Appendix B

Biological Resources Assessment

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BIOLOGICAL RESOURCES ASSESSMENT
for the
NEWELL CREEK PIPELINE IMPROVEMENT PROJECT

Prepared for:

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1 Introduction

The City of Santa Cruz's (City) Newell Creek Pipeline is a critical component of the City's raw water supply infrastructure. The Newell Creek Pipeline (NCP) conveys untreated water to and from the Loch Lomond Reservoir, which is the City's only raw water storage facility. The NCP conveys water to the water system, which is managed by the Santa Cruz Water Department (City), via the Felton Booster Pump Station (FBPS) to the Graham Hill Water Treatment Plant (GHWTP) for treatment and distribution into the City water service area. When the San Lorenzo River has high flows and storage is available in the Loch Lomond Reservoir, the NCP is also used to pump water from the Felton Diversion on the San Lorenzo River up to the Reservoir (via the FBPS) to store for later use.

The Newell Creek Pipeline Improvement Project (Proposed Project) proposes to replace approximately 8.75 miles of the existing NCP with a new 24-inch polyvinyl chloride (PVC), ductile iron or high-density polyethylene (HDPE) pipeline. The pipeline generally would be installed within existing road pavement, road right-of-way (ROW), and/or existing City's easements. Once the new pipeline is installed and the interconnections are made, the existing NCP would be removed or abandoned in place. Other components of the Proposed Project include installation and/or replacement of minor appurtenances, such as air release valves that extend approximately 24 inches above ground and isolation valves.

The purpose of this report is to (1) describe the conditions of biological resources within the Proposed Project area in terms of vegetation communities, plants, wildlife, wildlife habitat, and wetlands; (2) identify potential direct and indirect impacts to biological resources that could result from the Proposed Project; (3) discuss those impacts in light of federal, state, and local laws and policies protecting biological resources; and (4) specify measures to mitigate any significant or potentially significant impacts.

1.1 Project Location

The existing NCP is located in the Santa Cruz Mountains, primarily in the unincorporated San Lorenzo Valley area of Santa Cruz County, except for the portion of the NCP that extends onto the City's Graham Hill Water Treatment Plant (GHWTP) property, which is located within the City of Santa Cruz, but is surrounded by unincorporated lands. Both the existing NCP and the Proposed Project extend approximately 9 miles between GHWTP on the south and Newell Creek Dam, a City facility that impounds Loch Lomond Reservoir, on the north (see Figure 1).

The existing NCP and Proposed Project alignment are located within a primarily semi-rural area. The areas surrounding the existing NCP and Proposed Project are characterized by forested terrain with rural and semi-rural, low-density residential neighborhoods and limited commercial development, as well as areas of California State Parks land. Several streams are present in the general vicinity of the NCP, including San Lorenzo River, Zayante Creek, and Newell Creek.

The Proposed Project consists of two segments: northern and southern (Figure 2, Proposed Project). The northern segment of the existing pipeline extends from just south of the existing Newell Creek Dam to the Felton Booster Pump Station (FBPS), located at the intersection of Graham Hill Road and East Zayante Road. The northern segment is located east of Highway 9 and north of Mount Hermon Road, generally between the unincorporated communities of Felton and Ben Lomond and west of Lompico in the San Lorenzo Valley. The existing pipeline extends south from the toe of Newell Creek Dam and generally follows existing roads through residential neighborhoods, but also extends through undeveloped private property along an abandoned railroad bed in the Brackney Road and Rose Acres Lane neighborhoods.

The southern segment of the existing NCP extends from the FBPS to the GHWTP. The existing pipeline extends from the FBPS under Zayante Creek follows a dirt maintenance road in a 20-foot easement to the San Lorenzo Lumber Yard where it continues southerly within a 20-foot easement to the border of Henry Cowell Redwoods State Park. The existing pipeline traverses the State Park within an easement along Pipeline Road until it intersects Graham Hill Road at Nepenthe Drive..

Access to the existing pipeline for maintenance and to the Proposed Project segments for construction and future maintenance is provided by both regional and local roads. Access to the existing pipeline and Proposed Project northern segment is provided by Graham Hill Road, Mount Hermon Road, and State Route 9 (locally referred to as Highway 9), as well as several County roads, including Glen Arbor Road, Newell Creek Road, Brackney Road, San Lorenzo Way, and Rose Acres Lane. Access to the existing NCP and the Proposed Project southern segment is provided from Graham Hill Road, Mount Hermon Road, and Highway 9. Pipeline Road, a partially paved trail through Henry Cowell Redwoods State Park, provides access to the existing NCP section in this location, In addition to the public roadways providing access to the existing and Proposed Project segments. City easements on private land serve portions of the existing alignments and would continue to serve the Proposed Project segments, with a few minor modifications.

For the purposes of this report, a biological study area (BSA) was established to analyze potential impacts resulting from implementation of the Proposed Project. The BSA included the pipeline sections within the Northern Segment (Newell Creek Dam, Newell Creek Road, Glen Arbor Road, Brackney North, Brackney South, San Lorenzo Way, and Felton Pump Station) and Southern Segment (Santa Cruz Lumber Yard, Henry Cowell Redwoods State Park, Pipeline Road, Graham Hill Road North, and Graham Hill Road South), including identified construction staging areas, plus a 300-foot buffer on both sides of the centerline. The BSA includes a total of 982.82 acres.

1.2 Project Description

1.2.1 Project Background

There are a number of known concerns regarding the condition and operation of the existing NCP. Generally, the pipeline, constructed nearly 60 years ago, is reaching the end of its useful life and is experiencing increased frequency of breaks as a result of corrosion and land movement along portions of its alignment due to geological conditions. There is no functioning cathodic protection system[1] on the pipeline and corrosion has been observed, which presents risks of leaks and failure.

Due to steep terrain and landslides present in some locations, the existing NCP has been damaged and/or is located in areas that make access and repairs difficult. A portion of the existing NCP along Pipeline Road in Henry Cowell Redwoods State Park has the highest recent break history, and several areas of Pipeline Road have washed out, resulting in exposure of the pipeline. Another portion of the NCP was constructed in an old railroad bed along a steep hillside in the Brackney area, east of Highway 9 between Felton and Ben Lomond, which includes several landslide hazard areas that could cause stress or breakage of the pipeline as further explained below. Furthermore, some appurtenances, such as isolation valves are inoperable, or are unknown in location, and some portions of the

[1] Cathodic protection is a technique used to control the corrosion of a metal surface by making it the cathode of an electrochemical cell. A simple method of protection connects the metal to be protected to a more easily corroded "sacrificial metal" to act as the anode. The sacrificial metal then corrodes instead of the protected metal. For structures such as long pipelines, where passive galvanic cathodic protection is not adequate, an external DC electrical power source is used to provide sufficient current.

existing pipeline alignment have appurtenant structures (such as fences, retaining walls and sheds) constructed on top of the pipeline (HDR 2018).

The pipeline section that runs through the Brackney area has a history of landslides and geotechnical failures during heavy winter rains that threaten the integrity of the pipeline.. This section has been historically subject to repeated landslides during heavy winter rains. In addition, the NCP is located above and adjacent to the San Lorenzo River, which during high flows in winter storms has the potential to undermine the hillside and increase the risk of failure. Due to the evidence of unstable terrain due to the poor bearing capacity of the saturated soils, the continued buildup of landslide debris overburden over the pipeline, and the location of the pipeline next to the San Lorenzo River, the NCP is at a high risk of failure in the Brackney North area. In particular, the NCP is vulnerable to a leak, which may be exacerbated by other factors in the vicinity of the Brackney landslide including undermining by San Lorenzo River flooding and proximity to the Butano fault zone (Kennedy Jenks 2017). Additionally, the Brackney pipeline section is one of the few sections that is not accessible by paved road, making repairs and maintenance challenging (HDR 2019c).

