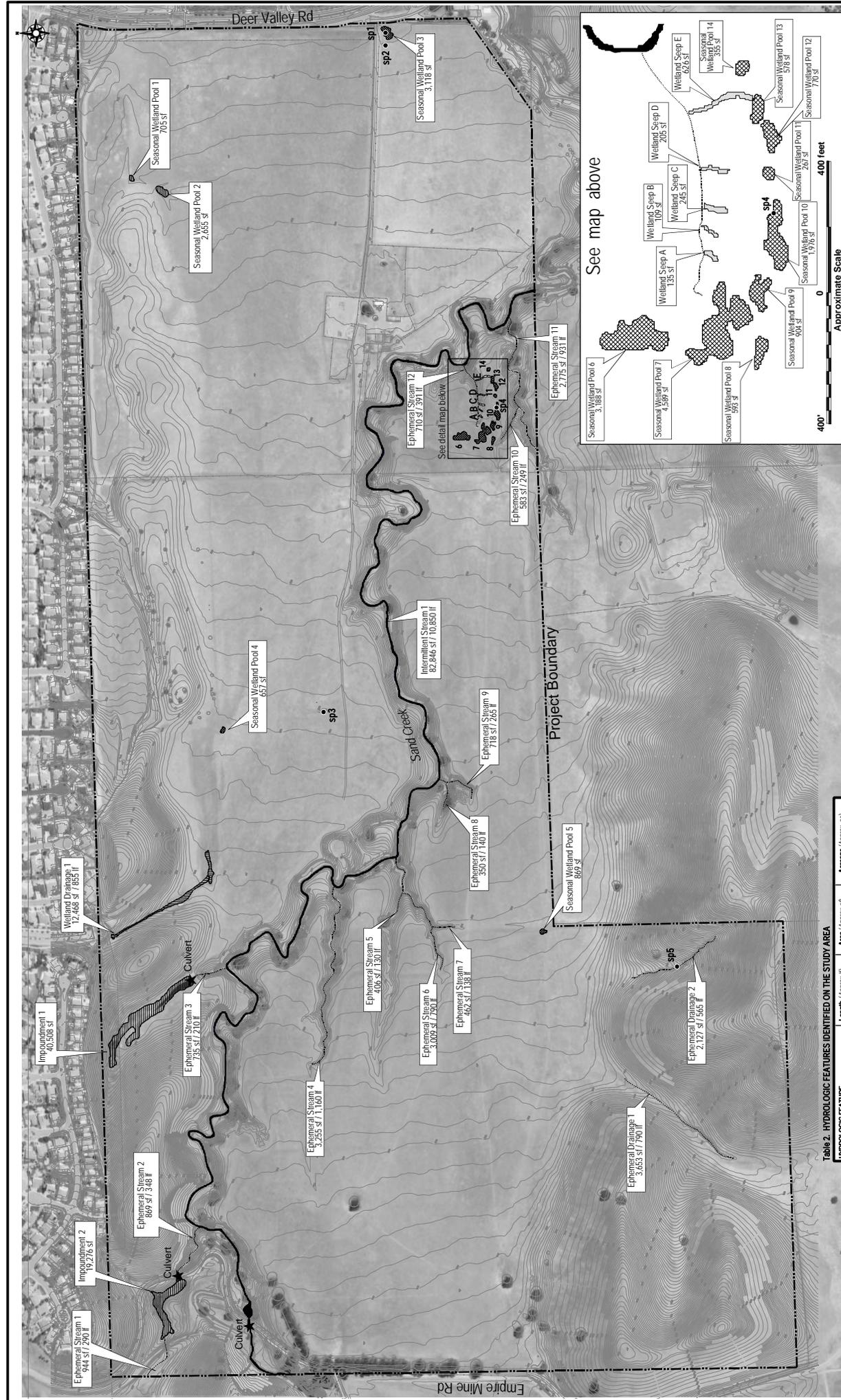


Table 2. HYDROLOGIC FEATURES IDENTIFIED ON THE STUDY AREA

HYDROLOGIC FEATURE	Length (Approx. ft)	Area (Approx. sf)	Area (Approx. ac)
POTENTIALLY JURISDICTIONAL WATERS			
Primary Waters			
Ephemeral Stream (Sand Creek)	10,890	82,846	1,901
Ephemeral Stream (tributary to Sand Creek)	5,042	14,716	0.340
Intermittent	N/A	97,328	1,372
Adjacent Waters			
Seasonal Wetland Pool	N/A	132,220	0,303
Welland Seep	N/A	1,320	0,030
Sub Total	15,932	171,886	3,948
POTENTIALLY NON-JURISDICTIONAL WATERS			
Non-Tributary Waters			
Ephemeral Drainage (1 & 2)	1,355	5,790	0.132
Isolated Wetlands			
Welland Drainage	865	12,468	0.284
Seasonal Wetland Pools (1, 2, 3, 4, 8, 9)	N/A	9,004	0.183
Sub Total	2,210	26,262	0.601
Total	18,142	198,238	4,551

LEGEND

- Ephemeral Drainage / Stream
- Intermittent Stream (Sand Creek)
- Wetland Seep
- Impoundment
- Wetland Drainage
- Seasonal Wetland Pools

Other Features

- Project Boundary 546 Ac
- Culvert
- Sample Point



Live Oak Associates, Inc.
 Cowan Ranch
 Potential Jurisdictional Waters
 Date: 09/15/2014
 Project #: 1892-01
 Figure #: 4

TABLE 2. POTENTIAL WATERS OF THE UNITED STATES DELINEATED WITHIN THE STUDY AREA.

Hydrologic Feature	Approximate length (lf)	Approximate Area (ft.²)	Approximate Area (acres)
<i>Tributary Waters in Form of Channels and Impoundments on Channels</i>			
Intermittent Stream (Sand Creek)	10,850	82,846	1.901
Ephemeral Stream (Tributary to Sand Creek)	5,042	14,816	0.340
Impoundment	N/A	59,784	1.372
<i>Adjacent Wetlands</i>			
Seasonal Wetland Pools	N/A	13,220	0.303
Wetland Seep	N/A	1,320	0.030
Total	15,892	171,986	3.948

Hydrologic features within the study area that meet the regulatory definition of a water of the United States are described below:

3.2.1 Non-Wetland Intermittent Stream (Sand Creek)

This stream channel was narrow with steep banks. The bed of the channel was well below the elevation of the surrounding valley floor. The bed was composed of soil. Cobbles and rocks were absent. Some areas of the channel bed supported upland herbaceous vegetation characteristic of surrounding grasslands. Other areas of the streambed were devoid of vegetation.

No portion of this channel met the technical criteria of jurisdictional wetlands. Wetland vegetation was absent. Herbaceous vegetation observed included barnyard barley (*Hordeum murinum* ssp. *leporinum*) (FACU), ripgut (*Bromus diandrus*) (UPL), and an identified species of mallow (*Malva* sp.) (UPL). Trees associated with Sand Creek primarily consisted of valley oak (*Quercus lobata*) (FACU) and blue oak (*Quercus douglasii*) (UPL). Hydric soils and evidence of wetland hydrology were absent.

The limits of potential jurisdiction were defined by ordinary high water marks on opposing channel banks as identified by shelving, exposed roots, scour marks, water stains, etc.



Incised Channel of Sand Creek

3.2.2 Non-wetland Ephemeral Stream

Twelve narrow ephemeral stream channels were identified within the Study Area that are tributary to Sand Creek. Together these ephemeral features occupy approximately 0.340 acres of the study area. These channels were characterized by a bed and bank, but hydrophytic vegetation was absent. Various vascular plant species were observed that included many of the same species observed in the surrounding non-native grasslands. Soils in one soil pit found the soils to be hydric with a matrix color of 10YR 3/4 across 60% of the soil and redox features with a color of 5YR 4/4 occupying 40% of the soil. Other than the single secondary indicator of “Drainage Patterns”, hydrology indicators were absent. See Sample Point 5 datasheets in Appendix B for detailed information.



Ephemeral Stream

3.2.3 Impoundment

Two impoundments of ephemeral drainages occupy 1.372 acres of the study area. Impoundment 1 was created as a stock pond for grazing cattle. Impoundment 2 was created as a result of the construction of the Empire Mine Road and the high placement of a culvert through the road fill. These areas were partially inundated during the 2014 investigation.

Historic aerial photography revealed fluctuating levels of inundation depending on the year and the season the photograph was taken. Seasonally inundated or saturated areas supported little vegetation at Impoundment 1 and a dense covering of saltgrass (*Distichlis spicata*) (FAC) with patches of common spikerush (*Eleocharis macrostachya*) (FACW) at Impoundment 2. These features were delineated by a combination of OHW marks and the limits of dominant wetland vegetation.



Impoundment

3.2.4 Seasonal Wetland Pools

Nine small seasonal pools with a total area of approximately 0.303 acres occupy small topographic depressions of the Study area just south of Sand Creek (Seasonal Wetland Pools 6, 7, 8, 9, 10, 11, 12, 13, 14 on Figure 4). The depressions within which these pools form collect surface runoff during the rainy season, which is discharged into Sand Creek via an ephemeral drainage when the pools are full. These depressions appeared to be mostly human-made. The boundaries of these pools consisted of bermed edges that were created in the past for some unknown reason.

These seasonal wetland pools met the technical criteria of jurisdictional wetlands. Wetland plants observed within these pools included species endemic to vernal pools of the region such as slender popcorn flower (*Plagiobothrys stipitatus*) (OBL), slender woolly marbles (*Psilocarphus tenellus*) (OBL), coyote thistle (*Eryngium vaseyi*) (FACW), spiny buttercup (*Ranunculus muricatus*) (FACW), and perennial ryegrass (*Festuca perennis*) (FAC). Some pools contained little to no vegetation. All of the pools observed were dry at the time of the 2014 field survey, which was not surprising given the drought conditions. Soil pits dug within representative pools revealed low soil matrix chromas and redox features. These soil characteristics met hydric soils

criteria. The presence of reduced iron and/or oxidized root channels were indicators of past inundation. See Sample Point 1 and Sample Point 4 datasheets in Appendix B for detailed information.

3.2.5 Wetland Seep

A few small areas occupying approximately 0.030 acres at the head of Ephemeral Stream 12 were delineated as seeps in 2003. During the 2014 investigation these areas were dry with widely scattered coyote thistle (FACW) as the only wetland vegetation observed. Given the drought conditions at the time of the 2014 survey, the areas delineated for these features in 2003 were used and presumed to be accurate and a much better representation of normal circumstances.



Wetland Seeps

3.3 ISOLATED WATERS

Isolated hydrologic features with no hydrologic connection to downstream waters of the United States included two non-wetland ephemeral streams, one wetland drainage, and 5 seasonal wetland pools. Approximately 0.601 acres of the site was composed of isolated waters.

TABLE 2. ISOLATED WATERS DELINEATED WITHIN THE STUDY AREA.			
<i>Non-Tributary Waters</i>			
Ephemeral Drainage	1,355	5,780	0.132
<i>Isolated Wetlands</i>			
Wetland Drainage	855	12,468	0.286
Seasonal Wetland Pools	N/A	8,004	0.183
Total	2,210	26,252	0.601

Hydrologic features within the study area that were considered to be isolated and not meeting the regulatory definition of a water of the United States are described below:

3.3.1 Ephemeral Drainage

Two ephemeral drainages were identified within the study area that are not tributary to Sand Creek or any other known or potential water of the U.S. Like other ephemeral streams of the site, these did not meet the technical criteria of jurisdictional wetlands.

3.3.2 Wetland Drainage

A relatively steep wetland drainage was present at the north end of the study area. This drainage receives water from a culvert discharging water from the residential development to the north of the study area. It appears that the residential development contains no jurisdictional waters or wetlands that this water could be hydrologically connected to. After exiting the culvert the water travels down a relatively steep drainage until it fans out in an easterly direction as it follows the easterly downgradient topography and completely dissipates in the valley floor. No evidence of any surface or subsurface connection to Sand Creek was observed. This drainage terminates approximately 400 feet upslope from Sand Creek.

This drainage contained a modest flow of water during the 2014 survey that flowed out of the three foot cement culvert emerging from the large residential development to the north. The drainage occupied approximately 0.286 acre of the Study Area. Vegetation within this area was dominated by fringed willowherb (*Epilobium ciliatum*) (FACW). The drainage consisted of a narrow and shallow incised channel that broadened out into an inundated/saturated swale. The

swale followed the contours of the valley floor and headed east away from Sand Creek until it gave way to upland grassland.



Wetland Drainage

3.3.3 Seasonal Wetland Pools

Five seasonal wetland pools were delineated that had no hydrologic connection to downstream waters of the United States. Like the nine seasonal pools described above, which are considered to be potential waters of the United States, these five pools met the technical criteria of jurisdictional wetlands and supported hydrophytic plant species. These five isolated seasonal pools are briefly described below:

Seasonal Wetland Pool 1 is a seasonally inundated area in a field corner where rainwater backs up against the edge of the field that is raised to create the adjacent roadbed. This area functions as a closed basin for rainwater that can escape only through evaporation and percolation.

Seasonal Wetland Pools 2 and 3 capture rainwater that sheet-flows northeast, away from Sand Creek, before it is stopped by low berms that create these two wetland pools.

Seasonal Wetland Pool 4 is a small shallow depression in the valley floor that appears to collect rainwater during normal or above average rainfall years. This pool is approximately 1,000 feet

from Sand Creek with the gradient of the land falling in an easterly direction parallel to Sand Creek.

Seasonal Wetland Pool 5 is also a small shallow depression in the valley floor; however, this pool is regularly disturbed by perimeter discing. It is located approximately 850 feet from the down gradient portion of Sand Creek.



Seasonal Wetland Pool 3.

3.4 OTHER AREAS OF THE STUDY SITE

Hydrophytic vegetation, wetland hydrology, and hydric soils were absent from the remainder of the Study Area, which comprised non-native annual grassland and ruderal habitats surrounding the onsite ranch house. Grasslands were dominated by annual grasses and forbs typical of the extensive non-native grassland habitats found throughout California's Central Valley and surrounding foothills. Most of the annual grasses and forbs are of European origin. Common grass species included ripgut brome (UPL), soft chess (*Bromus hordeaceus*) (FACU), barnyard barley (FACU), and wild oats (*Avena sp.*) (UPL). Typical forbs included bur clover (*Medicago polymorpha*) (FACU), Common gumplant (*Grindelia camporum*) (FACW), common fiddleneck (*Amsinckia intermedia*) (UPL), and red-stemmed filaree (*Erodium cicutarium*) (UPL). Ruderal areas contained compacted soils supporting little vegetation, which primarily consisted of landscaped vegetation and a large blue gum eucalyptus (*Eucalyptus globulus*) tree.

Hydric soil indicators were observed outside of depressions in grassland areas due to the clay soils and the NRCS hydric soils rating of these soils. The soil matrix exhibited Munsell color notations ranging from of 10YR 2/2, 10YR 3/3, and 5YR 5/2, with mottling occurring from 2 to 12 inches. See Sample Point 2 and 3 datasheets in Appendix B for detailed information.

4.0 DISCUSSION

The Cowan Ranch study area was examined for waters of the U.S. in the third year of a drought. The resulting dry conditions rendered the entire site a “problem area” where it was difficult to assess what exactly the vegetation and hydrology would have been in given areas had rainfall during the preceding winter (or winters) been closer to average. Rainfall had actually been approximately 50% of average during the preceding winter, and extreme drought can result in areas that typically support hydrophytic vegetation shifting to upland species. Furthermore, three years of extreme drought can obscure indicators of wetland hydrology. Drought conditions prevailing in the study area in 2014 required LOA to rely heavily on the previous delineations that were prepared based on fieldwork conducted in wetter years (i.e., 1998 and 2003).

LOA’s final delineation map of 2014, however, departed from the 2003 delineation map prepared by Thomas Reid and Associates where several areas previously mapped as wetlands failed to meet any of the technical criteria of jurisdictional wetlands. These included three wetland areas previously mapped along the north boundary of the study area and a wetland in the middle of the study area immediately north of the main road through the ranch. Two of these wetlands are accounted for in the acreage table of the 2003 report as Vernal Pools #4 and #5; the other two are unnumbered and not included in the acreage table of the 2003 report. These four areas were found to consist of non-native annual grassland habitat in 2014 that was indistinguishable from surrounding grassland habitat.

In fact, areas mapped as Vernal Pool #4 and the small unnumbered vernal pool north of Vernal Pool #5 actually occur in elevated areas of the study area, not depressions. Vernal Pool #4 occurs in an elevated area at the location of a water well. LOA investigators believe that this pool was mapped on the basis of aerial photo signatures of an elevated area that were mistakenly thought to be a vernal pool in a depression, as the mapped boundaries of Vernal Pool #4 consistently match the signature of the elevated area on multiple historic aerial photographs. Similarly, the small unnumbered vernal pool north of Vernal Pool #5 corresponds to an elevated area consistently avoided during annual perimeter firebreak discing, as is often the practice around wetland depressions; this area may have appeared to the 2003 investigators as a wetland depression because of the discing pattern. The area previously mapped as Vernal Pool #5 lies in

the midst of fill material that was apparently placed along the northern boundary of the study area sometime in the 1990s during construction of the large residential subdivision to the north. No depression was observed in this area and, in fact, the mapped boundary of this vernal pool extends up the slope of a hill to the south and contains a road bed in 2003 aerial photographs (see Photo 4 in Appendix C). The small unnumbered pool along the northern boundary of the study area east of Vernal Pool #5 consists of a depression and remnant culvert that likely drained land within the study area prior to the placement of fill, which has completely disrupted historic drainage patterns in that portion of the study area. This depression was dominated by a dense stand of California brome (*Bromus carinatus*) (UPL) (see Photo 5 in Appendix C).

One previously undelineated wetland area was mapped as a result of LOA's 2014 investigation, which is identified as Seasonal Wetland Pool 3. LOA also mapped a wetland area that was previously delineated on the 1998 map but omitted from the 2003 map. This feature is labeled as Seasonal Wetland Pool 5 on the 2014 map.

Two ephemeral drainages in folds of hills south of Sand Creek are unconnected to any other drainage. Ephemeral flows in these drainages are expected to be extremely modest, even during the heaviest rain events, due to the small size of the watershed they drain. The ends of these drainages are over 1,000 feet from the nearest ephemeral tributary to Sand Creek.

Altogether, these seasonal wetland pools, ephemeral drainages, and wetland drainage total approximately 0.601 acres. LOA's investigation found these 0.601 acres to receive water generated in uplands that drain to uplands. LOA found no evidence of a hydrologic connection or any significant nexus between these features and a known or potential water of the U.S. Therefore, LOA believes these 0.601 acres do not meet the criteria of a water of the U.S.

All potential jurisdictional waters that LOA mapped on the site are hydrologically connected to Sand Creek, which joins Marsh Creek approximately four miles east of the study area. Marsh Creek then flows north until it joins the San Joaquin River, a known water of the U.S. Therefore, LOA believes these 3.948 acres of delineated waters meet the criteria of a water of the U.S.

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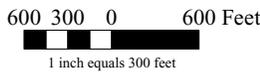
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APPENDIX A: 2003 DELINEATION MAP



SAND CREEK ADULT COMMUNITY PROJECT WETLAND DELINEATION



APPENDIX B: WETLAND DATA SHEETS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Cowan Property City/County: Antioch Sampling Date: 4-24-14
 Applicant/Owner: Dividend Homes / Richland Development Corp State: CA Sampling Point: 1
 Investigator(s): Jeff Gurule Section, Township, Range: S 7+8, T 1N, R 2E
 Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <2%
 Subregion (LRR): C Lat: 607325, 96 Long: 4200892, 46 Datum: UTM
 Soil Map Unit Name: Capay clay, 0 to 2% slopes 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? No Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? No (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 <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: <u>Investigation occurred in the 3rd of three consecutive drought years.</u>	

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>None</u>				Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. <u>None</u>				Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. <u>None</u>				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. <u>None</u>				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species <u>N</u> x 4 = <u>A</u> UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Total Cover: _____				
Sapling/Shrub Stratum				
1. <u>None</u>				
2. <u>None</u>				
Total Cover: _____				
Herb Stratum				
1. <u>Plagiobothrys stipitatus</u>	<u>70</u>	<input checked="" type="checkbox"/>	<u>FACW</u>	
2. <u>Psilocarphus tenellus</u>	<u>4</u>		<u>OBL</u>	
3. <u>Ranunculus muricatus</u>	<u>2</u>		<u>FACW</u>	
4. <u>Grindelia camporum</u>	<u>1</u>		<u>FACW</u>	
5. <u>Hordeum marinum</u>	<u>8</u>		<u>FACU</u>	
Total Cover: <u>85</u>				
Woody Vine Stratum				
1. <u>None</u>				
2. <u>None</u>				
Total Cover: _____				
% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____		Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		

Remarks: Dominant wetland veg present

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 2/2	95	5YR 3/4	5	C	M	clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix. ²Location: PL=Pore Lining, RC=Root Channel, 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 Soils³:

- 1 cm Muck (A9) (LRR C)
- 2 cm Muck (A10) (LRR B)
- Reduced Vertic (F18)
- Red Parent Material (TF2)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

Soils hydric

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- 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 Plowed Soils (C6)
- 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)
- Thin Muck Surface (C7)
- 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? Yes No _____ Depth (inches): ~4"
 (includes capillary fringe) on 4-8-14

Wetland Hydrology Present? Yes No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Saturation observed on 4-8-14

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Cowan Property City/County: Antioch Sampling Date: 4-24-14
 Applicant/Owner: Dividend Homes/Richland Development Corp. State: CA Sampling Point: 2
 Investigator(s): Jeff Gurule Section, Township, Range: S 718, T 1N, R 2E
 Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): ≤ 2%
 Subregion (LRR): C Lat: 607282.97 Long: 4200892.95 Datum: UTM
 Soil Map Unit Name: Capay clay, 0 to 2% slopes 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 <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: <u>Investigation occurred in the 3rd of three consecutive drought years.</u>	

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	<input type="checkbox"/>	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)
2. <u>None</u>	_____	<input type="checkbox"/>	_____	Total Number of Dominant Species Across All Strata: <u>0</u> (B)
3. _____	_____	<input type="checkbox"/>	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
4. _____	_____	<input type="checkbox"/>	_____	
Total Cover: _____				
Sapling/Shrub Stratum				
1. _____	_____	<input type="checkbox"/>	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species <u>NA</u> x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
2. <u>None</u>	_____	<input type="checkbox"/>	_____	
3. _____	_____	<input type="checkbox"/>	_____	
4. _____	_____	<input type="checkbox"/>	_____	
5. _____	_____	<input type="checkbox"/>	_____	
Total Cover: _____				
Herb Stratum				
1. <u>Hordeum murinum</u>	<u>69</u>	<input checked="" type="checkbox"/>	<u>FACU</u>	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.
2. <u>Bromus hordeaceus</u>	<u>6</u>	<input type="checkbox"/>	<u>FACU</u>	
3. <u>Medicago polymorpha</u>	<u>15</u>	<input type="checkbox"/>	<u>FACU</u>	
4. <u>Erodium cicutarium</u>	<u>3</u>	<input type="checkbox"/>	<u>UPL</u>	
5. <u>Festuca perenne</u>	<u>7</u>	<input type="checkbox"/>	<u>FAC</u>	
6. <u>Grindelia camporum</u>	<u>1</u>	<input type="checkbox"/>	<u>FACW</u>	
7. <u>Lepidium nitidum</u>	<u>1</u>	<input type="checkbox"/>	<u>FAC</u>	
8. _____	_____	<input type="checkbox"/>	_____	
Total Cover: <u>99</u>				
Woody Vine Stratum				
1. _____	_____	<input type="checkbox"/>	_____	Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
2. <u>None</u>	_____	<input type="checkbox"/>	_____	
Total Cover: _____				
% Bare Ground in Herb Stratum _____	% Cover of Biotic Crust _____			

Remarks: Dominant hydrophytic veg absent.

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 2/2	95	5YR 5/8	5	C	RC	clay loam	
3-12	10YR 2/2	100					" "	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix. ²Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

- 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)

- 1 cm Muck (A9) (LRR C)
- 2 cm Muck (A10) (LRR B)
- Reduced Vertic (F18)
- Red Parent Material (TF2)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

Hydric soils indicators are present. Sample point within a soil type that is considered hydric

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators (2 or more required)

Primary Indicators (any one indicator is sufficient)

- 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 Plowed Soils (C6)
- Other (Explain in Remarks)

- Water Marks (B1) (Riverine)
- Sediment Deposits (B2) (Riverine)
- Drift Deposits (B3) (Riverine)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Thin Muck Surface (C7)
- 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? Yes No Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Aside from the oxidized root channel, no other hydrology indicator was present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Cowan Property City/County: Antioch Sampling Date: 4-24-14
 Applicant/Owner: Dividend Homes/Richland Development Corp. State: CA Sampling Point: 3
 Investigator(s): JG Section, Township, Range: S 7+8, T 1N, R 2E
 Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): none Slope (%): <2%
 Subregion (LRR): C Lat: 606141.51 Long: 4201009.62 Datum: UTM
 Soil Map Unit Name: Rincon clay loam, 0 to 2% slope 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 <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

Remarks: Does not meet wetland veg requirement.
Investigation occurred in the 3rd of three consecutive drought year

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>NA</u>				Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)
2. <u>NA</u>				Total Number of Dominant Species Across All Strata: <u>0</u> (B)
3. <u>NA</u>				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
4. <u>NA</u>				
Total Cover: _____				
Sapling/Shrub Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. <u>NA</u>				Total % Cover of: _____ Multiply by: _____
2. <u>NA</u>				OBL species <u>0</u> x 1 = <u>0</u>
3. <u>NA</u>				FACW species <u>10</u> x 2 = <u>20</u>
4. <u>NA</u>				FAC species <u>25</u> x 3 = <u>75</u>
5. <u>NA</u>				FACU species <u>62</u> x 4 = <u>248</u>
Total Cover: _____				UPL species <u>3</u> x 5 = <u>15</u>
				Column Totals: <u>100</u> (A) <u>358</u> (B)
				Prevalence Index = B/A = <u>358/100 = 3.58</u>
Herb Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>Hordeum murinum</u>	<u>59</u>	<input checked="" type="checkbox"/>	<u>FACU</u>	<input type="checkbox"/> Dominance Test is >50%
2. <u>Festuca perenne</u>	<u>15</u>		<u>FAC</u>	<input type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. <u>Lepidium nitidum</u>	<u>10</u>		<u>FAC</u>	<input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. <u>Amsinckia menziesii</u>	<u>1</u>		<u>UPL</u>	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
5. <u>Medicago polymorpha</u>	<u>3</u>		<u>FACU</u>	
6. <u>Avena sp.</u>	<u>1</u>		<u>UPL</u>	
7. <u>Grindelia camporum</u>	<u>10</u>		<u>FACW</u>	
8. <u>Erodium cicutarium</u>	<u>1</u>		<u>UPL</u>	
Total Cover: <u>100</u>				
Woody Vine Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?
1. <u>NA</u>				Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
2. <u>NA</u>				
Total Cover: _____				
% Bare Ground in Herb Stratum _____	% Cover of Biotic Crust _____			

Remarks: Dominant wetland veg absent.

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10YR 3/3	85	5YR 3/4	15	C	M	Clay loam	
7-12	10YR 3/3	97	5YR 3/4	3	C	M	" "	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix. ²Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) (LRR C) <input type="checkbox"/> 1 cm Muck (A9) (LRR D) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR C) <input type="checkbox"/> 2 cm Muck (A10) (LRR B) <input type="checkbox"/> Reduced Vertic (F18) <input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Loamy Mucky Mineral (F1) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input checked="" type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> Vernal Pools (F9)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:
 Hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (2 or more required)
Primary Indicators (any one indicator is sufficient) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) (Nonriverine) <input type="checkbox"/> Sediment Deposits (B2) (Nonriverine) <input type="checkbox"/> Drift Deposits (B3) (Nonriverine) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Water Marks (B1) (Riverine) <input type="checkbox"/> Sediment Deposits (B2) (Riverine) <input type="checkbox"/> Drift Deposits (B3) (Riverine) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
 Tail end of a very broad and shallow swale that contains the same vegetation as outside of swale.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Cowan Property City/County: Antioch Sampling Date: 4-24-14
 Applicant/Owner: Dividend Homes/Richland Development Corp. State: CA Sampling Point: 4
 Investigator(s): JG Section, Township, Range: S 708, T1N, R2E
 Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): None Slope (%): <2%
 Subregion (LRR): C Lat: 606665.12 Long: 4200696.39 Datum: UTM
 Soil Map Unit Name: Copay clay, 0 to 2% slopes 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 <input checked="" type="checkbox"/> No <input type="checkbox"/>	Hydic Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Remarks: Area meets 3 criteria of a wetland.
Investigation occurred in the 3rd of three consecutive drought years.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>NA</u>				Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. <u>NA</u>				Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. <u>NA</u>				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. <u>NA</u>				
Total Cover: _____				
Sapling/Shrub Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. <u>NA</u>				Total % Cover of: _____ Multiply by: _____
2. <u>NA</u>				OBL species _____ x 1 = _____
3. <u>NA</u>				FACW species _____ x 2 = _____
4. <u>NA</u>				FAC species _____ x 3 = _____
5. <u>NA</u>				FACU species <u>NA</u> x 4 = _____
Total Cover: _____				UPL species _____ x 5 = _____
				Column Totals: _____ (A) _____ (B)
				Prevalence Index = B/A = _____
Herb Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>Festuca perenne</u>	<u>60</u>	<input checked="" type="checkbox"/>	<u>FAC</u>	<input checked="" type="checkbox"/> Dominance Test is >50%
2. <u>Bromus hordeaceus</u>	<u>5</u>		<u>FACU</u>	<input type="checkbox"/> Prevalence Index is ≤3.0 ¹
3. <u>Eryngium vaseyi</u>	<u>10</u>		<u>FACW</u>	<input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. <u>Erodium cicutarium</u>	<u>1</u>		<u>UPL</u>	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
5. <u>Medicago polymorpha</u>	<u>1</u>		<u>FACU</u>	
6. <u>Trifolium hirtum</u>	<u>1</u>		<u>UPL</u>	
7. _____				
8. _____				
Total Cover: <u>78</u>				
Woody Vine Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?
1. <u>NA</u>				Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. <u>NA</u>				
Total Cover: _____				
% Bare Ground in Herb Stratum _____				
% Cover of Biotic Crust _____				

Remarks: Wetland veg is dominant.

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR ³ /4	85	5YR ³ /4	15	C	M	Clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix. ²Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

- 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)

- 1 cm Muck (A9) (LRR C)
- 2 cm Muck (A10) (LRR B)
- Reduced Vertic (F18)
- Red Parent Material (TF2)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

Soils meet hydric criteria

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators (2 or more required)

Primary Indicators (any one indicator is sufficient)

- 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 Plowed Soils (C6)
- Other (Explain in Remarks)

- Water Marks (B1) (Riverine)
- Sediment Deposits (B2) (Riverine)
- Drift Deposits (B3) (Riverine)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Thin Muck Surface (C7)
- 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? Yes No Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Areas appear to be shallow man-made depressions, surrounded by berms.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Cowan City/County: Antioch Sampling Date: 4-24-14
 Applicant/Owner: Dividend Homes/Richland Development Corp State: CA Sampling Point: 5
 Investigator(s): JG Section, Township, Range: S 7th, T1N, R2E
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave Slope (%): 15
 Subregion (LRR): C Lat: 605674.44 Long: 4200384.07 Datum: UTM
 Soil Map Unit Name: Altamont Clay, 15 to 30% slopes 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 <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
--	--

Remarks: Investigation occurred in the 3rd of three consecutive drought years. Does not meet wetland veg criteria.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. <u>NA</u>				Total Number of Dominant Species Across All Strata: <u>3</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33.3</u> (A/B)
4. _____				
Total Cover: _____				
Sapling/Shrub Stratum				Prevalence Index worksheet:
1. _____				Total % Cover of: _____ Multiply by: _____
2. _____				OBL species <u>0</u> x 1 = <u>0</u>
3. <u>NA</u>				FACW species <u>0</u> x 2 = <u>0</u>
4. _____				FAC species <u>37</u> x 3 = <u>111</u>
5. _____				FACU species <u>62</u> x 4 = <u>248</u>
Total Cover: _____				UPL species <u>1</u> x 5 = <u>5</u>
				Column Totals: <u>100</u> (A) <u>364</u> (B)
				Prevalence Index = B/A = <u>3.64</u>
Herb Stratum				Hydrophytic Vegetation Indicators:
1. <u>Hordeum murinum</u>	<u>40</u>	<input checked="" type="checkbox"/>	<u>FACU</u>	___ Dominance Test is >50%
2. <u>Festuca perenne</u>	<u>37</u>	<input checked="" type="checkbox"/>	<u>FAC</u>	___ Prevalence Index is ≤3.0 ¹
3. <u>Bromus hordeaceus</u>	<u>2</u>		<u>FACU</u>	___ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4. <u>Brassica sp.</u>	<u>20</u>	<input checked="" type="checkbox"/>	<u>FACU</u>	___ Problematic Hydrophytic Vegetation ¹ (Explain)
5. <u>Amsinckia intermedia</u>	<u>1</u>		<u>UPL</u>	
6. _____				
7. _____				
8. _____				
Total Cover: <u>100</u>				
Woody Vine Stratum				¹ Indicators of hydric soil and wetland hydrology must be present.
1. _____				
2. <u>NA</u>				
Total Cover: _____				
% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____				Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>

Remarks: Wetland veg not dominant.

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 3/4	60	5YR	40	C	M	Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix. ²Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

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- 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)

- 1 cm Muck (A9) (LRR C)
- 2 cm Muck (A10) (LRR B)
- Reduced Vertic (F18)
- Red Parent Material (TF2)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

Hydric soils indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Secondary Indicators (2 or more required)

Primary Indicators (any one indicator is sufficient)

- 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)
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- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Plowed Soils (C6)
- Other (Explain in Remarks)

- Water Marks (B1) (Riverine)
- Sediment Deposits (B2) (Riverine)
- Drift Deposits (B3) (Riverine)
- Drainage Patterns (B10)
- Dry-Season Water Table (C2)
- Thin Muck Surface (C7)
- 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? Yes No Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Area an ephemeral drainage. Mapped as such on 2003 delineation.

APPENDIX C: SELECTED PHOTOGRAPHS OF THE STUDY AREA



Photo 1: Sample Point 1 in middle of seasonal wetland pool Sample Point 2 in grassland beyond to the left of the truck.



Photo 2: Sample Point 4



Photo 3: Sample Point 5



Photo 4: Upland area delineated as a vernal pool in 2003.



Photo 5: Another upland area delineated as a vernal pool in 2003.



Photo 6: Seasonal Wetland Pool 1 at center right is located in native topography and soils. To the left of the pool is a raised grade of fill that has created an earthen dam resulting in the creation of this pool.

APPENDIX D: VASCULAR PLANTS OF THE SAND CREEK STUDY AREA

APPENDIX D: VASCULAR PLANTS OF THE STUDY AREA

The plant species listed below have been observed on the study area during surveys conducted by Live Oak Associates, Inc. The USACE wetland indicator status of each plant has been shown following its common name.

OBL - Obligate
 FACW - Facultative Wetland
 FAC - Facultative
 FACU - Facultative Upland
 UPL - Upland
 +/- - Higher/lower end of category
 NR - No review
 NA - No agreement
 NI - No investigation

APIACEAE – Carrot Family

<i>Conium maculatum</i>	Poison Hemlock	FACW
<i>Foeniculum vulgare</i>	Fennel	UPL
<i>Sanicula bipinnatifida</i>	Purple Sanicle	UPL
<i>Sanicula crassicaulis</i>	Snake Root	UPL

ASCLEPIADACEAE – Milkweed Family

<i>Asclepias fascicularis</i>	Narrow-leaved Milkweed	FAC
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ASTERACEAE - Sunflower Family

<i>Achillea millefolium</i>	Yarrow	FACU
<i>Achyrrachaena mollis</i>	Blow Wives	FAC
<i>Anthemis cotula</i>	Mayweed	FACU
<i>Artemisia douglasiana</i>	Mugwort	FAC
<i>Baccharis pilularis</i>	Coyote Brush	UPL
<i>Carduus pycnocephalus</i>	Italian Thistle	UPL
<i>Calycadenia multiglandulosa</i>	Sticky Western Rosinweed	UPL
<i>Centaurea calcitrapa</i>	Purple Star-thistle	UPL
<i>Centaurea solstitialis</i>	Yellow Star-thistle	UPL
<i>Centromadia fitchii</i>	Spikeweed	UPL
<i>Centromadia pungens</i>	Common Tarweed	UPL
<i>Chamomilla suaveolens</i>	Pineapple Weed	UPL
<i>Cirsium arvense</i>	Field Thistle	FACU
<i>Cirsium vulgare</i>	Bull Thistle	FACU
<i>Cotula coronopifolia</i>	Brass-buttons	OBL
<i>Cynara cardunculus</i>	Cardoon	UPL
<i>Grindelia camporum</i>	Common Gumplant	FACW
<i>Hemizonia congesta</i>	Hayfield Tarweed	UPL
<i>Hesperexax sparsiflora</i> var. <i>sparsiflora</i>	Erect Evax	UPL
<i>Heterotheca grandiflora</i>	Telegraph Weed	UPL
<i>Holocarpha virgata</i>	Virgate Tarweed	UPL
<i>Lactuca serriola</i>	Prickly Lettuce	FACU

<i>Microseris douglasii</i>	Douglas Microseris	FACU
<i>Picris echioides</i>	Bristly Ox-Tongue	FACU
<i>Psilocarphus tenellus</i>	Slender Woolly Marbles	OBL
<i>Salsola tragus</i>	Russian Thistle	FACU
<i>Silybum marianum</i>	Milk Thistle	UPL
<i>Sonchus asper</i>	Prickly Sow-thistle	FAC
<i>Symphyotrichum chilensis</i>	Chilean Aster	FAC
<i>Wyethia helenioides</i>	Gray Mule-ears	UPL
<i>Xanthium spinosum</i>	Spiny Cocklebur	FACU
<i>Xanthium strumarium</i>	Cocklebur	FAC
BORAGINACEAE – Borage Family		
<i>Amsinckia intermedia</i>	Common Fiddleneck	UPL
<i>Cryptantha flaccida</i>	Flaccid Cryptantha	UPL
<i>Plagiobothrys nothofulvus</i>	Rusty Popcornflower	FAC
<i>Plagiobothrys stipitatus</i>	Stipitate Popcornflower	FACW
BRASSICACEAE – Mustard Family		
<i>Brassica nigra</i>	Black Mustard	UPL
<i>Brassica rapa</i>	Field Mustard	FACU
<i>Capsella bursa-pastoris</i>	Shepherd's-purse	FACU
<i>Hirschfeldia incana</i>	Summer Mustard	UPL
<i>Lepidium latifolium</i>	Broad-leaf Peppergrass	FACW
<i>Lepidium nitidum</i>	Common Peppergrass	FAC
<i>Raphanus sativa</i>	Wild Radish	UPL
<i>Sisymbrium officinale</i>	Hedge Mustard	UPL
CARYOPHYLLACEAE – Pink Family		
<i>Silene gallica</i>	Windmill Pink	UPL
<i>Spergularia marina</i>	Saltmarsh Sand-spurry	OBL
<i>Spergularia rubra</i>	Ruby Sand-spurry	FAC
<i>Stellaria media</i>	Common Chickweed	FACU
CHENOPIACEAE – Goosefoot Family		
<i>Chenopodium album</i>	Lamb's-quarters	FACU
CONVOLVULACEAE – Morning Glory Family		
<i>Convolvulus arvensis</i>	Bindweed	UPL
CUCURBITACEAE – Gourd Family		
<i>Marah fabaceus</i>	California Man-Root	UPL
EUPHORBIACEAE – Spurge Family		
<i>Croton setigerus</i>	Dove Weed	UPL
<i>Euphorbia spathulata</i>	Spatulateleaf Spurge	FAC
FABACEAE – Legume Family		
<i>Astragalus gambelianus</i>	Gambel Milkvetch	UPL
<i>Lathyrus vestitis</i>	Woodland Pea	UPL
<i>Lotus humistratus</i>	Hill Lotus	UPL
<i>Lotus scoparius</i>	Deer Weed	UPL
<i>Lotus wrangelianus</i>	Calf Lotus	UPL
<i>Lupinus bicolor</i>	Bicolored Lupine	UPL
<i>Lupinus microcarpus</i>	Gully Lupine	UPL

<i>Lupinus nanus</i>	Sky Lupine	UPL
<i>Lupinus succulentis</i>	Arroyo Lupine	UPL
<i>Medicago polymorpha</i>	Bur Clover	FACU
<i>Melilotus indica</i>	Yellow Sweetclover	FACU
<i>Trifolium albopurpureu</i>	Rancheria Clover	FACU
<i>Trifolium fucatum</i>	Bull Clover	FACU
<i>Trifolium hirtum</i>	Rose Clover	UPL
<i>Trifolium microcephalum</i>	Smallhead Clover	FAC
<i>Trifolium wildenovii</i>	Tomcat Clover	FACW
<i>Vicia benghalensis</i>	Purple Vetch	UPL
<i>Vicia sativa</i>	Spring Vetch	FACU
<i>Vicia villosa</i>	Hairy Vetch	UPL
FAGACEAE – Oak Family		
<i>Quercus agrifoli</i>	Coast Live Oak	UPL
<i>Quercus douglassii</i>	Blue Oak	UPL
<i>Quercus lobata</i>	Valley Oak	FACU
GERANIACEAE – Geranium Family		
<i>Erodium botrys</i>	Broadleaf Filaree	FACU
<i>Erodium cicutarium</i>	Redstem Filaree	UPL
<i>Geranium dissectum</i>	Cutleaf Geranium	UPL
<i>Geranium molle</i>	Dove’s-foot Geranium	UPL
HIPPOCASTANACEAE – Buckeye Family		
<i>Aesculus californica</i>	California Buckeye	UPL
IRIDACEAE – Iris Family		
<i>Sisyrinchium bellum</i>	Blue-eyed Grass	FACW
JUNCACEAE – Rush Family		
<i>Juncus balticus</i>	Baltic Rush	FACW
<i>Juncus bufonius</i>	Toad Rush	FACW
<i>Juncus effusus</i>	Common Rush	FACW
LAMIACEAE – Mint Family		
<i>Marrubium vulgare</i>	Horehound	UPL
<i>Salvia mellifera</i>	Black Sage	UPL
<i>Trichostema lanceolatum</i>	Vinegar Weed	FACU
LAURACEAE – Laurel Family		
<i>Umbellularia californica</i>	California Bay Laurel	FAC
LILIACEAE – Lily Family		
<i>Brodiaea elegans</i>	Elegant Harvest Brodiaea	FACU
<i>Chlorogalum pomeridianum</i>	Soap Plant	UPL
<i>Dichelostemma capitatum</i>	Bluedicks	FACU
<i>Triteleia hyacinthina</i>	White Triteleia	FAC
<i>Triteleia laxa</i>	Ithuriel’s-spear	UPL
MALVACEAE – Mallow Family		
<i>Malacothamnus fremontii</i>	Fremont’s Bush Mallow	UPL
<i>Malva parviflora</i>	Cheeseweed	UPL
<i>Malvella leprosa</i>	Alkali Mallow	FACU

MORACEAE – Mulberry Family		
<i>Ficus carica</i>	Fig	FACU
MYRTACEAE – Myrtle Family		
<i>Eucalyptus globulus</i>	Blue Gum	UPL
ONAGRACEAE – Evening Primrose Family		
<i>Clarkia affinis</i>	Small Clarkia	UPL
<i>Clarkia purpurea</i>	Winecup Clarkia	UPL
<i>Epilobium ciliatum</i>	Fringed Willowherb	FACW
PAPAVERACEAE – Poppy Family		
<i>Eschscholzia californica</i>	California Poppy	UPL
PLANTAGINACEAE – Plantago Family		
<i>Plantago erecta</i>	California Plantain	UPL
<i>Plantago lanceolata</i>	English Plantain	FAC
POACEAE - Grass Family		
<i>Aira caryophylllea</i>	Silver Hairgrass	UPL
<i>Avena barbata</i>	Slender Wild Oats	UPL
<i>Avena fatua</i>	Fat Wild Oats	UPL
<i>Avena sativa</i>	Cultivated Oats	UPL
<i>Bromus diandrus</i>	Ripgut	UPL
<i>Bromus hordeaceus</i>	Soft Chess	FACU
<i>Bromus madritensis</i> ssp. <i>rubens</i>	Red Brome	UPL
<i>Cynodon dactylon</i>	Bermuda Grass	FACU
<i>Cynosurus echinatus</i>	Hedgehog Dogtail Grass	UPL
<i>Distichlis spicata</i>	Salt Grass	FAC
<i>Elymus caput-medusae</i>	Medusa-head Grass	UPL
<i>Festuca myuros</i>	Rattail Fescue	UPL
<i>Festuca perrene</i>	Ryegrass	FAC
<i>Hordeum marinum</i>	Mediterranean Barley	FAC
<i>Hordeum murinum</i> ssp. <i>leporinum</i>	Barnyard Barley	FACU
<i>Nassella pulchra</i>	Purple Needlegrass	UPL
<i>Phalaris paradoxa</i>	Canary Grass	FAC
<i>Polypogon monspeliensis</i>	Rabbitsfoot Grass	FACW
POLEMONIACEAE – Phlox Family		
<i>Navarretia nigelliformis</i> ssp. <i>radians</i>	Shining Navarretia	FACW
POLYGONACEAE - Buckwheat Family		
<i>Polygonum arenastrum</i>	Knotweed	FACW
<i>Rumex crispus</i>	Curly Dock	FAC
POLYPODIACEAE – Polypody Family		
<i>Polypodium californicum</i>	California Polypody	UPL
PORTULACACEAE – Purslane Family		
<i>Calandrinia ciliata</i>	Red Maids	FACU
<i>Claytonia perfoliata</i>	Miner’s Lettuce	FAC
PRIMULACEAE – Primrose Family		
<i>Anagallis arvensis</i>	Scarlet Pimpernel	UPL