1.2.2 Proposed Project Description

The Proposed Project consists of replacement of 8.75 miles of the existing NCP with a new 24-inch polyvinyl chloride or ductile iron pipeline. The pipeline generally would be installed within existing road pavement, road right-of-way (ROW), which includes road pavement and unpaved shoulders adjacent to the paved road, and/or existing City easements. Additional easements would be acquired in some locations. In order to focus the environmental review on specific locations along the 8.75-mile pipeline, the alignment was separated into a northern segment and a southern segment; these segments were further delineated into specific sections as described below

The proposed northern NCP segment from the Newell Creek Access Road Bridge to the FBPS generally follows the existing NCP alignment with a few short re-alignments to avoid crossing private property. The proposed southern NCP segment from the FBPS to the GHWTP generally includes a new pipeline section along Graham Hill Road. Other components of the Proposed Project include installation and/or replacement of minor appurtenances, such as air release valves and isolation valves. Once the new pipeline is installed and the interconnections are made, the existing NCP would be removed or abandoned in place. Key features of the Proposed Project are summarized in Table 1

Three pipeline sections have been prioritized for replacement in the near term: two sections along Graham Hill Road, comprising the entire southern segment that would replace the existing pipe through Henry Cowell Redwoods State Park and the Brackney North section in the northern segment. The engineering design for these sections is underway. For the remainder of the pipeline alignment, a conservative project scenario is assumed, which includes installation of the new pipeline within specified construction disturbance corridors.

Standard construction practices would be implemented by the City or its contractors during construction of the Proposed Project to avoid or minimize erosion and water quality degradation, protect sensitive species and habitat, reduce potential impacts to cultural resources, and reduce air quality and noise impacts. Upon completion of construction, construction sites would be revegetated and/or restored, and disturbed roadways where trenching occurred to install the pipeline would be repaved in accordance with County requirements.

Table 1. Key Proposed Project Features

Project Feature	Northern Segment Newell Creek Road to FBPS	Southern Segment FBPS to GHWTP
Alignment Length (feet)	21,838	23,745
Number of Creek or River Crossings	3	1
Maximum Elevation (feet above mean sea level)	392	727

Source: HDR 2019a.

Northern Segment

The northern segment of the Proposed Project is planned within the same alignment as the existing pipeline with some minor realignments to avoid private properties as shown on Figure 2. The new pipeline would be installed within existing roadways, road ROWs, and/or City easements. The northern segment has a maximum surface elevation of approximately 392 feet above mean sea level, can gravity flow to the Felton Booster pump station, and has two creek crossings over Newell Creek and over one unnamed tributary to San Lorenzo River. Three short portions of pipe sections are currently under private property and would be rerouted as described below.

There are six distinct sections that comprise the northern segment as discussed below.

- **Newell Creek Road Section**. The northernmost pipeline section, Newell Creek Road, extends 5,035 feet within a road ROW. The section begins on the north side of the bridge crossing of Newell Creek (Newell Creek Access Road Bridge), crosses Newell Creek and follows Newell Creek Road to Glen Arbor Road. The existing pipeline is attached to the lower side of the upstream side of the bridge and is planned to be removed and replaced with the new pipe in either the same location or on the downstream side of the bridge. The Proposed Project would place the new pipeline entirely within the 60- to 100-foot wide road ROW, and generally.

- **Glen Arbor Road Section.** The Glen Arbor Road section extends 5,120 feet within a road ROW. The existing pipeline crosses through private property from Newell Creek Road to Glen Arbor Road, where it again crosses Newell Creek and continues along Glen Arbor Road and onto Caledonium Avenue. The existing pipeline also crosses private property at the southern terminus of Caledonium Avenue, where it jogs across to Fremont Avenue before continuing southward to the Brackney Road neighborhood. The Proposed Project would avoid the private property between Newell Creek Road and Glen Arbor Road and be located entirely within the 40- to 100-foot wide public road ROW, and generally within the existing road pavement of both roads..

- **Brackney North Section.** The Brackney North pipeline section extends approximately 2,610 feet between Glen Arbor Road, Schaaf Road and Brackney Road as shown on Figure 3-8. The majority of the pipeline would be a single fused pipeline of fusible polyvinyl chloride (FPVC) or HDPE, which would be installed using a horizontal directional drilling (HDD) trenchless method. Generally, the HDD method consists of a guided and steered trenchless construction technique to install the pipe into the subsurface as further described in Section 3.6.2.2. The pipe would be installed at depths of approximately 80 to 100 feet. Installation of the Brackney North pipe section also will include open cut trench construction for approximately 720 linear feet within a 4-foot wide trench. Open trench construction would occur at the north tie-in along Schaaf to Glen Arbor to Caledonium, and also at the south tie-in.

- **Brackney South Section.** The Brackney South section extends approximately 2,860 feet within a 10-foot wide City easement, partially unpaved and partially within road pavement. The section extends from the Brackney North section to San Lorenzo Way. The San Lorenzo River is located adjacent to portions of this section on the west. The Brackney South section ends at the property boundary near the northern intersection of San Lorenzo Way and Rose Acres Lane. The potential for deeper-seated landslides exists in the Brackney South section through most or all of the soil mass above the bedrock. Construction of a cantilevered retaining wall is being considered for a portion of the Brackney South section, which would help prevent potential slides from moving downslope. Installation may also occur with directional drilling or conventional open trench methods.

- **San Lorenzo Road Section.** The San Lorenzo Way section extends south from San Lorenzo Way/Rose Acres Lane approximately 4,242 feet within a 10-foot wide City easement through private property. The San Lorenzo River is located adjacent to portions of this section on the west, and the pipeline crosses an unnamed creek. This pipe section ends at Mount Hermon Road.

- **Felton Pump Station Section.** The Felton Pump Station section extends 1,970 feet from Mount Hermon Road at Graham Hill Road to the FBPS. A portion of this section has been re-aligned to avoid passing through the parking lot of Felton Fair Shopping Center where the current pipeline is located. The proposed pipeline would be installed within Mount Hermon Road and Graham Hill Road, ending at the FBPS.

Southern Segment

The southern segment of the proposed NCP extends from the FBPS to the GHWTP and generally consists of installation of a new 24-inch pipeline constructed within easements and Graham Road from the FBPS to Pipeline Road, and replacement of the southernmost section of existing pipeline located in Graham Hill Road from Pipeline Road to GHWTP as shown on Figure 2 and summarized on Table 1. The paved roadway width of Graham Hill Road varies between 28 and 40 feet in a 40- to 90-foot-wide ROW. This alignment would replace the existing NCP Santa Cruz Lumber Yard section, as well as the existing Henry Cowell Redwoods State Park and Pipeline Road sections through Henry Cowell Redwoods State Park.

The southern segment has a maximum elevation of approximately 727 feet above mean sea level, one creek crossing at Zayante Creek and two culverted creek crossings (Eagle Creek and Powder Hill Creek). The southern segment is comprised of two sections, Graham Hill Road North and South. The paved roadway width of Graham Hill Road varies between 28 and 40 feet in a 40- to 100-foot wide County ROW. This alignment would realign the portion of the existing NCP which passes through the San Lorenzo Lumber Yard, as well as the existing Pipeline Road sections through Henry Cowell Redwoods State Park into Graham Hill Road.

- **Graham Hill Road North Section.** The new pipeline extends 17,880 feet (approximately 3.4 miles) south from the FBPS to Graham Hill Road intersection with Pipeline Road. The first portion of the new pipeline would extend across Graham Road and over Zayante Creek adjacent to the City's Felton Diversion Pipeline. The proposed pipeline would then be installed in the City's existing 20-foot-wide easement, which also contains the existing pipeline is located within an unpaved, approximately 12-foot-wide path within the easement. The pipeline would cross the Santa Cruz Big Trees and Pacific Railway existing rail tracks via a trenchless method to Graham Hill Road, where the new pipeline would be installed within the Graham Hill Road pavement, primarily on the eastern side of the road.

- **Graham Hill Road South Section.** This section extends 5.865 feet along Graham Hill Road from its intersection at Pipeline Road south to the GHWTP. The southern approximately 3,600-linear feet of this pipeline would entail removal of the existing NCP and installation of the new pipeline in the current NCP location, which is generally near the center or eastern side of the existing paved road. In.

Other Components

Other components of the Proposed Project including the appurtenances and improvements, post-construction revegetation/restoration, decommissioning of existing pipeline, which are described below.

- **Appurtenances and Improvements.** Other components of the Proposed Project include installation of air release valves, isolation valves, blowoffs and other appurtenances. Air release valves would be installed that extend approximately 24 inches above ground. Existing air valves will be replaced, and new air valves will be required in new pipeline sections in locations to be determined during design. The FBPS has been improved over the past decade, and no new pump stations are required. No other improvements or appurtenances have been identified for the Proposed Project.

- **Post-Construction Revegetation/Restoration.** Upon completion of construction, construction sites would be revegetated and/or restored, and disturbed paved roadways would be repaved in accordance with County requirements.

- **Decommissioning of Existing Pipeline.** Once the new NCP pipeline sections are completed and operational, the existing pipeline sections would be decommissioned. This would generally involve capping off the existing pipeline and injecting the pipeline with grout, except in the Brackney North section, which would be abandoned by cutting and capping the existing pipeline. With the decommissioning of existing NCP sections, existing fire hydrants along Pipeline road in Henry Cowell Redwoods State Park also would be abandoned. All above-grade appurtenances along the abandoned pipeline would be completely removed.

Operations and Maintenance

After installation of the Proposed Project, operations would include continued implementation of pump start-up and valve operations at the FBPS, when needed to pump water to/from Loch Lomond Reservoir. Once installed, maintenance of the pipeline would include intermittent, periodic inspections and maintenance of air valves with access provided to the pipeline sections by existing roads and easements. The Brackney North pipeline section would have isolation and air valves on either end of the new pipeline and would not need to be accessed in the future unless removed for replacement (HDR 2020)..

1.2.3 Standard Construction Practices

The City has adopted standard construction practices that would be implemented by the City or its contractors during construction activities associated with the Proposed Project, where relevant.

Erosion Control and Air Quality Control

1. Implement erosion control best management practices for all construction activities occurring in or adjacent to jurisdictional aquatic resources (resources subject to permitting under the Clean Water Act, Clean Water Act , Porter-Cologne Water Quality Act and/or California Fish and Game Code). These measures may include, but are

not limited to, (1) installation of silt fences, fiber or straw rolls, and/or bales along limits of work/construction areas and from the edge of the water course; (2) covering of stockpiled spoils; (3) revegetation and physical stabilization of disturbed graded and staging areas; and (4) sediment control including fencing, dams, barriers, berms, traps, and associated basins.

2. Provide stockpile containment and exposed soil stabilization structures (e.g., Visqueen plastic sheeting, fiber or straw rolls, gravel bags, and/or hydroseed).

3. Provide runoff control devices (e.g., fiber or straw rolls, gravel bag barriers/chevrons) used during construction phases conducted during the rainy season. Following all rain events, runoff control devices shall be inspected for their performance and repaired immediately if they are found to be deficient.

4. Implement wind erosion (dust) controls, including the following:
   - Use a water truck;
   - Water active construction areas as necessary to control fugitive dust;
   - Hydro seed and/or apply non-toxic soil binders to exposed cut and fill areas after cut and fill operations;
   - Cover inactive storage piles;
   - Cover all trucks hauling dirt, sand, or loose materials off site; and
   - Install appropriately effective track-out capture methods at the construction site for all exiting trucks.

Water Quality Protection

5. Locate and stabilize spoil disposal sites and other debris areas such as concrete wash sites. Sediment control measures shall be implemented so that sediment is not conveyed to waterways or jurisdictional aquatic resources (resources subject to permitting under the Porter-Cologne Water Quality Act Section 1300 et seq., Clean Water Act Section 404, Clean Water Act Section 401, and/or California Fish and Game Code).

6. Minimize potential for hazardous spills from heavy equipment by not storing equipment or fueling within a minimum of 65 feet of any jurisdictional aquatic resource unless approved by permitting agencies along with implementation of additional spill prevention methods such as secondary containment and inspection.

7. Ensure that appropriate measures are taken to prevent gas, oil, or any other substances that could be hazardous to aquatic life or pollute habitat from contaminating the soil or entering jurisdictional aquatic resources by storing these types of materials within an established containment area. Vehicles and equipment will have spill kits available, be checked daily for leaks, and will be properly maintained to prevent contamination of soil or water from external grease and oil or from leaking hydraulic fluid, fuel, oil, and grease. Any gas, oil, or other substance that could be considered hazardous shall be stored in water-tight containers with secondary containment. Emergency spill kits shall be on site at all times.

8. Prevent equipment fluid leaks through daily equipment inspections.

9. Implement proper waste/trash management.

The City's Standard Construction Practices for In-Channel Work and Fish Species Protection (Practices #10-12) are not applicable to the Project because no work would occur within flowing water.

General Habitat Protection

13. Minimize disturbance of riparian vegetation to the maximum extent feasible when working in or adjacent to an active stream channel.

14. Restore all temporarily disturbed sensitive natural communities areas by replanting native vegetation using a vegetation mix appropriate for the site.

The City's Standard Construction Practice for decontamination of tools and equipment prior to entering waterways (Practice #15) is not applicable to the Project because no work would occur within flowing water.

16. A qualified biologist shall conduct a training-educational session for project construction personnel prior to any mobilization-construction activities within the project sites to inform personnel about species that may be present on site. The training shall consist of basic identification of special-status species that may occur on or near the project site, their habitat, their basic habits, how they may be encountered in the work area, and procedures to follow when they are encountered. The training will include a description of the project boundaries; general provisions of the Migratory Bird Treaty Act, California Fish and Game Code, and federal and state Endangered Species Acts; the necessity for adhering to the provision of these regulations; and general measures for the protection of special-status species, including breeding birds and their nests. Any personnel joining the work crew later shall receive the same training before beginning work.

The City's Standard Construction Practices for Dewatering (Practices #17-23) are not applicable to the Project because no work would occur within flowing water.