PTERIDACEAE – Brake Family		
<i>Pellaeaandro medifolia</i>	Coffee Fern	UPL
<i>Pentagramma triangularis</i>	Goldback Fern	UPL
RANUNCULACEAE – Buttercup Family		
<i>Delphinium hesperium</i>	Western Larkspur	UPL
<i>Ranunculus californicus</i>	California Buttercup	NI
RHAMNACEAE – Buckthorn Family		
<i>Rhamnus crocea</i>	Redberry	UPL
ROSACEAE – Rose Family		
<i>Rosa californica</i>	California Wild Rose	FAC
RUBIACEAE – Madder Family		
<i>Galium aparine</i>	Common Bedstraw	FACU
SALICACEAE – Willow Family		
<i>Salix gooddingii</i>	Black Willow	FACW
SAXIFRAGINACEAE – Saxifrage Family		
<i>Lithophragma affine</i>	Woodland Star	UPL
SCROPHULARIACEAE – Snapdragon Family		
<i>Bellardia trixago</i>	Bellardia	UPL
<i>Castilleja attenuata</i>	Valley-tassels	UPL
<i>Castilleja exserta</i> ssp. <i>exserta</i>	Purple Owl’s-clover	UPL
<i>Mimulus aurantiacus</i>	Sticky Monkeyflower	UPL
<i>Veronica peregrina</i>	Purslane Speedwell	OBL
SOLANACEAE – Nightshade Family		
<i>Nicotiana glauca</i>	Tree Tobacco	FAC
TYPHACEAE – Cattail Family		
<i>Typha angustifolia</i>	Slender Cattail	OBL
URTICACEAE – Nettle Family		
<i>Urtica urens</i>	Dwarf Nettle	UPL

APPENDIX E: SOILS INFORMATION

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Contra Costa County, California

AbD—Altamont clay, 9 to 15 percent slopes

Map Unit Setting

Elevation: 400 to 1,500 feet

Mean annual precipitation: 12 to 16 inches

Mean annual air temperature: 59 degrees F

Frost-free period: 260 to 300 days

Map Unit Composition

Altamont and similar soils: 85 percent

Minor components: 15 percent

Description of Altamont

Setting

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 26 inches: slightly alkaline, clay

H2 - 26 to 48 inches: moderately alkaline, clay

H3 - 48 to 52 inches: , weathered bedrock

Properties and qualities

Slope: 9 to 15 percent

Depth to restrictive feature: 40 to 60 inches to paralithic bedrock

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 5 percent

Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: Moderate (about 8.2 inches)

Interpretive groups

Farmland classification: Farmland of statewide importance

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Ecological site: CLAYEY (R015XD001CA)

Minor Components

Capay

Percent of map unit: 6 percent

Rincon

Percent of map unit: 4 percent

Fontana

Percent of map unit: 4 percent

Linne

Percent of map unit: 1 percent

AbE—Altamont clay, 15 to 30 percent slopes

Map Unit Setting

Elevation: 400 to 1,500 feet

Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 59 degrees F
Frost-free period: 260 to 300 days

Map Unit Composition

Altamont and similar soils: 85 percent
Minor components: 15 percent

Description of Altamont**Setting**

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 26 inches: slightly alkaline, clay
H2 - 26 to 48 inches: moderately alkaline, clay
H3 - 48 to 52 inches: , weathered bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.2 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: CLAYEY (R015XD001CA)

Minor Components**Capay**

Percent of map unit: 5 percent

Rincon

Percent of map unit: 3 percent

Fontana

Percent of map unit: 3 percent

Unnamed*Percent of map unit: 2 percent***Linne***Percent of map unit: 2 percent***AcF—Altamont-Fontana complex, 30 to 50 percent slopes****Map Unit Setting***Elevation: 400 to 1,500 feet**Mean annual precipitation: 12 to 16 inches**Mean annual air temperature: 59 to 61 degrees F**Frost-free period: 260 to 300 days***Map Unit Composition***Altamont and similar soils: 50 percent**Fontana and similar soils: 35 percent**Minor components: 15 percent***Description of Altamont****Setting***Landform: Hills**Landform position (two-dimensional): Backslope**Landform position (three-dimensional): Side slope**Down-slope shape: Convex**Across-slope shape: Convex**Parent material: Residuum weathered from sandstone and shale***Typical profile***H1 - 0 to 26 inches: slightly alkaline, clay**H2 - 26 to 48 inches: moderately alkaline, clay**H3 - 48 to 52 inches: , weathered bedrock***Properties and qualities***Slope: 30 to 50 percent**Depth to restrictive feature: 40 to 60 inches to paralithic bedrock**Natural drainage class: Well drained**Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)**Depth to water table: More than 80 inches**Frequency of flooding: None**Frequency of ponding: None**Calcium carbonate, maximum in profile: 5 percent**Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)**Available water storage in profile: Moderate (about 8.2 inches)***Interpretive groups***Farmland classification: Not prime farmland**Land capability classification (irrigated): 6e**Land capability classification (nonirrigated): 6e**Hydrologic Soil Group: C**Ecological site: STEEP CLAYEY (R015XD010CA)*

Description of Fontana

Setting

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 16 inches: neutral, silty clay loam

H2 - 16 to 22 inches: neutral, silty clay loam

H3 - 22 to 26 inches: , weathered bedrock

Properties and qualities

Slope: 30 to 50 percent

Depth to restrictive feature: 20 to 36 inches to paralithic bedrock

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high (0.20 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 10 percent

Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability classification (irrigated): 7e

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: C

Ecological site: STEEP CLAYEY (R015XD010CA)

Minor Components

Millsholm

Percent of map unit: 3 percent

Lodo

Percent of map unit: 3 percent

Capay

Percent of map unit: 3 percent

Rincon

Percent of map unit: 3 percent

Pescadero

Percent of map unit: 3 percent

Landform: Depressions

BdE—Briones loamy sand, 5 to 30 percent slopes

Map Unit Setting

Elevation: 500 to 1,000 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 59 degrees F
Frost-free period: 250 to 300 days

Map Unit Composition

Briones and similar soils: 85 percent
Minor components: 14 percent

Description of Briones

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone

Typical profile

H1 - 0 to 13 inches: slightly acid, loamy sand
H2 - 13 to 32 inches: moderately acid, loamy sand
H3 - 32 to 36 inches: , weathered bedrock

Properties and qualities

Slope: 9 to 30 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
 Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: SANDY (R015XD055CA)

Minor Components

Gaviato

Percent of map unit: 7 percent

Unnamed

Percent of map unit: 5 percent

San ysidro

Percent of map unit: 2 percent

CaA—Capay clay, 0 to 2 percent slopes**Map Unit Setting**

Elevation: 10 to 500 feet

Mean annual precipitation: 14 to 16 inches

Mean annual air temperature: 59 degrees F

Frost-free period: 250 to 300 days

Map Unit Composition

Capay and similar soils: 85 percent

Minor components: 10 percent

Description of Capay**Setting**

Landform: Basin floors, benches

Landform position (three-dimensional): Tread, tal

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 36 inches: slightly alkaline, clay

H2 - 36 to 51 inches: slightly alkaline, clay

H3 - 51 to 72 inches: slightly alkaline, silty clay loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 5 percent

Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 10.0

Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Farmland classification: Prime farmland if irrigated

Land capability classification (irrigated): 2s

Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: C

Minor Components**Rincon**

Percent of map unit: 7 percent

Brentwood

Percent of map unit: 2 percent

Marcuse

Percent of map unit: 1 percent

Landform: Depressions

RbA—Rincon clay loam, 0 to 2 percent slopes**Map Unit Setting**

Elevation: 50 to 500 feet

Mean annual precipitation: 12 to 16 inches

Mean annual air temperature: 59 degrees F

Frost-free period: 260 to 300 days

Map Unit Composition

Rincon and similar soils: 85 percent

Minor components: 15 percent

Description of Rincon**Setting**

Landform: Benches

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 12 inches: neutral, clay loam

H2 - 12 to 29 inches: slightly alkaline, clay

H3 - 29 to 60 inches: moderately alkaline, silty clay loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 5 percent

Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Farmland classification: Prime farmland if irrigated

Land capability classification (irrigated): 2s

Land capability classification (nonirrigated): 4s

Hydrologic Soil Group: C

Minor Components

Capay

Percent of map unit: 5 percent

Brentwood

Percent of map unit: 5 percent

Unnamed

Percent of map unit: 3 percent

Landform: Depressions

San ysidro

Percent of map unit: 2 percent

Data Source Information

Soil Survey Area: Contra Costa County, California

Survey Area Data: Version 9, Nov 25, 2013

U.S. Army Corps of Engineers Approved Jurisdictional Determination for the Project Area



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

February 23, 2016

Regulatory Division SPK-2003-00691

EPC Holdings 820 LLC (Richland Planned Communities)
Attn: Mr. Arron Ross-Swain
801 Ygnacio Valley Road
Walnut Creek, California 94596

Dear Mr. Ross-Swain:

We are responding to your January 13, 2016, request for an approved jurisdictional determination for the Ranch Residential Development site. The approximately 548-acre project site is located on Sand Creek, Latitude 37.946124°, Longitude -121.79362°, Antioch, Contra Costa County, California.

Based on available information, we concur with the estimate of waters of the United States, as depicted on the enclosed January 13, 2016, drawing prepared by Live Oak Associates Inc. Approximately 3.948 acres of waters of the United States, including wetlands, are present within the survey area. These waters are regulated under Section 404 of the Clean Water Act, since they are either tributary to Marsh Creek or adjacent to Sand Creek a tributary to Marsh Creek which is tributary to the San Joaquin River a traditionally navigable water.

The 1.111-acre of waters identified as "Ephemeral Drainage 1 and 2 (0.132 acre), Wetland Drainage (0.286 acre), Seasonal Wetland Pools 1, 2, 3, 4, 5, 15, 16, 17, 18, 19, and 20, (totaling 0.588 acre) and Non-wetland Seasonal Pools 1, 2, 3, and 4, (totaling 0.105 acre)" on the above drawing are intrastate isolated waters with no apparent interstate or foreign commerce connection. As such, these waters are not currently regulated by the Corps of Engineers. This disclaimer of jurisdiction is only for Section 404 of the Federal Clean Water Act. Other Federal, State, and local laws may apply to your activities. *In particular, you may need authorization from the California State Water Resources Control Board and/or the U.S. Fish and Wildlife Service.*

This determination is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 Code of Federal Regulations (CFR) Part 331.

A Notification of Appeal Process (NAP) and Request for Appeal (RFA) form is enclosed. If you request to appeal this determination you must submit a completed

RFA form to the South Pacific Division Office at the following address: Administrative Appeal Review Officer, Army Corps of Engineers, South Pacific Division, CESPDPDO, 1455 Market Street, 2052B, San Francisco, California 94103-1399, Telephone: 415-503-6574, FAX: 415-503-6646.

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the NAP. Should you decide to submit an RFA form, it must be received at the above address by 60 days from the date of this letter. It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this letter.

You should provide a copy of this letter and notice to all other affected parties, including any individual who has an identifiable and substantial legal interest in the property.

This determination has been conducted to identify the limits of Corps of Engineers' Clean Water Act jurisdiction for the particular site identified in this request. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are U.S. Department of Agriculture (USDA) program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

We appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing the customer survey on our website under *Customer Service Survey*.

Please refer to identification number SPK-2003-00691 in any correspondence concerning this project. If you have any questions, please contact me at California Delta Branch, 1325 J Street, Room 1350, Sacramento, California 95814-2922, by email at William.H.Guthrie@usace.army.mil, or telephone at 916-557-5269. For more information regarding our program, please visit our website at www.spk.usace.army.mil/Missions/Regulatory.aspx.

Sincerely,

A handwritten signature in black ink, appearing to read 'William Guthrie', with a long horizontal flourish extending to the right.

William Guthrie
Acting Chief, California Delta Branch

Enclosures

cc: (w/o encls)

Geoff Monk, Monk and Associates, 1136 Saranap Avenue, Suite Q, Walnut Creek,
California 94595, Geoff@monkassociates.com

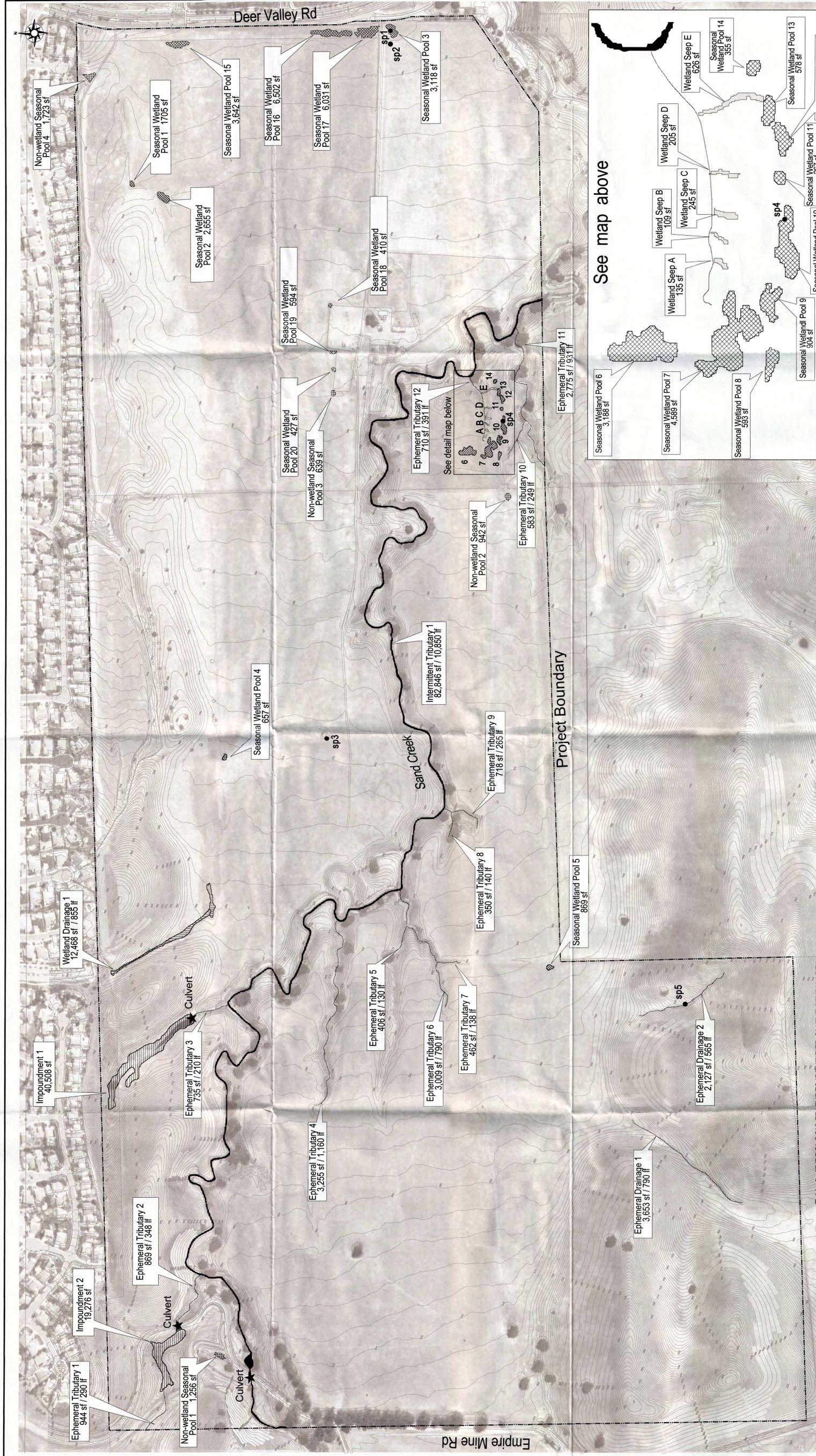


Table 2. HYDROLOGIC FEATURES IDENTIFIED ON THE STUDY AREA

HYDROLOGIC FEATURE	Length (Approx. ft)	Area (Approx. sf)	Acreage (Approx. ac)
POTENTIALLY JURISDICTIONAL WATERS			
Tributary Waters			
Intermittent Tributary (Sand Creek)	10,800	82,846	1.901
Ephemeral Tributary (Tributary 5, Sand Creek)	5,042	14,916	0.340
Impoundment	N/A	59,784	1.372
Adjacent Wetlands			
Seasonal Wetland Pool (6, 7, 8, 9, 10, 11, 12, 13, 14)	N/A	13,220	0.303
Wetland Seep	N/A	1,320	0.030
Sub-Total	15,882	171,986	3.948
POTENTIALLY NON-JURISDICTIONAL WATERS			
Non-Tributary Waters			
Ephemeral Drainage (1, 2)	1,355	5,780	0.132
Isolated Wetlands			
Wetland Drainage	855	12,468	0.286
Seasonal Wetland Pools (1, 2, 3, 4, 5, 15, 16, 17, 18, 19, 20)	N/A	25,609	0.588
Sub-Total	2,210	43,857	1.006
OTHER WATERS			
Non-wetland Seasonal Pool (1, 2, 3, 4)	N/A	4,559	0.105
Total	18,102	220,402	5.059

LEGEND

- Ephemeral Drainage / Tributary
- Intermittent Tributary (Sand Creek)
- Wetland Seep
- Impoundment
- Wetland Drainage
- Seasonal Wetland Pools
- Non-wetland Seasonal Pools

Other Features

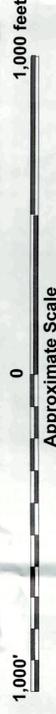
- Project Boundary 546 Ac
- Culvert
- Sample Point

Verbal 23-Aug-2016 WMA

Live Oak Associates, Inc.

Cowan Ranch
Potential Jurisdictional Waters

Date: 01/13/2016
Project #: 1852-01
Figure #: 4

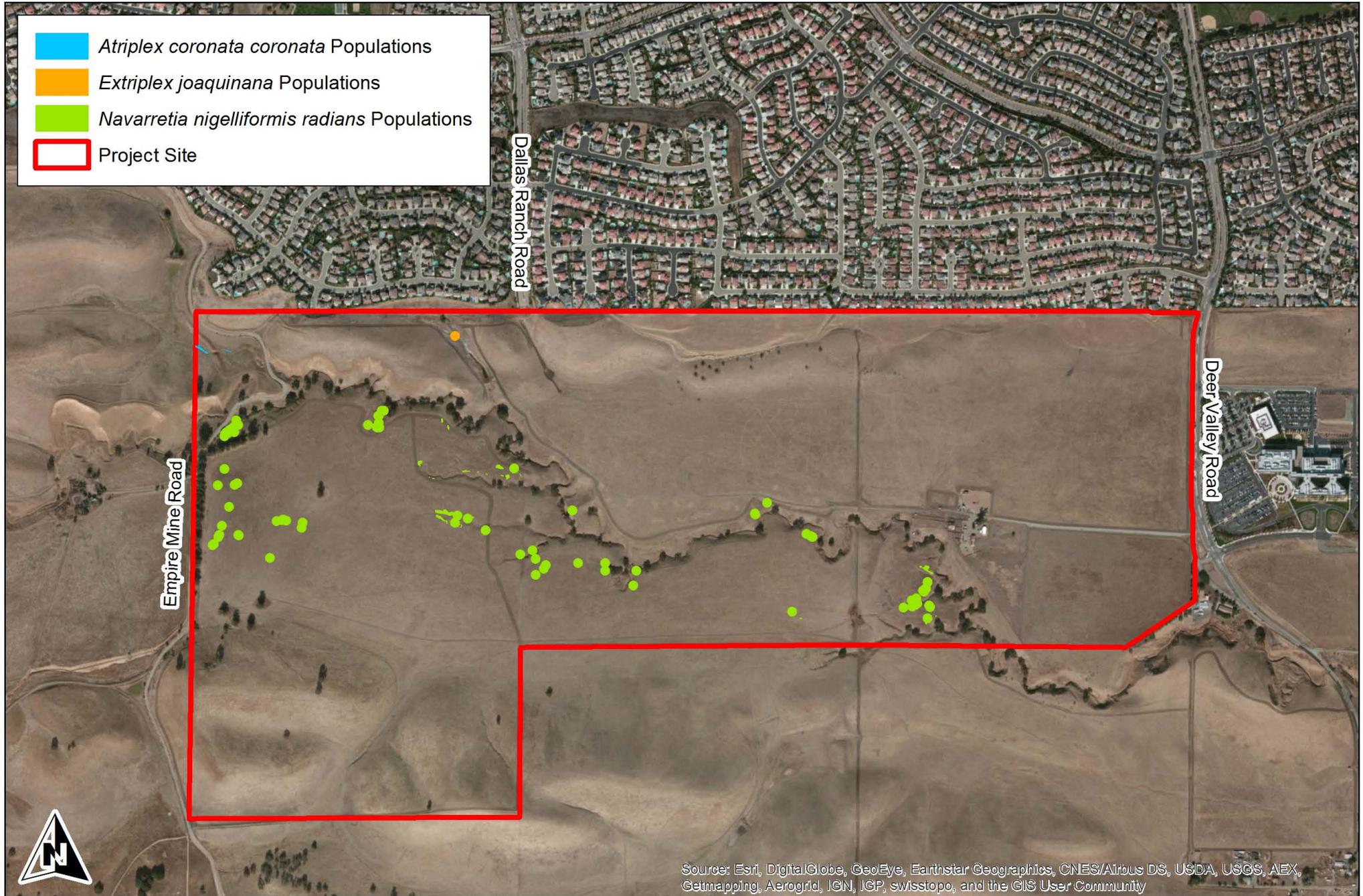


See map above

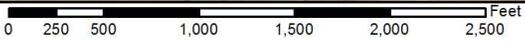
ATTACHMENT G

Monk & Associates' Project Area Rare Plant Survey Results Figure

-  *Atriplex coronata coronata* Populations
-  *Extriplex joaquinana* Populations
-  *Navarretia nigelliformis radians* Populations
-  Project Site



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

Special-Status Rare Plant Populations on the
The Ranch Project Site
Antioch, California

Aerial Photograph Source: ESRI
Map Preparation Date: April 30, 2015

D.2 - Biological Resources Assessment, Updated 2019

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Biological Resources Assessment

The Ranch in Antioch

City of Antioch
23 September 2019



Prepared for:

Richland Planned Communities, Inc.
3000 Lava Ridge Court
Roseville, CA 95661

Recommended Citation:

Madrone Ecological Consulting, LLC (Madrone). 2019. *Biological Resources Assessment for The Ranch in Antioch*. Prepared for Richland Planned Communities. Published on 23 September 2019.

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1.0 INTRODUCTION

This report presents the updated Biological Resources Assessment (BRA) conducted for The Ranch in Antioch and associated Offsite Improvements (Study Area) (**Figure 1**). In 2017 ECORP Consulting, Inc. (ECORP) drafted a BRA report for the Project. Since then, the Study Area has been modified to remove a large section of the Offsite Improvement areas, biological surveys including San Joaquin kit fox and protocol level special-status plant surveys were conducted, and the proposed land plan was modified and the impact areas were greatly reduced. Due to these changes and the lapse in time since the ECORP BRA was drafted, Madrone Ecological Consulting, LLC (Madrone) was contracted to draft an updated BRA. This BRA includes additional biological information based on recent surveys conducted within the Study Area, as well as updated impact analysis based on refined Project design. It is anticipated that this information will assist in CEQA analysis, including detailed impact information, associated mitigation measures, as well as informing required regulatory permitting for the Project.

The 560-acre Study Area is located generally east of Empire Mine Road, south of Southwood Way and Mammoth Way, and west and east of Deer Valley Road in southern Antioch, Contra Costa County, California. The Study Area is located in portions of Sections 5, 6, 7, 8, and 9 of Township 1 North and Range 2 East (MDB&M) of the "Antioch South, California" 7.5-Minute Series USGS Topographic Quadrangle (USGS 2015) (**Figure 1**). The main Project area is approximately 551-acres and is generally west of Deer Valley Road and the Offsite Improvements area is approximately 9-acres and generally east of Deer Valley Road.

1.1 Project Description

As an overview, the proposed Project includes the construction of 1,177 new homes, including a mix of low density and medium density (which will include both conventional and age-restricted housing), in two development areas - one north of Sand Creek and the other south of it, to be constructed in three phases. An expansive open space area oriented along the Sand Creek corridor would be a dominant central feature of the community. In addition, the Village Center, a fire station site, a trail staging area, numerous parks and linear parkways complete the overall master plan concept. The scale of the proposed Project provides an opportunity to include housing options that provide greater product diversification to meet the varied demand for housing in the Antioch area. Housing diversity is achieved by offering neighborhood types that fit a range of household types, income levels, ages and lifestyles. Each of these components is discussed below in more detail. An overview of the proposed conceptual plan can be found as **Attachment A**.

Residential Neighborhoods

As previously stated, the proposed Project would be comprised of two development areas on either side of the Sand Creek corridor. The community boundaries would be carefully defined to preserve open space, habitat, views and steeper slopes, and to minimize the development footprint. Sand Creek Road would connect into the Project Site from the north and would extend through to Deer Valley Road, creating a central arterial street to serve the villages located to the north and to the south. Each neighborhood would have a Homeowner's Association (HOA) subject to Covenants, Codes, and Restrictions (CC&Rs).

North Development Area: The north village would include Medium Density (MD) and Low Density (LD) neighborhoods. The MD neighborhoods would be situated along Deer Valley Road and along the eastern segment of Sand Creek Road and would average 4,500 square feet in lot size. The MD neighborhoods would have direct access or be in close proximity to the Village Center and two smaller MD areas would overlook the Sand Creek Corridor along Sand Creek Road. The Homestead Park would be located between the two MD areas along Sand Creek Road. This amenity, which would be situated at the site of the existing ranching operation and a prominent eucalyptus tree, would provide a vista into the creek and two detention ponds, as well as provide trail access to the Sand Creek trail system.

Approximately 410 Low Density units would comprise the balance of the north development area, starting from Deer Valley Road and spanning to the west along the extension of Sand Creek Road. The Low Density lots would average 7,000 square feet in size, although the lots abutting the northern property line would have a minimum lot size of 8,000 square feet and include larger rear setbacks than the standard low density lot to serve as a buffer to the neighborhood to the north. A 6-acre neighborhood park and a 5-acre linear parkway would form a central outdoor feature for the north village. The linear parkway would provide a trail linkage for the full length of the north village, from the proposed trail staging area on the west through the neighborhoods to the Village Center, Deer Valley Road, to Kaiser Permanente Antioch Medical Center and the abutting land uses to the East.

South Development Area: The south village would be accessed via Street C, a new collector street which would extend from the roundabout on Street B, south of Sand Creek. Street B is planned to continue south to serve the property due south of the Project Site. The south village would be comprised of three distinct residential neighborhoods, based on topography and view sheds.

The Active Restricted (AR) neighborhood would be approximately 75 acres and have a gentler topography and overlook the western portion of the Sand Creek Corridor. The neighborhood would be gated and provide age-restricted housing. The 5,000-square foot lots would be organized around a central neighborhood park, which would have a private clubhouse and recreation center as the central amenity, as well as access to the creek trail.

The Executive LD-2 neighborhood would be a gated community located on approximately 18 acres, and consist of low-density executive housing (averaging 7,000 square foot lots). It would overlook the detention ponds in the Sand Creek corridor, between Sand Creek and the southern boundary of the Project Site. This neighborhood would contain a park area, which would connect to the other neighborhoods by trails.

Lastly, the Executive LD-1 neighborhood would be 18.5 acres of low-density executive housing located at the base of the knoll and nestled within a small valley in the southwest corner of the Project Site. This gated neighborhood would contain a park area to serve this residential neighborhood.

A two-acre site for a future fire station would also be located in the south village, near the intersection of Sand Creek Road and Deer Valley Road.

Mixed Use Village Center

A five-acre Village Center site is proposed to be located at the northwest corner of Deer Valley Road and Sand Creek Road. This site would provide goods and services in a convenient location for residents, surrounding neighborhoods and the Kaiser Hospital, and future employment opportunities. The Village Center site would be accented with a small plaza on the northwest corner that would serve as a gateway to the neighborhood and the linear parkway trail. It would accommodate up to 54,000 square feet of neighborhood commercial, office and retail space.

Public Facilities and Amenities

The public facilities and recreational amenities within the Project would include open space, parks, trails, a trail staging area, and a fire station site; details of each are discussed below. These public facilities and amenities would also benefit the surrounding community and residents.

Open Space

An expansive open space area - the Sand Creek corridor - would be the dominant central feature of the Project. Additional open space areas would preserve hillsides and ridges in the northwestern and southwestern areas of the Project Site. The total open space and open space trail areas would comprise approximately 38 percent of the total Project Site. A 6-mile comprehensive trail system, of varying trail types, would weave through the Project and along Sand Creek to connect neighborhoods to each other, to destinations such as parks, ridgeline vista points, trailhead staging area and the mixed-use Village Center. The trail system would also connect to the existing neighborhoods to the north of the Project Site and to future development on the south to provide open space access for existing and future residents. The trail system would also connect to Empire Mine Road to allow access to East Bay Regional Park District's Black Diamond Mine Preserve. A pedestrian/cycling bridge south of Homestead Park would provide safe crossing over Sand Creek in addition to the Street B bridge and Empire Mine Road. Pedestrian bridges would be installed at three ephemeral drainage locations within the Project. The trails within the Open space will be aligned to avoid sensitive biological resources as is feasible.

Parks

A total of approximately 22 acres of parks are proposed for the Project Site. Generally, the designated park sites would include five Neighborhood Parks, ranging in size from 1.5 to 6 acres, as well as numerous "pocket" parks that are generally less than one acre in size.

Linear parkways would be integrated into the neighborhood lotting pattern to accommodate extensions of the trail system into the neighborhoods, provide a passive open space amenity, and to act as open space buffers between neighborhoods.

Trail Staging Area

There would be an approximately 1.0-acre staging area located in the south village, at the terminus of Street C, just west of the age-restricted community. The trail head would provide public parking, restrooms, a drinking fountain, and informational kiosks. The trail head would be open to the public and would provide access to The Ranch's trail system and access to the greater East Bay Regional Park District's trail system.

Fire Station

The fire station site is proposed to be located on the south side of Sand Creek Road, west of the intersection of Sand Creek Road and Deer Valley Road, near the eastern entrance of the Project. This approximately 2-acre site would allow for the construction of a new engine station that would serve the Project Site, as well as the surrounding Antioch community.

Circulation and Mobility

Sand Creek Road would be the main arterial (4-lane) road transecting the Project Site, and would connect the existing terminus of Dallas Ranch Road on the northwestern portion of the Project Site and the terminus of existing Sand Creek Road at Deer Valley Road, just south of the new Kaiser Hospital. Street B would be another main arterial road which would run north/south and connect the north village to the south village and Sand Creek Road to Street C. Two collector roads (with two lanes) are proposed – Street A off Sand Creek Road leading into the north village neighborhoods and back out to Deer Valley Road, and Street C, off Street B, leading into the south village neighborhoods, with remaining roads being local roads. (See Figure 3.) The Project would be also connected by bicycle lanes and off-street trails. Specifically, the Project would provide an extensive 6-mile off-street trail system as well as Class II bike lanes.

Sand Creek Bridges

Street B, an arterial road (4-lanes) leading from the central roundabout into the south village, would ultimately include either two, 2-lane bridges or one 4-lane bridge across Sand Creek to carry vehicles, bicycles, and pedestrians between the northern and southern villages, built in two phases. The bridge(s) would be span bridges (no piers) and would be constructed on top of bridge abutments located in the banks of Sand Creek.

Pedestrian/Bike Bridge

One pedestrian/bicycle bridge across Sand Creek is proposed. The bridge would be constructed across Sand Creek at the narrowest point between the north and south drainage basins, near the Homestead Park site. Sewer pipes would hang underneath the pedestrian/bicycle bridge at an elevation above the 100-year water surface elevation. No storm drain is anticipated at this crossing. Potable water and dry utilities may also be placed underneath the pedestrian bridge.

Open Trench Sewer Line Through Sand Creek (potential)

A large sewer pipe is proposed to be installed via open trench through the bed of Sand Creek within the central portion of the Project. The pipe would be installed in the dry season when water is not present within Sand Creek.

Storm Drainage/Detention

Drainage improvements proposed for the Project would include a combination of subsurface and surface drainage systems, including new pipe and channel conveyance systems, and culverts and/or pipelines in bridges over waterway crossings. In particular, storm drain pipes would be located in Sand Creek Road, as well as in other roads like the unnamed collector road in the south village and the extension of Wellness

Way. All storm water runoff from the Project Site would be treated onsite within three storm water detention basins.

The Project Site would be split into five drainage management areas (DMAs). Within each DMA, the project would include Integrated Management Practices (IMPs) that provide full bioretention treatment of stormwater runoff. DMAs 1, 2, and 3 would convey stormwater to a bioretention basin in the northeast corner of the Project Site. This detention basin would treat all stormwater runoff and discharge to the existing 36-inch storm drain pipe in Wellness Way. The existing storm drain line in Wellness Way ultimately discharges to the Upper Sand Creek basin via a twin 84-inch storm drain pipe. The northern portion of the project site north of Sand Creek (DMA 4) would drain into a bioretention basin located between Sand Creek Road and Sand Creek. This detention basin would then discharge treated stormwater into Sand Creek through a new, engineered outfall into Sand Creek.

The southern portion of the Project Site south of Sand Creek (DMA 5) would drain into a bioretention basin located at the eastern edge of the development south of Sand Creek. This detention basin would treat all stormwater runoff from the South Development Area, and then discharge treated stormwater through a new, engineered outfall into Sand Creek.

Each of the detention basins would provide detention, treatment, and hydromodification. In conjunction with the basins, the Project design would incorporate head-of-pipe LID treatments within individual phases and neighborhoods to provide stormwater treatment on a small scale throughout the entire project. After passing through neighborhood LID facilities, drainage would be collected into a single pipe storm drain system and mix with non-treated stormwater, prior to being routed to the detention basins. In addition to upstream LID treatment of the stormwater, the bioretention component of the basin would be sized to treat all project drainage from developed sheds.

Construction Timing

It is anticipated that construction of the Project would begin in 2020 and be built out in three phases over the next 15 to 20 years.

2.0 REGULATORY SETTING

This section describes federal, state and local laws and policies that are relevant to this assessment of biological resources.

2.1 Federal Regulations

2.1.1 Federal Endangered Species Act

The Federal Endangered Species Act (FESA) of 1973 protects species that are federally listed as endangered or threatened with extinction. FESA prohibits the unauthorized "take" of listed wildlife species. Take includes harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or

collecting wildlife species or any attempt to engage in such activities. Harm includes significant modifications or degradations of habitats that may cause death or injury to protected species by impairing their behavioral patterns. Harassment includes disruption of normal behavior patterns that may result in injury to or mortality of protected species. Civil or criminal penalties can be levied against persons convicted of unauthorized "take." In addition, FESA prohibits malicious damage or destruction of listed plant species on federal lands or in association with federal actions, and the removal, cutting, digging up, damage, or destruction of listed plant species in violation of state law. FESA does not afford any protections to federally listed plant species that are not also included on a state endangered species list on private lands with no associated federal action.

2.1.2 Clean Water Act, Section 404

Section 404 of the Federal Clean Water Act requires that a Department of the Army permit be issued prior to the discharge of any dredged or fill material into waters of the United States, including wetlands. The U. S. Army Corps of Engineers (USACE) administers this program, with oversight from the U. S. Environmental Protection Agency. Waters of the United States include all navigable waters; interstate waters and wetlands; all intrastate waters and wetlands that could affect interstate or foreign commerce; impoundments of the above; tributaries of the above; territorial seas; and wetlands adjacent to the above.

2.1.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase or barter, any native migratory bird, their eggs, parts, and nests, except as authorized under a valid permit (50 CFR 21.11.). Likewise, Section 3513 of the California Fish & Game Code prohibits the "take or possession" of any migratory non-game bird identified under the MBTA. Therefore, activities that may result in the injury or mortality of native migratory birds, including eggs and nestlings, would be prohibited under the MBTA.

2.2 State Regulations

2.2.1 California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires evaluations of Project effects on biological resources. Determining the significance of those effects is guided by Appendix G of the CEQA guidelines. These evaluations must consider direct effects on a biological resource within the Project site itself, indirect effects on adjacent resources, and cumulative effects within a larger area or region. Effects can be locally important but not significant according to CEQA if they would not substantially affect the regional population of the biological resource. Significant adverse impacts on biological resources would include the following:

- Substantial adverse effects on any species identified as candidate, sensitive, or special-status in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife

(CDFW) or the U.S. Fish and Wildlife Service (USFWS) (these effects could be either direct or via habitat modification);

- Substantial adverse impacts to species designated by the California Department of Fish and Game (2009) as Species of Special Concern;
- Substantial adverse effects on riparian habitat or other sensitive habitat identified in local or regional plans, policies, or regulations or by CDFW and USFWS;
- Substantial adverse effects on state or federally protected wetlands (these effects include direct removal, filling, or hydrologic interruption of marshes, vernal pools, coastal wetlands, or other wetland types);
- Substantial interference with movements of native resident or migratory fish or wildlife species population, or with use of native wildlife nursery sites;
- Conflicts with local policies or ordinances protecting biological resources (e.g. tree preservation policies); and
- Conflict with provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional, or state habitat conservation plan.

2.2.2 State Endangered Species Act

With limited exceptions, the California Endangered Species Act (CESA) of 1984 protects state-designated endangered and threatened species in a way similar to FESA. For projects on private property (i.e., for which a state agency is not a lead agency), CESA enables CDFW to authorize take of a listed species that is incidental to carrying out an otherwise lawful project that has been approved under CEQA (Fish & Game Code Section 2081).

2.2.3 Native Plant Protection Act

The Native Plant Protection Act (NPPA) was enacted in 1977 and allows the Fish and Game Commission to designate plants as rare or endangered. There are 64 species, subspecies, and varieties of plants that are protected as rare under the NPPA. The NPPA prohibits take of endangered or rare native plants, but includes some exceptions for agricultural and nursery operations; emergencies; and after properly notifying CDFW for vegetation removal from canals, roads, and other sites, changes in land use, and in certain other situations.

2.2.4 Clean Water Act, Section 401

Section 401 of the Clean Water Act requires any applicant for a 404 permit in support of activities that may result in any discharge into waters of the United States to obtain a water quality certification with the Regional Water Quality Control Board (RWQCB). This program is meant to protect these waters and wetlands by ensuring that waste discharged into them meets state water quality standards. Because the water quality certification program is triggered by the need for a Section 404 permit (and both programs are a part of the Clean Water Act), the definition of waters of the United States under Section 401 is the same as that used by the USACE under Section 404.

2.2.5 California Water Code, Porter-Cologne Act

The Porter Cologne Act, from Division 7 of the California Water Code, requires any person discharging waste or proposing to discharge waste that could affect the quality of waters of the state to file a report of waste discharge (RWD) with the RWQCB. The RWQCB can waive the filing of a report, but once a report is filed, the RWQCB must either waive or adopt water discharge requirements (WDRs). "Waters of the state" are defined as any surface water or groundwater, including saline waters, within the boundaries of the state.

2.2.6 California Fish and Game Code, Section 1600 – Streambed and Lake Alteration

The CDFW is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. To meet this responsibility, the Fish and Game Code, Section 1602, requires notification to CDFW of any proposed activity that may substantially modify a river, stream, or lake. Notification is required by any person, business, state or local government agency, or public utility that proposes an activity that will:

- Substantially divert or obstruct the natural flow of any river, stream or lake;
- Substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or
- Deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

For the purposes of Section 1602, rivers, streams and lakes must flow at least intermittently through a bed or channel. If notification is required and CDFW believes the proposed activity is likely to result in adverse harm to the natural environment, it will require that the parties enter into a Lake or Streambed Alteration Agreement (LSAA).

2.2.7 California Fish and Game Code, Section 3503.5 - Raptor Nests

Section 3503.5 of the Fish and Game Code makes it unlawful to take, possess, or destroy hawks or owls, unless permitted to do so, or to destroy the nest or eggs of any hawk or owl.

2.3 Local Regulations

2.3.1 City of Antioch General Plan

The City of Antioch General Plan (General Plan) contains several objectives and policies related to biological resources under the Resource Management section. Specifically, the biological resources objectives and policies pertain to CDFW sensitive natural communities such as: native grasslands, vernal pools, stabilized interior dunes, seasonal wetlands, freshwater seeps, freshwater marshes, coastal brackish marshes, alkaline floodplains, alkali seeps, valley oak woodlands, and riparian woodland. The biological resources objectives and policies also pertain to special-status species (City of Antioch 2003).

The General Plan biological resources policies emphasize compliance with federal policies regarding no net loss of wetlands through avoidance and creation; preserving and/or restoring existing wetlands and riparian resources along natural streams; requiring development setbacks adjacent to natural streams; requiring development projects to protect and/or mitigate for impacts to sensitive habitats through environmental review process; limiting uses within preserves (e.g., implementing passive recreation and public trails); permitting removal of healthy oaks only when necessary; preserving heritage trees; limiting introduction of invasive species and incorporating native vegetation in the planting plans; avoiding creation of perennial flows within urban streams; and, when presence/absence determinations are being made for threatened, endangered, or special of special concern, requiring protocol-level surveys prior to a final determination of absence for the species (City of Antioch 2003).

2.3.2 City of Antioch Tree Ordinance

Title 9: Planning and Zoning, Chapter 5 Zoning, Article 12: Tree Preservation and Regulation establishes the requirement for a permit or development application required prior to the removal of protected trees (City of Antioch 2017). Article 12 defines protected trees as:

- "(a) any tree required to be preserved as a condition of an approval from a "regular development application" as defined by this section, and/or any tree that is shown to be preserved on an approved development plan as submitted by the applicant and subsequently approved by the city.*
- (b) all established indigenous trees as defined by this section.*
- (c) all street trees as defined by this section.*
- (d) all mature and landmark trees as defined by this section."*

Indigenous trees are defined as: blue oak (Quercus douglasii), valley oak (Q. lobata), coast live oak (Q. agrifolia), canyon live oak (Q. chrysolepis), interior live oak (Q. wislizeni), California buckeye (Aesculus californica), and California bay (Umbellularia californica).

Street trees are defined as "any tree planted within either the public right-of-way and/or planting easement, where applicable."

Landmark trees are defined as "any tree which is at least 48 inches in diameter and/or in excess of 40 feet in height."

Mature trees are defined as "any tree which is at least 26 inches in diameter, as measured four and one half feet above natural grade."

2.3.3 California Native Plant Society – Locally Rare Plants

A list of locally rare plant species has been developed by the East Bay Chapter of the California Native Plant Society (*The Database of Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties*), and is available on-line at <https://ebcnps.org/database-of-rare-unusual-and-significant-plants-of-alameda-and-contra-costa-counties/>. The plant species included in this database are locally rare and are usually included in CEQA analysis.

3.0 METHODOLOGY

3.1 Literature Review

A list of special-status species with potential to occur within the Study Area was developed by conducting a query of the following databases:

- California Natural Diversity Database (CNDDDB) (CNDDDB 2019) query of the Study Area and all areas within 5-miles of the Study Area (**Figure 2 and 3**). Spatial data for suppressed CNDDDB occurrences were acquired from CDFW but are not shown on the CNDDDB maps in this report;
- USFWS Information for Planning and Conservation (IPaC) (USFWS 2019) query for the Study Area (**Attachment B**);
- California Native Plant Society (CNPS) Rare and Endangered Plant Inventory (CNPS 2019) query of the "Antioch South, California" USGS topo quadrangle, and the eight surrounding quadrangles (**Attachment C**); and
- Western Bat Working Group (WBWG) Species Matrix (WBWG 2019).
- East Bay Chapter of the California Native Plant Society's *The Database of Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties* available on-line at <https://ebcnps.org/database-of-rare-unusual-and-significant-plants-of-alameda-and-contra-costa-counties/>.

In addition, any special-status species that are known to occur in the region, but that were not identified in any of the above database searches were also analyzed for their potential to occur within the Study Area.

Several biological studies have been conducted within the Study Area. These surveys and their associated reports were reviewed during the preparation of this BRA:

- *Biological Assessment of Sand Creek Adult Community Project* (Thomas Reid and Associates 2003);
- *Biological Constraints, Cowan Ranch Project, Antioch, California*. (Monk and Associates 2004);
- *Investigation of Waters of the United States, Cowan Property, Contra Costa County, California* (Live Oak Associates 2014);
- *DRAFT Biological Assessment for The Ranch, City of Antioch, Contra Costa County* (Monk and Associates 2015);
- *Tree Preservation Report for The Ranch, Antioch, California* (Ed Brennan 2015);
- *Approved Jurisdictional Determination for The Ranch Residential Development Site* (USACE 2016);
- *Biological Resources Assessment for The Ranch in Antioch* (ECORP 2017a);
- *Aquatic Resources Delineation for the Richland Mitigation Properties* (ECORP 2017b);
- *Special-Status Plant Survey Report for The Ranch Project Site* (Monk and Associates 2018);
- *Aquatic Resources Delineation Report for the City of Antioch Regional Infrastructure Improvements* (Madrone 2019a);
- *Ranch at Antioch San Joaquin Kit Fox Survey* (H.T. Harvey & Associates 2019);
- *Special-Status Plant Survey Report for The Ranch in Antioch* (Madrone 2019b);
- *Special-Status Plant Survey Report for the City of Antioch Regional Infrastructure Improvements* (Madrone 2019c); and

- *90-Day Report of Findings for California Tiger Salamander and California Red-legged Frog for the Richland Mitigation Properties* (Madrone 2019d).