Inadvertent Discoveries of Archaeological Resources and Human Remain

24. Any unrecorded archaeological resources (sites, features, and/or artifacts) exposed during construction are subject to protection and consideration under CEQA and the California Public Resources Code (PRC) as well as Section 106 of the National Historic Preservation Act (NHPA) as detailed in the Code of Federal Regulations (CFR). The CEQA Guidelines Section 15064.5(f) specifically addresses provisions the City of Santa Cruz will make regarding accidental discovery of historical or unique archaeological resources during construction. The responsibilities of the lead federal agency to avoid, minimize or mitigate adverse effects to a "historic property" (36 CFR Section 800.16) are detailed in 36 CFR Section 800.13[b] and would be applicable for a project with federal involvement by way of funding, permitting, approval authority, or other means.

    In general, the implementation procedures under CEQA and the NHPA in the case of an inadvertent archaeological discovery during construction are similar and are as follows:

    - If archaeological resources are exposed immediately stop any construction work occurring within 100 feet which may further disturb the find. NOTE – This is a general guideline for the initial response, the exclusion zone may be contracted or expanded depending on the nature of discovery and type of construction activity proposed in the vicinity of the find. The duration of the exclusion zone will be determined by the City and the federal lead agency and is contingent on the approved course of action in response to the discovery.
    - Immediately notify the City Project Manager who shall immediately notify the Water Department Deputy Director/Engineering Manager

- A qualified archaeologist meeting the Secretary of the Interior's Professional Qualification Standards will evaluate the state and federal significance of the find for eligibility to the California Register of Historical Resources (CRHR) and the National Register of Historic Places (NRHP) in coordination with City staff.
- The City will notify the lead federal agency within 24 hours of discovery. The notification shall describe the assessment of the NRHP eligibility of the resource, specify the NRHP criteria used to evaluate the property's eligibility, and propose actions to resolve any adverse effects.
- The federal lead agency will contact the State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation (ACHP), and any interested locally affiliated Native American tribes. The SHPO, ACHP, and Native American tribes will respond within 48 hours of the notification. The federal lead agency shall consider any recommendations regarding National Register eligibility and proposed actions and notify the City of the appropriate actions. The federal lead agency official shall provide the SHPO and the ACHP a report of the actions when they are completed.
- Avoidance and/or minimization of impacts/effects is the preferred course of actions under both state and federal guidelines. If preservation in place is not feasible, additional study will likely be required. In coordination with the lead federal agency, the City will prepare a data recovery/treatment plan for retrieving important archaeological data relevant to the site's significance. The data recovery/treatment plan will be submitted to participating tribes and agencies for review and comment prior to implementation.
- If the inadvertent discovery location cannot be avoided, and continuing work would have an adverse effect on the site, the federal agency, in coordination with the City, SHPO, and Native American tribes as appropriate, will need to draft and finalize a Memorandum of Agreement for the treatment of the historic property before work can proceed.
- Implementation of the data recovery/treatment plan may include archaeological excavations, technical and laboratory analysis, and further consultation and coordination with Native American tribal representatives.
- A full written report will be prepared to include the results of all technical analyses and special studies and will be provided to participating tribes and agencies for review and comment. The report will be filed with the Northwest Information Center and will also provide for the permanent curation of recovered materials.

25. In California, the illegal possession of human remains is a felony, punishable by imprisonment (California Penal Code Section 1170[h]; Public Resources Code 5097.99[a] and [b]). Inadvertent discoveries of human remains exposed during construction on non-federal lands are subject to protection under CEQA and the NHPA. In accordance with Section 7050.5 of the California Health and Safety Code and the NHPA, if potential human remains are found, immediately notify the City, the lead federal agency, and the Santa Cruz County Coroner of the discovery. The Santa Cruz County Coroner will provide a determination within 48 hours of notification. No further excavation or disturbance of the identified material, or any area reasonably suspected to overlie additional remains, can occur until a determination has been made.

    - If human remains are exposed **immediately stop any construction work occurring within 100 feet** which may further disturb the find. NOTE – This is a general guideline for the initial response, the exclusion zone may be contracted or expanded depending on the nature of discovery and type of construction

activity proposed in the vicinity of the find. The duration of the exclusion zone is contingent on the course of action mandated by the City and lead federal agency.

- If the Santa Cruz County Coroner determines that the remains are, or are believed to be, Native American, the coroner will notify the Native American Heritage Commission (NAHC) within 24 hours and all the actions described in these Standard Construction Practices regarding Inadvertent Archaeological Discoveries shall be followed.
- In accordance with California Public Resources Code, Section 5097.98 and Section 106 of the NHPA, the NAHC must immediately notify those persons it believes to be the Most Likely Descendant (MLD) from the deceased Native American.
- Within 48 hours of this notification, the MLD will recommend to the City and lead federal agency her/his preferred treatment of the remains and associated grave goods.
- The ultimate disposition of the remains will be coordinated between the City, the federal agency, the MLD, the landowner, and the NAHC (if necessary).
- The lead federal agency will have additional government-to-government consultation requirements per the requirements of Section 106 [36 CFR § 800.2(c)(2)(ii)] which cannot be delegated to non-federal entities.

Other Practices

26. Notify adjacent property owners of nighttime construction schedules. A Construction Noise Coordinator will be identified. The contact number for the Construction Noise Coordinator will be included on notices distributed to neighbors regarding planned nighttime construction activities. The Construction Noise Coordinator will be responsible for responding to any local complaints about construction noise. When a complaint is received, the Construction Noise Coordinator shall notify the City within 48 hours of the complaint, determine the cause of the noise complaint, and implement as possible reasonable measures to resolve the complaint, as deemed acceptable by the City.

27. For construction in wildlands or in the wildland-urban interface, internal combustion engine equipment shall include spark arrestors, fire suppression equipment (e.g. fire extinguishers and shovels) shall be stored onsite during use of such mechanical equipment, and construction activities shall not be conducted during red flag warnings issued by the California Department of Forestry and Fire Protection (CAL FIRE) unless adequate fire protection measures are implemented in compliance with federal, state, and local fire prevention and protection regulations and guidance. Fire safety measures will be detailed in a Fire Safety Program on a project-by-project basis. Red flag warnings and fire weather watches are issued by CAL FIRE based on weather patterns (low humidity, strong winds, dry fuels, etc.) and listed on their website (https://www.fire.ca.gov/programs/communications/red-flag-warnings-fire-weather-watches/).

2 Regulatory Setting

2.1 Federal

2.1.1 Clean Water Act

The Federal Water Pollution Control Act of 1972 (Clean Water Act) (33 USC 1251 et seq.), as amended by the Water Quality Act of 1987 (PL 100-4), is the major federal legislation governing water quality. The purpose of the Clean Water Act is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The definition of what constitutes "waters of the United States" (provided in 33 CFR Section 328.3(a)) has changed multiple times over the past 36 years starting with the United States v. Riverside Bayview Homes, Inc. court ruling in 1985. Subsequent court proceedings, rule makings, and congressional acts in 2001 (Solid Waste Agency of North Cook County v. United States Army Corps of Engineers), 2006 (Rapanos v. United States), 2015 (Waters of the United States [WOTUS] Rule), 2018 (suspension of the WOTUS Rule), and 2019 (formal repeal of the WOTUS Rule) have attempted to provide greater clarity to the term and its regulatory implementation. The most recent Navigable Waters Protection Rule (NWPR), issued by the U.S. Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (USACE) in January 2020, defined "waters of the United States" to include the following four categories: (1) the territorial seas and traditional navigable waters; (2) tributaries of such waters; (3) certain lakes, ponds, and impoundments of jurisdictional waters; and (4) wetlands adjacent to other jurisdictional waters (other than waters that are themselves wetlands). However, this rule was remanded and vacated with the August 2021 decision in Pasqua Tribe et al v United States Environmental Protection Agency. As a result, the current administration is evaluating a new rulemaking process. In the meantime, the EPA and USACE have halted implementation of the NWPR nationwide and will revert to and apply the CWA 1986 definition and the 2008 Rapanos guidance, informally referred to as "the pre-2015 regulatory regime", until further notice. The term "wetlands" (a subset of waters) is defined in 33 CFR Section 328.3(b) 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. Wetlands generally include swamps, marshes, bogs, and similar areas." Discharges into waters of the United States and wetlands are regulated under Section 404 by the USACE.

In California, the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs) are responsible for implementing the Clean Water Act and related elements of the California Water Code (see Section 2.2.4 Porter-Cologne Water Quality Act).

Important applicable sections of the Clean Water Act are as follows:

- Section 401 requires an applicant for any federal permit for an activity that may result in a discharge of pollutants into waters of the United States to obtain certification from the state that the activity complies with all applicable water quality standards, limitations, and restrictions. Section 401 water quality certification is provided by the RWQCB and typically include conditions to minimize impacts on water quality.
- Section 402 establishes the National Pollutant Discharge Elimination System, a permitting system for municipal and industrial discharges of any pollutant (except for dredge or fill material) into waters of the United States. The National Pollutant Discharge Elimination System program establishes limits on allowable concentrations and mass emissions of pollutants contained in point source and non-point source

discharges. This program is administered by the RWQCB. Conformance with Section 402 is typically addressed in conjunction with water quality certification under Section 401.

- Section 404 provides for issuance of permits for the discharge of dredge or fill material into waters of the United States, including wetlands, by USACE. Two types of permits are issued by the USACE under Section 404: General Permits and Individual Permits. General Permits, which authorize groups activities with minimal impacts to an aquatic environment, can include Nationwide Permits, Regional General Permits, and Programmatic General Permits. Individual Permits are issued for projects that could cause significant impacts to an aquatic environment and require a lengthier public review process.

2.1.2 Federal Endangered Species Act

The FESA of 1973 (16 U.S.C. 1531 et seq.), as amended, is administered by the USFWS for most plant and animal species and by the National Oceanic and Atmospheric Administration National Marine Fisheries Service for certain marine species. This legislation is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend and to provide programs for the conservation of those species, thus preventing the extinction of plants and wildlife. Federal ESA defines an endangered species as "any species that is in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as "any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Under federal ESA, it is unlawful to take any listed species; "take" is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." As part of this regulatory act, federal ESA provides for designation of critical habitat, defined in federal ESA Section 3(5)(A) as specific areas within the geographical range occupied by a species where physical or biological features "essential to the conservation of the species" are found and that "may require special management considerations or protection." Critical habitat may also include areas outside the current geographical area occupied by the species that are nonetheless "essential for the conservation of the species." Critical habitat designations identify, with the best available knowledge, those biological and physical features (primary constituent elements) which provide for the life history processes essential to the conservation of the species.

FESA allows for the issuance of incidental take permits for listed species under Section 7, which is generally available for projects that also require other federal agency permits or other approvals, and under Section 10, which provides for the approval of habitat conservation plans (HCPs) on public or private property without any other federal agency involvement. The Proposed Project would overlap with the permit areas for three HCPs approved by the USFWS, two of which were co-developed by the City; these HCPs are described below.

Interim-Programmatic Habitat Conservation Plan for Mount Hermon June Beetle and Ben Lomond Spineflower

In June 2011, the USFWS, County of Santa Cruz, and City of Scotts Valley developed the *Interim-Programmatic Habitat Conservation Plan for the Endangered Mount Hermon June beetle and Ben Lomond Spineflower* (IPHCP) to cover eligible small development projects in densely developed residential neighborhoods that support habitat for the federally endangered Mount Hermon June beetle (*Polyphylla barbata*) and Ben Lomond spineflower (*Chorizanthe pungens* var. *hartwegiana*). This IPHCP is intended to support issuance of two incidental take permits (ITPs) under section 10(a)(1)(B) of FESA that would authorize the County and the City of Scotts Valley to take Mount Hermon June beetle resulting from such activities. The County and the City of Scotts Valley would then extend their take coverage through Certificates of Inclusion to eligible landowners within their jurisdiction needing incidental take authorization associated with their small development projects.

The 10 Project Units within the IPHCP boundary were identified within the communities of Ben Lomond, Felton, Mount Hermon, and Scotts Valley. These Project Units range in size from 3.2 to 373 acres. Project Units include parcels in the vicinity of the Rolling Woods neighborhood, the Whispering Pines neighborhood, east and west Scotts Valley, Green Valley, Mount Hermon, Zayante Road, and Ben Lomond. The existing NCP abuts the Mount Hermon IPHCP Project Unit at the northern end of the Graham Hill Road North section and the Rolling Woods Project Unit at the southern end of the Graham Hill Road North section and northern end of the Graham Hill Road South section.

City of Santa Cruz Operations and Maintenance Habitat Conservation Plan

The City developed the Operations and Maintenance Habitat Conservation Plan (O&M HCP) for improvements or projects with the potential to take federally listed species and other non-listed special-status species. The USFWS approved and has issued an Incidental Take Permit (No. TE89655D-0) for the O&M HCP, which covers six wildlife and four plant species: Ohlone tiger beetle (*Cicindela ohlone*; federally endangered), Mount Hermon June beetle, tidewater goby (*Eucyclogobius newberryi*; federally endangered), Pacific lamprey (*Entosphenus tridentatus*; California Species of Special Concern), California red-legged frog (*Rana draytonii*; federally threatened), western pond turtle (*Emys marmorata*; California Species of Special Concern), robust spineflower (*Chorizanthe robusta* var. *robusta*; federally endangered), Santa Cruz tarplant (*Holocarpha macradenia*; federally threatened and state endangered), San Francisco popcorn flower (*Plagiobothrys diffusus*; state endangered), and Ben Lomond spineflower. The biological goals and objectives and conservation measures include restoring habitat temporarily disturbed, contributing to protected and managed lands that support covered populations, implementing bypass flows consistent with the Anadromous Salmonid HCP (currently being developed), pursuing other conservation actions that will result in conservation benefits, and implementing general and species-specific impact minimization measures and best management practices. The O&M HCP addresses upgrades to the North Coast Pipeline and rehabilitation of diversion structures, operation of existing City facilities, and operations and maintenance of existing water diversions and transmission lines and their associated features. The O&M HCP was recently finalized and the incidental take permit was issued by the USFWS in January 2021; the permit is effective through January 2051 (City of Santa Cruz 2021).

Graham Hill Water Treatment Plant (GHWTP) Low-Effect Habitat Conservation Plan

The City developed a low-effect HCP for the operations, maintenance, and construction activities associated with the GHWTP (GHWTP LEHCP; City of Santa Cruz 2013). The USFWS approved and has issued an Incidental Take Permit (No. TE15139B-0) for this low-effect HCP, which covers incidental take of Mount Hermon June beetle, Zayante band-winged grasshopper, and Ben Lomond spineflower as a result of all current and future operations, maintenance, and construction activities at the GHWTP. The HCP covers the entire 12.71 acres of the GHWTP property, and includes 5.7 acres of suitable habitat, and 0.88 acres of occupied habitat for these species. The conservation strategy emphasizes protection of habitat through impact avoidance and implementation of measures designed to minimize impacts to Mount Hermon June beetle. To mitigate for unavoidable impacts to Mount Hermon June beetle, the City has protected suitable and occupied sandhills habitat at its 17-acre Bonny Doon mitigation site and can purchase credits from the USFWS-approved Zayante Sandhills Conservation Bank. There are 11.3 acres remaining at the mitigation site to compensate for future impacts to Mount Hermon June Beetle and potentially other species which rely on sandhills habitat.