For the purposes of this Biological Resources Assessment, special-status species is defined as those species that are:

- Listed as threatened or endangered, or proposed or candidates for listing by the USFWS or National Marine Fisheries Service;
- Listed as threatened or endangered and candidates for listing by CDFW;
- Identified as Fully Protected species or species of special concern by CDFW;
- Identified as Medium or High priority species by the WBWG (WBWG 2019);
- Plant species considered to be rare, threatened, or endangered in California by the CNPS and CDFW [California Rare Plant Rank (CRPR) 1, 2, and 3]:
 - CRPR 1A: Plants presumed extinct
 - CRPR 1B: Plants rare, threatened, or endangered in California and elsewhere
 - CRPR 2A: Plants extirpated in California, but common elsewhere
 - CRPR 2B: Plants rare, threatened, or endangered in California, but more common elsewhere
 - CRPR 3: Plants about which the CNPS needs more information – a review list; and
- Plant species considered to be locally rare by CNPS.

While the locally-rare plant species are locally of sufficient rarity to be considered under CEQA, statewide, they are more common. As a result, these species are not tracked by the spatially-searchable CNDDDB or the CNPS Inventory. There are 45 A-ranked plant species that are not CRPR-listed included in the *Database of Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties* for the Marsh Creek/Lone Tree Valley area (which includes Sand Creek). While these species were surveyed for during the 2018-2019 protocol-level plant surveys of the site, they are not included in Table 2 for brevity (with the exception of the one species that was documented on-site during the surveys).

3.2 Additional Field Surveys

Abundant biological studies have been conducted within the Study Area throughout the past 20 years. See the list of documents above for all the studies that have been performed to date. In order to support the analysis in this BRA, as well as to support ongoing regulatory permitting, the following additional surveys were conducted in the last two years. The surveys, including dates and associated field staff are detailed below.

Special-status plant surveys and vegetation community mapping: Madrone biologists and botanists Daria Snider, Dustin Brown, Matthew Shaffer, Bonnie Peterson conducted special-status plant surveys within the Study Area on 6 and 7 September 2018; 18 and 19 March, 13-15 May, 29 May, and 9 September 2019. During these surveys the biologists also conducted vegetation community mapping to assess the suitability of habitats on-site to support special-status species. Vegetation communities were classified in accordance

with *The Manual of California Vegetation, Second Edition* (Sawyer, Keeler-Wolf and Evens 2009), and plant taxonomy was based on the nomenclature in the *Jepson eFlora* (Jepson Flora Project 2019).

San Joaquin kit fox survey: On 22 February 2019 H.T. Harvey & Associates conducted scent dog surveys for San Joaquin kit fox within the Study Area. Two teams each consisting of one trained scent dog and one biologist surveyed the entire 551-acre Project area for sign of San Joaquin kit fox.

4.0 EXISTING CONDITIONS

The Study Area is bounded by suburban residential development to the north, undeveloped land, a hospital, and a high school on the east, and undeveloped land to the south and west. Topography within the Study Area is primarily flat in the central portion (referred to throughout this document as the “valley floor”), with steep hills rising up in the northwest and southwest portions. Elevations range from approximately 220 feet to 480 feet above mean sea level. The Study Area is almost entirely comprised of grazed annual brome grassland. The intermittent Sand Creek runs from west to southeast through the approximate center of the Study Area. A number of large, mature Valley oak (*Quercus lobata*), Coast live oak (*Q. agrifolia*), and California buckeye (*Aesculus californica*) trees occur adjacent to the creek. A rural ranch office, residence, and associated outbuildings and parking areas occur in the eastern portion of the Study Area. Several small pastures around this area receive extremely heavy livestock use, and are virtually unvegetated.

The Offsite Infrastructure area to the east of the Project site (and within the Study Area) consists of annual brome grassland, ruderal habitat, and paved roads (Figure 4).

4.1 Terrestrial Vegetation Communities

4.1.1 Alkali Weed-Salt Grass Playas and Sinks

Both of the ponds in the Study Area and the portion of ephemeral drainage west of Empire Mine Road are dominated by saltgrass (*Distichlis spicata*), perennial ryegrass, Mediterranean barley, alkali mallow (*Malvella leprosa*), and alkali weed (*Cressa truxillensis*). Other common plant species in these areas include California button-celery (*Eryngium aristulatum* var. *aristulatum*), brass buttons (*Cotula coronopifolia*), alkali popcorn flower (*Plagiobothrys leptocladus*), salt marsh sand spurrey (*Spergularia marina*), and crownscale (*Atriplex coronata*). These features would be classified as Alkali Weed – Salt Grass Sinks (*Cressa truxillensis* – *Distichlis spicata* Herbaceous Alliance) in accordance with the *Manual of California Vegetation, Second Edition* (Sawyer, Keeler-Wolf, and Evens 2009). This alliance is considered a Sensitive Natural Community by CDFW (CDFW 2018).

4.1.2 Annual Brome Grassland

The majority of the Study Area is composed of annual brome grassland. Annual brome grasslands on-site are dominated primarily by non-native annual grass species, including ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), wild oat (*Avena fatua*), foxtail barley (*Hordeum murinum*), and perennial ryegrass

(*Festuca perennis*). Common forb species within the annual brome grasslands include common gumplant (*Grindelia camporum*), turkey mullein (*Croton setiger*), California burclover (*Medicago polymorpha*), and red-stemmed filaree (*Erodium cicutarium*). Heavy clay inclusions within this community are dominated by sparse, low-growing forbs, such as California burclover, rose clover (*Trifolium hirtum*), and Douglas' microseris (*Microseris douglasii* ssp. *douglasii*). Scattered non-native trees occur occasionally within this community, and some isolated native trees including California buckeye, blue oak (*Quercus douglassii*), valley oak, and interior live oak (*Q. wislizeni*) occur along Sand Creek. Where these native trees form stands, they were mapped as Valley Oak Woodland, as described below in Section 3.1.6. The annual brome grasslands are only lightly grazed in the hills, but are very heavily grazed in the flat valley bottom by the end of summer.

4.1.3 Developed

Developed portions of the Study Area include the paved Empire Mine Road, Sand Creek Road, Deer Valley Road, the driveway to the residence, heavily impacted pastures, the rural residence, and associated outbuildings and vehicle storage yards. Many of these areas are characterized as bare dirt or paved, while others are occupied by ruderal vegetation (non-native forbs and grasses characteristic of recently disturbed sites). Dominant plant species within the ruderal areas include yellow star-thistle (*Centaurea solstitialis*), stinkwort (*Dittrichia graveolens*), Russian thistle (*Salsola tragus*), perennial ryegrass, and wild oat.

4.1.4 Eucalyptus Woodland

A grove of planted blue gum (*Eucalyptus globulus*) occurs along the western boundary of the Study Area. Little to no vegetation occurs in the understory of this community.

4.1.5 California Goldfields-Dwarf Plantain-Small Fescue Flower Fields

A small area of California Goldfields-Dwarf Plantain-Small Fescue Flower Fields occurs on a north-facing slope just to the north of the Eucalyptus Woodland on the western side of the Study Area. This unique area occurs on highly expansive clay soils, supports almost no grass, and dominant plant species include dwarf plantain (*Plantago erecta*), few-flowered evax (*Hesperevax sparsiflora*), California burclover, rose clover, shining navarretia (*Navarretia nigelliformis* ssp. *radians*), and chaparral fairyfan (*Clarkia affinis*).

4.1.6 Valley Oak Woodland

Valley Oak Woodland occurs in several small isolated patches along Sand Creek within the Study Area. These patches are dominated by Valley oak, California buckeye, and interior live oak. Understory species are largely similar to species found in the surrounding Wild Oats Grassland, but some more mesic species are found as well, such as Douglas' mugwort (*Artemisia douglasiana*), California buttercup (*Ranunculus californicus*), and California figwort (*Scrophularia californica*). This community is considered a Sensitive Natural Community by CDFW (CDFW 2018b).

4.1.7 Ruderal

Ruderal vegetation occurs adjacent to Deer Valley Road and Sand Creek Road within the eastern portion of the Study Area. This vegetation community is composed primarily of nonnative forbs and grasses characteristic of recently disturbed sites. Dominant plant species within the ruderal vegetation communities in the Study Area include yellow star-thistle, stinkwort, Russian thistle, perennial ryegrass, and wild oat.

4.2 Aquatic Resources

An approved jurisdictional determination has been issued for the Project area by the USACE (**Attachment D**), and a protocol-level aquatic resources delineation has been conducted for the off-site infrastructure areas by Madrone (Madrone 2019a). The nomenclature used in this BRA for the aquatic resource types within the Project area differs from the USACE-verified map. The verified aquatic resource map contained many categories of aquatic resources that are relevant to regulatory permitting but not for analysis of impacts to biological resources and species habitat relevant to CEQA. Thus, Madrone biologists “cross-walked” many of the aquatic resource types to make **Figure 5** in this document. This was done to help simplify analysis of impacts to aquatic resources and special-status species and their habitat.

Aquatic resources mapped within the Study Area are depicted in **Figure 5**. A total of 5.076 acres of aquatic resources were mapped within the Study Area (**Table 1**) (USACE 2016, Madrone 2019a). A description of each of the aquatic resources types is included below.

Table 1. Aquatic Resources Mapped within the Study Area

Resource Type	Acreage
Seasonal Wetland	1.013
Seasonal Wetland Swale	0.286
Seep	0.030
Ephemeral Drainage	0.473
Intermittent Drainage	1.903
Pond	1.373
Total	5.076*

*Rounding may result in small summation errors

4.2.1 Seasonal Wetland

Seasonal wetlands are ephemeral wet due to accumulation of surface runoff and rainwater within low-lying areas. Inundation periods tend to be relatively short and they are commonly dominated by nonnative annual and sometimes perennial hydrophytic species. There are several seasonal wetlands located along Deer Valley Road. These shallow features are dominated by annual grasses and hydrophytic forbs including perennial ryegrass. Several shallow seasonal wetlands occur near the farmhouse and are mostly unvegetated due to heavy cattle grazing. There are two relatively deep seasonal wetlands located in the central eastern portion of the site. These features appear to have been modified by the installation of earthen berms to make them deeper. There is a cluster of seasonal wetlands located within the southeastern

portion of the Study Area south of Sand Creek. These wetlands are relatively shallow and appear to be natural features.

4.2.2 Seasonal Wetland Swale

Seasonal wetland swales are generally linear wetland features that convey precipitation runoff and support a predominance of hydrophytic vegetation, but do not exhibit an ordinary high-water mark (OHWM). These are typically inundated for short periods during and immediately after rain events, but usually maintain soil saturation for longer periods during the wet season. One seasonal wetland swale occurs in the northern central portion of the Study Area. Hydrology for this feature is driven by an existing storm water outfall from the development to the north. This seasonal wetland swale is a narrow, moderate-gradient feature dominated by perennial ryegrass and black mustard (*Brassica negra*).

4.2.3 Intermittent Drainage (Sand Creek)

Intermittent drainages are linear features that exhibit a bed and bank and an OHWM. Intermittent drainages differ from ephemeral drainages in that they flow for longer duration, typically weeks or months following rainfall events, and are often influenced by groundwater. This usually results in greater quantities and duration of flow relative to ephemeral drainages. One intermittent drainage, Sand Creek, occurs within the Study Area.

Sand Creek flows from west to east across the central portion of the Project. Sand Creek is an intermittent stream that conveys precipitation runoff during and shortly after rain events. The duration of water flow within the creek ranges from a few days to several weeks after rain events and the duration of water flow is directly linked to the amount of precipitation received.

Sand Creek is highly incised within the Project and contains a primary low-flow channel that ranges from 8 to 10 feet deep and averages 12 feet in width and a secondary flood-plain terrace that ranges from approximately 30 to 70 feet in depth and 30 to 70 feet in width. Banks of Sand Creek are generally steep and range from 15 to 60 percent. The bed of Sand Creek is generally unvegetated due to high-volume and high-velocity flows. These flows tend to scour vegetation a soil from the primary channel. As another indicator of the generally flashy flow regime of Sand Creek, rack lines located within the channel were observed as high as 12 to 15 feet above the bed of the creek (Monk and Associates 2015). Within the Study Area there is one large plunge pool within the channel of the creek that remains inundated for long durations. This plunge pool is located immediately east (downstream) of Empire Mine Road. Both California red-legged frog and western spadefoot have been observed within this plunge pool.

Sand Creek is a highly incised intermittent drainage with steep banks and little to no vegetation within the channel. The banks of Sand Creek are quite tall, and in most areas, are occupied by species typical of the surrounding annual brome grassland. In addition, a few trees, shrubs, and forbs have established along these banks, including California buckeye (*Aesculus californicus*), Coast live oak (*Quercus agrifolia*), Valley

oak (*Quercus lobata*), California rose (*Rosa californica*), California sagebrush (*Artemisia californica*), and California mugwort (*Artemisia douglasiana*).

4.2.4 Ephemeral Drainage

Ephemeral drainages are linear features that exhibit a bed and bank and an OHWM. These features typically convey runoff for short periods of time, during and immediately following rain events, and are not influenced by groundwater sources at any time during the year. Ephemeral drainages occur in the two westernmost portions of the Study Area. These features are sparsely vegetated. Vegetated portions of ephemeral drainages within the Offsite Infrastructure Area are dominated by species typical of the surrounding annual brome grasslands.

4.2.5 Pond

Two ponds are located within the northwestern portion of the Study Area. These features were manmade by the placement of an earthen berm within an existing ephemeral drainage. The seasonal pond fills during the winter and remains inundated until summer to early fall. Vegetation observed below the OHWM of the ponds consists of salt grass, perennial ryegrass, Mediterranean barley, alkali-mallow, and alkali weed. Above the OHWM vegetation consisted mostly of annual grassland species with a few scattered black willows (*Salix gooddingii*).

Both of the ponds in the Study Area would be classified as Alkali Weed –Salt Grass Sinks (*Cressa truxillensis* – *Distichlis spicata* Herbaceous Alliance). This alliance is considered a Sensitive Natural Community by CDFW (CDFW 2018b).

4.2.6 Seep

There are 5 small seeps located on a hillside south of Sand Creek near the cluster of seasonal wetlands. These narrow linear features appear to be influenced mostly by surface water draining from the adjacent uplands toward Sand Creek. Vegetation within these features is mostly perennial ryegrass with scattered coyote-thistle (*Eryngium vaseyi*).

4.3 Soils

According to the Natural Resources Conservation Service (NRCS) Soil Survey Database (NRCS 2019), 6 soil mapping units occur within the Study Area (**Figure 3**): (AbD) Altamont Clay, 9 to 15 percent slopes, MLRA 15; (AbE) Altamont Clay, 15 to 30 percent slopes, MLRA 15; (AcF) Altamont-Fontana Complex, 30 to 50 percent slopes; (BdE) Briones Loamy Sand, 5 to 30 percent slopes; (CaA) Capay Clay, 0 to 3 percent slopes, MLRA 17; and (RbA) Rincon Clay Loam, 0 to 2 percent slopes, MLRA 14.

None of these soils are derived from serpentine parent material (NRCS 2019). None of the components of these soil mapping units are considered saline or alkaline (NRCS 2019), but inclusions of alkaline soils were

observed in the northwestern portion of the Study Area, which was mapped as Altamont clay, and Altamont Fontana complex.

5.0 RESULTS

Table 2 provides a list of special-status species that were evaluated, including their listing status, habitat associations, and their potential to occur in the Study Area. The following set of criteria was used to determine each species' potential for occurrence on the site:

- *Present*: Species occurs on the site based on CNDDDB records, and/or was observed on the site during field surveys.
- *High*: The site is within the known range of the species and suitable habitat exists.
- *Moderate*: The site is within the known range of the species and very limited suitable habitat exists.
- *Low*: The site is within the known range of the species and there is marginally suitable habitat or the species was not observed during protocol-level surveys conducted on-site.
- *Absent/No Habitat Present*: The site does not contain suitable habitat for the species, the species was not observed during protocol-level floristic surveys conducted on-site, or the site is outside the known range of the species.

Figures 2 and 3 are exhibits displaying CNDDDB occurrences within 5 miles of the Study Area. Below is a discussion of all special-status plant and animal species with potential to occur on the site.

The Ranch in Antioch
Special-Status Plant and Animal Species with Potential to Occur

Scientific Name (Common Name)	Federal Status	State Status	Habitat Requirements	Potential for Occurrence
Plants				
<i>Amsinckia grandiflora</i> Large-flowered fiddleneck	FE	CE, CRPR 1B.1	Grasslands and woodlands (886' - 1,804').	Absent. Marginally suitable habitat is present in the annual brome grasslands within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.
<i>Arctostaphylos auriculata</i> Mt. Diablo manzanita	--	CRPR 1B.3	Sandstone chaparral and cismontane woodland (443' - 2,133').	No Habitat Present. Study area does not contain sandstone chaparral or woodlands.
<i>Arctostaphylos manzanita ssp. laevigata</i> Contra Costa manzanita	--	CRPR 1B.2	Rocky soils in chaparral (1,410' - 3,609').	No Habitat Present. Study area does not contain rocky chaparral.
<i>Astragalus tener var. tener</i> Alkali milk-vetch	--	CRPR 1B.2	Playas, mesic areas within valley and foothill grasslands, and alkaline vernal pools (3' - 197').	Absent. Marginally suitable habitat is present in the alkali weed- salt grass sink within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.
<i>Atriplex cordulata var. cordulata</i> Heartscale	--	CRPR 1B.2	Alkaline or saline valley and foothill grasslands, meadows and seeps, and chenopod scrub communities (0' - 1,837').	Absent. Marginally suitable habitat is present in the alkali weed- salt grass sink within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.
<i>Atriplex coronata var. coronata</i> Crownscale	--	CRPR 4.2	Alkaline and often clay soils within chenopod scrub, valley and foothill grasslands, and vernal pools (3' - 1,936').	Present. Crownscale was documented along the fringes of the Alkali Weed - Salt Grass Sinks in the northwestern portion of the Study Area.

The Ranch in Antioch
Special-Status Plant and Animal Species with Potential to Occur

<i>Atriplex depressa</i> Brittlescale	--	CRPR 1B.2	Chenopod scrub, meadows and seeps, playas, valley and foothill grasslands, and vernal pools, and is typically found on alkaline clay soils (3' – 1,050').	Absent. Marginally suitable habitat is present in the alkali weed- salt grass sink within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.
<i>Atriplex minuscula</i> Lesser saltscale	--	CRPR 1B.1	Alkaline, sandy soils in chenopod scrub, playas, and valley and foothill grasslands (50' - 650')	Absent. Marginally suitable habitat is present in the alkali weed- salt grass sink within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.
<i>Blepharizonia plumosa</i> Big tarplant	--	CRPR 1B.1	Found on clay soils in grasslands (98' – 1,657').	Present. A single plant of this species was observed in the hills in the southern portion of the Study Area during a late-season plant survey conducted on 6 September 2018. The area was resurveyed in September of 2019 and one small population consisting of three plants was observed. The species has not been observed within the offsite infrastructure area.
<i>Calochortus pulchellus</i> Mt. Diablo fairy-lantern	--	CRPR 1B.2	Chaparral, cismontane woodland, riparian woodland, and valley and foothill grassland near woodlands (98' – 2,756').	No Habitat Present. No chaparral, cismontane woodland, or riparian woodland located within the Study Area.
<i>Campanula exigua</i> Chaparral harebell	--	CRPR 1B.2	Chaparral on rocky, usually serpentinite substrates (902' – 4,101').	No Habitat Present. Study area does not contain chaparral.
<i>Centromadia parryi ssp. congdonii</i> Congdon's tarplant	--	CRPR 1B.1	Valley and foothill grassland with alkaline soils (0' – 755').	Absent. Marginally suitable habitat is present in the alkali weed- salt grass sink within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.

The Ranch in Antioch
Special-Status Plant and Animal Species with Potential to Occur

<i>Chloropyron molle ssp. molle</i> Soft bird's beak	FE	CR, CRPR 1B.2	Found in coastal salt marshes and swamps (0' – 10').	No Habitat Present. No coastal salt marshes or swamps present.
<i>Cicuta maculata var. bolanderi</i> Bolander's water-hemlock	--	CRPR 2B.1	Coastal, fresh, or brackish marshes and swamps (0' – 656').	No Habitat Present. No coastal marshes or swamps present.
<i>Cordylanthus nidularius</i> Mt. Diablo bird's-beak	--	CR, CRPR 1B.1	Serpentine substrates in chaparral (1,969' – 2,625').	No Habitat Present. Study area does not contain serpentine or chaparral.
<i>Cryptantha hooveri</i> Hoover's cryptantha	--	CRPR 1A	Coarse sandy soils in Valley Grassland communities (30' – 492').	No Habitat Present. Coarse sandy soils do not occur within the Study Area.
<i>Delphinium californicum ssp. interius</i> Hospital Canyon larkspur	--	CRPR 1B.2	Openings in chaparral, mesic areas in cismontane woodland, and coastal scrub (640' – 3,593').	No Habitat Present. Study area does not contain chaparral, woodland, or coastal scrub.
<i>Delphinium recurvatum</i> Recurved larkspur	--	CRPR 1B.2	Alkaline soils within chenopod scrub, cismontane woodland, and valley and foothill grasslands (10' – 2,592').	Absent. Marginally suitable habitat is present in the alkali weed- salt grass sink within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.
<i>Dirca occidentalis</i> Western leatherwood	--	CRPR 1B.2	Mesic areas in broadleaved upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, North Coast coniferous forest, riparian forest, and riparian woodland (82' – 1,394').	No Habitat Present. Study Area does not contain any of the shrub or forest habitats that this species is found in.
<i>Downingia pusilla</i> Dwarf downingia	--	CRPR 2B.2	Mesic areas in valley and foothill grassland, and vernal pools (3' – 1,460').	Absent. Marginally suitable habitat is present in the seasonal wetlands within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.

The Ranch in Antioch
Special-Status Plant and Animal Species with Potential to Occur

<i>Eriastrum erterae</i> Lime Ridge eriastrum	--	CRPR 1B.1	Alkaline or semi-alkaline, sandy substrates in openings or along the edges of chaparral (656' – 951').	No Habitat Present. Study area does not contain chaparral.
<i>Eriogonum angulosum</i> Angle-stem buckwheat	--	CNPS "Locally Rare"	Clay soils within valley grassland, foothill woodland, Joshua tree woodland, and pinyon-juniper woodland.	Present. Angle-stem buckwheat was documented on the steep south-facing cliffs just north of Sand Creek within the Study Area.
<i>Eriogonum nudum var. psychicola</i> Antioch Dunes buckwheat	--	CRPR 1B.1	Inland dunes (0' – 66').	No Habitat Present. No dunes present.
<i>Eriogonum truncatum</i> Mt. Diablo buckwheat	--	CRPR 1B.1	Sandy soils in chaparral, coastal scrub, valley and foothill grassland (10' – 1,148').	Absent. Marginally suitable habitat is present in the annual brome grasslands within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.
<i>Eryngium jepsonii</i> Jepson's coyote thistle	--	CRPR 1B.2	Clay soils of valley and foothill grassland, and vernal pools (10' – 9,842').	Absent. Marginally suitable habitat is present in the seasonal wetlands and other aquatic resources within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.
<i>Eryngium spinosepalum</i> Spiny-sepaled button-celery	--	CRPR 1B.2	Vernal pools and other mesic areas in valley and foothill grasslands (262'-3,199')	Absent. Marginally suitable habitat is present in the seasonal wetlands and other aquatic resources within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.
<i>Erysimum capitatum var. angustatum</i> Contra Costa wallflower	FE	CE, CRPR 1B.2	Found in inland dunes (10' – 66').	No Habitat Present. No dunes present.

The Ranch in Antioch
Special-Status Plant and Animal Species with Potential to Occur

<p><i>Eschscholzia rhombipetala</i> Diamond-petaled California poppy</p>	<p>--</p>	<p>CRPR 1B.1</p>	<p>Valley and foothill grassland in alkaline and clay soils (0' – 3,199').</p>	<p>Absent. Marginally suitable habitat is present in the alkali weed- salt grass sink within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.</p>
<p><i>Extriplex joaquinana</i> San Joaquin spearscale</p>	<p>--</p>	<p>CRPR 1B.2</p>	<p>Found in alkaline soils in meadows and seeps and playas in chenopod scrub and valley and foothill grassland (3' – 2,740').</p>	<p>Absent. Suitable habitat for this species is present in the Alkali Weed –Salt Grass Sinks in the northwestern portion of the Study Area, and this species was previously detected by Monk and Associates in the eastern pond (Monk and Associates 2018). Despite a thorough search of the eastern pond (including a targeted search of this location on 5 June 2018 and again in 2019), this species was not detected during the 2018 special-status plant surveys of the Study Area.</p>
<p><i>Fritillaria liliacea</i> Fragrant fritillary</p>	<p>--</p>	<p>CRPR 1B.2</p>	<p>Cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grassland, often on serpentinite substrates (10' – 1,345').</p>	<p>Absent. Marginally suitable habitat is present in the annual brome grasslands within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.</p>
<p><i>Grimmia torenii</i> Toren's grimmia</p>	<p>--</p>	<p>CRPR 1B.3</p>	<p>Openings, rocky substrates, boulder and rock walls, carbonate substrates, and volcanic substrates in chaparral, cismontane woodland, and lower montane coniferous forest (1,066' – 3,806').</p>	<p>No Habitat Present. Study Area does not contain any of the shrub or forest habitats that this species is found in.</p>

The Ranch in Antioch
Special-Status Plant and Animal Species with Potential to Occur

<p><i>Helianthella castanea</i> Diablo helianthella</p>	<p>--</p>	<p>CRPR 1B.2</p>	<p>Usually rocky, axonal soils in broadleaved upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland, often in partial shade (197' – 4,265').</p>	<p>Absent. Marginally suitable habitat is present in the annual brome grasslands within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.</p>
<p><i>Hesperolinon breweri</i> Brewer's western flax</p>	<p>--</p>	<p>CRPR 1B.1</p>	<p>Usually in serpentine soils of chaparral, cismontane woodland, and valley and foothill grassland (98' – 3,100').</p>	<p>Absent. Marginally suitable habitat for this species is present in the Annual Brome Grasslands throughout the Study Area. The Study Area falls within CNDDDB Occurrence #32 for this species (CNDDDB 2019). This species was documented by Live Oak Associates somewhere in the Sand Creek Specific Plan in 2002 (CNDDDB 2019). We have not been able to locate the map showing the location of these plants within the Sand Creek Specific Plan, but given that this site is only a small portion of that area, the marginal nature of the habitat within this Study Area, and the much higher quality habitat in the hills to the south of the Study Area, we find it unlikely that Brewer's western flax was observed within this Study Area. This species was not observed during the 2019 special-status plant surveys of the Study Area.</p>
<p><i>Hibiscus lasiocarpus var. occidentalis</i> Woolly rose-mallow</p>	<p>--</p>	<p>CRPR 1B.2</p>	<p>Marshes and freshwater swamps (0' – 394').</p>	<p>No Habitat Present. No marshes are present.</p>
<p><i>Isocoma arguta</i> Carquinez goldenbush</p>	<p>--</p>	<p>CRPR 1B.1</p>	<p>Alkaline soils in valley and foothill grasslands (3' – 66').</p>	<p>No Habitat Present. Study Area is outside of this species' distributional range. This species is only known from north of Suisun Bay and the Sacramento River.</p>

The Ranch in Antioch
Special-Status Plant and Animal Species with Potential to Occur

<i>Lasthenia conjugens</i> Contra Costa goldfields	FE	CRPR 1B.1	Mesic sites within cismontane woodland, playas with alkaline soils, valley and foothill grassland and vernal pools (0' – 1,542').	Absent. Marginally suitable habitat is present in the alkali weed- salt grass sink within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.
<i>Lathyrus jepsonii</i> var. <i>jepsonii</i> Delta tule pea	--	CRPR 1B.2	Freshwater and brackish marshes and swamps (0' – 17').	No Habitat Present. No marshes occur within the Study Area.
<i>Lilaeopsis masonii</i> Mason's lilaeopsis	--	CR, CRPR 1B.1	Brackish or freshwater marshes or swamps and riparian scrub (0' – 33').	No Habitat Present. No marshes or riparian scrub occur within the Study Area.
<i>Limosella australis</i> Delta mudwort	--	CRPR 2B.1	Usually mud banks in freshwater or brackish marshes and swamps and riparian scrub (0' – 10').	No Habitat Present. No marshes or riparian scrub occur within the Study Area.
<i>Madia radiata</i> Showy golden madia	--	CRPR 1B.1	Cismontane woodland and valley and foothill grassland (82' – 3,986').	Absent. Suitable habitat for this species is present in the Annual Brome Grasslands throughout the Study Area. The Study Area falls within CNDDDB Occurrence #25 for showy golden madia (CNDDDB 2019). This occurrence includes two records from Hoover in 1938 and 1941, from "Lone Tree Valley" and "1 mi N of Lone Tree Valley" (CNDDDB 2019). Given that these occurrences have not been documented since 1941, the CNPS Inventory considers showy golden madia to be extirpated in Contra Costa County (CNPS 2019). This species was not observed during the 2019 special-status plant surveys of the Study Area.
<i>Malacothamnus hallii</i> Hall's bush-mallow	--	CRPR 1B.2	Chaparral, coastal scrub (32' – 2,493').	No Habitat Present. No chaparral or coastal scrub occurs within the Study Area.

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<i>Monardella antonina ssp. antonina</i> San Antonio Hills monardella	--	CRPR 3	Chaparral, cismontane woodland (1,050' – 3,281').	No Habitat Present. No chaparral or woodland occurs within the Study Area.
<i>Monolopia gracilens</i> Woodland woollythreads	--	CRPR 1B.2	Serpentinite substrates in openings in broadleafed upland forest and chaparral, cismontane woodland, openings in North Coast coniferous forest, and valley and foothill grassland (328' – 3,937').	No Habitat Present. No serpentine soils occur within the Study Area.
<i>Navarretia gowenii</i> Lime Ridge navarretia	--	CRPR 1B.1	Chaparral (591' – 1,001').	No Habitat Present. Study area does not contain chaparral.
<i>Navarretia nigelliformis ssp. radians</i> Shining navarretia	--	CRPR 1B.2	Vernal pools, cismontane woodland, and valley or foothill grassland (249' – 3,281').	Present. Thousands of plants are present within the Study Area in isolated locations on heavy clay soils. This species was previously documented in abundance within the Study Area by Monk and Associates, predominantly within openings in the flat Annual Brome Grassland to the south of Sand Creek. During the 2019 surveys, many of these populations of shining navarretia were re-documented. In addition, further discrete populations of this species were observed just to the north of Sand Creek, and at the far eastern boundary of the site.
<i>Neostapfia colusana</i> Colusa grass	FT	CE, CRPR 1B.1	Large vernal pools with adobe soils (16' – 656').	No Habitat Present. No vernal pools present. The seasonal wetlands do not provide suitable large adobe wetland habitat.
<i>Oenothera deltoides ssp. howellii</i> Antioch Dunes evening-primrose	FE	CE, CRPR 1B.1	Found in inland dunes (0' – 98').	No Habitat Present. No dunes present.

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<i>Phacelia phacelioides</i> Mt. Diablo phacelia	--	CRPR 1B.2	Rocky substrates in chaparral and cismontane woodland (1,640' – 4,495').	No Habitat Present. No chaparral or woodland occurs within the Study Area.
<i>Plagiobothrys hystriculus</i> Bearded popcornflower	--	CRPR 1B.1	Often in vernal swales, and in mesic areas of valley and foothill grassland and vernal pool margins (0' – 899').	Absent. Marginally suitable habitat is present in the seasonal wetlands and other aquatic resources within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.
<i>Potamogeton zosteriformis</i> Eel-grass pondweed	--	CRPR 2B.2	Assorted freshwater marshes and swamps (0' – 6,102').	No Habitat Present. No marshes occur within the Study Area.
<i>Puccinellia simplex</i> California alkali grass	--	CRPR 1B.2	Alkaline, vernal mesic areas in sinks, flats and lake margins in chenopod scrub, meadows and seeps, valley and foothill grassland, and vernal pools (7' – 3,051').	Absent. Marginally suitable habitat is present in the alkali weed- salt grass sink within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.
<i>Sanicula saxatilis</i> Rock sanicle	--	CR, CRPR 1B.2	Rocky, scree, and talus substrates in broadleafed upland forest, chaparral, and valley and foothill grassland (2,034' – 3,855').	No Habitat Present. Outside of the elevational range of the species, and no rocky substrates occur within the Study Area.
<i>Senecio aphanactis</i> Chaparral ragwort	--	CRPR 2B.2	Sometimes alkaline soils in chaparral, cismontane woodland, coastal scrub (49' – 2,625').	No Habitat Present. No chaparral, scrub or woodland occurs within the Study Area.
<i>Spergularia macrotheca</i> var. <i>longistyla</i> Long-styled sand-spurrey	--	CRPR 1B.2	Occurs in alkaline marshes and swamps, meadows and seeps (0' - 840').	Absent. Marginally suitable habitat is present in the alkali weed- salt grass sink within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.

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<i>Streptanthus albidus ssp. peramoenus</i> Most beautiful jewelflower	--	CRPR 1B.2	Serpentine soils in chaparral, cismontane woodland, and valley and foothill grassland (312' – 3,281').	No Habitat Present. No serpentine soils occur within the Study Area.
<i>Streptanthus hispidus</i> Mt. Diablo jewelflower	--	CRPR 1B.3	Rocky soils in chaparral and valley and foothill grassland (1,198' – 3,937').	No Habitat Present. Outside of the elevational range of the species, and no rocky substrates occur within the Study Area.
<i>Stuckenia filiformis ssp. alpina</i> Slender-leaved pondweed	--	CRPR 2B.2	Assorted shallow freshwater marshes and swamps (984' – 7,054').	No Habitat Present. No marshes occur within the Study Area.
<i>Symphotrichum lentum</i> Suisun Marsh aster	--	CRPR 1B.2	Found in freshwater and brackish marshes and swamps (0' – 10').	No Habitat Present. No marshes occur within the Study Area.
<i>Triquetrella californica</i> Coastal triquetrella	--	CRPR 1B.2	Soil in coastal bluff scrub and coastal scrub (33' – 328').	No Habitat Present. No coastal scrub occurs within the Study Area.
<i>Tropidocarpum capparideum</i> Caper-fruited tropidocarpum	--	CRPR 1B.1	Alkaline hills in valley and foothill grassland (3' – 1,493').	Absent. Marginally suitable habitat is present in the alkali weed- salt grass sink within the Study Area. The species was not observed within the Study Area during the 2019 special-status plant surveys.
<i>Viburnum ellipticum</i> Oval-leaved viburnum	--	CRPR 2B.3	Chaparral, cismontane woodland, and lower montane coniferous forest communities (705' – 4,593').	No Habitat Present. No chaparral or woodland occurs within the Study Area.
Invertebrates				
<i>Apodemia mormo langei</i> Lange's metalmark butterfly	FE	--	Requires specific sand dune habitat that is found only in Antioch Dunes National Wildlife Refuge. It is reliant on a specific subspecies of naked buckwheat for its diet as well as reproduction.	No Habitat Present. No suitable habitat is present within the Study Area, and the Study Area is outside of this species' distributional range.

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<p><i>Bombus crotchii</i> Crotch bumble bee</p>	<p>--</p>	<p>CC</p>	<p>Occurs in open grasslands and scrub habitats. This species occurs primarily in California including the Mediterranean region, Pacific Coast, Western Desert, Great Valley, and adjacent foothills through most of southwestern California (William et al 2014). This species was historically common in the Central Valley of California, but now appears to be absent from most of it, especially in the center of its historic range (Williams et al. 2014; Richardson et al 2014).</p>	<p>Low. The hillsides and areas along Sand Creek contain suitable foraging flower populations and abundant ground squirrel burrows that represent potential nesting and overwintering habitat.</p>
<p><i>Bombus occidentalis</i> Western bumble bee</p>	<p>--</p>	<p>CC</p>	<p>Meadows and grasslands with the blended floral resources are the appropriate habitat for this sub-species. While the Western bumble bee was historically known throughout the mountains and northern coast of California, it is now largely confined to high elevation sites and a small handful of records on the northern California coast (Cameron et al. 2011a; Xerces Society 2012; Williams et al. 2014; Xerces Society et al. 2017).</p>	<p>Low. The hillsides and areas along Sand Creek contain suitable foraging flower populations and abundant ground squirrel burrows that represent potential nesting and overwintering habitat.</p>
<p><i>Branchinecta conservatio</i> Conservancy fairy shrimp</p>	<p>FE</p>	<p>--</p>	<p>Very large, turbid vernal pools</p>	<p>No habitat present. Turbid playa vernal pools are not present within the Study Area.</p>
<p><i>Branchinecta lynchi</i> Vernal pool fairy shrimp</p>	<p>FT</p>	<p>--</p>	<p>Vernal pools.</p>	<p>Present. The species has been documented within the Study Area. The seasonal wetlands within the Study Area represent suitable habitat for the species.</p>

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<i>Callophrys mossii bayensis</i> San Bruno elfin butterfly	FE	--	Found on fog-influenced mountains in San Mateo and Marin counties, and on Mount Diablo (CNDDDB 2019). It lives near prolific growths of the larval food plant, broadleaf stonecrop (<i>Sedum spathulifolium</i>), which is associated with rocky outcrops (often in the shade) that occur on steep, mainly north-facing slopes from 200 to 5,000 feet elevation.	No Habitat Present. Rocky outcrops with extensive populations of broadleaf stonecrop do not occur within the Study Area.
<i>Desmocerus californicus dimorphus</i> Valley elderberry longhorn beetle	FT	--	Dependent upon elderberry plant as primary host species.	Low. A single elderberry shrub is located along the north bank of Sand Creek within the central portion of the Study Area. The shrubs was surveyed in 2016 and no sign of elderberry longhorn beetle was observed (exit holes).
<i>Lepidurus packardi</i> Vernal pool tadpole shrimp	FE	--	Vernal pools.	Present. The species has been documented within the Study Area. The seasonal wetlands within the Study Area represent suitable habitat for the species.
Fish				
<i>Archoplites interruptus</i> Sacramento perch	--	CSC	Ponds, rivers, backwaters, and lakes	No Habitat Present. No ponds, rivers, backwaters, or lakes are present within the Study Area.
<i>Hypomesus thaleichthys</i> Long fin smelt	FC	CT, CSC	Tidally-influenced drainages in the Sacramento and San Joaquin River delta.	No Habitat Present. No tidally influenced drainages are present within the Study Area.
<i>Hypomesus transpacificus</i> Delta smelt	FT	CE	Tidally-influenced drainages in the Sacramento and San Joaquin River delta.	No Habitat Present. No tidally influenced drainages are present within the Study Area.

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<i>Oncorhynchus mykiss</i> Steelhead (CA Central Valley ESU)	FT	--	Undammed rivers, streams, creeks.	No Habitat Present. No undammed rivers, streams or creeks are present within the Study Area.
Amphibians				
<i>Ambystoma californiense</i> California tiger salamander	FT	CT, CSC	Breeds in ponds or other deeply ponded wetlands, and uses gopher holes and ground squirrel burrows in adjacent grasslands for upland refugia/foraging.	Present. Madrone biologists observed hundreds of larvae California tiger salamanders within the easternmost pond in the spring of 2019 during the special-status plant surveys. The two ponds, plunge pool within Sand Creek, and the deeper seasonal wetlands within the Study Area represent suitable breeding habitat. The annual brome grassland within the Study Area contains abundant ground squirrel burrows and represents suitable upland habitat for the species.
<i>Rana boylei</i> Foothill yellow-legged frog	--	CC, CSC	Shallow tributaries and mainstems of perennial streams and rivers, typically associated with cobble or boulder substrate. Found from sea level to 5,000 feet in the Sierra Nevada (Seltenrich and Pool 2002).	No Habitat Present. No drainages with a boulder or cobble substrate occur within the Study Area.
<i>Rana draytonii</i> California red-legged frog	FT	CSC	Breeds in permanent to semi-permanent aquatic habitats including lakes, ponds, marshes, creeks, and other drainages.	Present. Documented within Sand Creek at the Empire Mine Road Crossing within the Study Area. The plunge pool within Sand Creek and the two ponds within the Study Area represent potential breeding habitat and Sand Creek represents potential dispersal habitat for the species.

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<i>Spea hammondi</i> Western spadefoot	--	CSC	Breeds in vernal pools, seasonal ponds, seasonal wetlands and associated swales. Forages and aestivates in adjacent grasslands and oak woodlands.	Present. Western spadefoot larvae were observed in the spring of 2019 in the plunge pool within Sand Creek. The two ponds and the deeper seasonal wetlands within the Study Area represent potential breeding habitat for the species.
Reptiles				
<i>Actinemys marmorata</i> Western pond turtle	--	CSC	Ponds, rivers, streams, wetlands, and irrigation ditches with associated marsh habitat.	Moderate. The single plunge pool and two ponds within the Study Area represent potential habitat for western pond turtle. All three features are ephemeral and dry in the late summer to fall.
<i>Aniella pulchra</i> Northern California legless lizard	--	CSC	Occurs in sandy or loose soils under sparse vegetation from Antioch south coastally and inland to Baja California.	Low. The Annual Brome Grasslands throughout the Study Area are only marginally suitable due to the lack of sandy, loose soils.
<i>Arizona elegans occidentalis</i> California glossy snake	--	CSC	Occurs from the eastern part of the San Francisco Bay Area south to northwestern Baja California. Inhabits arid scrub, rocky washes, grasslands, and chaparral	No Habitat Present. The Study Area is outside of the distributional range of the species.
<i>Masticophis flagellum ruddocki</i> San Joaquin Coachwhip	--	CSC	Open dry grassland and scrub habitats with little or no tree cover with rodent burrows for overwintering.	No Habitat Present. The Study Area is outside of the distributional range of the species.

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<p><i>Masticophis lateralis eurycanthus</i> Alameda whipsnake</p>	<p style="text-align: center;">FT</p>	<p style="text-align: center;">CT</p>	<p>Occurs in coastal scrub and chaparral communities, but also forages in a variety of other communities in the inner Coast Range, including grasslands and open woodlands. Rock outcrops with deep crevices or abundant rodent burrows are important habitat components.</p>	<p>Low. The study area contains marginally suitable foraging/dispersal habitat due to the long distance to the nearest chaparral or coastal scrub. The nearest suitable habitat for the species is ~1.25-mile southwest of the Study Area.</p>
<p><i>Phrynosoma blainvillii</i> Coast (Blainville's) Horned Lizard</p>	<p style="text-align: center;">--</p>	<p style="text-align: center;">CSC</p>	<p>Open areas of sandy soil and low vegetation in grasslands, coniferous forests, woodlands, and chaparral, with open areas and patches of loose soil. Often found in lowlands along sandy washes with scattered shrubs and along dirt roads, and frequently found near ant hills.</p>	<p>Low. The annual brome grassland within the Study Area represents marginally suitable habitat for the species.</p>
<p><i>Thamnophis gigas</i> Giant garter snake</p>	<p style="text-align: center;">FT</p>	<p style="text-align: center;">CT</p>	<p>Occurs in freshwater ditches, sloughs, and marshes in the Central Valley. Almost extirpated from the southern parts of its range.</p>	<p>No Habitat Present. No suitable water or food source during active season, no ditches, sloughs, or marshes.</p>
<p>Birds</p>				
<p><i>Agelaius tricolor</i> Tricolored blackbird</p>	<p style="text-align: center;">--</p>	<p style="text-align: center;">CE, CSC</p>	<p>Colonial nester in dense vegetation, such as cattails, bulrush, or blackberries associated with marsh habitats.</p>	<p>No Nesting Habitat Present. Dense vegetation does not occur within the Study Area. May forage seasonally.</p>

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<p><i>Ammodramus savannarum</i> Grasshopper sparrow</p>	<p>--</p>	<p>CSC</p>	<p>In California, breeding range includes most coastal counties south to Baja California; western Sacramento Valley and western edge of Sierra Nevada region. Nests in moderately open grasslands and prairies with patchy bare ground. Avoids grasslands with extensive shrub cover; more likely to occupy large tracts of habitat than small fragments; removal of grass cover by grazing often detrimental.</p>	<p>High. The annual brome grasslands throughout the Study Area represent suitable nesting and foraging habitat.</p>
<p><i>Aquila chrysaetos</i> Golden eagle</p>	<p>--</p>	<p>CFP</p>	<p>Nests on cliff ledges, river banks, trees, windmills, platforms, and transmission towers throughout California, except the immediate coast, Central Valley floor, Salton Sea region, and the Colorado River region, where they can be found during Winter.</p>	<p>Present. Golden eagles have been observed foraging and perching on the steep hillsides on-site. The annual brome grasslands throughout the Study Area represent suitable foraging habitat. Very low potential for the species to nest onsite.</p>
<p><i>Asio flammeus</i> Short-eared owl</p>	<p>--</p>	<p>CSC</p>	<p>Nests in large expanses of prairie, coastal grasslands, heathlands, shrub-steppe, tundra, and agricultural areas. Only overwinters in the Central Valley in the vicinity of the Study Area.</p>	<p>No nesting habitat present. The annual brome grasslands throughout the Study Area represent suitable foraging habitat.</p>
<p><i>Athene cunicularia</i> Burrowing owl</p>	<p>--</p>	<p>CSC</p>	<p>Nests in abandoned ground squirrel burrows associated with open grassland habitats.</p>	<p>Present. Many ground squirrel (<i>Spermophilis beechyi</i>) burrows were observed within the annual brome grasslands; these represent suitable nesting habitat. Burrowing owl pellets observed onsite at a low perch (pipe sticking out of the ground) within the eastern annual brome grassland. No owls directly observed within the Study Area.</p>

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<i>Buteo swainsoni</i> Swainson's hawk	--	CT	Nests in large trees, preferably in riparian areas. Forages in fields, cropland, irrigated pasture, and grassland near large riparian corridors.	High. The trees on-site provide suitable nesting habitat, and the annual grasslands represent suitable foraging habitat. Swainson's hawk have been observed soaring and foraging over the Study Area.
<i>Circus hudsonicus</i> Northern harrier	--	CSC	Nests on the ground in open wetlands, marshy meadows, wet/lightly grazed pastures, (rarely) freshwater/brackish marshes, tundra, grasslands, prairies, croplands, desert, shrub-steppe, and (rarely) riparian woodland communities.	Low. The annual brome grasslands are heavily grazed and throughout the Study Area represent low potential suitable nesting habitat.
<i>Elanus leucurus</i> White-tailed kite	--	CFP	Open grasslands, fields, and meadows are used for foraging. Isolated trees in close proximity to foraging habitat are used for perching and nesting.	High. The trees on-site provide suitable nesting habitat, and the annual grasslands represent suitable foraging habitat.
<i>Falco peregrinus anatum</i> American peregrine falcon	FD	CFP	Nests on cliff ledges, tall buildings, or other tall man-made structures near open areas for foraging.	No habitat present. No cliff ledges or other suitable nesting habitat is present within the Study Area.
<i>Lanius ludovicianus</i> Loggerhead shrike	--	CSC	Found throughout California in open country with short vegetation, pastures, old orchards, grasslands, agricultural areas, open woodlands. Not found in heavily forested habitats.	High. Shrubs and trees near Sand Creek within the Study Area represent suitable nesting habitat, and the annual brome grasslands throughout the Study Area represent suitable foraging habitat.