2.1.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) was originally passed in 1918 as four bilateral treaties, or conventions, for the protection of a shared migratory bird resource. The primary motivation for the international negotiations was to stop

the "indiscriminate slaughter" of migratory birds by market hunters and others. The MBTA protects over 800 species of birds (including their parts, eggs, and nests) from killing, hunting, pursuing, capturing, selling, and shipping unless expressly authorized or permitted.

2.1.4 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BAGEPA) is the primary law protecting both bald and golden eagles. Specifically, BAGEPA prohibits "take" of eagles without a permit and defines take to include "pursue, destroy, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb" and prohibits take of individuals, active nests, or eggs. The term "disturb" is further defined by regulation as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, injury to an eagle, a decrease in productivity, or nest abandonment" (50 CFR 22.3).

2.2 State

2.2.1 California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires identification of a project's potentially significant impacts on biological resources and ways that such impacts can be avoided, minimized, or mitigated. The act also provides guidelines and thresholds for use by lead agencies for evaluating the significance of proposed impacts.

CEQA Guidelines Section 15380(b)(1) defines endangered animals or plants as species or subspecies whose "survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors" (14 CCR 15380(b)(1). A rare animal or plant is defined in Section 15380(b)(2) as a species that, although not presently threatened with extinction, exists "in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or … [t]he species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered 'threatened' as that term is used in the federal Endangered Species Act." Additionally, an animal or plant may be presumed to be endangered, rare, or threatened if it meets the criteria for listing, as defined further in CEQA Guidelines Section 15380(c). For example, CDFW has concluded that plant species included on the California Native Plant Society's (CNPS) California Rare Plant Rank (CRPR) 1 and 2 lists are covered by CEQA Guidelines Section 15380.

The California Department of Fish and Wildlife (CDFW) has developed a list of "Special Animals" as "a general term that refers to all of the taxa the California Natural Diversity Database (CNDDB) is interested in tracking, regardless of their legal or protection status." This list includes many additional species beyond those protected under FESA, the California Endangered Species Act (CESA), and other California Fish and Game Code (CFGC) provisions, and incorporates lists developed by other conservation organizations, such as the North American Bird Conservation Initiative. Lists of sensitive species prepared by other agencies, including Bureau of Land Management and U.S. Forest Service Sensitive Species lists and USFWS' Birds of Conservation Concern, are also included.

CEQA Guidelines Section IV, Appendix G (Environmental Checklist Form), requires an evaluation of impacts to "any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service" (14 CCR 15000 et seq.). Sensitive natural communities are vegetation communities that are of limited distribution statewide or within a county or region. CDFW's Vegetation Classification and Mapping Program (VegCAMP) works to classify and map the vegetation of California and determine the rarity of vegetation types. Communities with a state rarity ranking of S1

through S3 in CDFW's Natural Community list (CDFW 2020) are considered highly imperiled, and project impacts on high-quality occurrences of these communities are typically considered significant under CEQA.

2.2.2 California Endangered Species Act

CESA (CFCG Section 2050 et seq.) provides protection and prohibits the take of plant, fish, and wildlife species designated by the Fish and Game Commission as endangered, candidate, or threatened in the State of California. Unlike FESA, state-listed plants have the same degree of protection as wildlife, but insects and other invertebrates may not be listed. Take under CESA is defined as any action or attempt to "hunt, pursue, catch, capture, or kill." Unlike FESA, CESA does not include harassment or harm (e.g., habitat loss or degradation) in its definition of take. Take is prohibited for both listed and candidate species. Take authorization for otherwise lawful activities may be obtained from the CDFW under Section 2081 of the CFGC. Project applicants consult with CDFW to develop an approved plan that minimizes and "fully mitigates" the impacts of the incidental take.

2.2.3 California Fish and Game Code

Fully Protected Species

CFGC Sections 3511, 4700, 5050, and 5515 identify fish, amphibian and reptile, bird, and mammal species, respectively, designated as fully protected in California. The classification of "fully protected" was the state's initial effort in the 1960s to identify and provide additional protection to those animals that were rare or faced possible extinction. Fully protected species may not be taken or possessed at any time, and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. "Take" is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."

Lake or Streambed Alteration

Under CFGC Section 1602, CDFW has authority to regulate work that will substantially divert or obstruct the natural flow of or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake. CDFW also has authority to regulate work that will deposit or dispose of debris, water, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. This regulation takes the form of a requirement for a Lake or Streambed Alteration Agreement and is applicable to any person, state, or local governmental agency or public utility (CFGC Section 1601). CDFW jurisdiction includes ephemeral, intermittent, and perennial watercourses (including dry washes) and lakes characterized by the presence of (1) definable bed and banks and (2) existing fish or wildlife resources. In practice, CDFW marks its jurisdictional limit at the top of the stream or lake bank or the outer edge of the riparian vegetation, where present, and sometimes extends its jurisdiction to the edge of the 100-year floodplain. Because riparian habitats do not always support wetland hydrology or hydric soils, wetland boundaries, as defined by Clean Water Act Section 404, sometimes include only portions of the riparian habitat adjacent to a river, stream, or lake. Therefore, jurisdictional boundaries under Section 1602 may encompass a greater area than those regulated under Clean Water Act Section 404; CDFW does not have jurisdiction over ocean or shoreline resources.

Sections 3503, 3511, 3513, 4150

CFGC Section 3503 states that it is unlawful to take, possess, or needlessly destroy the nests or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. CFGC Section 3503.5 protects

all birds-of-prey (raptors) and their eggs and nests. Section 3511 states fully protected birds or parts thereof may not be taken or possessed at any time. Section 3513 states that it is unlawful to take or possess any migratory nongame bird as designated in the MBTA. All nongame mammals, including bats, are protected by CFGC Section 4150.

2.2.4 Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act established the SWRCB and RWQCB as the principal state agencies responsible for the protection of water quality in California. The Central Coast Regional Water Quality Control Board (CCRWQCB) has regulatory authority over the Proposed Project. The Porter-Cologne Water Quality Control Act provides that "All discharges of waste into the waters of the state are privileges, not rights." Waters of the State are defined in Section 13050(e) of the Porter-Cologne Water Quality Control Act as "...any surface water or groundwater, including saline waters, within the boundaries of the state." All dischargers are subject to regulation under the Porter-Cologne Water Quality Control Act, including both point and nonpoint source dischargers. The CCRWQCB has the authority to implement water quality protection standards through the issuance of permits for discharges to waters at locations within its jurisdiction. As noted above, the CCRWQCB is the appointed authority for Clean Water Act Section 401 compliance of the Proposed Project.

2.2.5 California Native Plant Protection Act

The California Native Plant Protection Act of 1977 directed CDFW to carry out the Legislature's intent to "preserve, protect and enhance rare and endangered plants in this State." The Native Plant Protection Act gave the California Fish and Game Commission the power to designate native plants as "endangered" or "rare" and protect endangered and rare plants from take. CESA expanded on the original Native Plant Protection Act and enhanced legal protection for plants, but the Native Plant Protection Act remains part of the CFCG. To align with federal regulations, CESA created the categories of "threatened" and "endangered" species. It converted all "rare" animals into the act as threatened species, but did not do so for rare plants. Thus, there are three listing categories for plants in California: rare, threatened, and endangered. Because rare plants are not included in CESA, appropriate compensatory mitigation measures for significant impacts to rare plants are typically negotiated with the CDFW.

2.3 Local

California Government Code Section 53091 (d) and (e) provides that facilities for the production, generation, storage, treatment, and transmission of water supplies are exempt from local (i.e., county and city) building and zoning ordinances. The Proposed Project is critical to the operation, utilization, storage and transmission of water supplies, and, therefore, the Proposed Project is legally exempt from Santa Cruz County and City of Santa Cruz building and zoning ordinances. Where applicable and when feasible to meet project objectives, the Proposed Project would be constructed consistent with local policies and ordinances. This section describes local programs, policies, and regulations related to biological resources that may apply to the Proposed Project.

2.3.1 County of Santa Cruz General Plan and Local Coastal Program

The Santa Cruz County General Plan and Local Coastal Program (LCP) is a comprehensive, long-term planning document for the unincorporated areas of the County and includes the County's LCP, which was certified by the

California Coastal Commission in 1994 (County of Santa Cruz, 1994). The County General Plan and LCP provides policies and programs to establish guidelines for future growth and all types of physical developments.

The County's General Plan and LCP, Chapter 5 (Conservation and Open Space), Objective 5.2 (Riparian Corridors and Wetlands), establishes definitions for riparian corridors and wetlands to ensure their protection. Policies 5.2.1 through 5.2.5 identify and define riparian corridors and wetlands, determine the uses which are allowed in and adjacent to these habitats, and specify required buffer setbacks and performance standards for land in and adjacent to these areas. Riparian corridors are defined as (a) 50 feet from the top of a distinct channel or physical evidence of high water mark of perennial stream; (b) 30 feet from the top of a distinct channel or physical evidence of high water mark of an intermittent stream as designated on the General Plan maps and through field inspection of undesignated intermittent and ephemeral streams; (c) 100 feet of the high water mark of a lake, wetland, estuary, lagoon, or natural body of standing water; (d) the landward limit of a riparian woodland plant community; and (e) wooded arroyos within urban areas. The County definitions are consistent with those used for CEQA purposes.

The County's General Plan and LCP, Chapter 5 (Conservation and Open Space), Objective 5.1 (Biological Diversity), establishes definitions for sensitive habitats to ensure their protection. Policies 5.1.1 through 5.1.11 identify and define sensitive habitats, determine the uses which are allowed in and adjacent to these habitats, and specify performance standards for land in and adjacent to these areas.

The County's General Plan and LCP, Chapter 5 (Conservation and Open Space), Objective 5.12 (Timber Resources), describes lands to be designated for timber production to encourage economic production of forest products on a sustained yield basis under high environmental standards. Policies 5.12.1 through 5.12.14 identify and define permitted and conditional uses in timber production zones and specify performance standards for land in and adjacent to these areas.

The County's certified LCP is administered by the County Planning Department, pursuant to the California Coastal Act, and includes specific plans and ordinances for activities within the Coastal Zone. The LCP implementing ordinances in the County Code that are relevant to biological resources include the following:

- Grading Ordinance (Chapter 16.20)
- Erosion Control Ordinance (Chapter 16.22)
- Riparian Corridor and Wetlands Protection (Chapter 16.30)
- Sensitive Habitat Protection (Chapter 16.32)
- Significant Trees Protection (Chapter 16.34)

Because the proposed project does not occur within the Coastal Zone, it would not require compliance with the LCP, or the standards contained in the LCP implementing ordinances, nor would the proposed project require a Coastal Development Permit. While some of the above ordinances require separate approvals or permits (e.g., Riparian Exception), such approvals are not required for the Proposed Project, as it falls under California Government Code Section 53091 (d) and (e) and is legally exempt from Santa Cruz County building and zoning ordinances, as described above. The following implementing ordinances are described primarily for informational purposes, in addition to providing added context to the definition of sensitive resources for CEQA analysis.

2.3.1.1 Grading and Erosion Control Ordinances

Santa Cruz County Code Chapter 16.20, Grading Regulations, sets forth rules and regulations to control all grading, including excavations, earthwork, road construction, dredging, diking, fills, and embankments. Santa Cruz County Code Chapter 16.22 requires control of all existing and potential conditions of accelerated (human-induced) erosion, and sets forth required provisions for project planning, preparation of erosion control plans, runoff control, land clearing, and winter operations.

2.3.1.2 Riparian Corridor Protection Ordinance

Santa Cruz County Code Chapter 16.30, Riparian Corridor and Wetlands Protection, includes regulations to limit development activities in riparian corridors. The regulations provide that "no project shall undergo developmental activities in riparian corridors or areas with urban or rural service lines which are within a buffer zone as measured from the top of the arroyo." Buffer areas are specified in the regulations and are determined from characteristics found in the riparian area, including average slope within 30 feet of water's edge, vegetation, and stream characteristics. The buffer always extends 50 feet from the edge of riparian woodland and 20 feet beyond the edge of other woody vegetation, as determined by the dripline. After the buffer is determined, a 10-foot setback from the edge of the buffer is required for all structures, which allows construction equipment and use of a yard area. Exceptions and conditioned exceptions to the provisions of this code may be authorized. Findings meeting the following criteria define the circumstances necessary in granting an exception to the above requirements:

1. That there are special circumstances or condition affecting the property.
2. That the exception is necessary for the proper design and function of some permitted or existing activity on the property.
3. That the granting of the exception will not be detrimental to the public welfare or injurious to other property downstream or in the area in which the project is located.
4. That the granting of the exception, in the Coastal Zone, will not reduce or adversely impact the riparian corridor, and there is no feasible less environmentally damaging alternative.
5. That the granting of the exception is in accordance with the purpose of this chapter, and with the objectives of the General Plan and elements thereof, and the Local Coastal Program Land Use Plan.

2.3.1.3 Sensitive Habitats Protection Ordinance

Santa Cruz County Code Chapter 16.32 regulates development in or adjacent to specified environmentally sensitive habitat areas. An area defined as "sensitive habitat" under this ordinance includes various criteria, and includes all lakes, wetlands, estuaries, lagoons, streams, rivers, and riparian corridors. No development activity may occur within an area of biotic concern unless approval is issued or unless the activity is reviewed concurrently with the review of an associated development or land division application. All development within environmentally sensitive habitat must be mitigated or restored. The following findings are necessary in granting an exception to the provisions and requirements of this ordinance:

1. that adequate measures will be taken to ensure consistency with the purpose of this chapter to minimize the disturbance of sensitive habitats; and
2. one of the following situations exists:
    a. the exception is necessary for restoration of a sensitive habitat; or

b. it can be demonstrated by biotic assessment, biotic report, or other technical information that the exception is necessary to protect public health, safety, or welfare.

Any development activity that has received a riparian exception according to the provisions of Santa Cruz County Code Chapter 16.30 would not be subject to this chapter.