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<i>Laterallus jamaicensis coturniculus</i> California black rail	--	CT	Found in tidal marshes and sloughs with pickleweed (<i>Salicornia</i> spp.) and bulrush (<i>Schoenoplectus</i> spp.) in the San Francisco Bay area, Sacramento-San Joaquin Delta, coastal southern California at Morro Bay and a few other locations, the Salton Sea, and lower Colorado River.	No Habitat Present. No tidal marshes occur within the Study Area.
<i>Melospiza melodia</i> Song sparrow (Modesto population)	--	CSC	Resident in central and southwest California, including Central Valley; nests in marsh, scrub habitat.	No Habitat Present. No marshes occur within the Study Area.
<i>Rallus longirostris obsoletus</i> California clapper rail	FE	CE, CFP	San Francisco and San Pablo Bay tidal marshes, sloughs, with pickleweed (<i>Salicornia</i> spp.), cordgrass (<i>Spartina</i> spp.), and gum plant (<i>Grindelia</i> spp.).	No Habitat Present. No tidal marshes occur within the Study Area.
<i>Sternula antillarum browni</i> California least tern	FE	CE, CFP	Nests along Pacific Coast from San Francisco Bay south the Mexico; nests colonially, on sand or dried mudflats, sand or shell islands, and gravel and sand pits and rarely in agricultural fields, parking lots, airports, and flat/graveled rooftops.	No Habitat Present. Study Area lacks suitable nesting habitat.
Mammals				
<i>Antrozous pallidus</i> Pallid bat	--	CSC, WBWG H	Roosts in crevices in rocky outcrops and cliffs, caves, mines, cavities and exfoliating bark of trees, and various human structures such as bridges, barns, porches, bat boxes, and human-occupied as well as vacant buildings (WBWG 2015).	High. The trees along Sand Creek and the structures in the vicinity of the farmstead provide suitable roosting habitat for this species, and adjacent open areas provide foraging habitat.

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<i>Corynorhinus townsendii townsendii</i> Townsend's big-eared bat	--	CSC, WBWG H	Roosts in caves and cave analogues, such as abandoned mines, buildings, bridges, rock crevices and large basal hollows of coast redwoods and giant sequoias. Extremely sensitive to human disturbance (WBWG 2019).	Low. The structures in the vicinity of the farmstead provide suitable roosting habitat for this species, and adjacent open areas provide foraging habitat.
<i>Lasiurus blossevillii</i> Western red bat	--	CSC, WBWG H	Require large leaf trees such as cottonwoods, willows, and fruit/nut trees for daytime roosts. Often associated with wooded habitats that are protected from above and open below. Often found in association with riparian corridors. Require open space for foraging.	High. The trees along Sand Creek provide suitable roosting habitat for this species, and adjacent open areas provide foraging habitat.
<i>Reithrodontomys raviventris</i> Salt marsh harvest mouse	FE	CE, FP	Salt marsh and brackish marsh dominated by pickleweed.	No Habitat Present. No suitable salt marsh habitat present on-site.
<i>Taxidea taxus</i> American badger	--	CSC	Drier open stages of most shrub, forest, and herbaceous habitats with friable soils.	Moderate. Annual brome grasslands throughout the Study Area represent suitable habitat for this species.
<i>Vulpes macrotis mutica</i> San Joaquin kit fox	FE	CT	Occupies grasslands and sagebrush scrub.	Low. Annual brome grasslands throughout the Study Area represent suitable habitat for this species. Surveys for this species did not identify any kit fox or sign of kit fox within the Study Area.
<u>Status Codes:</u>				
CC - CDFW Candidate for Listing	CSC - CDFW Species of Concern	FP - Proposed for Federal Listing		
CE - CDFW Endangered	CT - CDFW Threatened	FT - Federally Threatened		
CFP - CDFW Fully Protected	FC - Candidate for Federal Listing	WBWG M - Western Bat Working Group Medium Threat Rank		
CR - CDFW Rare	FD - Federally Delisted	WBWG H - Western Bat Working Group High Threat Rank		
CRPR - California Rare Plant Rank	FE - Federally Endangered			

5.1 Plants

Three CRPR-listed plants were observed within The Ranch in Antioch Study Area during the 2018 through 2019 protocol-level special-status plant surveys conducted by Madrone: crownscale (CRPR 4.2), big tarplant (CRPR 1B.1), and shining navarretia (CRPR 1B.2). One A-ranked locally rare plant species (angle-stem buckwheat) was observed within the Study Area. No other special-status plant species were observed within The Ranch in Antioch Study Area during the 2018 through 2019 protocol-level special-status plant surveys.

Monk and Associates documented crownscale, shining navarretia and San Joaquin spearscale (*Extriplex joaquiniana*) during their surveys in 2013-2015. A Madrone botanist searched the location that San Joaquin spearscale was documented by Monk and Associates several times throughout the summers of 2018 and 2019 and could not locate any San Joaquin spearscale plants. It is unknown how many plants Monk and Associates biologists observed during their surveys, but the population was indicated by a single dot on the map in their report. It is possible that if the population was comprised of a single plant, the heavy cattle use in the area (as this is the last source of water for cattle in mid-summer) could have extirpated the population.

5.1.1 Crownscale

Crownscale (*Atriplex coronata* var. *coronata*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 4.2 species. This species is an herbaceous annual that occurs in alkaline and often clay soils within chenopod scrub, valley and foothill grasslands, and vernal pools (CNPS 2019). Crownscale blooms from March through October and is known to occur at elevations ranging from approximately 3 feet to 1,936 feet above MSL (CNPS 2019).

Crownscale was documented along the fringes of the Alkali Weed –Salt Grass Sinks in the northwestern portion of the Study Area (Figure 7).

5.1.2 Big Tarplant

Big tarplant (*Blepharizonia plumosa*) is not federally or state listed, but it is classified as a CRPR List 1B.1 species. This species is an herbaceous annual that occurs in valley and foothill grasslands, usually in clay soil (CNPS 2019). Big tarplant blooms from July through October and is known to occur from approximately 98 feet to 1,657 feet above MSL (CNPS 2019).

Suitable habitat for this species is present in the Annual Brome Grasslands throughout the Study Area. One small population of *Blepharizonia plumosa* comprised of three plants was observed in the southern hills of the Study Area (Figure 7).

5.1.3 Shining Navarretia

Shining navarretia (*Navarretia nigelliformis* ssp. *radians*) is not federally or state listed, but it is classified as a CRPR List 1B.2 species. This annual herb is primarily associated with vernal pools and other mesic areas in cismontane woodland and valley and foothill grassland, often on clay soils (CNPS 2019). Shining navarretia occurs at elevations between approximately 210 feet and 3,280 feet, and typically blooms from April through July (CNPS 2019).

Suitable habitat for this species is present on heavy clay soils in the flat portions of the Annual Brome Grasslands throughout the Study Area as well as the California Goldfields-Dwarf Plantain-Small Fescue Flower Fields. This species was previously documented in abundance within the Study Area by Monk and Associates (Monk and Associates 2018), predominantly within openings in the flat Annual Brome Grassland to the south of Sand Creek. During the 2019 surveys, Madrone resurveyed all areas of suitable habitat to obtain sub-meter accurate location data and accurate population counts for this species. Many of the populations of shining navarretia originally observed by Monk and Associates were re-documented. Additional discrete populations of this species were observed just to the north of Sand Creek, and at the far eastern boundary of the site (Figure 7). Thousands of shining navarretia were observed during the 2019 surveys.

5.1.4 Angle-Stem Buckwheat

Angle-stem buckwheat (*Eriogonum angulosum*) is a common species that is not listed pursuant to either the federal or California ESAs or designated as a CRPR species. It is listed as a "locally rare" species by the East Bay Chapter of CNPS as the Study Area is located at the far northern end of the species' range. This species is an herbaceous annual that occurs in clay soils within valley grassland, foothill woodland, Joshua tree woodland, and pinyon-juniper woodland (CalFlora 2019). Angle-stem buckwheat blooms in mid to late-summer. Angle-stem buckwheat was not a target species for this survey; however, angle-stem buckwheat was documented on the steep south-facing cliffs just north of Sand Creek (Figure 7).

5.2 Invertebrates

5.2.1 Crotch Bumble Bee

Crotch bumble bee (*Bombus crotchii*) has a limited distribution in southwestern North America. This species occurs primarily in California, including the Mediterranean region, Pacific Coast, West Desert, Great Valley, and adjacent foothills through most of southwestern California. It also occurs in Mexico (Baja California and Baja California Sur) (Williams et al. 2014) and has been documented in southwest Nevada, near the California border.

In California, *B. crotchii* inhabits open grasslands and scrub habitats. This species occurs primarily in California including the Mediterranean region, Pacific Coast, Western Desert, Great Valley, and adjacent foothills through most of southwestern California (William et al 2014). This species was historically common in the Central Valley of California, but now appears to be absent from most of it, especially in the center of

its historic range (Williams et al. 2014). There is one documented occurrence of this species within 5 miles of the Study Area located approximately 2.5 miles north within the City of Antioch (CNDDDB 2019). This occurrence was documented in 1926 and exact location is unknown.

The hills and areas along Sand Creek within the Study Area represent suitable habitat for crotch bumble bee. These areas contain abundant flowering plants for much of the year and contain abundant ground squirrel burrows in which the species can nest and overwinter. Due to the fact that crotch bumble bee is currently absent from most of the Central Valley of California, there is a low potential for the species to be present within the Study Area.

5.2.2 Western Bumble Bee

Western bumble bee (*Bombus occidentalis occidentalis*) was historically broadly distributed across the West Coast of North America from southern British Columbia to central California, east through Alberta and western South Dakota, and south to Arizona and New Mexico (Williams et al 2014; Sheffield et al. 2016). In California, it has been documented in Alameda, Alpine, Calaveras, Contra Costa, Del Norte, El Dorado, Fresno, Humboldt, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Modoc, Monterey, Napa, Nevada, Placer, Plumas, San Benito, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Tehama, Trinity, Tulare, Yolo, and Yuba counties (Xerces Society et al. 2018).

Meadows and grasslands with the blended floral resources are the appropriate habitat for this sub-species. While the Western bumble bee was historically known throughout the mountains and northern coast of California, it is now largely confined to high elevation sites and a small handful of records on the northern California coast (Williams et al. 2014; Xerces Society et al. 2018). There are four documented occurrences of this species within 5-miles of the Study Area with the nearest being approximately 3-miles west of the Study Area (CNDDDB 2019).

The hills and areas along Sand Creek within the Study Area represent suitable habitat for western bumble bee. These areas contain abundant flowering plants for much of the year and contain abundant ground squirrel burrows in which the species can nest and overwinter. Due to the fact that western bumble bee is currently absent from most of the Central Valley of California, there is a low potential for the species to be present within the Study Area.

5.2.3 Vernal Pool Fairy Shrimp

The vernal pool fairy shrimp (*Branchinecta lynchi*) is listed as threatened pursuant to the federal Endangered Species Act. Historically, the range of vernal pool fairy shrimp extended throughout the Central Valley of California. Vernal pool fairy shrimp populations have been found in several locations throughout California, with habitat extending from Stillwater Plain in Shasta County through the Central Valley to Pixley in Tulare County, and along the Central Coast range from northern Solano County to Pinnacles National Monument in San Benito County (Eng et al. 1990, Fugate 1992). Additional populations occur in San Luis Obispo, Santa

Barbara, and Riverside counties. The historic and current ranges of vernal pool fairy shrimp are very similar in extent; however, the remaining populations are more fragmented and isolated than during historical times (USFWS 2005a).

The life cycle of vernal pool fairy shrimp is adapted to seasonally inundated features such as vernal pools, seasonal wetlands, and seasonal wetland swales. Fairy shrimp embryos survive the dry season in cyst form. Cysts “hatch” soon after pools become inundated during the wet season. Fairy shrimp complete their life cycle quickly and feed on small particles of detritus, algae, and bacteria (Eriksen and Belk 1999).

There are 9 documented occurrences of this species within 5 miles of the Study Area (CNDDDB 2019). This species has been identified within the Study Area (Thomas Reid and Associates 2003) and it is assumed that vernal pool fairy shrimp is present within all suitable habitat within the Study Area (seasonal wetlands). There is no Critical Habitat for vernal pool fairy shrimp within the Study Area (USFWS 2006).

5.2.4 Valley Elderberry Longhorn Beetle

The Valley elderberry longhorn beetle is listed as threatened pursuant to the federal Endangered Species Act. The historic range of this beetle is limited to moist Valley oak woodlands along margins of rivers and streams in the lower Sacramento and lower San Joaquin Valleys (USFWS 1980). At the time of its listing, the beetle was known from less than 10 localities in Merced, Sacramento, and Yolo Counties (USFWS 1984). Its current distribution is patchy throughout California’s Central Valley and associated foothills (USFWS 1999).

The Valley elderberry longhorn beetle is completely dependent on its host plant, elderberry (*Sambucus* species), which occurs in riparian and other woodland communities in California’s Central Valley and the associated foothills (USFWS 1999). Female beetles lay their eggs in crevices on the stems or on the leaves of living elderberry plants. When the eggs hatch, larvae bore into the stems. The larval stages last for one to two years. The fifth instar larvae create emergence holes in the stems and then plug the holes and remain in the stems through pupation (Talley 2003). Adults emerge through the emergence holes from late March through June. The short-lived adult beetles forage on leaves and flowers of elderberry shrubs (USFWS 2017).

There are no documented occurrences of this species within 5 miles of the Study Area (CDFW 2019). A single elderberry shrub is present within the central portion of the Study Area along the north bank of Sand Creek. This shrub was surveyed by madrone biologists and no evidence of elderberry longhorn beetle (exit holes) were observed. The shrub is not located within typical riparian habitat that is preferred by the species. There is a low potential for the species to be within the Study Area.

5.2.5 Vernal Pool Tadpole Shrimp

The vernal pool tadpole shrimp (*Lepidurus packardii*) is listed as endangered pursuant to the federal ESA. This species inhabits vernal pools containing clear to highly turbid water, ranging in size from 0.001 to 89.0

acres (USFWS 1994). Vernal pool tadpole shrimp are distinguished from other vernal pool branchiopods discussed in this report by a large, shield like carapace that covers the anterior half of their body (USFWS 2003a). Cysts hatch during the wet season and the shrimp reach maturity in a few weeks. This species matures slowly and is long-lived, relative to other species. Vernal pool tadpole shrimp will continue to grow as long as the pools they occur in remain inundated, and in some instances can survive for six months or longer (USFWS 2003a). The geographic range of vernal pool tadpole shrimp extends from Shasta County to northern Tulare County in California's Central Valley, and in the central coast range from Solano County to Alameda County (USFWS 2003a).

There is 1 documented occurrence of vernal pool tadpole shrimp within the Study Area (CNDDDB 2019; Thomas Reid and Associates 2003). This is the only occurrence known within 5 miles of the Study Area, and it is located within the far northwestern portion of the Study Area in an area that will be preserved in open space. It is assumed that vernal pool tadpole shrimp is present within all suitable habitat within the Study Area (seasonal wetlands). There is no Critical Habitat for vernal pool tadpole shrimp within the Study Area (USFWS 2006).

5.3 Amphibians

5.3.1 California Tiger Salamander – Central California DPS

California tiger salamander (*Ambystoma californiense*) (CTS) is a member of the family Ambystomatidae, the "mole" salamanders and is endemic to California. The Central California DPS for CTS ranged throughout most of the Central Valley where there was suitable vernal pool and grassland habitat, from Tulare County north to at least Yolo County, and in the south Coast Ranges from San Luis Obispo County north to Monterey Bay and north, east of the Bay Area (Storer 1925). This salamander is generally terrestrial and most commonly found in annual grasslands but also occurs in oak woodlands (Stebbins 2012). Necessary habitat components include upland underground retreats and breeding ponds, which are used seasonally. CTS spend most of their adult life within underground refugia such as burrows of California ground squirrel (*Otospermophilus beecheyi*) and pocket gophers (*Thomomys bottae*). Breeding sites are generally ponded, and include vernal pools, seasonal wetlands, stock ponds, and slow-moving fishless streams. Adult CTS are generally crepuscular or nocturnal and can migrate distances up to 1.6 km from underground refugia to breeding ponds (USFWS 2004). Breeding and egg-laying occur between November and April (Petranka 1998) following rainfall events. Tiger salamander larvae transform into juveniles during late spring or early summer, usually by July. The average larval period is four to five months (Petranka 1998).

There are 45 documented occurrences of CTS within 5 miles of the Study Area (CNDDDB 2019). Hundreds of CTS larvae were observed by Madrone biologists within the easternmost pond during the special-status plant surveys in 2019. Suitable CTS aquatic habitat is present within the two ponds, the plunge pool within Sand Creek, and the deeper seasonal wetlands within the Study Area. The annual brome grasslands within the Study Area represent high quality upland habitat for CTS, and the species is known to occur within the Study Area.

5.3.2 California Red-legged Frog

The California red-legged frog (*Rana draytonii*) (CRLF) was listed as threatened by USFWS on May 23, 1996 (Federal Register Vol. 61, No. 101:25813) and is a CDFW species of special concern. Critical habitat was designated pursuant to the ESA across ±1,636,609 acres in 27 counties including Alameda, Butte, Calaveras, Contra Costa, El Dorado, Marin, Napa, Nevada, Placer, Solano, and Yuba counties.

CRLF is the largest native frog in the western United States, ranging from 1.5 to 5 inches in length. Their historic range extends through Pacific slope drainages and parts of the Central Valley from Shasta County, California, to Baja, Mexico. This area includes the Coast Ranges and the west slope of the Sierra Nevada at elevations below 1,548 m (5,000 feet). The current range is greatly reduced, with most remaining populations occurring along the coast from Marin County to Ventura County and in isolated locations in the foothills of the western slope of the Sierra Nevada (Fellers 2005; Barry and Fellers 2013).

CRLF occur in different habitats depending on life stage, season, and weather conditions. Breeding habitat includes coastal lagoons, marshes, springs, permanent and semi-permanent natural ponds, and ponded and backwater portions of streams. California red-legged frogs also breed in artificial impoundments including stock ponds, irrigation ponds, and siltation ponds. Creeks and ponds with dense growths of woody riparian vegetation, especially willows (*Salix* spp.) are used disproportionately (Hayes and Jennings 1988). The absence of vegetation at an aquatic site does not rule out the possibility of occupancy. Adult CRLF are most often found in areas of dense, shrubby or emergent riparian vegetation near deep [$\geq 0.6 - 0.9$ m (2 - 3 feet)], still or slow-moving water, especially where dense stands of overhanging willow and an intermixed fringe of cattail (*Typha* sp.) occur adjacent to open water. CRLF breed from November through April (Jennings and Hayes 1994), and larvae generally metamorphose by mid to late summer.

Upland and riparian areas provide important habitat during summer when CRLF are known to aestivate in dense vegetation, burrows and leaf litter. CRLF often disperse from breeding habitats to forage and seek upland refugia and are often found within close proximity to a pond or deep pool in a creek where emergent vegetation, undercut banks, or semi-submerged rootballs afford shelter (USFWS 2005b). The diet of CRLF is highly variable. Larvae probably graze on algae, whereas invertebrates are the most common food items of adult frogs. Vertebrates, such as Sierra chorus frogs (*Pseudacris sierra*) and California mice (*Peromyscus californicus*) are frequently eaten by larger frogs. Juvenile frogs are active both during the day and at night, whereas adult frogs are largely nocturnal.

There are approximately 19 documented occurrences of CRLF within 5 miles of the Study Area, including one documented occurrence located within the Study Area (CNDDDB 2019) (Figure 2). This occurrence (CNDDDB occurrence number 286) was documented in 1998 along Sand Creek. Three adults and approximately 20 larvae CRLF were observed within the large plunge pool in Sand Creek at the Empire Mine Road Crossing (CNDDDB 2019).

There is no CRLF critical habitat located within the Study Area. However, CRLF have been documented within the Study Area and potential breeding habitat for CRLF is present within the Sand Creek plunge pool and within the two onsite ponds. Sand Creek also represents potential dispersal habitat for CRLF.

5.3.3 Western Spadefoot

The western spadefoot (*Spea hammondi*) is not federally or state listed, but is a CDFW species of special concern. This amphibian is a nocturnal animal that forages in grassland, open chaparral, and pine-oak woodlands for a variety of invertebrates such as insects and worms (USFWS 2005a). Western Spadefoot breeds from January through May in variety of temporary wetlands including creeks, pools in intermittent drainages, vernal pools, and seasonal wetlands, and other fish-free water features. The tadpoles develop in 3 to 11 weeks, and must complete their metamorphosis before the temporary pools dry. Post-metamorphic juveniles feed and then immediately seek underground refugia. Following metamorphosis, the adults are largely terrestrial in nature and will burrow into sandy or gravelly soils utilizing the "spades" on the hind feet. The majority of the adult's life is spent in underground burrows (USFWS 2005a). Western spadefoot are known to breed in relatively deep vernal pools, seasonal wetlands, man-made features, such as ponded areas adjacent to railroad tracks, and in intermittent drainage plunge pools or similar pools that hold water through late spring (Stebbins 2012).

There are no documented occurrences of western spadefoot within 5 miles of the Study Area within the CNDDDB (CNDDDB 2019). However, Madrone biologists observed hundreds of western spadefoot larvae within the large plunge pool within Sand Creek during the 2019 special-status plant surveys. Suitable aquatic habitat for western spadefoot within the Study Area consists of the large plunge pool within Sand Creek, the two ponds, and deeper seasonal wetlands.

5.4 Reptiles

5.4.1 Western Pond Turtle

The western pond turtle (*Emys marmorata*) is not federally or state listed, but is a CDFW species of special concern. Its favored habitats include streams, large rivers and canals with slow-moving water, aquatic vegetation, and open basking sites (Jennings and Hayes 1994). Although the turtles must live near water, they can tolerate drought by burrowing into the muddy beds of dried drainages. This species feeds mainly on invertebrates such as insects and worms, but will also consume small fish, frogs, mammals and some plants. Western pond turtle predators include raccoons, coyotes, raptors, weasels, large fish, and bullfrogs. This species breeds from mid to late spring in adjacent open grasslands or sandy banks (Jennings and Hayes 1994).

There are 4 documented occurrences of western pond turtle within 5 miles of the Study Area (CNDDDB 2019). The large plunge pool within Sand Creek and the two ponds within the Study Area represent potential habitat for western pond turtle. These three features are seasonally inundated and dry in the late summer

to early fall and represent low quality habitat. There is a moderate potential for western pond turtle to be within the Study Area.

5.4.2 Northern California Legless Lizard

The northern California legless lizard (*Anniella pulchra*) is one of five species of legless lizard in California (Papenfuss and Parham 2013). This species is not listed pursuant to the California or federal ESAs, but is designated as a CDFW species of special concern. Although lacking legs, the legless lizards (*Anniella*) are decidedly lizards as shown by their eyelids, which are lacking in all snakes. Like snakes, however, these species lack external ear openings. The species ranges from sites in and around Antioch, in the East Bay, south to northern San Luis Obispo County.

There are 5 documented occurrences of northern California legless lizard within 5 miles of the Study Area (CNDDDB 2019). However, the annual grasslands within the Study Area provide only marginally suitable habitat for this species. Thus, the northern California legless lizard has low potential to occur within the Study Area.

5.4.3 Alameda Whipsnake

The Alameda whipsnake (*Masticophis lateralis euryxanthus*), also known as the Alameda striped racer, (*Coluber lateralis euryxanthus*) is a narrow, medium-sized (to 1.5 m), snake of the widespread family Colubridae (Ernst and Ernst 2003). Known from Alameda and Contra Costa counties, and tentatively in Santa Clara and San Joaquin counties (USFWS 2002), this snake is an isolated subspecies of the much more widespread California striped racer (*C. l. lateralis*), which is found throughout chaparral and foothill transition zones in California and northern Baja (Stebbins and McGinnis 2012). Because of its limited distribution and the extensive loss of habitat to residential development in Alameda and Contra Costa counties, in 1997 the Alameda whipsnake was listed as threatened under the federal ESA. Preceding the federal listing, in 1971 California listed the Alameda whipsnake as threatened under the California ESA. Critical Habitat was designated in 2006 (71 FR No. 190, October 2). In total, approximately 154,800 acres (62,700 ha) of Critical Habitat was designated in Alameda, Contra Costa, Santa Clara, and San Joaquin counties.

The Alameda whipsnake is active and diurnal (Ernst and Ernst 2003). Like all *Coluber*, the Alameda whipsnake is an active forager and uses visual cues to a larger extent than many other snakes, and often forages with its head held high (Stebbins 2003). Although to some degree they are dietary generalists, eating frogs, snakes, birds, and mammals, the majority of their diet consists of lizards, particularly western fence lizard (*Sceloporus occidentalis*), whose activity cycles correspond with those of the whipsnake. Prey are tracked and may be actively run down, grabbed in the jaws, and swallowed alive (Stebbins 2003). No constriction is used, although loops of the body may be used to subdue prey while manipulating for swallowing.

This is a snake of foothills, chaparral, and scrub habitats in the eastern San Francisco Bay Area. Common microhabitat associations include rocky outcrops and talus slopes in an open or broken canopy, usually with a south-, southeastern-, southwestern- or northeast-facing aspect (Stebbins and McGinnis 2012). Alameda

whipsnakes also use grasslands and oak woodlands within 1 mile of chaparral and scrub habitat (USFWS 2002). Even in grasslands and woodlands, rock outcrops are considered an essential feature of Alameda whipsnake habitat, as they provide retreats and positively favor lizard populations. They can often go into trees, and may flee there when pursued (USFWS 2002). There is some evidence that their use of grasslands is higher in the spring (Swaim 1994).

There are 5 documented occurrences Alameda whipsnake within 5 miles of the Study Area with the nearest observed approximately 1.0 mile southwest of the Study Area (CNDDDB 2019).

The annual grassland within the Study Area provides suitable dispersal habitat for this species. The Study Area and immediate vicinity lack coastal scrub and chaparral communities, which have been found to serve as the center of home ranges for the species (Swaim 1994). Although Alameda whipsnake have been found to utilize and disperse through annual grasslands, they are more frequently found within 500 feet of coastal scrub and chaparral (Swaim 1994; Alvarez, Shea, and Murphy 2005). Alameda whipsnake have been found to use grasslands further from coastal scrub and chaparral, although this is less common. Since there is no coastal scrub or chaparral in the immediate vicinity of the Study Area, Alameda whipsnake has low potential to occur within the Study Area. There is no Critical Habitat for this species within the Study Area.

5.4.4 Coast Horned Lizard

Blainville's horned lizard (*Phrynosoma blainvillii*) is not federally or state listed, but is a CDFW species of special concern. This species is a relatively large (to 105 mm in snout-vent length), dorsoventrally flattened, rounded lizard found historically from Redding, California, to Baja, Mexico (Jennings and Hayes 1994). This diurnal species can occur within a variety of habitats including scrubland, annual brome grassland, valley-foothill woodlands and coniferous forests, though it is most common along lowland desert sandy washes and chaparral (Stebbins 2012). In the Coast Ranges, it occurs from Sonoma County south into Baja California (CDFG 1988). It occurs from sea level to 8,000 feet above MSL and an isolated population occurs in Siskiyou County (Stebbins 2012).

Blainville's horned lizard is found in open microhabitats such as sandy washes with scattered shrubs or firebreaks in chaparral, where they forage for ants, small beetles and other insects (Jennings and Hayes 1994). Horned lizards (*Phrynosoma*) are native ant specialists and daily activities are centered on above-ground activity patterns of ants, with lizards active generally in mornings and later in the afternoon in the summer.

There are no documented occurrences of Blainville's horned lizard within 5 miles of the Study Area (CNDDDB 2019). However, the annual brome grassland within the Study Area provides marginally suitable habitat for this species. This species has a low potential to occur within the Study Area.

5.5 Birds

5.5.1 Grasshopper Sparrow

The grasshopper sparrow (*Ammodramus savannarum*) is not listed pursuant to either the California or federal Endangered Species Acts, but it is designated as a species of special concern by CDFW. The grasshopper sparrow is an uncommon and local summer resident and breeder along the western edge of the Sierra Nevada and most coastal counties south to Baja California (Small 1994, Vickery 1996). This species generally inhabits moderately open grasslands and prairies with patchy bare ground and scattered shrubs (Vickery 1996). Grasshopper sparrows are more likely to occupy large tracts of habitat than small fragments (Vickery 1996). Breeding generally occurs from early May through August.

There are no documented occurrences of grasshopper sparrow within 5 miles of the Study Area (CNDDDB 2019). The annual brome grassland throughout the Study Area provides suitable nesting habitat for this species.

5.5.2 Golden Eagle

The golden eagle (*Aquila chrysaetos*) is not listed pursuant to either the California or federal Endangered Species Acts. However, it is fully protected according to § 3511 of the California Fish and Game Code and the federal Bald and Golden Eagle Protection Act. Golden eagles generally nest on cliff ledges and/or large lone trees in rolling to mountainous terrain. Golden eagles nest throughout California except the Central Valley, the immediate coast, and portions of southeastern California (Kochert et al 2002). Occurrences within the Central Valley are usually dispersing post-breeding birds, non-breeding sub-adults, or migrants. Foraging habitat includes open grassland and savannah. Nesting occurs during February through August.

There are no documented occurrences of golden eagles nesting within 5 miles of the Study Area (CNDDDB 2019). The annual brome grassland in the Study Area provide suitable foraging habitat for this species. There is a low potential for golden eagle to nest within the Study Area.

5.5.3 Burrowing Owl

Burrowing owl (*Athene cunicularia*) is not listed pursuant to either the California or federal Endangered Species Acts; however, it is designated as a species of special concern by the CDFW. They typically inhabit dry open rolling hills, grasslands, desert floors, and open bare ground with gullies and arroyos. This species typically uses burrows created by fossorial mammals, most notably the California ground squirrel, but may also use man-made structures such as culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement (CDFG 1995). The breeding season extends from February 1 through August 31 (CBOC 1993, CDFG 1995, CDFG 2012).

There are 44 documented occurrences of burrowing owl within 5 miles of the Study Area (CNDDDB 2019). No protocol-level surveys for burrowing owl have occurred within the Study Area to date. Many ground

squirrel burrows were observed within the annual brome grasslands within the Study Area; these represent suitable nesting habitat. Although no burrowing owls have been directly observed within the Study Area, burrowing owl pellets were observed on-site at a low perch (pipe sticking out of the ground) within the eastern annual brome grassland. It is assumed that burrowing owls are present in very small numbers within the Study Area.

5.5.4 Swainson's Hawk

Swainson's hawk (*Buteo swainsoni*) is a raptor species that is not federally listed, but is listed as threatened by CDFW. Breeding pairs typically nest in tall trees associated with riparian corridors, and forage in grassland, irrigated pasture, and cropland with a high density of rodents (Shuford and Gardali 2008). The Central Valley populations breed and nest in the late spring through early summer before migrating to Central and South America for the winter (Shuford and Gardali 2008).

There are 12 documented occurrences of Swainson's hawk within 5 miles of the Study Area (CNDDDB 2019). The nearest occurrence was a nesting pair along Sand Creek approximately 1 mile east of the Study Area (CNDDDB Occurrence 1681). The annual brome grasslands throughout the Study Area represent suitable foraging habitat for Swainson's hawk, and the trees within the Study Area provide suitable nesting habitat.

5.5.5 Northern Harrier

The northern harrier (*Circus cyaneus*) is not listed pursuant to either the California or federal Endangered Species Acts; however, it is considered to be a species of special concern by the CDFW. This species is known to nest within the Central Valley, along the Pacific Coast, and in northeastern California (Shuford and Gardali 2008). The northern harrier is a ground nesting species, and typically nests in emergent wetland/marsh, open grasslands, or savannah habitats. Foraging occurs within a variety of open habitats such as marshes, agricultural fields, and grasslands (Shuford and Gardali 2008).

The annual brome grasslands throughout the Study Area are heavily grazed and represent low quality nesting habitat for northern harrier. Northern harrier has not been documented in the CNDDDB within 5 miles of the Study Area (CNDDDB 2018). There is a low potential for this species to nest within the Study Area.

5.5.6 White-Tailed Kite

White-tailed kite (*Elanus leucurus*) is not federally or state listed, but is a CDFW fully protected species. This species is a yearlong resident in the Central Valley and is primarily found in or near foraging areas such as open grasslands, meadows, farmlands, savannahs, and emergent wetlands (Shuford and Gardali 2008). White-tailed kites typically nest from March through June in trees within riparian, oak woodland, and savannah habitats of the Central Valley and Coast Range (Shuford and Gardali 2008).

The annual brome grasslands throughout the Study Area represent suitable foraging habitat for white-tailed kite, and the trees within the Study Area provide suitable nesting habitat. This species was observed foraging in the Study Area during a field survey. There are 3 documented occurrences of white-tailed kite within 5 miles of the Study Area (CNDDDB 2019).

5.5.7 Loggerhead Shrike

The loggerhead shrike (*Lanius ludovicianus*) is not listed and protected pursuant to either the California or federal Endangered Species Acts; but is a CDFW species of special concern. Loggerhead shrikes nest in small trees and shrubs in woodland and savannah vegetation communities, and forage in open habitats throughout California (Shuford and Gardali 2008). The nesting season ranges from March through June.

The trees and annual brome grassland within the Study Area provide suitable habitat for loggerhead shrike. Loggerhead shrike has not been documented in the CNDDDB within 5 miles of the Study Area (CNDDDB 2018).

5.6 Mammals

5.6.1 Pallid Bat

Pallid bat (*Antrozous pallidus*) is not federally or state listed, but is considered a CDFW species of special concern, and is classified by the WBWG as a high-priority species. It favors roosting sites in crevices in rock outcrops, caves, abandoned mines, hollow trees, and human-made structures such as barns, attics, and sheds (WBWG 2019). Though pallid bats are gregarious, they tend to group in smaller colonies of 10 to 100 individuals. It is a nocturnal hunter and captures prey in flight, but unlike most American bats, the species has been observed foraging for flightless insects, which it seizes after landing (WBWG 2019).

Pallid bat has not been documented in the CNDDDB within 5 miles of the Study Area (CNDDDB 2019). Tree hollows and exfoliating bark on trees within the Study Area, and the structures within the vicinity of the farmstead provide suitable roosting habitat for this species. Adjacent open areas provide foraging habitat for Pallid bat.

5.6.2 Townsend's Big-Eared Bat

The Townsend's big-eared bat (*Corynorhinus townsendii*) is not listed pursuant to either the federal or California Endangered Species Acts; however, this species is considered a species of special concern by CDFW. Townsend's big-eared bat is a fairly large bat with prominent bilateral nose lumps and large rabbit-like ears. This species occurs throughout the west and ranges from the southern portion of British Columbia south along the Pacific coast to central Mexico and east into the Great Plains. This species has been reported from a wide variety of habitat types and elevations from sea level to 10,827 feet. Habitats used include coniferous forests, mixed mesophytic forests, deserts, native prairies, riparian communities, active agricultural areas, and coastal habitat types. Its distribution is strongly associated with the availability of caves and cave-like roosting habitat including abandoned mines, buildings, bridges, rock crevices, and

hollow trees. This species is readily detectable when roosting due to their habit of roosting pendant-like on open surfaces. Townsend's big-eared bat is a moth specialist with over 90 percent of its diet composed of Lepidopterans. Foraging habitat is generally edge habitats along streams adjacent to and within a variety of wooded habitats. This species often travels long distances when foraging and large home ranges have been documented in California (WBWG 2019).

There are no documented occurrences of Townsend's big-eared bat within 5 miles of the Study Area (CDFW 2019). The structures near the farmstead provide suitable roosting habitat for this species. The open areas within the Study Area provide suitable foraging habitat for the species.

5.6.3 Western Red Bat

Western red bat (*Lasiurus blossevillii*) is not federally or state listed, but is considered a CDFW species of special concern, and is classified by the WBWG as a high-priority species. Western red bat is typically solitary, roosting primarily in the foliage of trees or shrubs (WBWG 2017). Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas. There may be an association with intact riparian habitat (particularly willows, cottonwoods, and sycamores) used as foraging (WBWG 2017).

Western red bat has been documented in the CNDDDB approximately 2.5 miles north of the Study Area (CNDDDB 2019). Trees within the Study Area represent suitable roosting habitat for western red bat. The open areas within the Study Area provide suitable foraging habitat for the species.

5.6.4 American Badger

The American badger (*Taxidea taxus*) is not federally or state listed but is designated as a species of special concern by CDFW. The species historically ranged throughout much of the state except in humid coastal forests. Badgers were once numerous in the Central Valley; however, populations now occur in low numbers in the surrounding peripheral parts of the valley and in the adjacent lowlands of eastern Monterey, San Benito, and San Luis Obispo counties (Williams 1986). Badgers occupy a variety of habitats, including grasslands and savannas. The principal requirements seem to be significant food supply, friable soils, and relatively open uncultivated ground (Williams, 1986).

There are 3 documented occurrences of American badger within 5 miles of the Study Area (CDFW 2018). The annual brome grassland within the Study Area provides suitable habitat for this species. However, no badger burrows have been observed within the Study Area.

5.6.5 San Joaquin Kit Fox

The San Joaquin kit fox (*Vulpes macrotis mutica*) is listed as threatened under the California Endangered Species Act and as endangered under the federal Endangered Species Act. Although the precise historical range of the San Joaquin kit fox is unknown, Grinnell et al. (1937) believed that prior to 1930, San Joaquin

kit fox occupied most of the San Joaquin Valley from southern Kern County north to Tracy, San Joaquin County, on the west side, and near La Grange, Stanislaus County, on the east side. Since then the San Joaquin kit fox population has declined primarily as a result of habitat loss to agricultural, urban, industrial and mineral development in the San Joaquin Valley. San Joaquin kit fox has been listed as endangered for over 30 years; yet despite the loss of habitat and apparent decline in numbers since the early 1970s, there has never been a comprehensive survey of its entire range or habitat that was once thought to be occupied (USFWS 1983; Morrell 1975). Despite the lack of a comprehensive data set, local surveys, research projects and incidental sightings indicate that kit foxes currently inhabit some areas of suitable habitat on the San Joaquin Valley floor and in the surrounding foothills of the coastal ranges, Sierra Nevada, and Tehachapi Mountains, from southern Kern County north to Contra Costa, Alameda, and San Joaquin Counties on the west, and near La Grange, Stanislaus County on the east side of the Valley, and some of the larger scattered islands of natural land on the Valley floor in Kern, Tulare, Kings, Fresno, Madera, and Merced Counties (USFWS 1998).

In the southern portion of the range, the kit fox is commonly associated with Valley Sink Scrub, Valley Saltbush Scrub, Upper Sonoran Subshrub Scrub, and Annual Grassland. Kit foxes also inhabit grazed grasslands, petroleum fields (Morrell 1971), and survive adjacent to tilled or fallow fields (Jensen 1972, Ralls and White 1991). In the central portion of the range, which includes Madera County, the kit fox is associated with Valley Sink Scrub, Interior Coast Range Saltbush Scrub, Upper Sonoran Subshrub Scrub, Annual Grassland and the remaining native grasslands. Agriculture dominates this region where kit foxes mostly inhabit grazed, non-irrigated grasslands, but also live next to and forage in tilled or fallow fields, irrigated row crops, orchards, and vineyards (USFWS 1998). In the northern portion of their range, kit foxes commonly are associated with annual grassland (Hall 1983) and Valley Oak Woodland (Bell 1994). Kit foxes inhabit grazed grasslands, grasslands with wind turbines, and also live adjacent to and forage in tilled and fallow fields, and irrigated row crops (Bell 1994). They usually inhabit areas with loose-textured (friable) soils, suitable for den excavation (USFWS 1983). Where soils make digging difficult, the foxes frequently use and modify burrows built by other animals (Orloff et al. 1986). Structures such as culverts, abandoned pipelines, and well casings also may be used as den sites (USFWS 1983).

Kit foxes are primarily nocturnal and carnivorous, but are commonly seen during the day in the late spring and early summer (Orloff et al. 1986). Major prey includes kangaroo rats, black-tailed hares, desert cottontails, deer mice, California ground squirrels, ground nesting birds, and insects (Scrivener et al. 1987).

There are 7 documented occurrences of San Joaquin kit fox within 5 miles of the Study Area (CDFW 2019). The nearest occurrence (CNDDDB occurrence number 21) was last documented in 1995 approximately 1.5 miles northwest of the Study Area. The species has not been documented within 10-miles of the Study Area since 1997 (22 years)(CNDDDB 2019).

Even though the annual brome grassland within the Study Area provides potentially suitable habitat for San Joaquin kit fox, no sign of kit fox was observed during the 2019 kit fox surveys (H.T. Harvey and Associates 2019). Additionally, in 1994, H. T. Harvey & Associates expended 80 hours of effort spotlighting (i.e., 20 nights), 40 track station nights, and 44 camera station nights surveying the adjacent Kaiser hospital site and

vicinity and were unable to detect any kit foxes at that site or within a 2-mile radius, which included the Ranch at Antioch.

The lack of recent observations and abundant prior survey efforts support a determination that San Joaquin kit foxes are likely absent from the Study Area.

6.0 WILDLIFE MOVEMENT/CORRIDORS

The Study Area is centered on Sand Creek. Sand Creek is located within the broad Lone Tree Valley. This valley represents a potential wildlife corridor for highly mobile vertebrate species to move from the lower foothills of the San Joaquin Valley to suitable habitat within the hills to the north and east of Mount Diablo (Black Diamond Mines Regional Preserve area). Special-status species such as California tiger salamander, California red-legged frog, western pond turtle, American badger, and San Joaquin kit fox as well as common species such as Columbian black-tailed deer (*Odocoileus hemionus columbianus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and gray fox (*Urocyon cinereoargenteus*) may also use the Lone Tree Valley and the Sand Creek corridor for seasonal or daily migration.

7.0 IMPACTS TO SENSITIVE BIOLOGICAL RESOURCES

This section details potential impacts to the biological resources discussed above associated with construction of the Project, as discussed in Section 1.1 and shown in Attachment A.

7.1 Terrestrial Vegetation Communities

A total of 350.2 acres (62%) of terrestrial vegetation communities will be impacted, and 210.2 acres (38%) will be avoided by the Project (Figure 8). Impacts to terrestrial vegetation communities are shown below in Table 3. No sensitive natural communities will be impacted by the Project.

Table 3. Impacts and Avoidance of Terrestrial Vegetation Communities within the Study Area

Vegetation Community	Impacted Acreage	Avoided Acreage	Total Acreage
Annual Brome Grassland	343.5	196.3	539.8
Developed	5.6	2.6	8.2
Valley Oak Woodland*	0.0	7.0	7.0
California Goldfields – Dwarf Plantain – Small Fescue Flower Fields	0.2	1.4	1.6
Eucalyptus Woodland	0.0	1.5	1.5
Alkali Weed – Salt Grass Playas and Sink*	0.0	1.4	1.4
Ruderal	0.9	0.0	0.9
Total	350.2	210.2	560.4

*Sensitive Natural Community

7.2 Aquatic Resources

Of the approximately 5.076 acres of aquatic resources mapped within the Study Area, 1.041 acres will be impacted by the Project, 4.035 acres will be avoided in the open space areas (Table 4 and Figure 9).

Table 4. Impacts and Avoidance of Aquatic Resources within the Study Area

Aquatic Resource Type	Impact Acreage	Avoidance Acreage	Total Acreage
Intermittent Drainage (Sand Creek)	0.005	1.896	1.901
Pond	0.000	1.373	1.373
Seasonal Wetland	0.680	0.333	1.013
Ephemeral Drainage	0.076	0.397	0.473
Seasonal Wetland Swale	0.280	0.006	0.286
Seep	0.000	0.030	0.030
Total	1.041	4.035	5.076

¹ Rounding may result in small summation errors.

7.3 Special-Status Plant Species

Protocol-level special-status plant surveys were conducted throughout the Study Area in 2018-2019, and 4 special-status plant species were found (Madrone 2019b). All of the documented populations of 3 of the special-status plants (crownscale, big tarplant, and angle-stem buckwheat) will be avoided. The Project will impact some of the extensive populations of the fourth special-status plant species documented on-site, shining navarretia. Approximately 2.139 acres or 3,307 plants will be impacted by the Project, while 0.959 acre of 2,472 plants will be avoided (Figure 10).

7.4 Invertebrates

7.4.1 Crotch and Western Bumble Bee

The Annual Brome Grassland and California Goldfields-Dwarf Plantain-Small Fescue Flower Fields within the Study Area represent potential habitat for crotch and western bumble bee, which were recently deemed candidate species under the California ESA. The hillsides and areas along Sand Creek contain high quality foraging habitat due to the presence of abundant wildflowers. The Annual Brome Grasslands in the flats away from Sand Creek is lower quality habitat. Approximately 343.7-acres of habitat for these species will be impacted by the Project (Figure 8).

7.4.2 Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

All of the seasonal wetlands within the Study Area are assumed to contain vernal pool fairy shrimp and vernal pool tadpole shrimp. Approximately 0.680 acres of suitable vernal pool fairy shrimp and vernal pool tadpole shrimp habitat will be directly impacted, and 0.333 acres will be avoided by the Project. Figure 9 shows the location and extent of these impacts.

7.4.3 Valley Elderberry Longhorn Beetle

One elderberry shrub with stems greater than 1 inch in diameter was mapped within the Study Area (Figures 8 and 9), and represents potential habitat for VELB. The shrub will be avoided by the Project as it is located

within the Sand Creek open space area, and a buffer of 20 feet at minimum will be maintained around it during construction.

7.5 Amphibians

7.5.1 California Tiger Salamander

Approximately 0.423 acres of potential CTS aquatic habitat, consisting of the deeper seasonal wetlands, will be impacted by the Project. Approximately 1.827 acres of CTS aquatic habitat will be avoided by the Project (Figure 9). Approximately 344.6 acres of suitable CTS upland habitat (annual brome grassland, California Goldfields-Dwarf Plantain-Small Fescue Flower Fields, and ruderal) will be directly impacted, and approximately 197.7 will be avoided by the proposed Project. Figure 8 shows the location and extent of these impacts.

7.5.2 California Red-Legged Frog

The Project will not impact any CRLF potential breeding habitat (two onsite ponds and plunge pool within Sand Creek) totaling approximately 1.40 acres. Approximately 0.005 acre of Sand Creek (dispersal habitat) will be impacted by the construction of a pedestrian bridge and an auto bridge over Sand Creek. Figure 9 shows the location and extent of these impacts.

7.5.3 Western Spadefoot

Approximately 0.423 acres of potential western spadefoot aquatic habitat, consisting of the deeper seasonal wetlands, will be impacted by the Project. Approximately 1.827 acres of western spadefoot aquatic habitat will be avoided by the Project (Figure 9).

7.6 Reptiles

7.6.1 Western Pond Turtle

The Project will not impact western pond turtle aquatic habitat (onsite ponds and plunge pool within Sand Creek). Approximately 0.005 acre of Sand Creek (dispersal habitat) will be impacted by the construction of a pedestrian bridge and an auto bridge over Sand Creek. Figure 9 shows the location and extent of these impacts. If western pond turtles or their nests were present in those areas during construction, individual turtles could be injured or killed, or nests could be destroyed.

7.6.2 Northern California Legless Lizard, Alameda Whipsnake, and Coast Horned Lizard

Approximately 344.6 acres of low potential habitat for Northern California legless lizard, Alameda whipsnake, and coast horned lizard (annual brome grassland, California Goldfields-Dwarf Plantain-Small

Fescue Flower Fields, and ruderal) will be directly impacted, and approximately 197.7 will be avoided by the proposed Project. **Figure 8** shows the location and extent of these impacts.

7.7 Birds

7.7.1 Nesting Raptors and Songbirds

Grasshopper sparrow, Swainson's hawk, white-tailed kite, northern harrier, and loggerhead shrike have the potential to nest within both the Project area, as do other more common bird species protected by the MBTA. If they were nesting on-site, removal of the nests would impact these species. Furthermore, birds nesting in avoided areas adjacent to construction could be disturbed by construction, which could result in nest abandonment.

7.7.2 Foraging Raptors and Winter Foraging Birds

The annual brome grassland within the Study Area provides suitable foraging habitat for golden eagle, Swainson's hawk, white-tailed kite, northern harrier, and other more common raptors. The Study Area also represents suitable wintering foraging habitat for a variety of bird species such as golden eagle, short-eared owl, ferruginous hawk, long-billed curlew, among other. Approximately 344.6 acres of foraging habitat (annual brome grassland, California Goldfields-Dwarf Plantain-Small Fescue Flower Fields, and ruderal) will be directly impacted, and approximately 197.7 will be avoided by the proposed Project. **Figure 8** shows the location and extent of these impacts.

7.7.3 Burrowing Owl

Approximately 344.6 acres of potential burrowing owl habitat (annual brome grassland, California Goldfields-Dwarf Plantain-Small Fescue Flower Fields, and ruderal) will be directly impacted, and approximately 197.7 will be avoided by the proposed Project. **Figure 8** shows the location and extent of these impacts. If ground disturbance occurred while burrowing owls were in burrows, individuals of this species could be injured or killed.

7.8 Mammals

7.8.1 Roosting Bats

Abandoned buildings and trees throughout the Project area are habitat for various special-status bats species. If special-status bats were roosting in trees or buildings to be removed by Project construction they could be injured or killed.

7.8.2 American Badger

Approximately 344.6 acres of potential habitat (annual brome grassland, California Goldfields-Dwarf Plantain-Small Fescue Flower Fields, and ruderal) for American badger will be directly impacted, and approximately 197.7 will be avoided by the proposed Project. **Figure 8** shows the location and extent of these impacts. If ground disturbance occurred while badgers were in burrows, individuals of this species could be injured or killed.

7.8.3 San Joaquin Kit Fox

Approximately 344.6 acres of potential habitat (annual brome grassland, California Goldfields-Dwarf Plantain-Small Fescue Flower Fields, and ruderal) for San Joaquin Kit Fox will be directly impacted, and approximately 197.7 will be avoided by the proposed Project. **Figure 8** shows the location and extent of these impacts. The potential habitat within the Study Area provides suitable habitat for San Joaquin kit fox, however no sign of kit fox was observed during the extensive 1994 and 2019 kit fox surveys and the species is likely absent from the Study Area.

7.9 Wildlife Corridors

Much of the existing Lone Tree Valley within the Study Area will be developed with residential neighborhoods and roads. These features may lead to a decrease in special-status and common species migration. This could lead to species populations being cut off from potential breeding locations. This may lead to a bottleneck in geneflow and may also lower the likelihood of species such as San Joaquin kit fox from recovering from portions of their historic range (Black Diamond Mines Regional Preserve).

7.10 Native Trees

An on-site tree survey was conducted in 2015 by certified arborist Ed Brennan (Ed Brennan 2015), which identified 16 tree species and 255 individual trees. For a map of the trees within the Project please see **Attachment E**. There are no trees located within the offsite improvement area. Approximately 181 of the 255 trees identified within the Study Area are native trees as identified in the City of Antioch Tree Ordinance. The native trees in the Study Area consist of native oaks (coast live oak, blue oak, valley oak, and interior live oak) and California buckeye. Various planted and ornamental trees such as blue gum eucalyptus, manna gum (*Eucalyptus viminalis*), black locust (*Robinia pseudoacacia*), and others also exist in the Study Area. Some of the planted and ornamental trees are protected under the City of Antioch Tree Ordinance as "mature trees" or "landmark trees" because the trees exceed the 26 inches diameter at breast height (DBH) or 48 inches DBH respective thresholds.

There are 13 trees located within the footprint of the Project (See **Attachment E** for a map of the trees and a table of the tree survey data). These trees include 8 non-native trees and 5 native trees. The Project proponent will work with the design team to preserve and incorporate as many of these trees into the

Project design as feasibly possible. If any trees do need to be removed, a tree removal permit will be acquired from the City.

8.0 MITIGATION FOR IMPACTS TO SENSITIVE BIOLOGICAL RESOURCES

The following mitigation measures are often required by CEQA lead agencies for impacts to sensitive biological resources that may be associated with construction of the Project. The intent of these mitigation measures is to reduce impacts to biological resources to a less than significant level.

8.1 Aquatic Resources

1. The Project applicant shall apply for a Section 404 permit from the U.S. Army Corps of Engineers. Waters that will be impacted shall be replaced or rehabilitated on a “no-net-loss” basis. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods acceptable to the USACE.
2. The applicant shall apply for a Section 401 water quality certification from the RWQCB, and adhere to the certification conditions.
3. The applicant shall apply for a Section 1600 Lake or Streambed Alteration Agreement from CDFW. The information provided will include a description of all of the activities associated with the Project, not just those closely associated with the drainages and/or riparian vegetation. Impacts will be outlined in the application and are expected to be in substantial conformance with the impacts to biological resources outlined in this document. Impacts for each activity will be broken down by temporary and permanent, and a description of the proposed mitigation for biological resource impacts will be outlined per activity and then by temporary and permanent. Information regarding Project-specific drainage and hydrology changes resulting from Project implementation will be provided as well as a description of storm water treatment methods. Minimization and avoidance measures will be proposed as appropriate and may include: preconstruction species surveys and reporting, protective fencing around avoided biological resources, worker environmental awareness training, seeding disturbed areas adjacent to open space areas with native seed, and installation of project-specific storm water BMPs. Mitigation may include restoration or enhancement of resources on- or off-site, purchase habitat credits from an agency-approved mitigation/conservation bank, off-site, working with a local land trust to preserve land, or any other method acceptable to CDFW.

8.2 Special-Status Plant Species

Three CRPR-listed plants were observed within the Study Area during the 2018 through 2019 protocol-level special-status plant surveys: crownscale, big tarplant, and shining navarretia (Madrone 2019b and Madrone 2019c) and one A-ranked locally rare plant species (angle-stem buckwheat) was observed within the Study Area.

No other plant species of sufficient rarity to be considered under CEQA were observed within the Study Area during the 2018 through 2019 protocol-level special-status plant surveys.

All of the known on-site populations of crownscale, big tarplant, and angle-stem buckwheat will be preserved within the open space. Some populations of shining navarretia will be preserved within the open space. However, some of the shining navarretia populations will be impacted during the grading of the site. Mitigation for impacts to shining navarretia may include the following:

A qualified biologist shall determine and establish appropriate avoidance zones around the shining navarretia populations identified during the 2018-2019 surveys. The avoidance zones around the plant populations shall clearly demarcate areas for avoidance that will be considered "occupied special-status plant habitat" for the purposes of the DEIR. All survey results and avoidance zone maps shall be submitted to the City of Antioch Planning Division prior to approval of grading permits.

If all avoidance zones are fully avoided by direct and indirect impacts of the Project, then no impacts to special-status plants are anticipated, and no further mitigation is necessary. If the Project will impact mapped shining navarretia populations, that will be considered a direct impact. If the Project will avoid the mapped populations, but will impact a portion of the avoidance zone, then that will be considered an indirect impact. If the Project will directly or indirectly impact one or more avoidance zones, then the applicant may choose one of the following options. As population sizes for annual plants can vary widely from year to year, for Option 2, population counts will be conducted in the last three years of monitoring, and the highest count shall be at least equivalent to the number of impacted plants. For Option 3, a single count is acceptable.

- 1. Mitigate for any direct impacts at a 3:1 ratio (preserved habitat: impacted habitat), and for any indirect impacts at a 1:1 ratio. The applicant must provide documentation to the City of Antioch Planning Division to show that the habitat to be protected is largely similar to that being impacted in terms of vegetation community, soils, etc. Once the proposed mitigation area has been approved by the City of Antioch Planning Division, the mitigation habitat shall be protected by a conservation easement and managed in accordance with a long-term management plan that maintains the habitats the conservation easement was established to protect. In addition, prior to any direct impacts to special status plant populations, under the supervision of a qualified botanist, the applicant shall collect as many special-status plant seeds as possible in proposed impact areas, and spread them in apparently suitable locations either in on-site avoided areas, or in the off-site mitigation area. Under this Option 1, there are no success criteria for the seed relocation/transplantation.*
- 2. Under this Option 2, the applicant would mitigate in accordance with Option 1, but mitigation for direct impacts may be reduced to 1.5:1 if the applicant chooses develop a monitoring plan, monitor the relocated seeds/plants in accordance with that plan, and meet established success criteria for successful establishment of a new population of the impacted special-status plant. The success criterion for this Option 2 would be 1:1 replacement of special-status plants by Year 5 or later following transplantation. This would require documentation of the number of plants within*

the proposed impact area prior to impact such that the number of impacted plants could be compared to the number of established plants at the mitigation site. The monitoring plan and monitoring reports shall be submitted to the City of Antioch Planning Division for review and approval. If the success criteria are not met, then additional habitat shall be set aside as set forth under Option 1.

3. *Identify one or more existing, unprotected populations of shining navarretia in the vicinity of the Project, and acquire a recorded conservation easement over the land that supports those populations. As with Option 1, under this Option 3, once the proposed mitigation area is approved by the City of Antioch Planning Division, the mitigation habitat shall be protected by a recorded conservation easement and managed in accordance with a long-term management plan that maintains the habitats the conservation easement was established to protect. An endowment would be recorded in favor of the conservation easement holder to fund the long-term management outlined in the long-term management plan. As this Option 3 would preserve an existing, established population, there would be no temporal loss, and no risk of failure. As a result, the mitigation ratio for this option would be 1:1.*

8.3 Invertebrates

8.3.1 Crotch and Western Bumble Bee

The Project will impact potential foraging and nesting/overwintering habitat for the crotch and western bumble bee species. To avoid take of these species the Project proponent shall do the following:

- *Prior to each phase of construction, a qualified biologist shall conduct a take avoidance survey for active bumble bee colony nesting sites. In order to maximize detection of active bee colonies, the take avoidance survey shall be conducted during the spring, summer, or fall during appropriate weather (not during cool overcast, rainy, or windy days). The biologist shall walk the entire area proposed for grading and inspect all ground squirrel burrows for bumble bee activity. The survey shall specifically target the slopes that face west to southwest as these areas are specifically utilized by western bumble bee. If any bumble bees are identified during the survey they shall be identified to species.*
- *All active colonies of crotch bumble bee or western bumble bee shall be avoided and no work shall occur within 50-feet of the colony. If the colony is in a location proposed for development, consultation with CDFW will be necessary and an Incidental Take Permit from CDFW may be required prior to disturbance.*

8.3.2 Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

The Project will result in the loss of approximately 0.687 acre of potential habitat for VPFS and VPTS. To mitigate for this loss of potential habitat for vernal pool crustaceans on the Project site, the Project applicant shall do the following:

- *Prior to the issuance of any grading permit that could directly or indirectly impact vernal pool crustaceans, the Project applicant shall consult with the USFWS regarding impacts to vernal pool fairy shrimp and vernal pool tadpole shrimp from the proposed Project. The Project applicant shall obtain the appropriate take authorization (Section 7 or 10 of the FESA) from the USFWS prior to issuance of grading permits. The Project applicant shall comply with all terms of the endangered species permits, including any mitigation requirements, which shall be determined during consultation with USFWS. Mitigation may be accomplished through permittee-responsible mitigation and/or through the preservation of vernal pool fairy shrimp habitat at USFWS-approved ratios at a USFWS-approved mitigation bank.*

8.3.3 Valley Elderberry Longhorn Beetle

The elderberry shrub within the Study Area will be avoided. The following measures will ensure that there are no significant impacts to VELB:

All elderberry shrubs (which are defined for the purposes of this section as those with stems greater than 1 inch in diameter) shall be avoided completely during Project construction with a buffer of at least 20 feet, and the following avoidance and minimization measures [as outlined in the Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (USFWS 2017) (Framework)] shall be implemented for all work within 165 feet of a shrub:

- *All areas to be avoided during construction activities shall be fenced and/or flagged as close to construction limits as feasible.*
- *Activities that could damage or kill an elderberry shrub (e.g., trenching, paving, etc.) shall receive an avoidance area of at least 20 feet from the drip-line.*
- *A qualified biologist shall provide training for all contractors, work crews, and any onsite personnel on the status of the VELB, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for noncompliance, prior to the commencement of work.*
- *A qualified biologist shall monitor the work area at project appropriate intervals to assure that all avoidance and minimization measures are implemented.*
- *As much as feasible, all activities within 165 feet of an elderberry shrub shall be conducted between August and February.*
- *Elderberry shrubs shall not be trimmed.*
- *Herbicides shall not be used within the drip-line of the shrub. Insecticides shall not be used within 100 feet of an elderberry shrub.*
- *Mechanical weed removal within the drip-line of the shrub shall be limited to the season when adults are not active (August - February) and shall avoid damaging the elderberry shrub.*

If either a 20-foot diameter avoidance area around the elderberry shrub is found later to not be feasible or an elderberry shrub must be removed to accommodate construction, then the applicant shall notify the City and implement additional mitigation measures required by the Framework (USFWS 2017) after consultation with USFWS.

8.4 Amphibians

8.4.1 California Tiger Salamander

The Project will result in the loss of 0.423 acres of potential breeding habitat for CTS and approximately 344.6 acres of potential upland habitat. To mitigate for this loss the Project applicant shall do the following:

- *Prior to the commencement of construction activities, the applicant shall obtain take coverage from USFWS under Sections 7 or 10 of the federal ESA for any impacts to CTS and/or its habitat. In addition, the applicant shall obtain take coverage from CDFW under Section 2081 of the California Fish and Game Code for any impacts to CTS and/or its habitat. Any required compensatory mitigation shall be determined during consultation with USFWS and CDFW and may include permittee-responsible mitigation and/or the purchase of mitigation credits from a USFWS- and CDFW-approved mitigation bank. Should consultation with the USFWS and CDFW result in required mitigation measures in conflict with the measures included here, USFWS and CDFW measures shall take precedence.*
- *The Project applicant will be preserving both aquatic habitat and upland habitat that are either known to be CTS breeding habitat and upland habitat, or which have the proper hydrology to support breeding CTS, on offsite mitigation properties and within the on-site open space or as otherwise required as a result of consultation with USFWS. Additionally, the on-site preserved areas may be connected to additional offsite open space containing CTS breeding ponds to the west and south of the Project site;*
- *To the extent practicable, Project activities shall occur during the dry season (May 1 through October 15);*
- *Prior to the start of construction, a qualified biologist shall conduct a training program for all construction personnel including contractors and subcontractors. The training shall include, at a minimum, a description of CTS and its habitat within the Project Area; an explanation of the species status and protection under state and federal laws; the avoidance and minimization measures to be implemented to reduce take of this species; communication and work stoppage procedures in case a listed species is observed within the Project Area; and an explanation of the importance of the Environmentally Sensitive Areas (ESAs) and Wildlife Exclusion Fencing (WEF). A fact sheet conveying this information shall be prepared and distributed to all construction personnel. The training shall provide interpretation for non-English speaking workers. The same instruction shall be provided to any new workers before they are authorized to perform project work;*
- *Prior to the start of each phase of construction, ESAs (defined as areas containing sensitive habitats adjacent to or within construction work areas for which physical disturbance is not allowed) shall be clearly delineated using high visibility orange fencing. The ESA fencing shall remain in place*

throughout the duration of the construction and shall be regularly inspected and fully maintained at all times;

- *A qualified biologist shall be onsite during all activities that may result in take of CTS. The qualifications of the biologist(s) shall be submitted to the USFWS and CDFW for review and approval at least thirty (30) calendar days prior to the date earthmoving is initiated at the project site;*
- *Prior to the start of each phase of construction, WEF shall be installed at the edge of the project footprint in all areas where sensitive species could enter the construction area. The location of the fencing shall be determined by the contractor and the qualified biologist. The WEF shall remain in place throughout the duration of the project phase and shall be regularly inspected and fully maintained. Repairs to the WEF shall be made within 24 hours of discovery. Upon project completion, the WEF shall be completely removed, the area cleaned of debris and trash, and returned to natural conditions. An exception to the foregoing fencing measures is that for work sites where the duration of work activities is very short (e.g., 3 days or less) and that occur during the dry season, and the installation of exclusion fencing will result in more ground disturbance than from project activities, then the boundaries and access areas and sensitive habitats may be staked and flagged (as opposed to fully fenced) by the qualified biologist prior to disturbance and species monitoring would occur during all project activities at that site;*
- *If a water body is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters and the intake should be placed within a perforated bucket or other method to attenuate suction to prevent CTS from entering the pump system. Pumped water shall be managed in a manner that does not degrade water quality and then upon completion released back into the water body, or at an appropriate location in a manner that does not cause erosion. No rewatering of the water body is necessary if sufficient surface or subsurface flow exists to fill it within a few days, or if work is completed during the time of year the water body would have dried naturally.*
- *When constructing a road improvement, wherever possible, the project applicant shall enhance or establish wildlife passage for the California tiger salamander across roads, highways, or other anthropogenic barriers. This includes upland culverts, tunnels, and other crossings designed specifically for wildlife movement, as well as making accommodations in curbs (no vertical faced curbs), median barriers, and other impediments to terrestrial wildlife movement at locations most likely to be beneficial to CTS.*
- *Preconstruction surveys shall be conducted by an approved biologist within 72 hours of the initiation of any ground disturbing activities and vegetation clearing that may result in take of CTS. All suitable aquatic and upland habitat, including refugia habitat such as small woody debris, refuse, burrow entries, etc., shall be duly inspected. The approved biologist(s) shall conduct clearance surveys at the beginning of each day and regularly throughout the workday when construction activities are occurring that may result in take of CTS. Where feasible and only on a case-by-case basis, rodent burrows and other ground openings suspected to contain Central California tiger salamanders that would be destroyed from project activities may be carefully excavated under supervision of the biologist. If CTS is observed, the approved biologist shall implement the species observation and handling protocol outlined below.*

- *At least 15 days prior to initiation of ground disturbance activities the applicant's biologist shall prepare and submit a Relocation Plan for the USFWS and CDFW written approval. The plan shall include protocol to be followed should a CTS be encountered during Project activities. The Relocation Plan shall contain the name(s) of the approved biologist(s) to relocate CTS, method of relocation, a map, and description of the proposed release site(s) within 300 feet from the Project, unless at a distance otherwise agreed to by the USFWS and CDFW, and written permission from the landowner to use their land as a relocation site.*

8.4.2 California Red-Legged Frog

While all of the potential CRLF breeding habitat within the Study Area will be preserved, approximately 0.005 acre of CRLF dispersal habitat will be impacted by the construction of the proposed bridges over Sand Creek. Additionally, impacts to uplands within 300 feet of Sand Creek may represent potential upland habitat for CRLF. To mitigate the loss of aquatic and upland habitat for this species, the Project applicant shall do the following:

- *Prior to issuance of any grading permits, the project applicant shall consult with the USFWS and CDFW regarding impacts to California red-legged frog from the proposed project. The project applicant shall obtain the appropriate take authorization from the USFWS (Section 7 or 10 of the FESA) and/or from the CDFW (Section 2081 of the California Fish and Game Code). The project applicant shall comply with all required compensatory mitigation determined during consultation with the USFWS and CDFW, and provide proof of compliance to the City of Antioch Planning Division. Should consultation with the USFWS result in required mitigation measures in conflict with the measures included here, USFWS measures shall take precedence.*
- *Approximately 1.40 acres of CRLF aquatic habitat will be preserved on-site. The on-site preserved areas may be connected to additional offsite open space containing CRLF breeding ponds to the west and south of the Project site. Additionally, the Project proponent shall preserve very high quality aquatic and upland habitat that are either known to be CRLF breeding habitat and upland habitat, or which have the proper hydrology to support breeding CRLF, as may be required as a result of consultation with USFWS.*
- *Prior to the start of construction, a qualified biologist shall conduct a training program for all construction personnel including contractors and subcontractors. The training shall include, at a minimum, a description of CRLF and their habitats within the Project Area; an explanation of the species status and protection under state and federal laws; the avoidance and minimization measures to be implemented to reduce take of this species; communication and work stoppage procedures in case a listed species is observed within the Project Area; and an explanation of the importance of the Environmentally Sensitive Areas (ESAs) and Wildlife Exclusion Fencing (WEF). A fact sheet conveying this information shall be prepared and distributed to all construction personnel. The training shall provide interpretation for non-English speaking workers. The same instruction shall be provided to any new workers before they are authorized to perform project work.*
- *Prior to the start of each phase of construction, ESAs (defined as areas containing sensitive habitats adjacent to or within construction work areas for which physical disturbance is not allowed) shall be*

clearly delineated using high visibility orange fencing. The ESA fencing shall remain in place while construction activities are ongoing, and shall be regularly inspected and fully maintained at all times.

- A qualified biologist shall be onsite during all activities that may result in take of CRLF. The qualifications of the biologist(s) shall be submitted to the USFWS for review and approval at least thirty (30) calendar days prior to the date earthmoving is initiated at the project site.
- Prior to the start of each phase of construction, WEF shall be installed at the edge of the project footprint in all areas where sensitive species could enter the construction area. The location of the fencing shall be determined by the contractor and the qualified biologist prior to the start of staging or ground disturbing activities. The WEF shall remain in place throughout the duration of the project and shall be regularly inspected and fully maintained. Repairs to the WEF shall be made within 24 hours of discovery. Upon project completion, the WEF shall be completely removed, the area cleaned of debris and trash, and returned to natural conditions. An exception to the foregoing fencing measures is that for work sites where the duration of work activities is very short (e.g., 3 days or less) and that occur during the dry season, and the installation of exclusion fencing will result in more ground disturbance than from project activities, then the boundaries and access areas and sensitive habitats may be staked and flagged (as opposed to fenced) by the qualified biologist prior to disturbance and species monitoring would occur during all project activities at that site.
- No more than twenty-four (24) hours prior to the date of initial ground disturbance, a preconstruction survey for the CRLF shall be conducted by the qualified biologist at the project site. The survey shall consist of walking the project limits and within the project site to ascertain the possible presence of the species. The biologist shall investigate all potential areas that could be used by the CRLF for feeding, breeding, sheltering, movement, and other essential behaviors. This includes an adequate examination of mammal burrows, such as California ground squirrels or gophers. If any adults, subadults, juveniles, tadpoles, or eggs are found, the biologist shall contact the USFWS to determine if moving any of the individuals is appropriate. In making this determination the USFWS will consider if an appropriate relocation site exists. Only USFWS-approved biologists may capture, handle, and monitor the California red-legged frog.
- To the extent practicable, initial ground-disturbing activities shall be avoided between November 1 and March 31 because that is the time period when CRLF are most likely to be moving through upland areas. When ground-disturbing activities must take place between November 1 and March 31, the applicant shall ensure that daily monitoring by the USFWS-approved biologist is completed.

8.4.3 Western Spadefoot

To mitigate for the loss of approximately 0.423 acres of potential western spadefoot aquatic habitat, the Project proponent shall do the following:

- Prior to initiation of construction activity, the applicant shall retain a qualified biologist to survey all suitable aquatic habitat within the Study Area (including features proposed for avoidance) by sampling the features thoroughly with dipnets during March or early April, when spadefoot tadpoles would be present. In addition, one nocturnal acoustic survey of all areas within 300 feet of suitable aquatic habitat shall be conducted. Acoustic surveys consist of walking through the area and listening

for the distinctive snore-like call of this species. Timing and methodology for the aquatic and acoustic surveys shall be based on those described in Distribution of the Western Spadefoot (Spea hammondi) in the Northern Sacramento Valley of California, with Comments on Status and Survey Methodology (Shedd 2017). If both the aquatic survey and the nocturnal acoustic survey are negative, further mitigation is not necessary; and

- *If western spadefoot are observed within aquatic habitat proposed for impact, the tadpoles shall be captured by a qualified biologist and relocated either to aquatic habitat to be avoided on-site (and implement the fencing requirement outlined below), or to an off-site open space preserve with suitable habitat in the vicinity of the Study Area. If western spadefoot are observed within aquatic habitats proposed for avoidance, then the applicant shall install a keyed in silt fence along the edge of the proposed impact area within 300 feet of the occupied aquatic habitat to prevent metamorphosed individuals from dispersing into the construction area.*

8.5 Reptiles

8.5.1 Western Pond Turtle

While the majority of the on-site western pond turtle habitat will be preserved within the on-site open space, approximately 0.005 acre of western pond turtle habitat will be impacted by the construction of two bridges over Sand Creek. To mitigate for the impacts to aquatic habitat for this species, the Project applicant shall do the following:

- *Within 14 days prior to the initiation of any construction activities for each phase, a qualified biologist shall conduct preconstruction surveys for northwestern pond turtles. If northwestern pond turtles are found prior to the initiation of, and/or during, construction activities, a qualified biologist shall relocate them outside of the Project area, subject to review and approval by the appropriate resource agencies (i.e., CDFW).*

8.5.2 Northern California Legless Lizard, Alameda Whipsnake, and Coast Horned Lizard

There is a low potential for northern California legless lizard, Alameda whipsnake, and coast horned lizard to be present within the Study Area. However, in order to avoid direct mortality of these species, the Project applicant shall do the following:

- *Within 14 days prior to the initiation of any construction activities for each phase, a qualified biologist shall conduct preconstruction surveys for northern California legless lizard, Alameda whipsnake, and coast horned lizard. If alameda whipsnake is identified during the survey, it will be allowed to leave the work area on its own. If northern California legless lizard or coast horned lizard are found during the survey, a qualified biologist shall relocate them to suitable habitat outside of the Project area, subject to review and approval by the appropriate resource agencies (i.e., CDFW and/or the USFWS, and the City of Antioch Planning Division).*

8.6 Nesting Raptors and Songbirds

The following nest survey requirements shall apply if construction activities take place during the typical bird breeding/nesting season (typically February 15 through September 1).

8.6.1 Swainson's Hawk

- *A targeted Swainson's hawk nest survey shall be conducted throughout all accessible areas within ¼-mile of the proposed construction area no later than 14 days prior to construction activities. If active Swainson's hawk nests are found within ¼-mile of a construction area, construction shall cease within ¼-mile of the nest until a qualified biologist (Project Biologist) determines that the young have fledged or it is determined that the nesting attempt has failed. If the applicant desires to work within ¼-mile of the nest, the applicant shall consult with CDFW to determine if the nest buffer can be reduced. The Project applicant, the Project biologist, and CDFW shall collectively determine the nest avoidance buffer, and what (if any) nest monitoring is necessary. If an active Swainson's hawk nest is found within the Project site prior to construction and is in a tree that is proposed for removal, then the Project applicant shall implement additional mitigation recommended by a qualified biologist based on CDFW guidelines and obtain any required permits from CDFW.*

8.6.2 Burrowing Owls

- *A targeted take avoidance burrowing owl nest survey shall be conducted of all accessible areas within 500 feet of the proposed construction area within 14 days prior to construction activities utilizing 60 foot transects as outlined in the Staff Report on Burrowing Owl Mitigation (CDFG 2012) (Staff Report). If an active burrowing owl nest burrow (i.e., occupied by more than one adult owl, and/or juvenile owls are observed) is found within 250 feet of a construction area, construction shall cease within 250 feet of the nest burrow until a qualified biologist (Project Biologist) determines that the young have fledged or it is determined that the nesting attempt has failed. If the applicant desires to work within 250 feet of the nest burrow, the applicant shall consult with CDFW to determine if the nest buffer can be reduced. During the non-breeding season (late September through the end of January), the applicant may choose to conduct a survey for burrows or debris that represent suitable nesting habitat for burrowing owls within areas of proposed ground disturbance, exclude any burrowing owls observed, and collapse any burrows or remove the debris in accordance with the methodology outlined by the CDFW.*

8.6.3 Other Birds

- *A pre-construction nesting bird survey shall be conducted by a qualified biologist on the Project site and within a 500-foot radius of proposed construction areas, where access is available, no more than three (3) days prior to the initiation of construction. If there is a break in construction activity of more than two (2) weeks then subsequent surveys shall be conducted.*

- *If active raptor nests are found, no construction activities shall take place within 500 feet of the nest until the young have fledged. If active songbird nests are found, a 100-foot no disturbance buffer will be established. These no-disturbance buffers may be reduced if a smaller buffer is proposed by the Project Biologist and approved by the City (and CDFW if it is a tricolored blackbird nesting colony) after taking into consideration the natural history of the species of bird nesting, the proposed activity level adjacent to the nest, habituation to existing or ongoing activity, and nest concealment (are there visual or acoustic barriers between the proposed activity and the nest). A qualified biologist can visit the nest as needed to determine when the young have fledged the nest and are independent of the site or the nest can be left undisturbed until the end of the nesting season.*

8.6.4 Survey Report

- *A report summarizing the survey(s), including those for Swainson's hawk and burrowing owls, shall be provided to the City and CDFW within 30 days of the completed survey and is valid for one construction season. If no nests are found, no further mitigation is required.*

8.6.5 Changes to Buffers and Completion of Nesting

- *Should construction activities cause a nesting bird do any of the following in a way that would be considered a result of construction activities: vocalize, make defensive flights at intruders, get up from a brooding position, or fly off the nest, then the exclusionary buffer shall be increased such that activities are far enough from the nest to stop this agitated behavior. The exclusionary buffer shall remain in place until the chicks have fledged or as otherwise determined by a qualified biologist in consultation with CDFW.*
- *Construction activities may only resume within the buffer zone after a follow-up survey by the Project Biologist has been conducted and a report has been prepared indicating that the nest (or nests) are no longer active, and that no new nests have been identified.*

8.7 Loss of Foraging Habitat

Approximately 344.6 acres of suitable foraging habitat for Swainson's hawks and burrowing owl will be impacted during construction of the proposed Project. These impacts shall be mitigated through purchase and conservation of similar habitat as follows:

8.7.1 Swainson's Hawk

At the present time (September 2019), a Swainson's hawk nest is reported in the CNDDDB approximately 1.05-miles east of the Study Area (CNDDDB Occurrence #1681); however, this occurrence is only of foraging adults, and no nesting was observed (CNDDDB 2019). The nearest documented occurrence of nesting Swainson's hawks within the last five years (2016) is CNDDDB Occurrence #2692 located approximately 2.4 miles south of the Study Area. Another active Swainson's hawk nest was documented in 2016 approximately 2.5-miles north of the Study Area (CNDDDB Occurrence #2690).

Prior to Project construction, a qualified biologist shall conduct a review of Swainson's hawk nest data available in the CNDDDB and contact CDFW to determine if they have any additional nest data. If desired by the Project proponent, the biologist may conduct a survey of these nests to determine if they are still present. The biologist shall provide the City with a summary of the findings. If it is determined that the Project site is within 10-miles of an active Swainson's hawk nest (an active nest is defined as a nest with documented Swainson's hawk use within the past 5 years), the applicant will mitigate for the loss of suitable Swainson's hawk foraging habitat by implementing one of the below measures:

- Active nest identified within 1 mile of the Project site: One acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. Protection shall be via purchase of mitigation bank credits or other land protection mechanism acceptable to the City.
- Active nest identified within 5 miles (but greater than 1 mile) of the Project site: 0.75 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. Protection shall be via purchase of mitigation bank credits or other land protection mechanism acceptable to the City.
- Active nest identified within 10 miles (but greater than 5 miles) of the Project site: 0.5 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. Protection shall be via purchase of mitigation bank credits or other land protection mechanism acceptable to the City.

8.7.2 Burrowing Owl

- If any nesting burrowing owls are found during the pre-construction survey, mitigation for the permanent loss of burrowing owl foraging habitat (defined as all areas of suitable habitat within 250 feet of the active burrow) shall be accomplished at a 1:1 ratio. The mitigation provided shall be consistent with recommendations in the 2012 CDFW Staff Report and may be accomplished within the Swainson's Hawk Foraging Habitat mitigation area (as detailed in Section 8.12.1 above) if burrowing owls have been documented utilizing that area, or if the Project Biologist, the City, and CDFW collectively determine that the area is suitable.

8.8 Mammals

8.8.1 Roosting Bats

To mitigate for potential impacts to roosting bats, the Project proponent shall do the following:

- A qualified biologist shall conduct a bat habitat assessment of all potential roosting habitat features, including trees within the proposed development footprint. This habitat assessment shall identify all potentially suitable roosting habitat and may be conducted up to 1 year prior to the start of construction.
- If potential roosting habitat is identified (cavities in trees) within the areas proposed for development, the biologist shall survey the potential roosting habitat during the active season (generally April

through October or from January through March on days with temperatures in excess of 50 degrees F) to determine presence of roosting bats. These surveys are recommended to be conducted utilizing methods that are considered acceptable by CDFW and bat experts. Methods may include evening emergence surveys, acoustic surveys, inspecting potential roosting habitat with fiberoptic cameras or a combination thereof.

- *If roosting bats are identified within any of the trees planned for removal, or if presence is assumed, the trees shall be removed outside of pup season only on days with temperatures in excess of 50 degrees F. Pup season is generally during the months of May through August. Two-step tree removal shall be utilized under the supervision of the qualified biologist. Two-step tree removal involves removal of all branches of the tree that do not provide roosting habitat on the first day, and then the next day cutting down the remaining portion of the tree.*
- *Additionally, it is recommended that all other tree removal be conducted from January through March on days with temperatures in excess of 50 degrees F to avoid potential impacts to foliage-roosting bat species.*

8.8.2 American Badger and San Joaquin Kit Fox

To mitigate for potential impacts to American badger and San Joaquin kit fox, the Project applicant shall do the following:

- *Within 48 hours prior to the initiation of any construction activities for each Project phase, a qualified biologist shall conduct a preconstruction-level American badger and San Joaquin kit fox den survey within the Project area. If American badger or San Joaquin kit fox or burrows with American badger or San Joaquin kit fox sign is found within the Project site or off-site improvement area during the preconstruction surveys, consultation with CDFW shall occur prior to the initiation of any construction activities to determine an appropriate burrow excavation and/or relocation method. If American badger or San Joaquin kit fox burrows are not found, further measures are not necessary. All survey results shall be submitted to the City of Antioch Planning Division prior to the initiation of any construction activities or where construction has been halted for 30 days or more.*

8.9 Wildlife Corridors

In order to maintain the wildlife corridor along Sand Creek, the Project applicant shall do the following:

- *No permanent or temporary fencing shall be erected that will hinder migratory wildlife from utilizing the Sand Creek corridor. Utility and bridge crossings of Sand Creek shall be designed to be free spanning of the creek.*

8.10 Native Trees

The Project applicant shall work with the design team to preserve and incorporate existing trees into the Project design. However, if any Protected Trees are removed, to mitigate for the loss of Protected Trees, the

Project applicant shall obtain a Tree Permit from the City of Antioch Planning Division prior to the initiation of construction (i.e., ground clearing). The Project applicant shall mitigate for the loss of protected trees by either paying into a Tree Preservation Fund at \$100 per DBH removed or impacted or conducting onsite plantings.

Efforts should be made to save trees where feasible. This may include the use of retaining walls, planter islands, pavers, or other techniques commonly associated with tree preservation. The Improvement Plans shall include a note and show placement of temporary construction fencing around trees to be saved: The applicant shall install a 4-foot tall, brightly colored (typically orange), synthetic mesh material fence (or an equivalent) approved by the City at the following locations prior to any construction equipment being moved on-site or any construction activities taking place: at the limits of construction; outside the Protected Zone of all native oaks, California buckeye, or Landmark Trees; within 50 feet of any grading, road improvements, underground utilities, or other development activity; or as otherwise shown on the tentative subdivision map.

No development of the Project, including grading, shall be allowed until this requirement is satisfied. Any encroachment within these areas, including Protected Zones of trees to be saved, shall first be approved by the City.

8.11 Worker Environmental Awareness Training

Prior to any ground-disturbing or vegetation-removal activities, a Worker Environmental Awareness Training (WEAT) shall be prepared and administered to the construction crews. The WEAT shall include the following information: discussion of the state and federal Endangered Species Act, the Clean Water Act, the Project's permits and CEQA documentation, and associated mitigation measures; consequences and penalties for violation or noncompliance with these laws and regulations; identification of special-status wildlife, location of any avoided Waters of the U.S.; hazardous substance spill prevention and containment measures; and the contact person in the event of the discovery of a special-status wildlife species. The WEAT shall also discuss the different habitats used by the species' different life stages and the annual timing of these life stages. A handout summarizing the WEAT information shall be provided to workers to keep on-site for future reference. Upon completion of the WEAT training, workers shall sign a form stating that they attended the training, understand the information presented and will comply with the regulations discussed. Workers shall be shown designated "avoidance areas" during the WEAT training; worker access should be restricted to outside of those areas to minimize the potential for inadvertent environmental impacts.

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Figures

Figure 1. Location and Vicinity Map

Figure 2. California Natural Diversity Database Occurrences of Plant Species and Critical Habitat

Figure 3. California Natural Diversity Database Occurrences of Wildlife Species and Critical
Habitat

Figure 4. Vegetation Communities

Figure 5. Aquatic Resources

Figure 6. Natural Resources Conservation Service Soils

Figure 7. Special Status Plant Locations

Figure 8. Vegetation Communities Impacts

Figure 9. Aquatic Resources Impacts

Figure 10. Special Status Plant Impacts

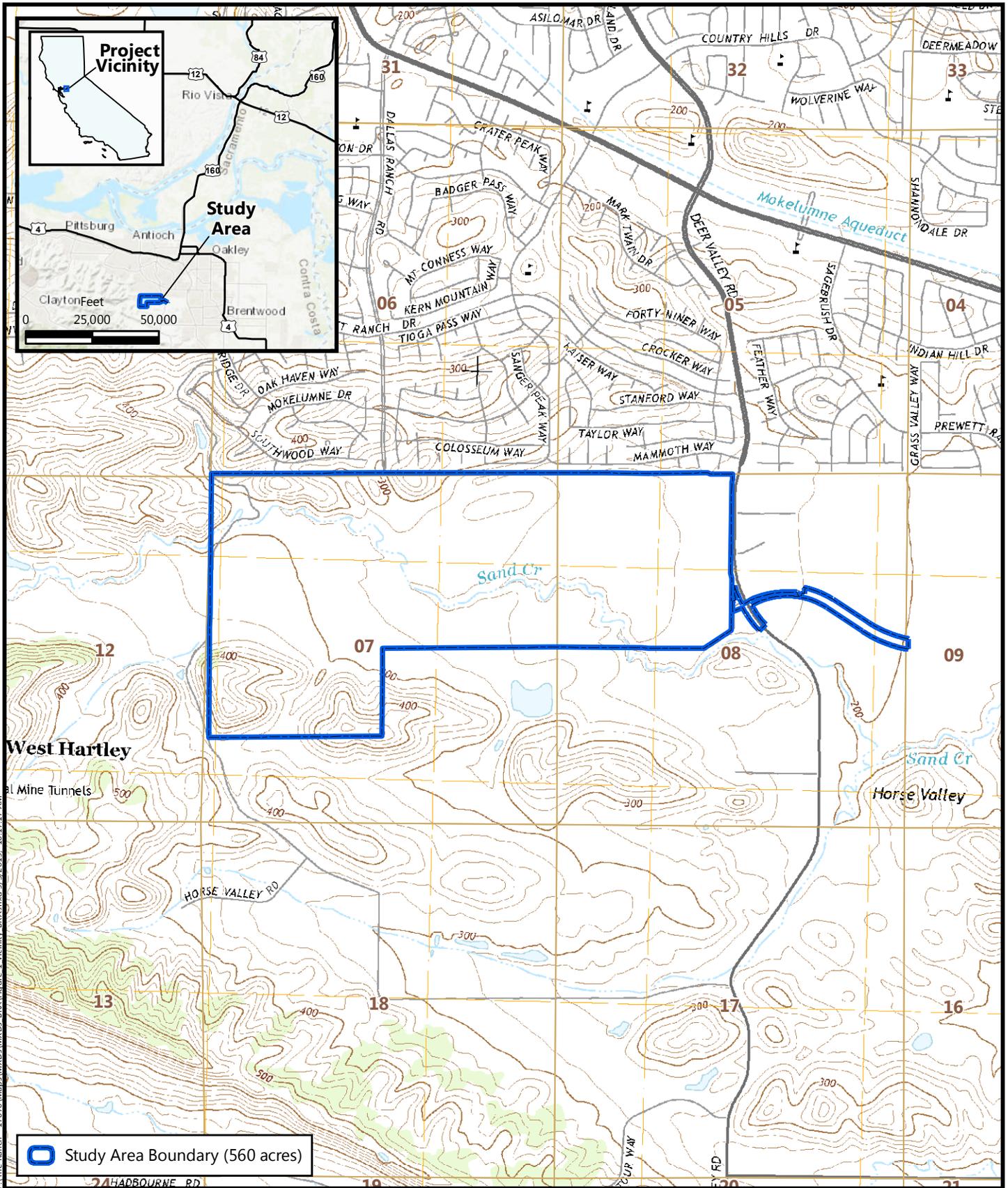


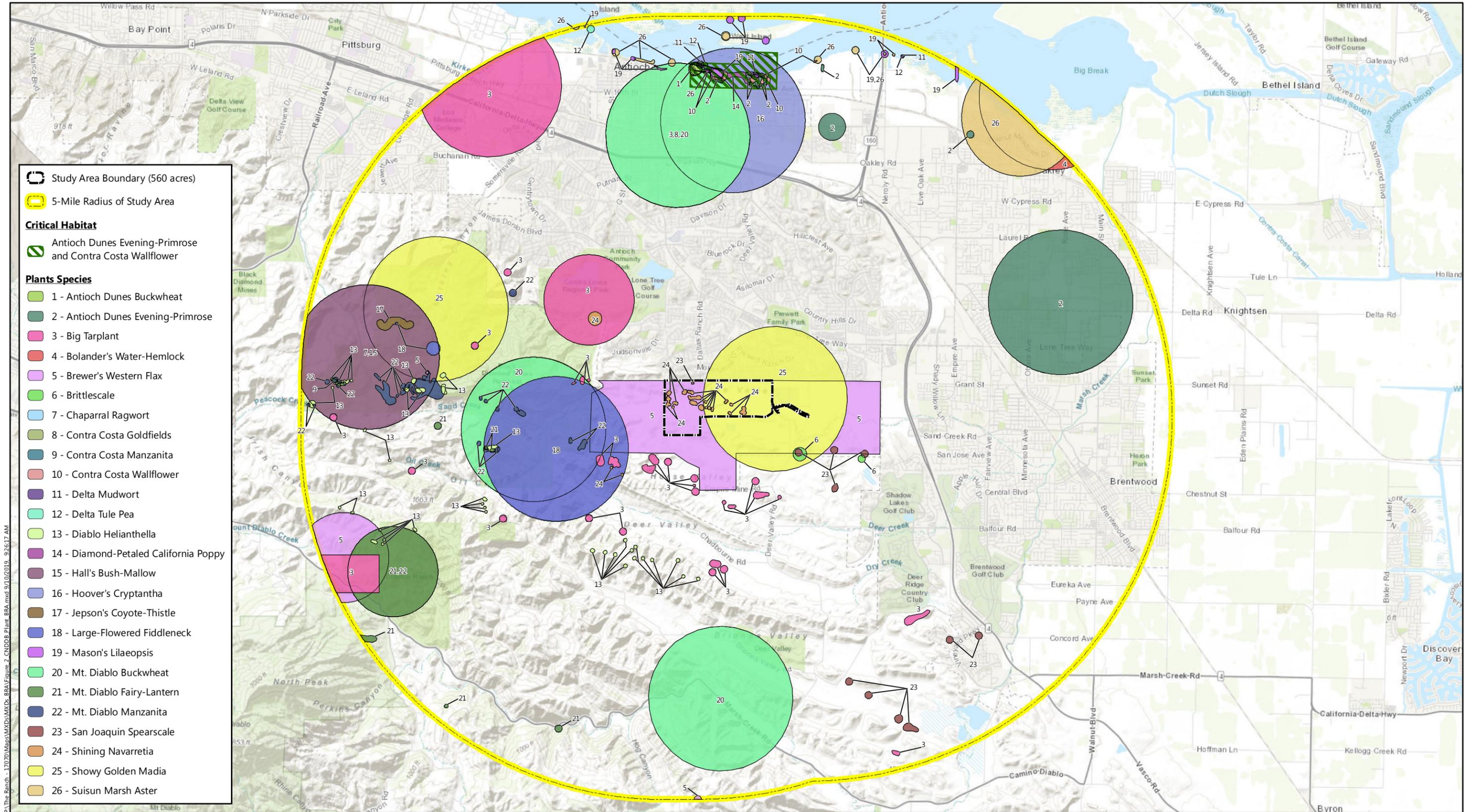
Figure 1
Site and Vicinity

Source: United States Geologic Survey, 2015
 Sections 5-9, Township 1 North, Range 2 East, MDB&M
 "Antioch South, California" 7.5-Minute Topographic Quadrangle
 Longitude -121.783351, Latitude 37.949083

The Ranch in Antioch
 Antioch, Contra Costa County, California



P:\The Ranch - 17070\Maps\MXD\MXD: BRA\Figure 1 vicinity BRA.mxd 9/5/2019, 10:17:17 AM



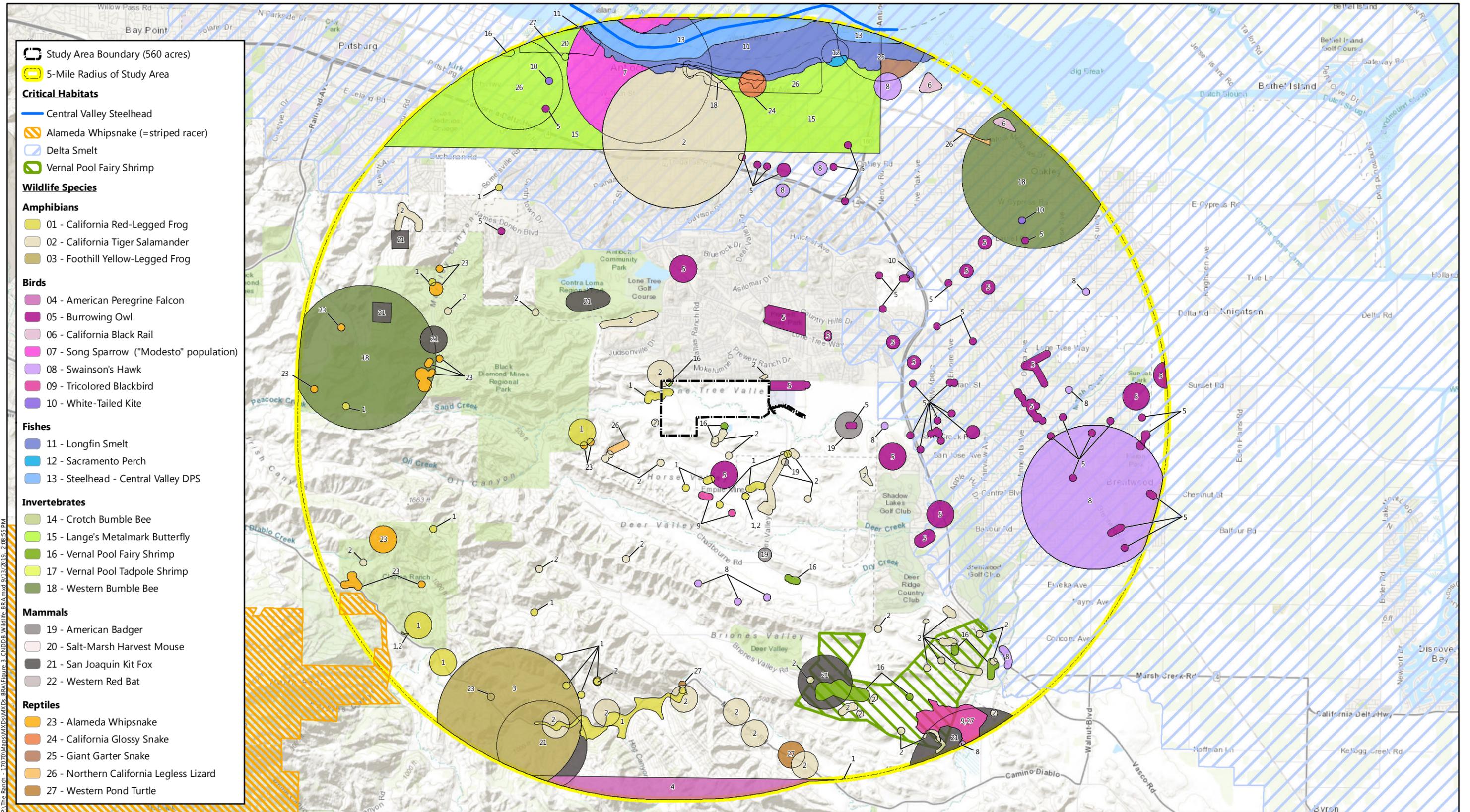
P:\The Ranch - 17070\Maps\MXD\1\WK Ds - BRA\Figure 2 - CNDDDB Plant BRAs.mxd 9/10/2019 - 9:26:17 AM



Plant Species Data Source: California Department of Fish and Wildlife, June 2019
 Basemap Source: National Geographic and ESRI

Figure 2
California Natural Diversity Database
Occurrences of Plant Species
and Critical Habitats
The Ranch in Antioch
 Antioch, Contra Costa County, California





PA:The Ranch - 17070 Maps\MXD\1\WX Ds - BRA\Figure 3 - CNDDDB Wildlife BRA.mxd 9/13/2019 - 2:08:55 PM



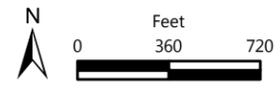
Figure 3
California Natural Diversity Database
Occurrences of Wildlife Species
and Critical Habitats
The Ranch in Antioch
 Antioch, Contra Costa County, California



Wildlife Species Data Source: California Department of Fish and Wildlife, June 2019
 Basemap Source: National Geographic and ESRI



P:\The Ranch - 17070\Maps\MXD\MapDocs - BRA\Figure 4 - Veg Comm - BRA.mxd 9/10/2019 9:31:41 AM



Vegetation Community Source: Madrone Ecological Consulting, LLC, 2019
 Aerial Source: DigitalGlobe, 19 and 25 August 2017

Figure 4
Vegetation Communities

The Ranch in Antioch
 Antioch, Contra Costa County, California





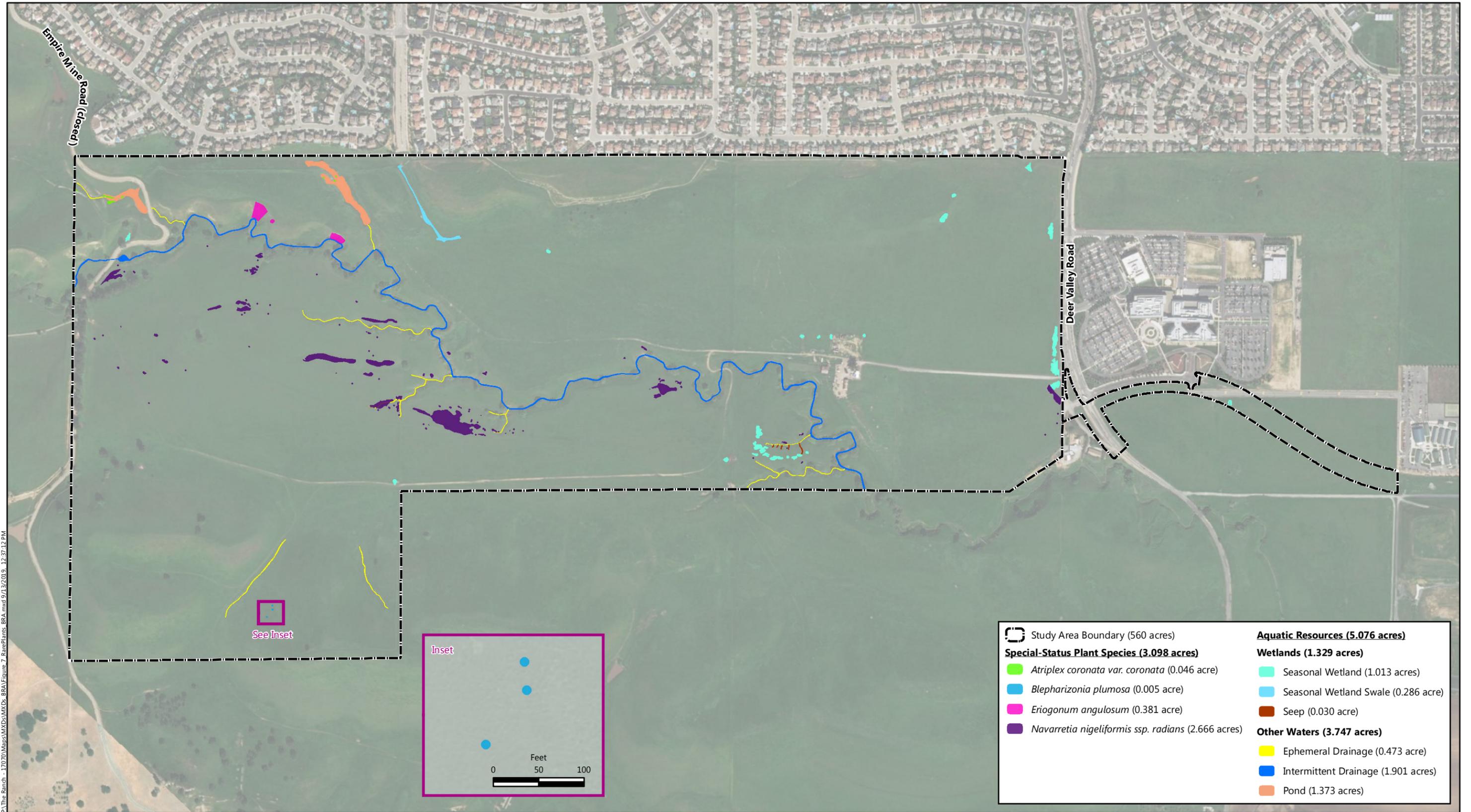
P:\The Ranch - 17070\Maps\MXD\BRA\Figure 5 Aquatics BRA.mxd 9/10/2019 9:14:13 AM

	Study Area Boundary (560 acres)
	Elderberry Shrub
Aquatic Resources (5.076 acres)	
Wetlands (1.329 acres)	
	Seasonal Wetland (1.013 acres)
	Seasonal Wetland Swale (0.286 acre)
	Seep (0.030 acre)
Other Waters (3.747 acres)	
	Ephemeral Drainage (0.473 acre)
	Intermittent Drainage (1.901 acres)
	Pond (1.373 acres)



Figure 5
Aquatic Resources

Aquatic Resources Source: Live Oak Associates, Inc., March 2015,
 Madrone Ecological Consulting, LLC, 2019
 Aerial Source: DigitalGlobe, 19 and 25 August 2017



P:\The Ranch - 17070\Maps\MXDs\WxDs - BRA\Figure 7 - RarePlants BRA.mxd 9/13/2019 - 12:37:12 PM

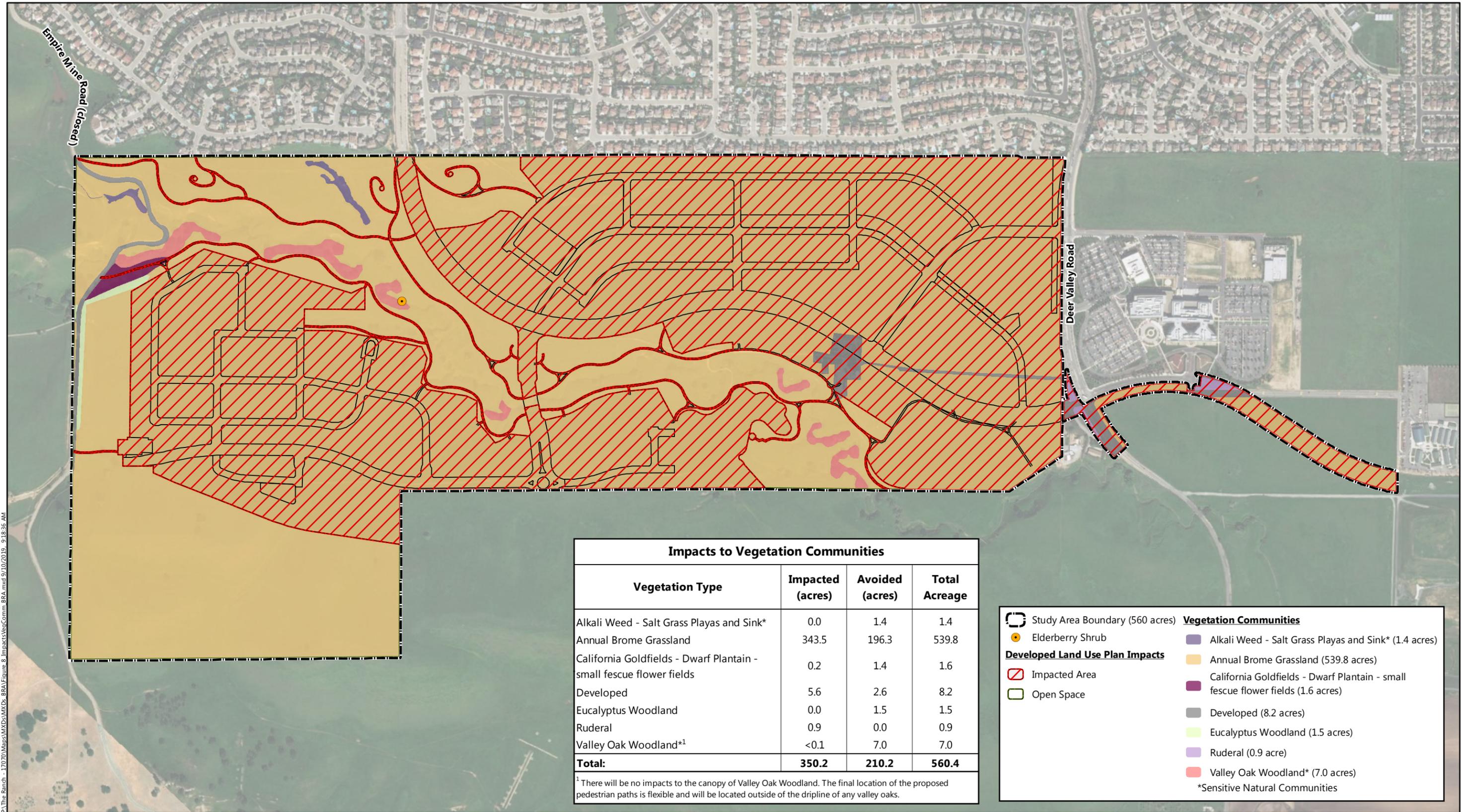


Aquatic Resources Source: Live Oak Associates, Inc., March 2015,
Madrone Ecological Consulting, LLC, 2019
Aerial Source: DigitalGlobe, 19 and 25 August 2017

Figure 7
Special-Status Plants Documented
within the Study Area During the
2018-2019 Field Surveys

The Ranch in Antioch
Antioch, Contra Costa County, California





Impacts to Vegetation Communities			
Vegetation Type	Impacted (acres)	Avoided (acres)	Total Acreage
Alkali Weed - Salt Grass Playas and Sink*	0.0	1.4	1.4
Annual Brome Grassland	343.5	196.3	539.8
California Goldfields - Dwarf Plantain - small fescue flower fields	0.2	1.4	1.6
Developed	5.6	2.6	8.2
Eucalyptus Woodland	0.0	1.5	1.5
Ruderal	0.9	0.0	0.9
Valley Oak Woodland* ¹	<0.1	7.0	7.0
Total:	350.2	210.2	560.4

¹ There will be no impacts to the canopy of Valley Oak Woodland. The final location of the proposed pedestrian paths is flexible and will be located outside of the dripline of any valley oaks.

Study Area Boundary (560 acres)

- Study Area Boundary (560 acres)
- Elderberry Shrub

Developed Land Use Plan Impacts

- Impacted Area
- Open Space

Vegetation Communities

- Alkali Weed - Salt Grass Playas and Sink* (1.4 acres)
- Annual Brome Grassland (539.8 acres)
- California Goldfields - Dwarf Plantain - small fescue flower fields (1.6 acres)
- Developed (8.2 acres)
- Eucalyptus Woodland (1.5 acres)
- Ruderal (0.9 acre)
- Valley Oak Woodland* (7.0 acres)

*Sensitive Natural Communities

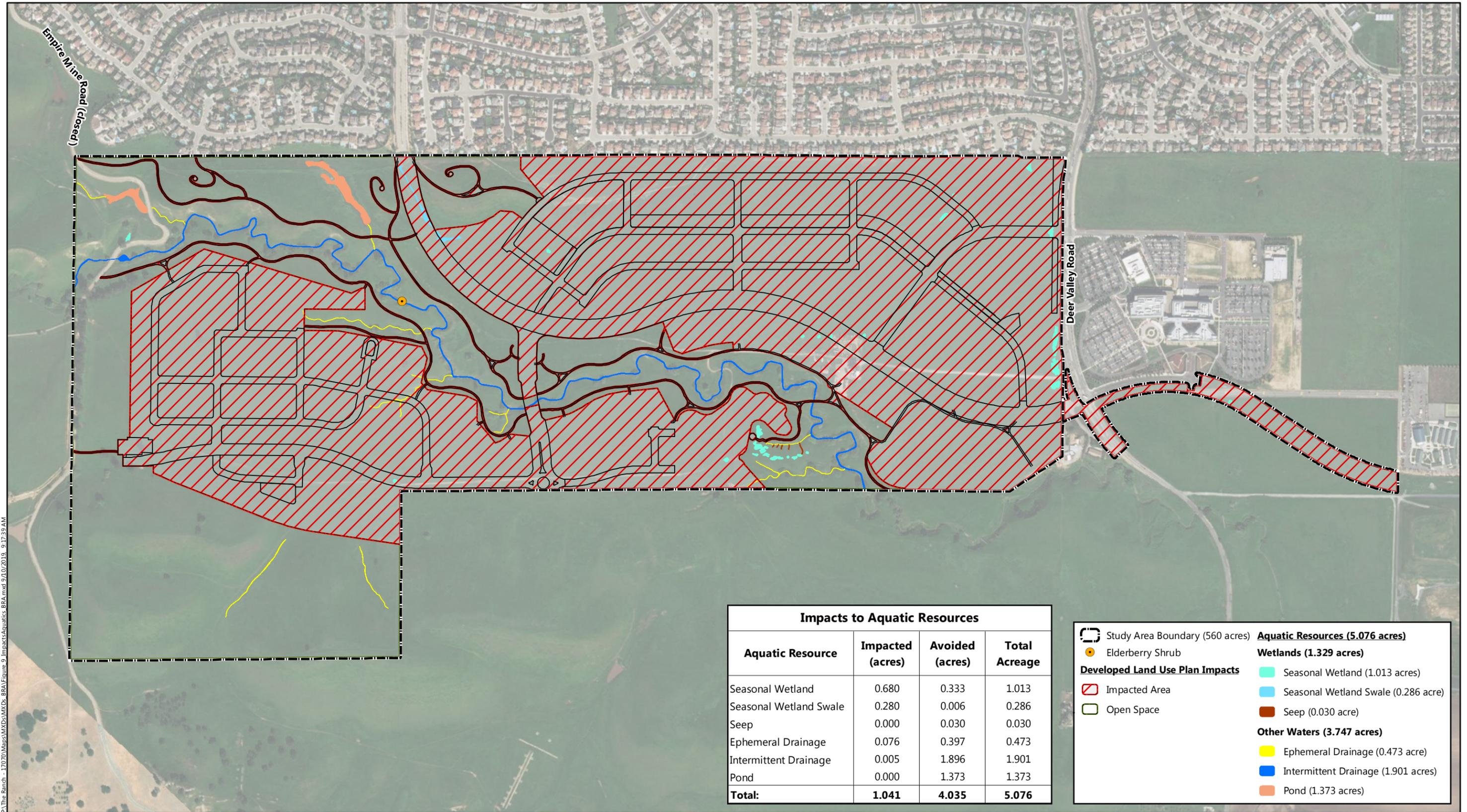
P:\The Ranch - 17070\Maps\MXDs\WXDs - BRA\Figure 8 - Impacts\VerComm - BRA.mxd 9/10/2019 9:18:36 AM



Vegetation Community Source: Madrone Ecological Consulting, LLC, 2019
 Land Use Plan: CBG, Inc., March 2019
 Aerial Source: DigitalGlobe, 19 and 25 August 2017

Figure 8
Vegetation Communities Impacts

The Ranch in Antioch
 Antioch, Contra Costa County, California



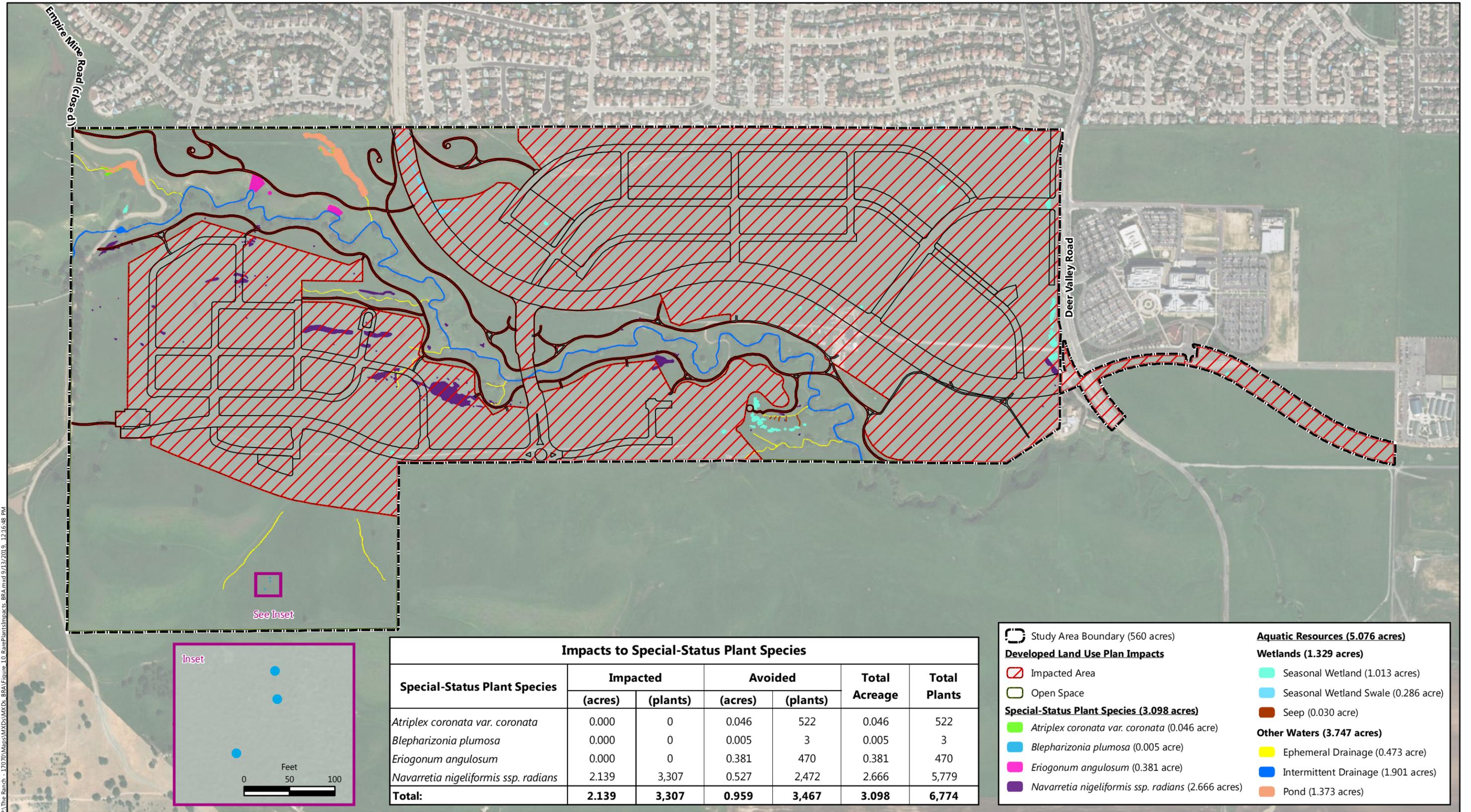
P:\The Ranch - 17070\Maps\MXD\1\MXDs - BRA\Figure 9 - ImpactsAquatics - BRA.mxd 9/10/2019 9:17:39 AM



Aquatic Resources Source: Live Oak Associates, Inc., March 2015,
 Madrone Ecological Consulting, LLC, 2019
 Land Use Plan: CBG, Inc., March 2019
 Aerial Source: DigitalGlobe, 19 and 25 August 2017

Figure 9
Aquatic Resources Impacts
The Ranch in Antioch
 Antioch, Contra Costa County, California





Aquatic Resources Source: Live Oak Associates, Inc., March 2015,
 Madrone Ecological Consulting, LLC, 2019
 Land Use Plan: CBG, Inc., March 2019
 Aerial Source: DigitalGlobe, 19 and 25 August 2017

Figure 10
Impacts to Special-Status Plants
Documented within the Study Area
During the 2018-2019 Field Surveys
The Ranch in Antioch
 Antioch, Contra Costa County, California



Attachments

Attachment A. Conceptual Plan

Attachment B. USFWS IPaC Species List

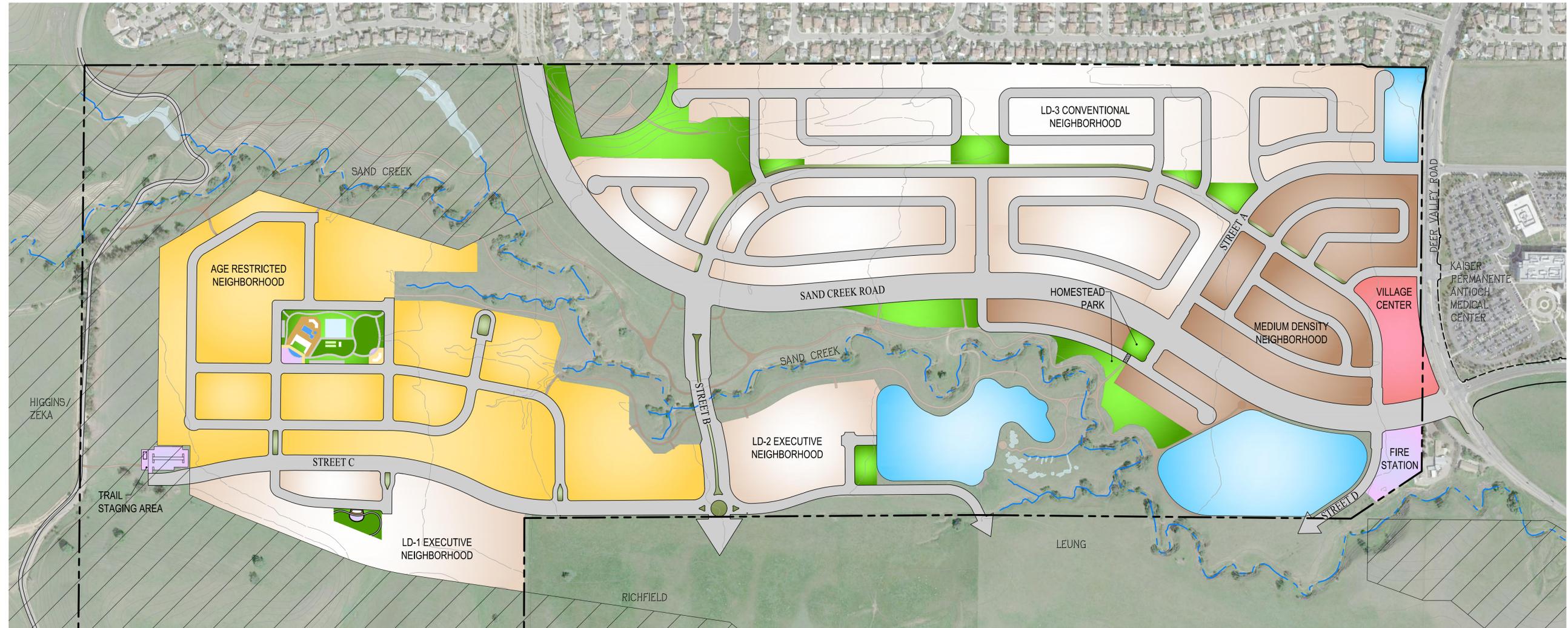
Attachment C. California Native Plant Society Species List

Attachment D. U.S. Army Corps of Engineers Approved Jurisdictional Determination and Map

Attachment E. Tree Map

Attachment A

Conceptual Plan



PRODUCT & AREA SUMMARY

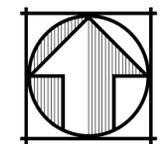
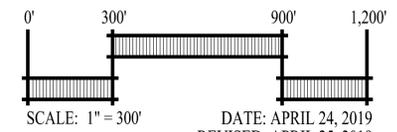
TYPE	PRODUCT OR AREA TYPE	ACREAGE	% OVERALL	% RES ACREAGE	NET DENSITY (DU/AC)	AVERAGE LOT SIZE (SF)	TARGET # UNITS	% RES UNITS
[Light Brown Box]	LOW DENSITY (LD)	140.5	25.5%	55.4%	3.9		543	42.7%
	• LD-1 EXECUTIVE	18.5	3.4%	7.3%	3.7	10,000	68	5.8%
	• LD-2 EXECUTIVE	18	3.3%	7.1%	3.6	7,000	65	5.5%
	• LD-3 CONVENTIONAL	104	18.9%	41.0%	3.9	7,000*	410	31.4%
[Yellow Box]	AGE RESTRICTED (AR)	75	13.6%	29.6%	5.6	5,000	422	38.2%
[Brown Box]	MEDIUM DENSITY (MD)	38	6.9%	15.0%	5.6	4,500	212	18.0%
	RESIDENTIAL TOTAL	253.5	46.0%	100.0%	4.6		1,177	100.0%
[Pink Box]	VILLAGE CENTER	5	0.9%					
[Purple Box]	PUBLIC USE (PQ)	3	0.5%					
	• FIRE STATION (PQ-F)	2	0.4%					
	• TRAIL STAGING AREA (PQ-S)	1	0.2%					
[Green Box]	PARKS (P)	20	3.6%					
[Light Green Box]	LANDSCAPE (L)	2.5	0.5%					
[Dark Green Box]	OPEN SPACE (OS)	229.5	41.6%					
[Grey Box]	MAJOR ROADWAYS	38	6.9%					
	TOTAL	551.5	100%					

*NOTE: A ROW OF MINIMUM 8,000 SF LOTS IS REQUIRED WHERE ABUTTING EXISTING SINGLE FAMILY DEVELOPMENT TO THE NORTH.
 AREA SUMMARY BASED ON THE RANCH AT ANTIOCH DEVELOPMENT STANDARDS AND DESIGN GUIDELINES, ASCENT ENVIRONMENTAL, OCTOBER 2018

ILLUSTRATIVE SITE PLAN

THE RANCH

CITY OF ANTIOCH CONTRA COSTA COUNTY CALIFORNIA



DATE: APRIL 24, 2019
 REVISED: APRIL 25, 2019
 REVISED: MAY 10, 2019
 REVISED: JUNE 4, 2019



SAN RAMON • (925) 866-0322
 SACRAMENTO • (916) 375-1877
 WWW.CBANDG.COM
 CIVIL ENGINEERS • SURVEYORS • PLANNERS

Attachment B

USFWS IPaC Species List



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To:
Consultation Code: 08ESMF00-2019-SLI-2964
Event Code: 08ESMF00-2019-E-09495
Project Name: The Ranch in Antioch

September 06, 2019

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office

Federal Building

2800 Cottage Way, Room W-2605

Sacramento, CA 95825-1846

(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2019-SLI-2964

Event Code: 08ESMF00-2019-E-09495

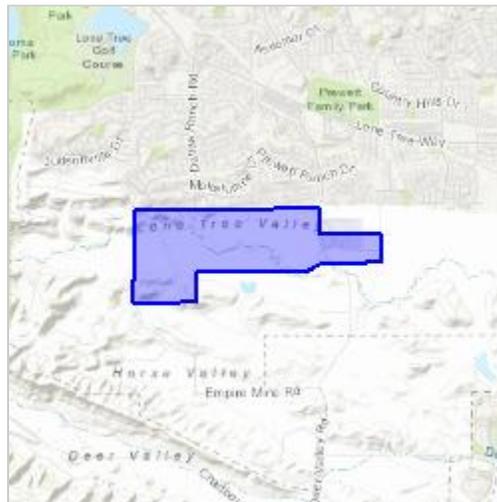
Project Name: The Ranch in Antioch

Project Type: DEVELOPMENT

Project Description: Residential Development

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/37.94851761821252N121.7871603125607W>



Counties: Contra Costa, CA

Endangered Species Act Species

There is a total of 16 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
San Joaquin Kit Fox <i>Vulpes macrotis mutica</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2873	Endangered

Birds

NAME	STATUS
California Clapper Rail <i>Rallus longirostris obsoletus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4240	Endangered
California Least Tern <i>Sterna antillarum browni</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered

Reptiles

NAME	STATUS
Alameda Whipsnake (=striped Racer) <i>Masticophis lateralis euryxanthus</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5524	Threatened
Giant Garter Snake <i>Thamnophis gigas</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog <i>Rana draytonii</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander <i>Ambystoma californiense</i> Population: U.S.A. (Central CA DPS) There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt <i>Hypomesus transpacificus</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
San Bruno Elfin Butterfly <i>Callophrys mossii bayensis</i> There is proposed critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3394	Endangered
Valley Elderberry Longhorn Beetle <i>Desmocerus californicus dimorphus</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7850 Habitat assessment guidelines: https://ecos.fws.gov/ipac/guideline/assessment/population/436/office/11420.pdf	Threatened

Crustaceans

NAME	STATUS
Conservancy Fairy Shrimp <i>Branchinecta conservatio</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8246	Endangered
Vernal Pool Fairy Shrimp <i>Branchinecta lynchi</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp <i>Lepidurus packardii</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
Antioch Dunes Evening-primrose <i>Oenothera deltoides ssp. howellii</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5970	Endangered
Contra Costa Goldfields <i>Lasthenia conjugens</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7058	Endangered
Large-flowered Fiddleneck <i>Amsinckia grandiflora</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5558	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Attachment C

California Native Plant Society Species List

Inventory of Rare and Endangered Plants

Plant List

58 matches found. [Click on scientific name for details](#)

Search Criteria

California Rare Plant Rank is one of [1A, 1B, 2A, 2B, 3], Found in Quads 3812118, 3812117, 3812116, 3712188, 3712187, 3712186, 3712178 3712177 and 3712176;

[Modify Search Criteria](#)
[Export to Excel](#)
[Modify Columns](#)
[Modify Sort](#)
[Display Photos](#)

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Amsinckia grandiflora	large-flowered fiddleneck	Boraginaceae	annual herb	(Mar)Apr-May	1B.1	S1	G1
Arctostaphylos auriculata	Mt. Diablo manzanita	Ericaceae	perennial evergreen shrub	Jan-Mar	1B.3	S2	G2
Arctostaphylos manzanita ssp. laevigata	Contra Costa manzanita	Ericaceae	perennial evergreen shrub	Jan-Mar (Apr)	1B.2	S2	G5T2
Astragalus tener var. tener	alkali milk-vetch	Fabaceae	annual herb	Mar-Jun	1B.2	S1	G2T1
Atriplex cordulata var. cordulata	heartscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G3T2
Atriplex depressa	brittscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
Atriplex minuscula	lesser saltscale	Chenopodiaceae	annual herb	May-Oct	1B.1	S2	G2
Blepharizonia plumosa	big tarplant	Asteraceae	annual herb	Jul-Oct	1B.1	S1S2	G1G2
Calochortus pulchellus	Mt. Diablo fairy-lantern	Liliaceae	perennial bulbiferous herb	Apr-Jun	1B.2	S2	G2
Campanula exigua	chaparral harebell	Campanulaceae	annual herb	May-Jun	1B.2	S2	G2
Centromadia parryi ssp. congdonii	Congdon's tarplant	Asteraceae	annual herb	May-Oct (Nov)	1B.1	S1S2	G3T1T2
Chloropyron molle ssp. molle	soft bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Nov	1B.2	S1	G2T1

<u>Cicuta maculata var. bolanderi</u>	Bolander's water-hemlock	Apiaceae	perennial herb	Jul-Sep	2B.1	S2?	G5T4T5
<u>Cordylanthus nidularius</u>	Mt. Diablo bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Aug	1B.1	S1	G1
<u>Cryptantha hooveri</u>	Hoover's cryptantha	Boraginaceae	annual herb	Apr-May	1A	SH	GH
<u>Delphinium californicum ssp. interius</u>	Hospital Canyon larkspur	Ranunculaceae	perennial herb	Apr-Jun	1B.2	S3	G3T3
<u>Delphinium recurvatum</u>	recurved larkspur	Ranunculaceae	perennial herb	Mar-Jun	1B.2	S2?	G2?
<u>Dirca occidentalis</u>	western leatherwood	Thymelaeaceae	perennial deciduous shrub	Jan-Mar (Apr)	1B.2	S2	G2
<u>Downingia pusilla</u>	dwarf downingia	Campanulaceae	annual herb	Mar-May	2B.2	S2	GU
<u>Eriastrum erterae</u>	Lime Ridge eriastrum	Polemoniaceae	annual herb	Jun-Jul	1B.1	S1	G1
<u>Eriogonum nudum var. psychicola</u>	Antioch Dunes buckwheat	Polygonaceae	perennial herb	Jul-Oct	1B.1	S1	G5T1
<u>Eriogonum truncatum</u>	Mt. Diablo buckwheat	Polygonaceae	annual herb	Apr-Sep (Nov-Dec)	1B.1	S1	G1
<u>Eryngium jepsonii</u>	Jepson's coyote thistle	Apiaceae	perennial herb	Apr-Aug	1B.2	S2?	G2?
<u>Erysimum capitatum var. angustatum</u>	Contra Costa wallflower	Brassicaceae	perennial herb	Mar-Jul	1B.1	S1	G5T1
<u>Eschscholzia rhombipetala</u>	diamond-petaled California poppy	Papaveraceae	annual herb	Mar-Apr	1B.1	S1	G1
<u>Extriplex joaquinana</u>	San Joaquin spearscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
<u>Fritillaria liliacea</u>	fragrant fritillary	Liliaceae	perennial bulbiferous herb	Feb-Apr	1B.2	S2	G2
<u>Grimmia torenii</u>	Toren's grimmia	Grimmiaceae	moss		1B.3	S2	G2
<u>Helianthella castanea</u>	Diablo helianthella	Asteraceae	perennial herb	Mar-Jun	1B.2	S2	G2
<u>Hesperolinon breweri</u>	Brewer's western flax	Linaceae	annual herb	May-Jul	1B.2	S2	G2
<u>Hibiscus lasiocarpus var. occidentalis</u>	woolly rose-mallow	Malvaceae	perennial rhizomatous herb (emergent)	Jun-Sep	1B.2	S3	G5T3
<u>Isocoma arguta</u>	Carquinez goldenbush	Asteraceae	perennial shrub	Aug-Dec	1B.1	S1	G1
<u>Lasthenia conjugens</u>	Contra Costa goldfields	Asteraceae	annual herb	Mar-Jun	1B.1	S1	G1
<u>Lathyrus jepsonii var. jepsonii</u>	Delta tule pea	Fabaceae	perennial herb	May-Jul (Aug-Sep)	1B.2	S2	G5T2
<u>Lilaeopsis masonii</u>	Mason's lilaeopsis	Apiaceae	perennial rhizomatous herb	Apr-Nov	1B.1	S2	G2
<u>Limosella australis</u>	Delta mudwort	Scrophulariaceae	perennial stoloniferous herb	May-Aug	2B.1	S2	G4G5

<u>Madia radiata</u>	showy golden madia	Asteraceae	annual herb	Mar-May	1B.1	S3	G3
<u>Malacothamnus hallii</u>	Hall's bush-mallow	Malvaceae	perennial evergreen shrub	(Apr)May-Sep(Oct)	1B.2	S2	G2
<u>Monardella antonina ssp. antonina</u>	San Antonio Hills monardella	Lamiaceae	perennial rhizomatous herb	Jun-Aug	3	S1S3	G4T1T3Q
<u>Monolopia gracilens</u>	woodland woollythreads	Asteraceae	annual herb	(Feb)Mar-Jul	1B.2	S3	G3
<u>Navarretia gowenii</u>	Lime Ridge navarretia	Polemoniaceae	annual herb	May-Jun	1B.1	S1	G1
<u>Navarretia nigelliformis ssp. radians</u>	shining navarretia	Polemoniaceae	annual herb	(Mar)Apr-Jul	1B.2	S2	G4T2
<u>Neostapfia colusana</u>	Colusa grass	Poaceae	annual herb	May-Aug	1B.1	S1	G1
<u>Oenothera deltoides ssp. howellii</u>	Antioch Dunes evening-primrose	Onagraceae	perennial herb	Mar-Sep	1B.1	S1	G5T1
<u>Phacelia phacelioides</u>	Mt. Diablo phacelia	Hydrophyllaceae	annual herb	Apr-May	1B.2	S2	G2
<u>Plagiobothrys hystriculus</u>	bearded popcornflower	Boraginaceae	annual herb	Apr-May	1B.1	S2	G2
<u>Potamogeton zosteriformis</u>	eel-grass pondweed	Potamogetonaceae	annual herb (aquatic)	Jun-Jul	2B.2	S3	G5
<u>Puccinellia simplex</u>	California alkali grass	Poaceae	annual herb	Mar-May	1B.2	S2	G3
<u>Sanicula saxatilis</u>	rock sanicle	Apiaceae	perennial herb	Apr-May	1B.2	S2	G2
<u>Senecio aphanactis</u>	chaparral ragwort	Asteraceae	annual herb	Jan-Apr (May)	2B.2	S2	G3
<u>Spergularia macrotheca var. longistyla</u>	long-styled sand-spurrey	Caryophyllaceae	perennial herb	Feb-May (Jun)	1B.2	S2	G5T2
<u>Streptanthus albidus ssp. peramoenus</u>	most beautiful jewelflower	Brassicaceae	annual herb	(Mar)Apr-Sep(Oct)	1B.2	S2	G2T2
<u>Streptanthus hispidus</u>	Mt. Diablo jewelflower	Brassicaceae	annual herb	Mar-Jun	1B.3	S2	G2
<u>Stuckenia filiformis ssp. alpina</u>	slender-leaved pondweed	Potamogetonaceae	perennial rhizomatous herb (aquatic)	May-Jul	2B.2	S2S3	G5T5
<u>Symphotrichum lentum</u>	Suisun Marsh aster	Asteraceae	perennial rhizomatous herb	(Apr)May-Nov	1B.2	S2	G2
<u>Triquetrella californica</u>	coastal triquetrella	Pottiaceae	moss		1B.2	S2	G2
<u>Tropidocarpum capparideum</u>	caper-fruited tropidocarpum	Brassicaceae	annual herb	Mar-Apr	1B.1	S1	G1
<u>Viburnum ellipticum</u>	oval-leaved viburnum	Adoxaceae	perennial deciduous shrub	May-Jun	2B.3	S3?	G4G5

Suggested Citation

California Native Plant Society, Rare Plant Program. 2019. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website <http://www.rareplants.cnps.org> [accessed 06 September 2019].

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rareplants@cnps.org

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[The Calflora Database](#)

[The California Lichen Society](#)

[California Natural Diversity Database](#)

[The Jepson Flora Project](#)

[The Consortium of California Herbaria](#)

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Attachment D

U.S. Army Corps of Engineers Approved Jurisdictional Determination and Map



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

February 23, 2016

Regulatory Division SPK-2003-00691

EPC Holdings 820 LLC (Richland Planned Communities)
Attn: Mr. Arron Ross-Swain
801 Ygnacio Valley Road
Walnut Creek, California 94596

Dear Mr. Ross-Swain:

We are responding to your January 13, 2016, request for an approved jurisdictional determination for the Ranch Residential Development site. The approximately 548-acre project site is located on Sand Creek, Latitude 37.946124°, Longitude -121.79362°, Antioch, Contra Costa County, California.

Based on available information, we concur with the estimate of waters of the United States, as depicted on the enclosed January 13, 2016, drawing prepared by Live Oak Associates Inc. Approximately 3.948 acres of waters of the United States, including wetlands, are present within the survey area. These waters are regulated under Section 404 of the Clean Water Act, since they are either tributary to Marsh Creek or adjacent to Sand Creek a tributary to Marsh Creek which is tributary to the San Joaquin River a traditionally navigable water.

The 1.111-acre of waters identified as "Ephemeral Drainage 1 and 2 (0.132 acre), Wetland Drainage (0.286 acre), Seasonal Wetland Pools 1, 2, 3, 4, 5, 15, 16, 17, 18, 19, and 20, (totaling 0.588 acre) and Non-wetland Seasonal Pools 1, 2, 3, and 4, (totaling 0.105 acre)" on the above drawing are intrastate isolated waters with no apparent interstate or foreign commerce connection. As such, these waters are not currently regulated by the Corps of Engineers. This disclaimer of jurisdiction is only for Section 404 of the Federal Clean Water Act. Other Federal, State, and local laws may apply to your activities. *In particular, you may need authorization from the California State Water Resources Control Board and/or the U.S. Fish and Wildlife Service.*

This determination is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 Code of Federal Regulations (CFR) Part 331.

A Notification of Appeal Process (NAP) and Request for Appeal (RFA) form is enclosed. If you request to appeal this determination you must submit a completed

RFA form to the South Pacific Division Office at the following address: Administrative Appeal Review Officer, Army Corps of Engineers, South Pacific Division, CESPDPDO, 1455 Market Street, 2052B, San Francisco, California 94103-1399, Telephone: 415-503-6574, FAX: 415-503-6646.

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the NAP. Should you decide to submit an RFA form, it must be received at the above address by 60 days from the date of this letter. It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this letter.

You should provide a copy of this letter and notice to all other affected parties, including any individual who has an identifiable and substantial legal interest in the property.

This determination has been conducted to identify the limits of Corps of Engineers' Clean Water Act jurisdiction for the particular site identified in this request. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are U.S. Department of Agriculture (USDA) program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

We appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing the customer survey on our website under *Customer Service Survey*.

Please refer to identification number SPK-2003-00691 in any correspondence concerning this project. If you have any questions, please contact me at California Delta Branch, 1325 J Street, Room 1350, Sacramento, California 95814-2922, by email at William.H.Guthrie@usace.army.mil, or telephone at 916-557-5269. For more information regarding our program, please visit our website at www.spk.usace.army.mil/Missions/Regulatory.aspx.

Sincerely,

A handwritten signature in black ink, appearing to read 'William Guthrie', with a long horizontal flourish extending to the right.

William Guthrie
Acting Chief, California Delta Branch

Enclosures

cc: (w/o encls)

Geoff Monk, Monk and Associates, 1136 Saranap Avenue, Suite Q, Walnut Creek,
California 94595, Geoff@monkassociates.com

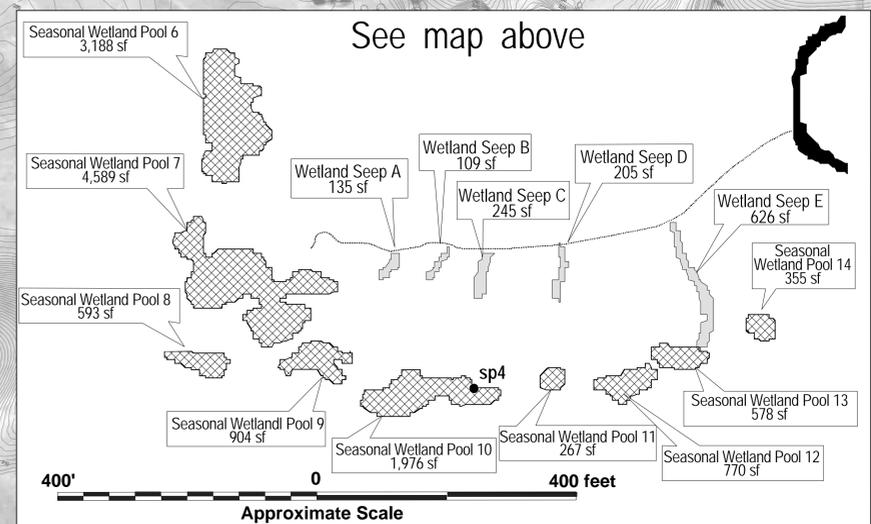
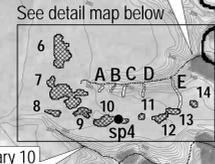
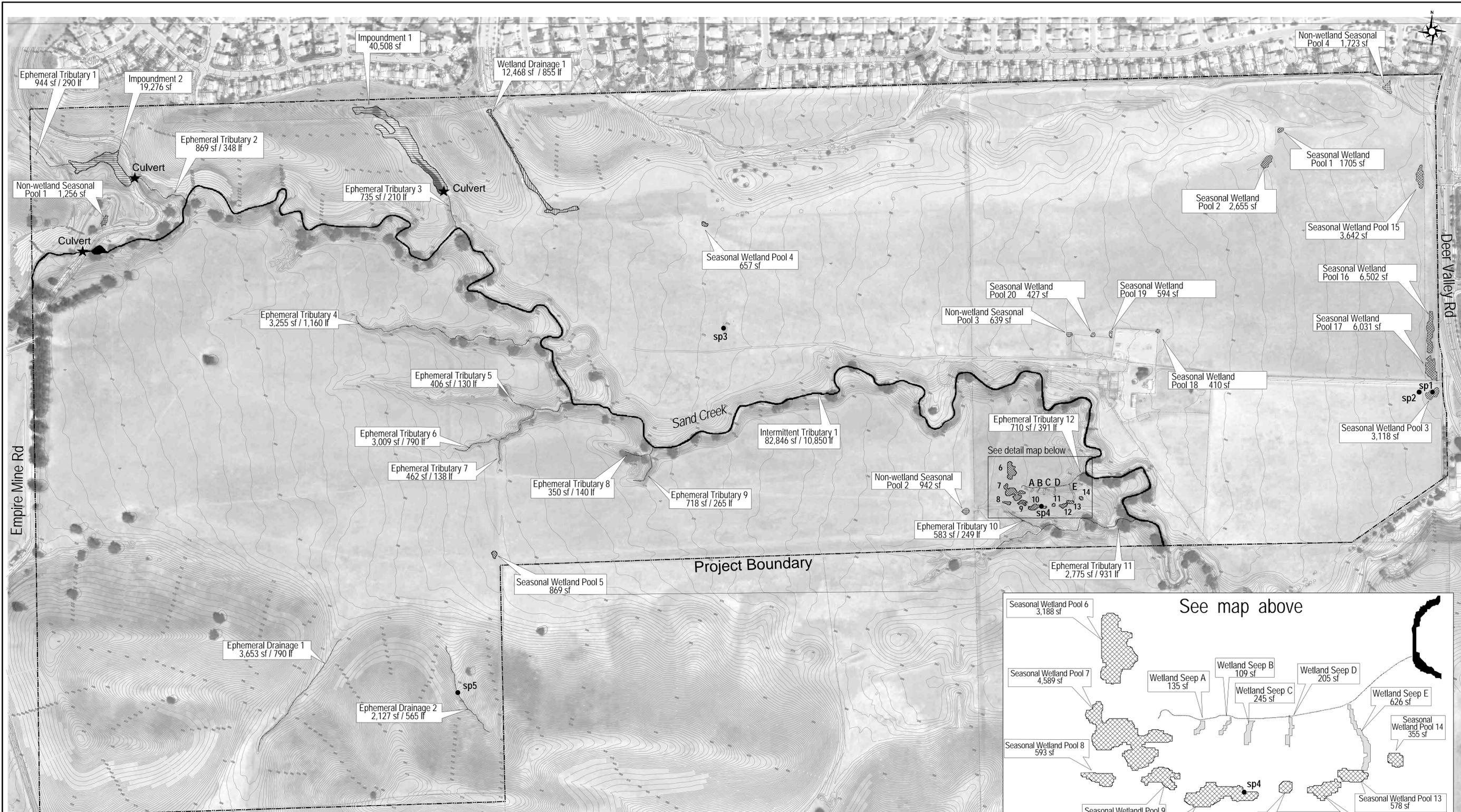


Table 2. HYDROLOGIC FEATURES IDENTIFIED ON THE STUDY AREA

HYDROLOGIC FEATURE	Length (Approx. lf)	Area (Approx. sf)	Acreage (Approx. ac)
POTENTIALLY JURISDICTIONAL WATERS			
Tributary Waters			
Intermittent Tributary (Sand Creek)	10,850	82,846	1.901
Ephemeral Tributary (Tributary to Sand Creek)	5,042	14,816	0.340
Impoundment	N/A	59,784	1.372
Adjacent Wetlands			
Seasonal Wetland Pool (6, 7, 8, 9, 10, 11, 12, 13, 14)	N/A	13,220	0.303
Wetland Seep	N/A	1,320	0.030
Sub-Total	15,892	171,986	3.948
POTENTIALLY NON-JURISDICTIONAL WATERS			
Non-Tributary Waters			
Ephemeral Drainage (1, 2)	1,355	5,780	0.132
Isolated Wetlands			
Wetland Drainage	855	12,468	0.286
Seasonal Wetland Pools (1, 2, 3, 4, 5, 15, 16, 17, 18, 19, 20)	N/A	25,609	0.588
Sub-Total	2,210	43,857	1.006
OTHER WATERS			
Non-wetland Seasonal Pool (1, 2, 3, 4)	N/A	4,559	0.105
Total	18,102	220,402	5.059

LEGEND

- Ephemeral Drainage / Tributary
- Intermittent Tributary (Sand Creek)
- Wetland Seep
- Impoundment
- Wetland Drainage
- Seasonal Wetland Pools
- Non-wetland Seasonal Pools

Other Features

- Project Boundary 546 Ac
- Culvert
- Sample Point



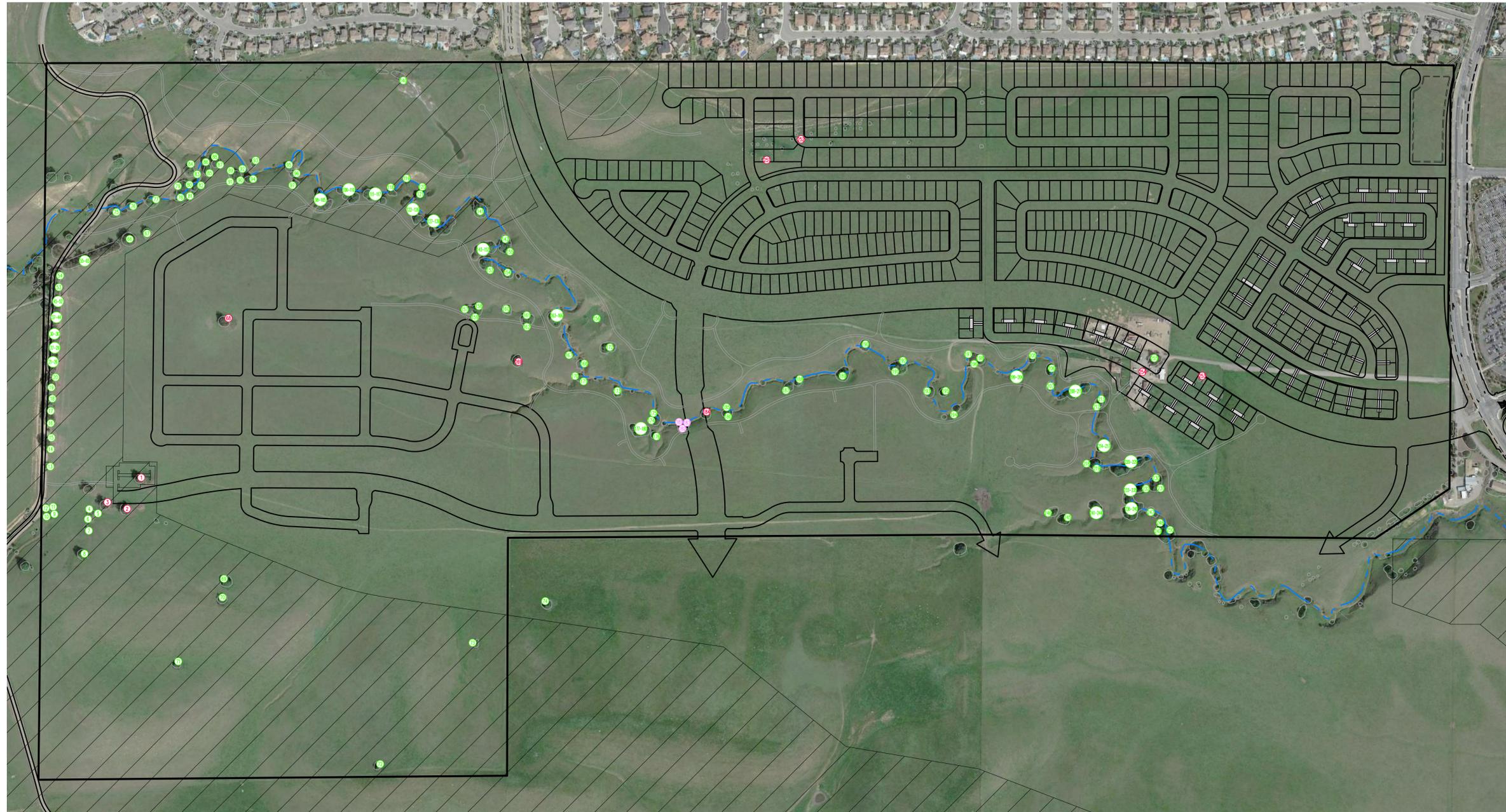
Live Oak Associates, Inc.

Cowan Ranch
Potential Jurisdictional Waters

Date	Project #	Figure #
01/13/2016	1852-01	4

Attachment E

Tree Map



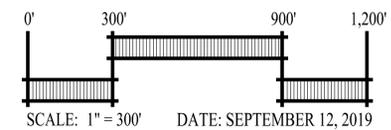
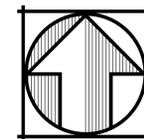
LEGEND

- ③ TREE TO BE REMOVED PER ARBORIST REPORT TABLE 3
- ④ TREE TO BE REMOVED PER SITE PLAN
- ⑤ TREE TO REMAIN / OUTSIDE DEVELOPMENT FOOTPRINT

TREE LOCATIONS

THE RANCH

CITY OF ANTIOCH CONTRA COSTA COUNTY CALIFORNIA



SAN RAMON (925) 866-0322
 SACRAMENTO (916) 375-1877
 WWW.CBANDG.COM
 CIVIL ENGINEERS SURVEYORS PLANNERS

TREE No.	SPECIES	TRUNK DIAMETER (inches)	CONDITION 1=POOR 5=EXCELLENT	SUITABILITY FOR PRESERVATION	COMMENTS
1	Blue gum	74	3	Moderate	Numerous branch failures.
2	Red iron bark	49	4	Moderate	Trunk divides at 10'.
3	Blue gum	56	2	Poor	Trunk decayed at base.
4	Osage orange	11,10,10,9	3	Moderate	Multi-stemmed at 5'.
5	Osage orange	10,10,8,7,5	3	Moderate	Multi-stemmed at 2'.
6	Osage orange	15,7,5	3	Moderate	Multi-stemmed at 4'.
7	Osage orange	10,8,7	3	Moderate	Multi-stemmed at 2'.
8	Valley oak	41	5	Moderate	Excellent form and health.
9	Black locust	28	2	Poor	Trunk wounded at base.
10	Black locust	25,22	3	Moderate	Trunks attach at base.
11	Black locust	22	2	Poor	Trunk wounded at base.
12	Black locust	13	2	Poor	Trunk wounded at base.
13	Blue gum	20,18,16	3	Moderate	Trunks attach at 5'.
14	Blue gum	96	3	Moderate	Trunk divides at 10'.
15	Valley oak	6	5	Moderate	Excellent form and health.
16	Blue gum	79	3	Moderate	Trunk divides at 10'.
17	Blue gum	84	3	Moderate	Trunk divides at 10'.
18	Blue oak	7,4	3	Moderate	Crown suppressed.
19	Blue gum	67	3	Moderate	Large trunk failure.
20	Valley oak	21	4	Moderate	Good form and health.
21	Blue gum	11	2	Poor	Trunk wounded at base.
22	Blue gum	59	3	Moderate	Trunk divides at 20'.
23	Almond	7,6,6,5	3	Moderate	Trunks attach at 5'.
24	Blue gum	88	3	Moderate	Trunk divides at 10'.
25	Blue gum	14,9	3	Moderate	Trunks attach at base.
26	Blue gum	74	3	Moderate	Trunk divides at 10'.
27	Blue gum	35	3	Moderate	Single trunk.
28	Blue gum	28,24	3	Moderate	Trunks attach at 5'.
29	Blue gum	31,19	3	Moderate	Trunks attach at 5'.
30	Blue gum	69	4	Moderate	Trunk divides at 10'.

TREE No.	SPECIES	TRUNK DIAMETER (inches)	CONDITION 1=POOR 5=EXCELLENT	SUITABILITY FOR PRESERVATION	COMMENTS
31	Blue gum	71	3	Moderate	Trunks attach at 5'.
32	Blue gum	66	3	Moderate	Trunks attach at 5'.
33	Blue gum	26,16	3	Moderate	Trunks attach at base.
34	Blue gum	54	3	Moderate	Trunks attach at 5'.
35	Blue gum	38	3	Moderate	Trunks attach at 5'.
36	Blue gum	18,10	3	Moderate	Trunks attach at base.
37	Blue gum	52	3	Moderate	Trunks attach at 5'.
38	Blue gum	46	4	Moderate	Single trunk.
39	Blue gum	10,8	2	Poor	Trunks attach at base.
40	Blue gum	18,15	1	Poor	Trunk decayed at base.
41	Blue gum	53	3	Moderate	Trunk divides at 10'.
42	Blue gum	34	2	Poor	Vine covered trunk leans east.
43	Blue gum	62	3	Moderate	Trunk divides at 10'.
44	Blue gum	38	3	Moderate	Trunks attach at 5'.
45	Blue gum	48	1	Poor	Trunk decayed at base.
46	Blue gum	24,22	2	Poor	Trunks attach at base.
47	Blue gum	64	2	Poor	Trunk decayed at base.
48	Blue gum	28,14	3	Moderate	Trunks attach at 5'.
49	Blue gum	36,29,25	3	Moderate	Trunks attach at 5'.
50	Blue gum	71	3	Moderate	Trunk divides at 10'.
51	Blue gum	42,29,26,18	3	Moderate	Trunk divides at 10'.
52	Blue gum	65	2	Poor	Trunk fire-scarred.
53	Blue gum	59	3	Moderate	Crown asymmetrical.
54	Blue gum	37,19	2	Poor	Trunk decayed at base.
55	Blue gum	26	1	Poor	Trunk decayed at base.
56	Blue gum	47	3	Moderate	Trunks attach at 5'.
57	Blue gum	44	3	Moderate	Trunk wounded at base.
58	Blue gum	61	3	Moderate	Trunk divides at 10'.
59	Blue gum	31	3	Moderate	Trunk decayed at base.
60	Blue gum	21	2	Poor	Trunk decayed at base.



**Ed Brennan
Consulting Arborist**

Tree Survey

**Richland Communities, Inc.
The Ranch Project
Antioch, California
July 2015**

TREE No.	SPECIES	TRUNK DIAMETER (inches)	CONDITION 1=POOR 5=EXCELLENT	SUITABILITY FOR PRESERVATION	COMMENTS
61	Blue gum	28,19	3	Moderate	Trunks attach at 4'.
62	Blue gum	46	3	Moderate	Trunks attach at 5'.
63	Blue gum	41	3	Moderate	Trunks attach at 5'.
64	Blue gum	48	3	Moderate	Trunk divides at 10'.
65	Blue gum	39	3	Moderate	Trunks attach at 5'.
66	Blue gum	61	3	Moderate	Trunk divides at 10'.
67	Blue gum	89	3	Moderate	Trunks attach at 5'.
68	Blue gum	45,24	3	Moderate	Trunk divides at 10'.
69	Blue oak	42	5	Moderate	Excellent form and health.
70	Blue oak	33	4	Moderate	Good form and health.
71	Blue oak	37	4	Moderate	Good form and health.
72	Blue oak	24	4	Moderate	Good form and health.
73	Blue oak	21	4	Moderate	Trunk divides at 10'.
74	Blue oak	26	4	Moderate	Trunk divides at 10'.
75	Valley oak	41	4	Moderate	Roots exposed by stream erosion.
76	Interior live oak	37	4	Moderate	Roots exposed by stream erosion.
77	Valley oak	51	4	Moderate	Good form and health.
78	Valley oak	19	3	Moderate	Roots exposed by stream erosion.
79	Valley oak	26	3	Moderate	Asymmetric crown.
80	Valley oak	13	3	Moderate	Asymmetric crown.
81	Valley oak	23,20	4	Moderate	Good form and health.
82	Valley oak	24,13	3	Moderate	Trunks attach at 4'.
83	Interior live oak	43	5	Moderate	Excellent form and health.
84	Valley oak	43	4	Moderate	Trunk divides at 10'.
85	Interior live oak	20	3	Moderate	Trunk divides at 8'.
86	Interior live oak	18	4	Moderate	Good form and health.
87	Interior live oak	24	4	Moderate	Trunk divides at 10'.
88	Interior live oak	36	4	Moderate	Trunk divides at 10'.
89	Valley oak	26	3	Moderate	Sparse foliage.
90	Blue oak	15	3	Moderate	Leaning trunk.



**Ed Brennan
Consulting Arborist**

Tree Survey

**Richland Communities, Inc.
The Ranch Project
Antioch, California
July 2015**

TREE No.	SPECIES	TRUNK DIAMETER (inches)	CONDITION 1=POOR 5=EXCELLENT	SUITABILITY FOR PRESERVATION	COMMENTS
91	Valley oak	31	3	Moderate	Sparse foliage.
92	Interior live oak	23	4	Moderate	Trunks attach at 5'.
93	Valley oak	22	3	Moderate	Trunk divides at 10'.
94	Blue oak	24	5	Moderate	Trunk divides at 5'.
95	Blue oak	22	3	Moderate	Trunk divides at 5'.
96	Blue oak	14	4	Moderate	Good form and health.
97	Blue oak	22	3	Moderate	Leaning trunk.
98	Calif. buckeye	9,8,8,7	4	Moderate	Trunks attach at base.
99	Interior live oak	31	5	Moderate	Excellent form and health.
100	Interior live oak	15,14,8	2	Poor	Branch dieback.
101	Interior live oak	31	1	Poor	Crown dying back.
102	Interior live oak	29	3	Moderate	Single trunk.
103	Interior live oak	19	2	Poor	Branch dieback.
104	Interior live oak	18	2	Poor	Leaning trunk.
105	Valley oak	30	3	Moderate	Sparse foliage.
106	Calif. buckeye	9,8,8,6	3	Moderate	Trunks attach at base.
107	Calif. buckeye	12,10,9,9,8	4	Moderate	Trunks attach at base.
108	Calif. buckeye	7,7,6	3	Moderate	Trunks attach at base.
109	Valley oak	38	1	Poor	Crown dying back.
110	Blue oak	23	5	Moderate	Excellent form and health.
111	Blue oak	27	5	Moderate	Excellent form and health.
112	Coast live oak	17	2	Poor	Leaning trunk.
113	Valley oak	29	3	Moderate	Sparse foliage.
114	Blue oak	19,18	3	Moderate	Twig dieback.
115	Blue oak	26	3	Moderate	Sparse foliage.
116	Blue oak	19	3	Moderate	Sparse foliage.
117	Blue oak	26	3	Moderate	Trunk divides at 5'.
118	Blue oak	29	3	Moderate	Wound on trunk.
119	Valley oak	23	3	Moderate	Sparse foliage.
120	Calif. buckeye	12,10	3	Moderate	Trunks attach at base.

TREE No.	SPECIES	TRUNK DIAMETER (inches)	CONDITION 1=POOR 5=EXCELLENT	SUITABILITY FOR PRESERVATION	COMMENTS
121	Calif. buckeye	15	3	Moderate	Single trunk.
122	Christmas berry	9	3	Moderate	Leaning trunk.
123	Blue oak	31	5	Moderate	Single trunk.
124	Blue oak	32	4	Moderate	Good form and health.
125	Coast live oak	29	2	Poor	Boring insect damage in trunk.
126	Coast live oak	21	2	Poor	Crown dying back.
127	Blue oak	36	5	Moderate	Trunk divides at 8'.
128	Calif. buckeye	12,7	3	Moderate	Trunks attach at base.
129	Calif. buckeye	14,9	3	Moderate	Trunks attach at base.
130	Calif. buckeye	15,10	3	Moderate	Trunks attach at base.
131	Blue oak	20	3	Moderate	Leaning trunk.
132	Blue oak	29	3	Moderate	Sparse foliage.
133	Calif. buckeye	9,7	3	Moderate	Trunks attach at 4'.
134	Blue oak	24	4	Moderate	Good form and health.
135	Calif. buckeye	14,12	4	Moderate	Trunks attach at 2'.
136	Blue oak	30	3	Moderate	Single trunk.
137	Blue oak	22	3	Moderate	Crown leans south.
138	Coast live oak	13	3	Moderate	Leaning trunk.
139	Blue oak	32	3	Moderate	Sparse foliage.
140	Arroyo willow	10,8,8,7,7,6,6	3	Moderate	Trunks attach at base.
141	Valley oak	53	5	Moderate	Excellent form and health.
142	Calif. buckeye	11,10,9,8	2	Poor	Upper crown dead.
143	Valley oak	40	4	Moderate	Asymmetric crown.
144	Blue oak	22	4	Moderate	Single trunk.
145	Valley oak	19	3	Moderate	Dieback in upper crown.
146	Valley oak	9	3	Moderate	Trunk divides at 5'.
147	Valley oak	31	3	Moderate	Branch dieback.
148	Valley oak	35	3	Moderate	Sparse foliage.
149	Coast live oak	20,12,10	3	Moderate	Trunks attach at 2'.
150	Blue oak	7	3	Moderate	Twig dieback.



**Ed Brennan
Consulting Arborist**

Tree Survey

**Richland Communities, Inc.
The Ranch Project
Antioch, California
July 2015**

TREE No.	SPECIES	TRUNK DIAMETER (inches)	CONDITION 1=POOR 5=EXCELLENT	SUITABILITY FOR PRESERVATION	COMMENTS
151	Valley oak	38	3	Moderate	Branch dieback.
152	Valley oak	19	4	Moderate	Trunk divides at 10'.
153	Valley oak	41	3	Moderate	Branch dieback.
154	Coast live oak	22	1	Poor	Trunk decayed at base.
155	Valley oak	47	4	Moderate	Good form and health.
156	Tree of heaven	9	4	Poor	Trunk divides at 5'.
157	Blue oak	28	3	Moderate	Sparse foliage.
158	Valley oak	29	4	Moderate	Trunk divides at 10'.
159	Blue oak	20	3	Moderate	Asymmetric crown.
160	Valley oak	37	4	Moderate	Trunk divides at 12'.
161	Valley oak	46	4	Moderate	Good form and health.
162	Valley oak	42	4	Moderate	Good form and health.
163	Blue oak	22	4	Moderate	Leaning trunk.
164	Valley oak	18	3	Moderate	Asymmetric crown.
165	Valley oak	13	4	Moderate	Single trunk.
166	Blue oak	8	3	Moderate	Leaf fall wasp infestation.
167	Valley oak	17	4	Moderate	Good form and health.
168	Valley oak	13	3	Moderate	Trunk divides at 10'.
169	Blue oak	35	5	Moderate	Excellent form and health.
170	Valley oak	29	4	Moderate	Good form and health.
171	Blue oak	7	4	Moderate	Trunks attach at 4'.
172	Blue oak	38	3	Moderate	Trunk wounded at base.
173	Blue oak	43	4	Moderate	Trunk wounded at base.
174	Calif. buckeye	14,10,8,8	4	Moderate	Trunks attach at base.
175	Blue oak	28	4	Moderate	Good form and health.
176	Blue oak	22	5	Moderate	Excellent form and health.
177	Blue oak	26	4	Moderate	Good form and health.
178	Blue oak	19	4	Moderate	Trunk divides at 12'.
179	Blue oak	30	4	Moderate	Good form and health.
180	Blue oak	23	4	Moderate	Trunk divides at 12'.



**Ed Brennan
Consulting Arborist**

Tree Survey

**Richland Communities, Inc.
The Ranch Project
Antioch, California
July 2015**

TREE No.	SPECIES	TRUNK DIAMETER (inches)	CONDITION 1=POOR 5=EXCELLENT	SUITABILITY FOR PRESERVATION	COMMENTS
181	Calif. buckeye	14	3	Moderate	Roots exposed by stream erosion.
182	Calif. buckeye	10,9,8,7	3	Moderate	Trunks attach at base.
183	Valley oak	38	4	Moderate	Trunk divides at 10'.
184	Valley oak	42	5	Moderate	Excellent form and health.
185	Valley oak	34	4	Moderate	Trunk divides at 10'.
186	Valley oak	7	4	Moderate	Single trunk.
187	Blue oak	34	3	Moderate	Trunk divides at 8'.
188	Valley oak	31	4	Moderate	Trunk divides at 10'.
189	Valley oak	38	4	Moderate	Trunk divides at 10'.
190	Valley oak	58	4	Moderate	Good form and health.
191	Blue oak	32	4	Moderate	Good form and health.
192	Valley oak	34	3	Moderate	Trunk divides at 20'.
193	Blue oak	32	5	Moderate	Trunk divides at 20'.
194	Valley oak	24	4	Moderate	Asymmetric crown.
195	Valley oak	45	5	Moderate	Trunk divides at 20'.
196	Almond	8,5,4	3	Moderate	Trunks attach at base.
197	Valley oak	43	4	Moderate	Trunk divides at 8'.
198	Blue oak	31	5	Moderate	Trunk divides at 12'.
199	Blue oak	17	1	Poor	Root failure.
200	Blue oak	23	4	Moderate	Trunk divides at 12'.
201	Blue oak	19	2	Poor	Trunk wounded at base.
202	Calif. buckeye	11,9,9,8	4	Moderate	Trunks attach at base.
203	Calif. buckeye	16,9	4	Moderate	Trunks attach at base.
204	Valley oak	31	4	Moderate	Trunk divides at 12'.
205	Valley oak	28	4	Moderate	Trunk divides at 12'.
206	Valley oak	16	3	Moderate	Roots exposed by stream erosion.
207	Calif. buckeye	11,6,6,5	3	Moderate	Upper crown dead.
208	Valley oak	38	5	Moderate	Trunk divides at 20'.
209	Valley oak	32	4	Moderate	Good form and health.
210	Calif. buckeye	20,14,14,9	3	Moderate	Trunks attach at base.

TREE No.	SPECIES	TRUNK DIAMETER (inches)	CONDITION 1=POOR 5=EXCELLENT	SUITABILITY FOR PRESERVATION	COMMENTS
211	Valley oak	24	3	Moderate	Trunk divides at 20'.
212	Blue oak	21	3	Moderate	Asymmetric crown.
213	Calif. buckeye	5,12,12,11,9,9	4	Moderate	Trunks attach at base.
214	Valley oak	18	3	Moderate	Single trunk.
215	Calif. buckeye	10,10,8,7	4	Moderate	Trunks attach at base.
216	Valley oak	39	5	Moderate	Trunk divides at 25'.
217	Blue oak	13	3	Moderate	Trunk divides at 5'.
218	Calif. buckeye	9,6	3	Moderate	Trunks attach at base.
219	Calif. buckeye	7,3	3	Moderate	Trunks attach at base.
220	Calif. buckeye	6,6,4,4	3	Moderate	Trunks attach at base.
221	Blue oak	19	3	Moderate	Trunk divides at 12'.
222	Blue oak	19	3	Moderate	Single trunk.
223	Blue oak	7	3	Moderate	Single trunk.
224	Blue oak	27	4	Moderate	Trunk divides at 8'.
225	Blue oak	32	5	Moderate	Trunk divides at 10'.
226	Calif. buckeye	12,10	3	Moderate	Trunks attach at base.
227	Blue oak	20	4	Moderate	Trunk divides at 20'.
228	Blue oak	36	5	Moderate	Trunk divides at 20'.
229	Calif. buckeye	15,9,9,8	4	Moderate	Trunks attach at base.
230	Blue oak	18	3	Moderate	Roots exposed by stream erosion.
231	Valley oak	29	4	Moderate	Trunk divides at 10'.
232	Blue oak	26	5	Moderate	Trunk divides at 25'.
233	Calif. buckeye	13,11	4	Moderate	Trunks attach at base.
234	Calif. buckeye	12	3	Moderate	Single trunk.
235	Christmas berry	8	2	Moderate	Trunk grows horizontally.
236	Blue oak	18,8,8	3	Moderate	Trunks attach at 5'.
237	Blue oak	34	4	Moderate	Trunk divides at 12'.
238	Blue oak	31	4	Moderate	Trunk divides at 10'.
239	Valley oak	43	5	Moderate	Trunk divides at 10'.
240	Blue oak	22	3	Moderate	Trunk divides at 12'.

TREE No.	SPECIES	TRUNK DIAMETER (inches)	CONDITION 1=POOR 5=EXCELLENT	SUITABILITY FOR PRESERVATION	COMMENTS
241	Blue oak	24	4	Moderate	Trunk divides at 12'.
242	Blue oak	26	4	Moderate	Asymmetric crown.
243	Blue oak	30	5	Moderate	Trunk divides at 8'.
244	Blue oak	37	5	Moderate	Trunk divides at 10'.
245	Valley oak	39	5	Moderate	Trunk divides at 12'.
246	Valley oak	35	4	Moderate	Trunk divides at 8'.
247	Calif. buckeye	10,10,9,9,8	3	Moderate	Trunks attach at base.
248	Blue oak	37	5	Moderate	Trunk divides at 20'.
249	Blue oak	23	3	Moderate	Trunk divides at 8'.
250	Blue oak	42	5	Moderate	Trunk divides at 25'.
251	Almond	6,5,5,4	1	Poor	Almost dead.
252	Almond	10,8,7	3	Moderate	Trunks attach at 4'.
253	Mulberry	12,10	2	Moderate	Root failure.
254	Silk oak	15	2	Poor	Trunk decayed.
255	Manna gum	71	3	Moderate	Trunk wounded at base.

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D.3 - Offsite Special-Status Plant Survey Report

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Special-Status Plant Survey Report

City of Antioch Regional
Infrastructure Improvements

Contra Costa County, California

September 2019



Prepared for:

Richland Planned Communities, Inc.
3000 Lava Ridge Court
Roseville, CA 95661

Recommended Citation:

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Attachment A: Botanist Qualifications

Attachment B: Target Plant Species Reference Population Information

Attachment C: Plant Species Observed within the City of Antioch Regional Infrastructure Improvements Study Area

Attachment D: Potential Unusual (Locally Rare) Plants for Grassland and Riparian Habitats for Sand Creek
Focus Area, 2018

1.0 INTRODUCTION

This report presents the results of a special-status plant survey conducted for the approximately 44-acre City of Antioch Regional Infrastructure Improvements Area (Study Area). The Study Area is a proposed off-site waterline area for The Ranch in Antioch development project. The Study Area is located along and largely east of Deer Valley Road, from just south of Mammoth Way to just south of Sand Creek in southern Antioch, Contra Costa County, California. The Study Area is located in portions of Sections 5, 8, and 9 of Township 1 North and Range 2 East (MDB&M) of the "Antioch South, California" 7.5-Minute Series USGS Topographic Quadrangle (USGS 2013) (Figure 1).

2.0 METHODOLOGY

Madrone Ecological Consulting, LLC (Madrone) senior biologist Daria Snider conducted special-status plant surveys of the Study Area on 6 March, 3 May, 5 June, and 6 September, 2018; and 14 May, 2019. The special-status plant survey was conducted in accordance with the U.S. Fish and Wildlife Service's *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 1996), California Department of Fish and Wildlife's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018), and the *CNPS Botanical Survey Guidelines* (CNPS 2001).

A list of special-status plant species with potential to occur within the Study Area was developed by reviewing the following literature, and then refining the list based on habitats present within the Study Area:

- California Native Plant Society (CNPS) Rare and Endangered Plant Inventory (CNPS 2018) query of CRPR Lists 1A, 1B, 2A, 2B, and 3 within the "Antioch South, California" USGS topo quadrangle and eight surrounding quadrangles; and
- the California Natural Diversity Database occurrences of special-status plant species within 5 miles of the Study Area (CNDDB 2018).

The target species for this survey were:

- Big tarplant (*Blepharizonia plumosa*)
- Dwarf downingia (*Downingia pusilla*)
- Jepson's coyote thistle (*Eryngium jepsonii*)
- Spiny-sepaled button-celery (*Eryngium spinosepalum*)
- Diamond-petaled California poppy (*Eschscholzia rhombipetala*)
- Fragrant fritillary (*Fritillaria liliacea*)
- Diablo helianthella (*Helianthella castanea*)
- Brewer's western flax (*Hesperolinon breweri*)
- Showy golden madia (*Madia radiata*)
- Shining navarretia (*Navarretia nigelliformis* ssp. *radians*)
- Bearded popcornflower (*Plagiobothrys hystriculus*)

It should be noted that this target list differs slightly from the list of plant species with potential to occur in these areas that was included in the *Biological Resources Assessment for The Ranch in Antioch* (ECORP 2017). Below is a list of plant species that ECORP noted as having potential to occur, and the reason that we felt that suitable habitat did not occur within our Study Area:

Plant species	Reason that suitable habitat is lacking within Study Area
Large-flowered fiddleneck (<i>Amsinckia grandiflora</i>)	The Study Area is well outside of this species' elevational range.
Alkali milk-vetch (<i>Astragalus tener</i> var. <i>tener</i>)	This plant is found in alkali wetlands, which do not occur within the Study Area.
Heartscale (<i>Atriplex cordulata</i> var. <i>cordulata</i>)	This plant is found in alkali wetlands, which do not occur within the Study Area.
Brittlescale (<i>Atriplex depressa</i>)	This plant is found in alkali wetlands, which do not occur within the Study Area.
Mount Diablo fairy-lantern (<i>Calochortus pulchellus</i>)	Although this species is occasionally found in grassland habitats, those occurrences are only in association with adjacent well-developed chaparral and oak woodland, which do not occur on or in the vicinity of the Study Area.
Congdon's tarplant (<i>Centromadia parryi</i> ssp. <i>congdonii</i>)	This plant is found on alkaline soils, which do not occur within the Study Area.
Hoover's cryptantha (<i>Cryptantha hooveri</i>)	This species is only found on inland dunes and other sandy substrates, which do not occur within the Study Area.
Recurved larkspur (<i>Delphinium recurvatum</i>)	This plant is found on alkaline soils, which do not occur within the Study Area.
Mt. Diablo buckwheat (<i>Eriogonum truncatum</i>)	This plant is found in sandy soils, which do not occur within the Study Area.
San Joaquin spearscale (<i>Extriplex joaquinana</i>)	This plant is found on alkaline soils, which do not occur within the Study Area.
Carquinez goldenbush (<i>Isocoma arguta</i>)	The Study Area is outside of the distributional range of this species; it is only known to occur north of Suisun Bay and the Sacramento River.
Woodland woolythreads (<i>Monolopia gracilens</i>)	This plant is only found on serpentine soils, which do not occur within the Study Area.
California alkali grass (<i>Puccinellia simplex</i>)	This plant is found on alkaline soils, which do not occur within the Study Area.

Keck's checkerbloom (<i>Sidalcea keckii</i>)	This plant is only found on serpentine soils, which do not occur within the Study Area.
Most beautiful jewelflower (<i>Streptanthus albidus</i> ssp. <i>peramoenus</i>)	This plant is only found on serpentine soils, which do not occur within the Study Area.
Mt. Diablo jewelflower (<i>Streptanthus hispidus</i>)	The Study Area is well outside of the elevational range of this species.
Caper-fruited tropidocarpum (<i>Tropidocarpum</i> <i>capparideum</i>)	This plant is found on alkaline soils, which do not occur within the Study Area.

Meandering pedestrian surveys were conducted throughout the Study Area. The surveys were floristic in nature, which means that all plant species observed on-site were identified to the taxonomic level necessary to determine rarity. Thus, if a special-status plant was present but not on the target list (such as CNPS List 4 plant species, locally-rare plant species, or special-status plants not previously documented in the vicinity), it would have been detected and documented. Plant taxonomy was based on the nomenclature in the *Jepson eFlora* (Jepson Flora Project 2018). Vegetation communities were classified according to the *Manual of California Vegetation, Second Edition* (Sawyer et al. 2009). Qualifications for the botanist that conducted the survey are included in **Attachment A**, a list of reference populations of target plants visited is included in **Attachment B**, and a comprehensive list of all plant species observed during surveys of the Study Area is included in **Attachment C**.

We attempted to obtain a comprehensive list of the locally-rare plants of the region that was compiled by the East Bay Chapter of the California Native Plant Society, but despite repeated attempts, were unable to do so. As a result, we utilized a (potentially abbreviated) list of locally rare plant species that we provided by that chapter as part of the CEQA review for The Ranch in Antioch project. This list is included as **Attachment D**.

3.0 EXISTING SITE CONDITIONS

The Study Area is bounded by suburban residential development to the north, undeveloped land, a hospital, and a high school on the east, and undeveloped land to the south and west. Topography within the Study Area ranges from gently rolling hills to flat terrain, with elevations ranging from approximately 200 feet to 220 feet above mean sea level. The Study Area is comprised of portions of Deer Valley Road and Sand Creek Road as well as adjacent undeveloped areas.

3.1 Terrestrial Vegetation Communities

Three terrestrial vegetation communities were mapped within the Study Area (**Figure 2**). These include Annual Brome Grassland, Ruderal community, and Developed. These vegetation communities are described below.

3.1.1 Annual Brome Grassland

The majority of the Study Area is composed of annual brome grassland. Annual grasslands within the Study Area are dominated primarily by non-native annual grass species, including ripgut brome (*Bromus diandrus*), soft brome (*Bromus hordeaceus*), wild oat (*Avena fatua*), foxtail barley (*Hordeum murinum*), and Italian ryegrass (*Festuca perennis*). Common forb species within the annual grasslands include common gumplant (*Grindelia camporum*), bur clover (*Medicago polymorpha*), and red-stemmed filaree (*Erodium cicutarium*).

3.1.2 Ruderal Community

Ruderal vegetation occurs adjacent to Deer Valley Road and Sand Creek Road. This vegetation community is composed primarily of non-native forbs and grasses characteristic of recently disturbed sites. Dominant plant species within the ruderal vegetation communities in the Study Area include yellow star-thistle (*Centaurea solstitialis*), stinkwort (*Dittrichia graveolens*), Russian thistle (*Salsola tragus*), Italian ryegrass, and wild oat.

3.1.3 Developed

Developed portions of the Study Area include roads, landscaped areas, and other paved or recently disturbed areas. Any vegetation within these areas is primarily ornamental and is regularly maintained.

3.2 Aquatic Resources

A protocol-level aquatic resources delineation was conducted for the Study Area (Madrone 2019). Aquatic resources mapped within the Study Area during this survey are depicted in **Figure 2**. A description of each of the mapped aquatic resources types is included below.

3.2.1 Seasonal Wetland

Seasonal wetlands are ephemerally wet due to accumulation of surface runoff and rainwater within low-lying areas. Inundation periods tend to be relatively short and they are commonly dominated by nonnative annual and sometimes perennial hydrophytic species. Two seasonal wetlands occur within the Study Area. These seasonal wetlands are shallow features dominated by Italian ryegrass.

3.2.2 Intermittent Drainage (Sand Creek)

Intermittent drainages are linear features that exhibit a bed and bank and an OHWM. Intermittent drainages differ from ephemeral drainages in that they flow for longer duration, typically weeks or months following rainfall events, and are often influenced by groundwater. This usually results in greater quantities and duration of flow relative to ephemeral drainages. One intermittent drainage, Sand Creek, occurs within the Study Area. Sand Creek is a highly incised intermittent drainage with steep banks and little to no vegetation within the channel. The banks of Sand Creek are quite tall, and in most areas, are occupied by species typical of the surrounding annual brome grassland. In addition, a few very large trees have established along these banks, including California buckeye (*Aesculus californicus*), Coast live oak (*Quercus agrifolia*), and Valley oak (*Quercus lobata*).

3.3 Soils

According to the Natural Resources Conservation Service (NRCS) Soil Survey Database (NRCS 2018), three soil mapping units occur within the Study Area (**Figure 3**): (AbD) Altamont Clay, 9 to 15 percent slopes; (CaA) Capay Clay, 0 to 2 percent slopes; and (RbA) Rincon Clay Loam, 0 to 2 percent slopes.

These soils are clays or clay loams; none are sandy, and none are derived from serpentine parent material (NRCS 2018). None of the components of these soil mapping units are considered saline or alkaline (NRCS 2018).

4.0 SURVEY RESULTS

4.1 Big Tarplant

Big tarplant (*Blepharizonia plumosa*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs in valley and foothill grassland, usually in clay soil (CNPS 2018). Big tarplant blooms from July through October and is known to occur from 98 to 1,657 feet above MSL (CNPS 2018).

Suitable habitat for this species is present in the Annual Brome Grasslands throughout the Study Area. This species was not observed during the 2018 special-status plant surveys of the Study Area.

4.2 Dwarf Downingia

Dwarf downingia (*Downingia pusilla*) is not listed pursuant to either the federal or California ESAs, but has been identified by the CNPS as a List 2B.2 species. This species is an herbaceous annual that occurs in vernal pools and mesic areas in Valley and foothill grasslands (CNPS 2018). This species blooms from March through May and is known to occur at elevations ranging from 3 to 1,460 feet above MSL (CNPS 2018).

Marginally suitable habitat for this species is present in the seasonal wetlands and other aquatic resources within the Study Area. This species was not observed during the 2018 special-status plant surveys of the Study Area.

4.3 Jepson's Coyote Thistle

Jepson's coyote thistle (*Eryngium jepsonii*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is a perennial herb that is found on clay soils in vernal pools and other mesic areas in valley and foothill grasslands (CNPS 2018). Jepson's coyote thistle blooms from April through August and is known to occur at elevations ranging from 10 to 9,842 feet above MSL (CNPS 2018).

Marginally suitable habitat for this species is present in the seasonal wetlands and other aquatic resources within the Study Area. This species was not observed during the 2018 special-status plant surveys of the Study Area.

4.4 Spiny-Sepaled Button-Celery

Spiny-sepaled button-celery (*Eryngium spinosepalum*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is an herbaceous annual/perennial that occurs in vernal pools and other mesic areas in valley and foothill grasslands (CNPS 2018). Spiny-sepaled button-celery blooms from April through June and is known to occur at elevations ranging from 262 to 3,199 feet above MSL (CNPS 2018).

Marginally suitable habitat for this species is present in the seasonal wetlands and other aquatic resources within the Study Area. This species was not observed during the 2018 special-status plant surveys of the Study Area.

4.5 Diamond-Petaled California Poppy

Diamond-petaled California poppy (*Eschscholzia rhombipetala*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs on alkaline clay soils within Valley and foothill grassland (CNPS 2018). Diamond-petaled California poppy blooms from March through April and is known to occur at elevations ranging from sea level to 3,199 feet above MSL (CNPS 2018).

Marginally suitable habitat for this species is present in the Annual Brome Grasslands around the Alkali Weed –Salt Grass Sink in the northwestern portion of the Study Area. This species was not observed during the 2018 special-status plant surveys of the Study Area.

4.6 Fragrant Fritillary

Fragrant fritillary (*Fritillaria liliacea*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is a perennial bulbiferous herb that is found in cismontane woodland, coastal prairie, coastal scrub, and Valley and foothill grassland, often on serpentine soils (CNPS 2018). Fragrant fritillary blooms from February through April and is known to occur from 10 to 1,345 feet above MSL (CNPS 2018).

Marginally suitable habitat for this species is present in the Annual Brome Grasslands throughout the Study Area. This species was not observed during the 2018 special-status plant surveys of the Study Area.

4.7 Diablo Helianthella

Diablo helianthella (*Helianthella castanea*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is an herbaceous perennial that is usually found on rocky, axonal soils, in partial shade, in broadleaved upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, and Valley and foothill grassland (CNPS 2018). Diablo helianthella blooms from March through June and is known to occur from 197 to 4,265 feet above MSL (CNPS 2018).

Marginally suitable habitat for this species is present in the Annual Brome Grasslands throughout the Study Area. This species was not observed during the 2018 special-status plant surveys of the Study Area.

4.8 Brewer's Western Flax

Brewer's western flax (*Hesperolinon breweri*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.2 species. This species is an herbaceous annual that occurs in chaparral, cismontane woodland, and valley and foothill grassland, usually in serpentine substrates (CNPS 2018). Brewer's western flax blooms from May through July and is known to occur from 98 to 3,100 feet above MSL (CNPS 2018).

Marginally suitable habitat for this species is present in the Annual Brome Grasslands throughout the Study Area. The Study Area falls within CNDDDB Occurrence #32 for this species (CNDDDB 2018). This species was documented by Live Oak Associates somewhere in the Sand Creek Specific Plan in 2002 (CNDDDB 2018). We have not been able to locate the map showing the location of these plants within the Sand Creek Specific Plan, but given that this site is only a small portion of that area, the marginal nature of the habitat within this Study Area, and the much higher quality habitat in the hills to the south of the Study Area, we find it unlikely that Brewer's western flax was observed within this Study Area. This species was not observed during the 2018 special-status plant surveys of the Study Area.

4.9 Showy Golden Madia

Showy golden madia (*Madia radiata*) is not listed pursuant to either the federal or California ESAs, but is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs in cismontane woodland and Valley and foothill grasslands (CNPS 2018). Showy golden madia blooms between March and May and is known to occur at elevations ranging from 82 to 3,986 feet above MSL (CNPS 2018).

Suitable habitat for this species is present in the Annual Brome Grasslands throughout the Study Area. The Study Area falls within CNDDDB Occurrence #25 for showy golden madia (CNDDDB 2018). This occurrence includes two records from Hoover in 1938 and 1941, from "Lone Tree Valley" and "1 mi N of Lone Tree Valley" (CNDDDB 2018). Given that these occurrences have not been documented since 1941, the CNPS Inventory considers showy golden madia to be extirpated in Contra Costa County (CNPS 2018). This species was not observed during the 2018 special-status plant surveys of the Study Area.

4.10 Shining Navarretia

Shining navarretia (*Navarretia nigelliformis* ssp. *radians*) is not federally or state listed, but it is classified as a CRPR List 1B.2 species. This annual herb is primarily associated with vernal pools and other mesic areas in cismontane woodland and valley and foothill grassland, often on clay soils (CNPS 2018). Shining navarretia occurs at elevations between approximately 210 feet and 3,280 feet, and typically blooms from April through July (CNPS 2018).

Suitable habitat for this species is present in the Annual Brome Grasslands throughout the Study Area. Although this species has not previously been documented within the Study Area, it has been documented in relative abundance on The Ranch in Antioch Project site. The Madrone botanist visited these known populations of shining navarretia, and found that very few of the previously mapped populations appear to have emerged in 2018, and those that did emerged quite late, and senesced quickly. This was a trend noted on numerous sites visited by Madrone biologists during the spring of 2018; other upland *Navarretia* species that are usually quite prevalent were quite sparse. We have conjectured that it may have been due to the unusual precipitation regime in 2018. As a result, we did not feel that the 2018 surveys were conclusive for this species; therefore, we conducted an additional survey of the Study Area on 14 May 2019, targeting this species only. On that date, shining navarretia was prevalent on The Ranch in Antioch Project site. We did not observe this species during either the 2018 or 2019 follow-up special-status plant survey of the Study Area.

4.11 Bearded Popcornflower

Bearded popcornflower (*Plagiobothrys hystriculus*) is not listed as endangered pursuant to either the federal and California ESAs and is designated as a CRPR 1B.1 species. This species is an herbaceous annual that occurs in mesic areas in valley and foothill grassland and vernal pool margins, often in vernal swales (CNPS 2018). Bearded popcornflower blooms between April and May and is known to occur at elevations ranging from 0 to 899 feet above MSL (CNPS 2018).

Marginally suitable habitat for this species is present in the seasonal wetlands and other aquatic resources within the Study Area. This species was not observed during the 2018 special-status plant surveys of the Study Area.

4.12 Sensitive Natural Communities

No Sensitive Natural Communities were found within the Study Area.

5.0 CONCLUSION

No special-status plant species or plant species noted as Locally Rare in **Attachment D** were observed within The Ranch in Antioch Off-Site Infrastructure Study Area during the 2018 and 2019 protocol-level special-status plant surveys.

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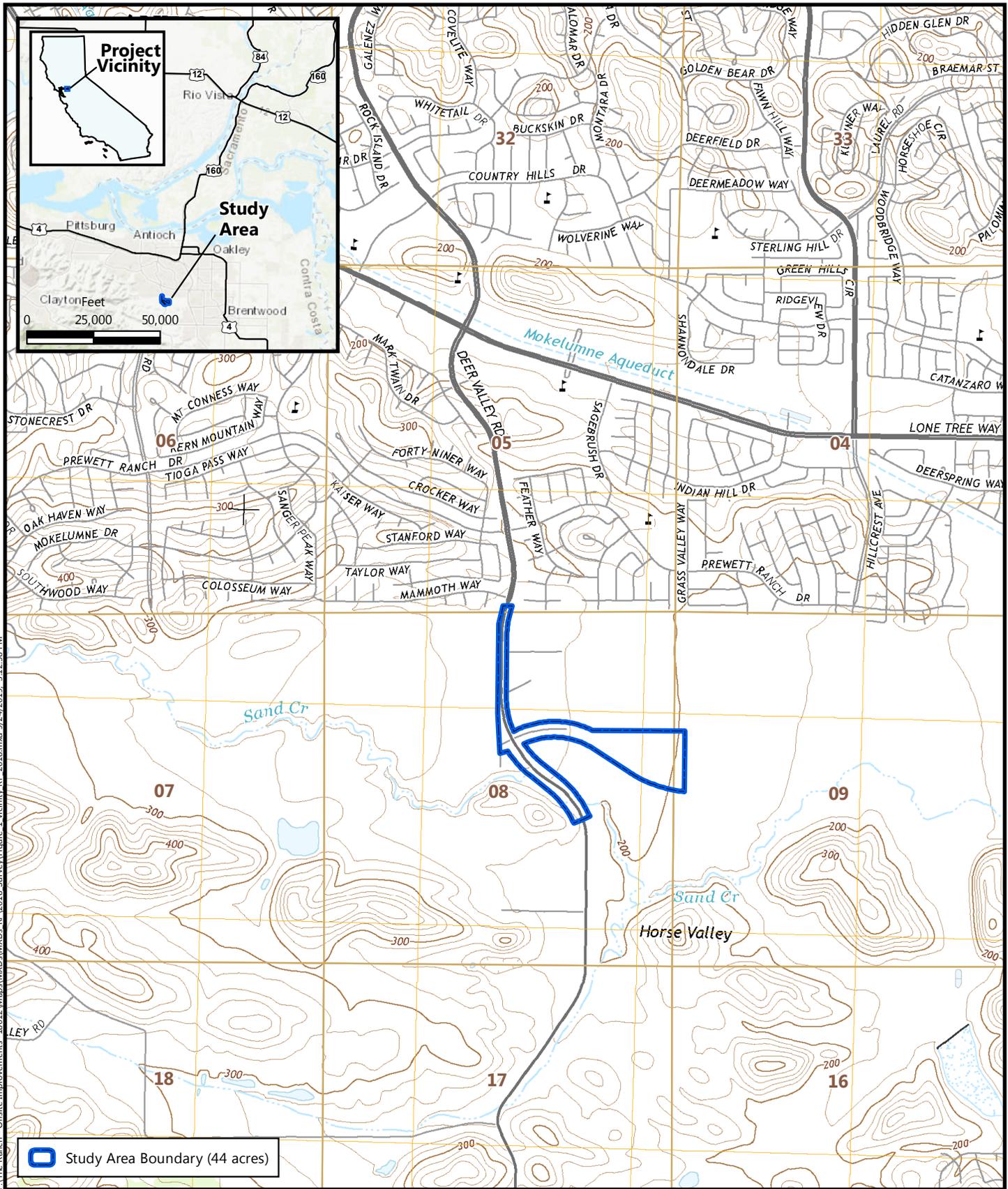
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Figures

Figure 1. Vicinity Map

Figure 2. Aquatic Resources and Terrestrial Vegetation Communities

Figure 3. NRCS Soils



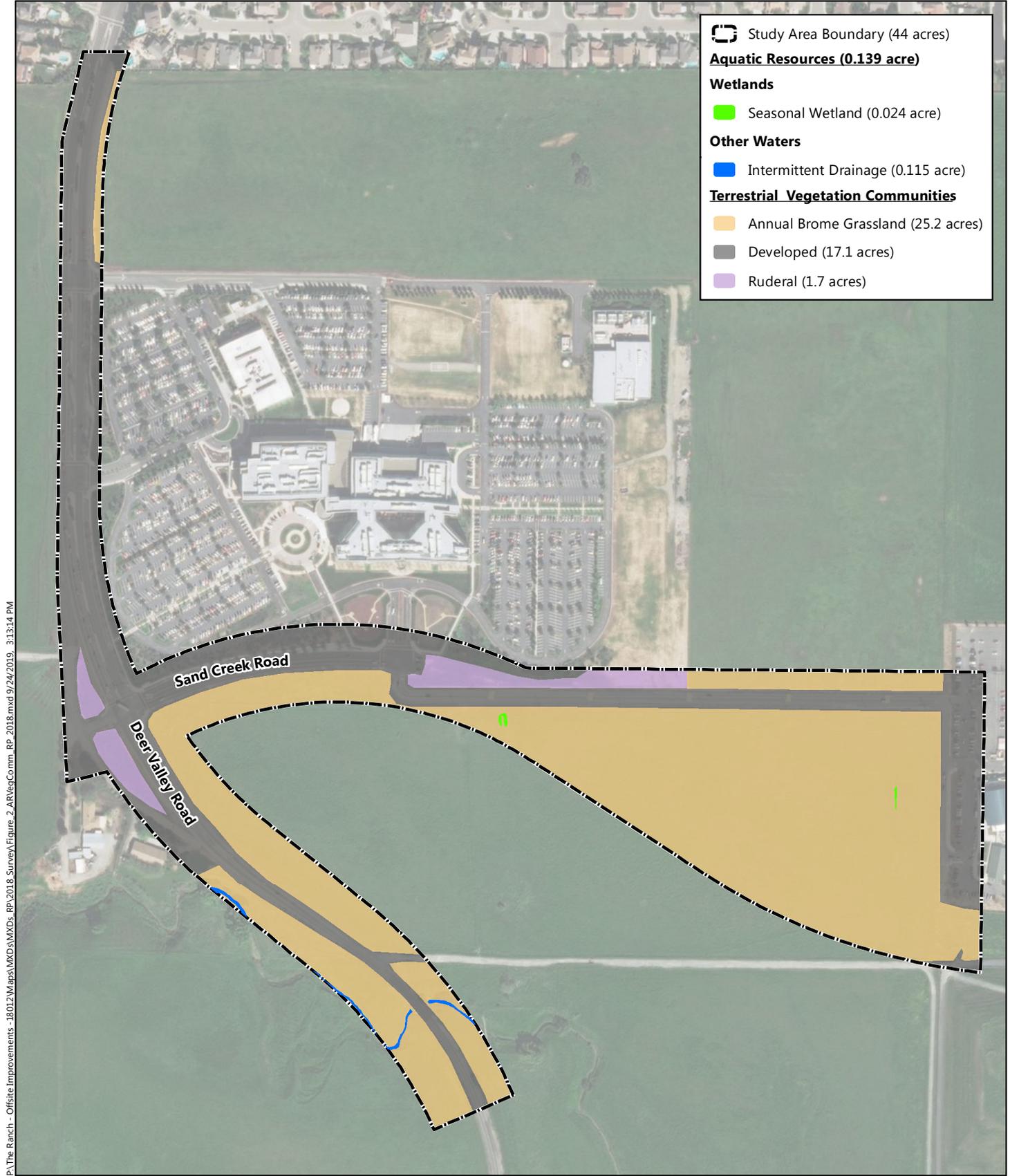
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Figure 1
Site Vicinity

Source: United States Geologic Survey, 2015.
 Sections 5, 8, and 9, Township 1 North, Range 2 East, MDB&M
 "Antioch South, California" 7.5-Minute Topographic Quadrangle
 Longitude -121.773572, Latitude 37.948785

City of Antioch Regional Infrastructure Improvements
 Antioch, Contra Costa County, California





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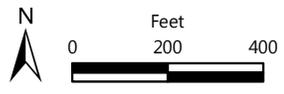


Figure 2
Aquatic Resources and
Terrestrial Vegetation Communities

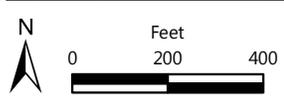
City of Antioch Regional Infrastructure Improvements
 Antioch, Contra Costa County, California



Aerial Source: DigitalGlobe, 19 August 2017



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Soil Survey Source: *USDA, Soil Conservation Service. Soil Survey Geographic (SSURGO) database for Contra Costa County, California*
 Aerial Source: *DigitalGlobe, 19 August 2017*

Figure 3
Natural Resources Conservation Service Soils

City of Antioch Regional Infrastructure Improvements
Antioch, Contra Costa County, California



Attachments

Attachment A: Botanist Qualifications

Attachment B: Target Plant Species Reference Population Information

Attachment C: Plant Species Observed within the City of Antioch Regional Infrastructure
Improvements Study Area

Attachment D: Potential Unusual (Locally Rare) Plants for Grassland and Riparian Habitats for
Sand Creek Focus Area, 2018

Attachment A

Botanist Qualifications

Rare Plant Survey Botanist Qualifications

Daria Snider

Ms. Snider has more than 15 years of experience conducting botanical inventories. As a senior biologist, she specializes in rare plant surveys, wetland delineations, and general biological resource inventories. In addition to rare plant surveys, her botanical experience includes general vegetation surveys, aerial and field vegetation mapping, Certified Arborist tree inventories, CRAM Assessments, floristic monitoring, and invasive species identification and mapping. Ms. Snider's experience includes a wide variety of habitat types, including vernal pools, alkaline sinks and playas, annual grasslands, oak woodlands, riparian communities, coastal sage scrub, chaparral, cismontane and montane forests, and desert. Her geographic expertise covers much of California, from Shasta County in the north to the Mojave Desert and San Gabriel Mountains in the south, and from Napa and Sonoma Counties in the west to the Sierra Nevada foothills and mountains in the east. Her primary focus is on the Sacramento Valley and the adjacent Sierra Nevada foothills.

Attachment B

Target Plant Species
Reference Population Information

**Target Plant Species Reference Population Information
for City of Antioch Regional Infrastructure Improvements
Special-Status Plant Survey**

Plant Species	Location of Reference Population	Date of Visit	Phenology of Reference Population/ Distinctive Characteristics
<i>Blepharizonia plumosa</i> Big tarplant	Black Diamond Mines Regional Park CNDDDB Occurrence # 39	6 September 2018	Population robust; approximately 50% in bud, 40% in bloom, and 10% in fruit. Found on a north-facing roadcut. Readily identifiable by its plumose pappus bristles.
<i>Downingia pusilla</i> Dwarf downingia	Burke Ranch Mitigation Bank	19 April 2018	Thousands of plants, both of the white and purple variant of this species. Peak bloom; approximately 15% of plants remain in bud. Plants readily differentiated from other <i>Downingia</i> by their star-shaped flowers and stout, diminutive stature.
<i>Eryngium jepsonii</i> Jepson's coyote thistle	UC Davis Center for Plant Diversity Herbarium	22 March 2018	Plants are stout and erect, with a prominent main stem. The sepal tip spines are longer than 1mm, and the outer bracts are more than 2x the inner bracts.
<i>Eryngium spinosepalum</i> Spiny-sepaled button-celery	UC Davis Center for Plant Diversity Herbarium	22 March 2018	Very similar to <i>Eryngium castrense</i> , but with fruit scales that are acute and obvious oil ducts, as opposed to the long, tapering fruit scales and very inconspicuous oil ducts in <i>E. castrense</i> .
<i>Eschscholzia rhombipetala</i> Diamond-petaled California poppy	No reference population or herbarium specimen could be located.	N/A	
<i>Fritillaria liliacea</i> Fragrant fritillary	Tilden Park Botanical Garden	17 February 2018	Several plants are present – one is in full bloom, and several are in bud.

Plant Species	Location of Reference Population	Date of Visit	Phenology of Reference Population/ Distinctive Characteristics
<i>Helianthella castanea</i> Diablo helianthella	CNDDDB Occurrence #117	5 June 2018	Robust population of about 30 plants, growing on a north-facing slope in weedy annual grassland just below an oak woodland. One plant in full bloom, and the rest are in fruit.
<i>Hesperolinon breweri</i> Brewer's western flax	No reference population or herbarium specimen could be located.	N/A	
<i>Madia radiata</i> Showy golden madia	UC Davis Center for Plant Diversity Herbarium	22 March 2018	Plants are conspicuous due to the large, showy ray flowers, and are distinguished from other <i>Madia</i> by the beaked ray fruits.
<i>Navarretia nigelliformis</i> ssp. <i>radians</i> Shining navarretia	Previously-mapped populations within The Ranch at Antioch Project Area	3 May 2018 and 5 June 2018 14 May 2019	Plants were not identifiable at the time of the May visit, and were past bloom at the time of the June visit. This was a large known population, and very few plants grew in this location this year, potentially due to the unusual precipitation timing. Plants were in full bloom and abundant. Readily identifiable by the yellow flowers and grey-green foliage.
<i>Plagiobothrys hystriculus</i> Bearded popcornflower	UC Davis Center for Plant Diversity Herbarium	22 March 2018	Quite similar to <i>Plagiobothrys greenei</i> , but with much smaller nutlets (1-1.5 mm vs. 1.5-3 mm).

Attachment C

**Plant Species Observed within
The City of Antioch Regional
Infrastructure Improvements
Study Area**

Plant Species Observed within
The City of Antioch Regional
Infrastructure Improvements Study Area
6 March, 3 May, 5 June, and 6 September 2018

Family / Species Name	Common name	Native / Non-Native
AGAVACEAE		
<i>Chlorogalum angustifolium</i>	Narrowleaf soap plant	Native
AMARANTHACEAE		
<i>Amaranthus blitoides</i>	Procumbent pigweed	Native
APIACEAE		
<i>Anthriscus caucalis</i>	Bur-chervil	Non-Native
<i>Foeniculum vulgare</i>	Fennel	Non-Native
APOCYNACEAE		
<i>Asclepias fascicularis</i>	Narrow-leaf milkweed	Native
<i>Vinca major</i>	Greater periwinkle	Non-Native
ARECACEAE		
<i>Washingtonia robusta</i>	Mexican fan palm	Non-Native
ASTERACEAE		
<i>Achillea millefolium</i>	Yarrow	Native
<i>Achyrochaena mollis</i>	Blow wives	Native
<i>Anthemis cotula</i>	Mayweed	Non-Native
<i>Artemisia douglasiana</i>	Mugwort	Native
<i>Carduus pycnocephalus subsp. pycnocephalus</i>	Italian thistle	Non-Native
<i>Centaurea calcitrapa</i>	Purple star-thistle	Non-Native
<i>Centaurea solstitialis</i>	Yellow star-thistle	Non-Native
<i>Centromadia fitchii</i>	Fitch's spikeweed	Native
<i>Dittrichia graveolens</i>	Stinkwort	Non-Native
<i>Erigeron canadensis</i>	Horseweed	Native
<i>Grindelia camporum</i>	Great Valley gumweed	Native
<i>Helminthotheca echioides</i>	Bristly ox-tongue	Non-Native
<i>Heterotheca grandiflora</i>	Telegraph weed	Native
<i>Holocarpha heermannii</i>	Heermann's tarweed	Native
<i>Hypochaeris glabra</i>	Smooth cat's-ear	Non-Native
<i>Lactuca serriola</i>	Prickly lettuce	Non-Native
<i>Microseris douglasii subsp. douglasii</i>	Douglas' silverpuffs	Native
<i>Senecio vulgaris</i>	Common groundsel	Non-Native
<i>Silybum marianum</i>	Milk thistle	Non-Native

Family / Species Name	Common name	Native / Non-Native
<i>Xanthium strumarium</i>	Cocklebur	Native
BORAGINACEAE		
<i>Amsinckia menziesii</i>	Common fiddleneck	Native
<i>Plagiobothrys fulvus var. campestris</i>	Field popcornflower	Native
<i>Plagiobothrys stipitatus var. micranthus</i>	Slender popcornflower	Native
BRASSICACEAE		
<i>Brassica nigra</i>	Black mustard	Non-Native
<i>Brassica rapa</i>	Field mustard	Non-Native
<i>Capsella bursa-pastoris</i>	Shepherd's purse	Non-Native
<i>Hirschfeldia incana</i>	Tumble mustard	Non-Native
<i>Lepidium nitidum</i>	Shining pepperweed	Native
CARYOPHYLLACEAE		
<i>Cerastium glomeratum</i>	Sticky mouse-ear chickweed	Non-Native
<i>Spergularia rubra</i>	Red sand-spurrey	Non-Native
CHENOPODIACEAE		
<i>Chenopodium album</i>	Lamb's quarters	Non-Native
<i>Salsola tragus</i>	Russian thistle	Non-Native
CONVOLVULACEAE		
<i>Convolvulus arvensis</i>	Bindweed	Non-Native
CUPRESSACEAE		
<i>Cedrus deodara</i>	Deodar cedar	Non-native
EUPHORBIACEAE		
<i>Croton setiger</i>	Turkey-mullein	Native
FABACEAE		
<i>Acmispon americanus var. americanus</i>	Spanish lotus	Native
<i>Lupinus bicolor</i>	Miniature lupine	Native
<i>Lupinus nanus</i>	Valley sky lupine	Native
<i>Medicago polymorpha</i>	California burclover	Non-Native
<i>Trifolium fragiferum</i>	Strawberry clover	Non-Native
<i>Trifolium glomeratum</i>	Clustered clover	Non-Native
<i>Trifolium hirtum</i>	Rose clover	Non-Native
<i>Vicia sativa subsp. sativa</i>	Spring vetch	Non-Native
<i>Vicia villosa subsp. villosa</i>	Winter vetch	Non-Native
FAGACEAE		
<i>Quercus agrifolia</i>	Coast live oak	Native

Family / Species Name	Common name	Native / Non-Native
<i>Quercus lobata</i>	Valley oak	Native
GERANIACEAE		
<i>Erodium botrys</i>	Filaree	Non-Native
<i>Erodium cicutarium</i>	Redstem filaree	Non-Native
<i>Geranium molle</i>	Geranium molle	Non-Native
LAMIACEAE		
<i>Trichostema lanceolatum</i>	Vinegar weed	Native
MALVACEAE		
<i>Malva parviflora</i>	Cheeseweed, little mallow	Non-Native
MONTIACEAE		
<i>Calandrinia menziesii</i>	Red maids	Native
MYRSINACEAE		
<i>Lysimachia arvensis</i>	Scarlet pimpernel	Non-Native
OLEACEAE		
<i>Olea europaea</i>	Cultivated olive	Non-Native
ONAGRACEAE		
<i>Epilobium brachycarpum</i>	Panicled willow-herb	Native
OROBANCHACEAE		
<i>Bellardia trixago</i>	Mediterranean linseed	Non-Native
<i>Castilleja attenuata</i>	Valley tassels	Native
PAPAVERACEAE		
<i>Eschscholzia californica</i>	California poppy	Native
POACEAE		
<i>Avena barbata</i>	Slender wild oat	Non-Native
<i>Avena fatua</i>	Wild oat	Non-Native
<i>Bromus diandrus</i>	Ripgut grass	Non-Native
<i>Bromus hordeaceus</i>	Soft chess	Non-Native
<i>Bromus madritensis subsp. rubens</i>	Red brome	Non-Native
<i>Crypsis schoenoides</i>	Swamp prickle grass	Non-Native
<i>Cynodon dactylon</i>	Bermuda grass	Non-Native
<i>Elymus caput-medusae</i>	Medusa head	Non-Native
<i>Elymus glaucus subsp. glaucus</i>	Blue wildrye	Native
<i>Elymus triticoides</i>	Creeping wildrye	Native
<i>Festuca perennis</i>	Rye grass	Non-Native

Family / Species Name	Common name	Native / Non-Native
<i>Hordeum marinum subsp. gussoneanum</i>	Mediterranean barley	Non-Native
<i>Hordeum murinum</i>	Wall barley	Non-Native
<i>Muhlenbergia rigens</i>	Deer grass	Native
<i>Phalaris paradoxa</i>	Hood canary grass	Non-Native
POLYGONACEAE		
<i>Polygonum aviculare subsp. depressum</i>	Prostrate knotweed	Non-Native
<i>Rumex crispus</i>	Curly dock	Non-Native
<i>Rumex pulcher</i>	Fiddle dock	Non-Native
SAPINDACEAE		
<i>Aesculus californica</i>	California buckeye	Native
THEMIDACEAE		
<i>Dichelostemma capitatum</i>	Blue dicks	Native
<i>Triteleia laxa</i>	Ithuriel's spear	Native
ZYGOPHYLLACEAE		
<i>Tribulus terrestris</i>	Puncture vine	Non-Native

Attachment D

**Potential Unusual (Locally Rare) Plants for
Grassland and Riparian Habitats for
Sand Creek Focus Area, 2018**

Appendix 1:
Potential Unusual (Locally Rare) Plants for Grassland and Riparian Habitats
For Sand Creek Focus Area, 2018

Amaranthus powellii
Blepharizonia laxa
BLEPHARIZONIA PLUMOSA
Brodiaea terrestris ssp. terrestris
Camissonia campestris ssp. campestris
Lasthenia minor
Layia hieracioides
Lithophragma bolanderi
Microseris campestris
Microseris elegans
Mimulus latidens
Navarretia viscidula
Pectocarya penicillata
Pentachaeta alsinoides
Pentachaeta exilis ssp. exilis
Pilularia americana
Plagiobothrys infectivus
Trifolium gambelii

Appendix 2:
Potential Statewide Listed Rare Plants for Grassland and Riparian Habitats
For Sand Creek Focus Area, 2018

Blepharizonia plumosa
California macrophylla
Eriogonum truncatum
Hesperolinon breweri
Juglans hindsii
Madia radiata

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D.4 - Ranch at Antioch San Joaquin Kit Fox Survey

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H. T. HARVEY & ASSOCIATES

Ecological Consultants



**Ranch at Antioch
San Joaquin Kit Fox Survey**

Project #4275-01



Prepared for:

Richland Communities, Inc.

Kate Hart

3000 Lava Ridge Court, Suite 115

Roseville, CA 95661

Prepared by:

H. T. Harvey & Associates



March 2019



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List of Preparers

Brian B. Boroski, Ph.D., Principal-in-Charge
Jeff Seay, B.S. Senior Wildlife Ecologist

Section 1. Introduction

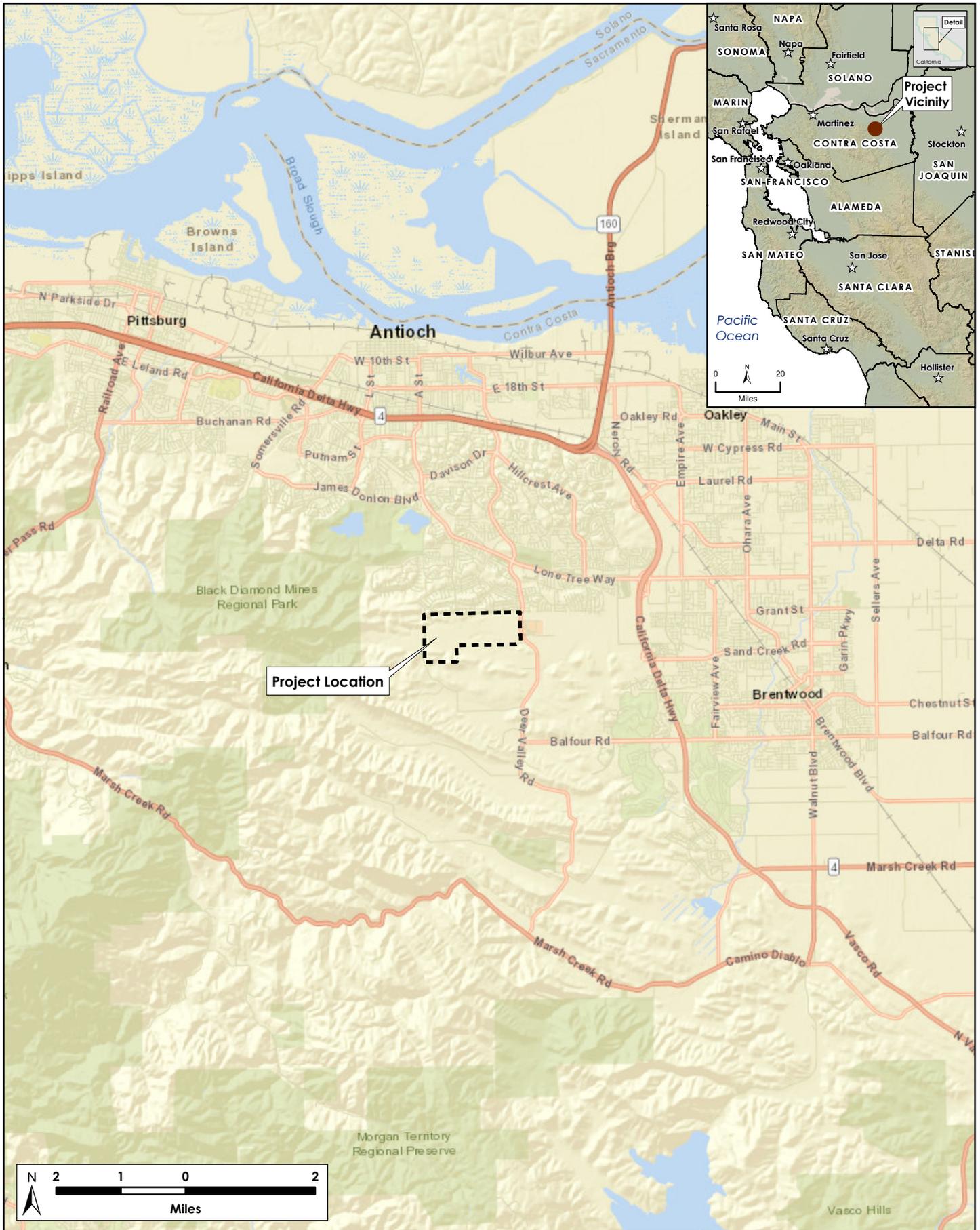
H. T. Harvey & Associates conducted surveys for sign of San Joaquin kit fox (*Vulpes macrotis mutica*) using ecological scent-detection dogs at the approximately 546-acre Ranch at Antioch (Ranch) (Figure 1). The Ranch adjoining Deer Valley Road to the east and Empire Mine Road to the west is primarily comprised of annual grassland and oak savannah habitats supporting an active cattle operation. Expansive areas of residential development adjoin the Ranch to the north, Antioch Medical Center and open space exists to the east, and open space occurs immediately south and west of the Ranch.

Detection dogs have effectively detected San Joaquin kit fox scat in various habitat types and in areas of high kit fox abundance, as well as in areas with low kit fox abundance (Smith et al. 2005). As an added benefit, scat surveys are noninvasive, and scat can be used to genetically confirm species identity and to identify the number of individuals potentially using the project site (Maldonado 2010). Detection dogs can detect fresh scat as well as scat that is several weeks or months old. As such, detection dog teams are more likely to detect foxes that occur at low densities or that only occasionally use an area, and can aid in the development of a longer-term, holistic understanding of kit fox use in a survey area, as compared to other survey methods (Smith et al. 2003, 2005).

The closest documented record of San Joaquin kit fox to the Ranch was reported in 1995 and is located approximately 1.5 miles northwest of the Ranch (CNDDB 2019). In 1994, H. T. Harvey & Associates (1994) completed protocol-level surveys for San Joaquin kit fox for the hospital site east of the Ranch along Deer Valley Road, including spotlighting surveys along Deer Valley Road and Empire Mine Road, and did not find any evidence of kit foxes on that project site or within two miles of the site, which included Antioch Ranch. As the northern range of the San Joaquin kit fox is composed largely of marginal habitat (Clark et al. 2007) and records of San Joaquin kit fox are uncommon in the vicinity of the Ranch at Antioch, surveys for the species using detection dogs is a prime method for reliable results.

Reliable surveys for species that rarely occur in an area require a method with a high rate of detection. The detection rate of three San Joaquin kit fox scat-detection dog teams used by H. T. Harvey & Associates was rigorously studied in 2016 and resulted in an average detection rate of 0.90. This detection rate is comparable to, or at the high end of, rates calculated for other detection dog teams that survey for carnivore species. The dog-handler teams' average detection rates estimated in Long et al. (2007a) were 0.95 for fishers (*Martes pennanti*), 0.86 for black bears (*Ursus americanus*), and 0.40 for bobcats (*Lynx rufus*). In Long et al. (2007b) estimated detection rates were 0.84 for fishers, 0.87 for black bears, and 0.27 for bobcats. The detection rates of dog-handler teams surveying for carnivore species were always significantly higher than those obtained by other methods of survey. For example, remote-sensing camera stations have demonstrated detection rates of only 0.28 for fishers, 0.33 for black bears, and 0.13 for bobcats (Long et al. 2007b). Furthermore, when other noninvasive methods for carnivore surveys (not involving detection dogs) were examined, it was found that those survey efforts require approximately 30 days to achieve a detection rate similar to that obtained by the

detection dog teams used by H. T. Harvey & Associates (Gompper et al. 2006). In summary, when compared to traditional survey methods for carnivores, such as camera traps, hair snares, and scent stations, ecological scent-detection dogs trained to find the scat of a target species can provide a more effective detection method (Wasser et al. 2004, Harrison 2006, Long et al. 2007b). Therefore, using detection dog teams to survey for San Joaquin kit fox at the Ranch at Antioch provided an efficient and highly effective technique for documenting presence or absence.



N:\Projects\4200\4275-01\Reports\Fig 1 Vicinity Map.mxd;miagard



H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 1. Vicinity Map

The Ranch at Antioch San Joaquin Kit Fox Surveys (4275-01)
March 2019

Section 2. San Joaquin Kit Fox Surveys at the Ranch at Antioch

2.1 Methods

2.1.1 Detection Dog Training

Two detection dogs were used to survey the Ranch at Antioch, a border collie/lab mix named Luna and a Belgian malinois named Gunny, with 6 and 3 years of experience with detection of kit fox scat, respectively (Photos 1 and 2). The two detection dogs chosen for the survey were trained, using industry-accepted methods (Smith et al. 2001, Wasser et al. 2004), to recognize the scent of San Joaquin kit fox scat and to alert their handlers to the location of the scat. The dogs were trained on scat from multiple kit fox individuals from each sex, to encourage the dogs to find every variety of kit fox scat encountered during surveys. In addition, the dogs were trained to ignore nontarget scents of sympatric canids, such as coyotes (*Canis latrans*) and red foxes (*Vulpes vulpes*), so that the dogs were unlikely to alert handlers to these species, thereby increasing efficiency. The two teams that surveyed the Ranch at Antioch have a documented history of conducting successful San Joaquin kit fox scat surveys.



Photo 1. Luna, San Joaquin Kit Fox Detection Dog



Photo 2. Gunny, San Joaquin Kit Fox Detection Dog

2.1.2 | San Joaquin Kit Fox Surveys

To inform the level of effort (measured in survey miles) needed to achieve rigorous results at the Ranch at Antioch, the expected kit fox scat density at this site was estimated based on encounter rates reported in the literature. Smith et al. (2005) used scent-detection dogs to survey for kit fox scat at several sites throughout the southern and central portions of the San Joaquin kit fox's range in both core (high-density) and satellite (low-density) populations. The lowest encounter rate observed by Smith et al. (2005), representing the lowest density of kit foxes among all the satellite population areas surveyed, was 0.40 scat locations per mile. Seven to 8 miles of transects would theoretically result in an average of 3 detected kit fox scats in a sparsely occupied area; therefore, based on the high rate of detection (0.90) of H. T. Harvey & Associates' detection dogs, this amount of effort provides a low error rate. The target survey mileage for the approximately 0.85 square-mile (mi²) Ranch at Antioch was 7 to 8 miles per 1 mi², which is the smallest reported home range for a San Joaquin kit fox (USFWS 1998).

On February 22, 2019, two detection dog teams, each consisting of one handler and one dog, systematically surveyed the approximately 546-acre (0.85 -mi²) Ranch property. The two teams surveyed the project site along transects that followed unpaved roads, fence lines, and other linear features (Figure 2) that are typically used by kit foxes for travel and are frequently marked with scat. The survey teams sometimes deviated from the transect lines to conduct more detailed searching in other areas where kit foxes often defecate, such as on and around prominent natural and human-made objects. The survey tracks were recorded using a handheld GPS unit carried by the handler and a second GPS unit attached to the working vest of the detection dog.

2.1.3 San Joaquin Kit Fox Scat Detection Rate

To estimate detection rates for three San Joaquin kit fox scent-detection dog teams in 2016, the teams surveyed a reference site with a known population of kit foxes. The detection dog teams surveyed the same set of nine transects and an N-mixture model (Royle 2004) was fit to the number of scat locations found per transect per dog-handler team. A scat location was defined as either a single scat deposit or a latrine (a location where one or more animals habitually defecate, as is common with canids). This model estimates the abundance of kit fox scat locations while simultaneously accounting for, and estimating, detection rates based on spatially replicated counts. The model was fit using the *pcount* function of the *unmarked* package in the R statistical computing environment (R Core Team 2015). Detection rates were modeled as a function of dog-handler team and the maximum number of scat locations detected on each transect across all surveys. Scat location abundance was modeled as a function of maximum scat locations. Maximum scat locations provided a conservative estimate of the total number of scat locations available for detection on each transect. Modeling detection rates as a function of maximum scat locations accounts for variability in detection rates associated with scat location abundance.

The detection rate, averaged across the two detection dogs used at the Ranch at Antioch (Luna and Gunny), was then used to determine the probability of not detecting scat along all transects of the Project site, hypothetically assuming a low density of available kit fox scat. Thus, the expected number of scat locations

along the survey transects at the Ranch at Antioch (N) was estimated using the total transect miles surveyed and the lowest reported encounter rate observed in an area of low kit fox abundance (Smith et al. 2005). The probability of missing a scat location, assuming that N were available to be detected, was then estimated from the average detection rate, p , as $(1 - p)^N$.

2.2 Results

2.2.1 Ranch at Antioch San Joaquin Kit Fox Survey Results

The two detection dog teams [Team 1 (Luna) and Team 2 (Gunny)] surveyed the approximately 546-acre Ranch property in one day. The teams worked independently along a total of approximately 9.17 miles of transects. Transect mileage was calculated based on the survey tracks recorded on the GPSs of the handlers (Figure 2). No San Joaquin kit fox scat was detected during the surveys.

2.2.2 San Joaquin Kit Fox Scat Detection Probability

The average detection rate previously calculated for the two dogs used during the Ranch at Antioch survey was 0.895. If the scat density at the Ranch at Antioch were as low as the Smith et al. (2005) estimate of 0.40 scat locations per mile, 4 scat (3.7 rounded to the nearest whole number) locations would be expected to be available for detection on the 9.17 miles of survey transects. Given the detection dogs' average detection rate of 0.895, the estimated probability of having missed all 4 scat locations at the Ranch is 1.22×10^{-4} [$(1-p)^N=(1-0.895)^4=0.00012155$]. In other words, the confidence that can be placed in the results given the level of survey effort is 99.9878%.

N:\Projects\4200\4275-01\Reports\Fig 2 SJKF Survey Map.mxd



Figure 2. San Joaquin Kit Fox Survey
The Ranch at Antioch San Joaquin Kit Fox Surveys
(4275-01) March 2019

Section 3. Discussion

In 2016, H. T. Harvey & Associates completed surveys using detection dogs in known habitat of radio-collared kit foxes within the Carrizo Plain. We delineated a survey area that overlapped the known home ranges of at least six radio-collared kit foxes. One or more detection-dog transect routes targeted the home range of each known kit fox, but the total transect mileage for each kit fox home range was consistently between 3 and 4 miles. Microsatellite analysis of the detected scat by the Lab of Organismal and Molecular Evolution at the California Polytechnic State University, San Luis Obispo identified that nine individual kit foxes were represented in that study including six that matched the known identities of the radio-collared foxes. Surveying 3 to 4 miles of detection dog transects within known home ranges resulted in the detection of every radio-collared fox and additional un-collared foxes. Therefore, to provide a highly sensitive survey methodology that was likely to detect even sparse kit fox use at the Ranch at Antioch, detection dogs were deployed at the Ranch at Antioch at an intensity approximately 3 times greater than that previously demonstrated to be necessary to identify the occupants on known kit fox home ranges. Even with this level of effort, no kit fox scat was detected during the survey effort using the two detection dog teams.

In 1994, H. T. Harvey & Associates (1994) expended 80 hours of spotlighting (i.e., 20 nights), 40 track station nights, and 44 camera station nights surveying the adjacent hospital site and vicinity and were unable to detect any kit foxes at that site or within a 2-mile radius, which included the Ranch at Antioch. While California Natural Diversity Database records (CNDDB 2019) and prior survey efforts (H. T. Harvey & Associates 1994) support a determination that San Joaquin kit foxes are absent from the Ranch at Antioch, the high detection rate of the scent-detection dogs used for the survey, the absence of detections on the Ranch along over 9 miles of survey transects, along with the extremely low estimated rate of nondetection, provide additional evidence that San Joaquin kit foxes do not occupy the Ranch at Antioch.

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