2.3.2 City of Santa Cruz City-Wide Creeks and Wetlands Management Plan

Activities within the City limits that occur along or adjacent to riparian areas are regulated by the *City-wide Creeks and Wetlands Management Plan* (Creeks Plan; City of Santa Cruz 2008). The Creeks Plan was adopted by the City Council to provide a comprehensive approach to managing all creeks and wetlands within the City. The Plan recommends specific setback requirements based on biological, hydrological, and land use characteristics for various watercourse types within the City. The recommended setbacks within a designated management area include a riparian corridor setback and a development setback area; an additional area extends from the outward edge of the development area to the outer edge of the management area. The Management Plan outlines a process for permitting development adjacent to watercourses. Projects that require a Watercourse Development Permit would be subject to the provisions in Chapter 24.08, Part 21 of the City's Municipal Code (Zoning Regulations) that pertain to issuance of these permits. The Plan and zoning regulations include specified development standards and management guidelines. It should be noted that repair, maintenance, or minor alteration of existing public utilities or projects that are reviewed and approved under another authorizing permitting agency (USACE, RWQCB, and/or CDFW) are exempt from City permit requirements.

The only portion of the BSA that occurs within the City limits is the GHWTP parcel located immediately adjacent and to the west of the terminus of the Graham Hill Road South section. The nearest drainage to this portion of the BSA is the San Lorenzo River, which occurs approximately 1,000 feet to the west of the Proposed Project work area. The Creeks Plan does not identify any riparian corridors or setbacks associated with the San Lorenzo River within the BSA.

3 Methods

Data regarding biological resources present within the 982.82-acre BSA were obtained through a review of pertinent literature, field reconnaissance, an aquatic resources jurisdictional delineation, and habitat assessments, which are described in detail below. For purposes of this report, special-status biological resources are defined as follows:

- Special-status plant species include (1) species designated as either rare, threatened, or endangered by CDFW or USFWS and are protected under either CESA (CFCG 2050 et seq.) or FESA (16 USC 1531 et seq.); (2) species that are candidate species being considered or proposed for listing under CESA or FESA; (3) species that are included on the CDFW Special Vascular Plants, Bryophytes, and Lichens List (CDFW 2021a) or species with a CRPR of 1 or 2 in the CNPS Inventory of Rare and Endangered Plants of California (CNPS Inventory; CNPS 2021); or (4) species given protection under the County's General Plan/Local Coastal Program and applicable ordinances.
- Special-status wildlife species include (1) fish or wildlife species listed, proposed for listing, or candidates for listing as threatened or endangered by the USFWS under FESA (16 USC 1531 et seq.); (2) fish or wildlife species listed as threatened or endangered, or proposed for listing, under CESA (CFCG, Section 2050 et seq.); (3) fish or wildlife species designated by the CDFW as "Species of Special Concern" (SSC) as indicated on the CDFW Special Animals List (CDFW 2021b); (4) wildlife designated as fully protected species under Sections 3511, 4700, 5050, and 5515 the California Fish and Game Code; and (5) species that meet the definition of rare, threatened, or endangered as described in the CEQA Guidelines, Section 15380.
- Sensitive vegetation communities include (1) those designated as sensitive by CDFW and assigned state ranks of S1-S3 based on their rarity and threats (CDFW 2020), (2) those that provide habitat for special-status species, or (3) those designated as sensitive by the County of Santa Cruz within Chapter 5 of the General Plan and County Code Title 16.
- Jurisdictional aquatic resources subject to the permitting authority of the USACE, CCRWQCB, and CDFW.
- Wildlife corridors and habitat linkages as identified in the *Critical Linkages: Bay Area and Beyond* project report (Penrod et al. 2013) as well as applicable datasets (Penrod 2014a, 2014b) in CDFW's BIOS viewer (version 5.89.14c) and general species' life history literature.

3.1 Literature Review

Prior to field surveys, special-status biological resources present or potentially present within the BSA were identified through queries of the County of Santa Cruz Online GIS database (County of Santa Cruz 2021), CNDDB (CDFW 2021c), USFWS Information for Planning and Consultation (IPaC) website (USFWS 2021), CNPS Inventory of Rare and Endangered Plants of California (CNPS Inventory) (CNPS 2021), and U.S. Department of Agriculture Web Soil Survey (USDA 2021a). The CNPS Inventory and CNDDB were queried based on the U.S. Geological Survey 7.5-minute quadrangle in which the BSA is located (Felton) and the seven surrounding quadrangles (Big Basin, Castle Rock Ridge, Los Gatos, Davenport, Laurel, Santa Cruz, and Soquel). The IPaC databases was queried using GIS software based on a 1-mile buffer around the BSA.

General information regarding wildlife species distribution in the region and potential presence within the BSA was primarily obtained from Cornell Lab of Ornithology (2021) for birds, Hall (1981) for mammals, and Stebbins (2003) for reptiles and amphibians. To identify "established native resident or migratory wildlife movement corridors" that could be impacted by the Proposed Project, biologists reviewed the Critical Linkages: Bay Area and Beyond project

report (Penrod et al. 2013) as well as applicable datasets (Penrod 2014a, 2014b) in CDFW's BIOS viewer (version 5.89.14c).

3.2 Field Surveys

From December 2020 to February 2021, Dudek conducted reconnaissance-level biological surveys of the BSA that included vegetation community and land cover mapping, focused habitat assessments for special-status plant and wildlife species, and an aquatic resources jurisdictional delineation. Table 2 lists the dates, focus, scope, conditions, and personnel for each survey, and Appendix A, Site Photographs, provides representative photographs taken during the survey efforts. Additional information on each survey type is provided below.

Table 2. Summary of Biological Surveys

Date	Time	Type of Survey	Survey Conditions	Biologists
12/02/2020	0830–1620	Biological reconnaissance survey, vegetation mapping, special-status species habitat assessments, Sandhills habitat assessment	43°F–55°F, 15%–20% CC, 0–5 mph wind	ES, JMc
12/09/2020	0900–1630	Biological reconnaissance survey, vegetation mapping, special-status species habitat assessments	46°F–60°F, 10%–40% CC, 0–5 mph wind	ES
01/07/2021	0800–1700	Sandhills habitat assessment	46°F–59°F, 50%–100% CC, 0–6 mph wind	JMc
01/25/2021	1030–1730	Biological reconnaissance survey, vegetation mapping, special–status species habitat assessments	45°F –50°F, 15%-70% CC, 5–15 mph wind	ES, ML, MR
02/03/2021	0830–1700	Biological reconnaissance survey, vegetation mapping, special–status species habitat assessments	41°F –57°F, 0%-15% CC, 5–8 mph wind	ML
02/03/2021	0830–1700	Aquatic resources jurisdictional delineation	41°F –57°F, 0%–15% CC, 5-8 mph wind	EG, SL
02/04/2021	0830–1700	Aquatic resources jurisdictional delineation	42°F –58°F, 0%–15% CC, 0–5 mph wind	EG, SL
04/19/2021	0800–1700	Special-status plant survey (pass 1)	52°F –64°F, 0%–20% CC, 2–10 mph wind	JMc
04/21/2021	0800–170	Special-status plant survey (pass 1)	53°F –64°F, 0%–20% CC, 2–15 mph wind	JMc
04/22/2021	0800–1700	Special-status plant survey (pass 1)	52°F –62°F, 0%–20% CC, 2–15 mph wind	JMc
06/03/2021	0800–1700	Special-status plant survey (pass 2)	57°F –80°F, 0%–20% CC, 0–5 mph wind	JMc
06/04/2021	0800–1700	Special-status plant survey (pass 2)	61°F –72°F, 40%–80% CC, 0–5 mph wind	JMc
07/14/2021	0800–1700	Special-status plant survey (pass 3)	59°F –75°F, 0%–20% CC, 0–10 mph wind	JMc
07/15/2021	0800–1700	Special-status plant survey (pass 3)	58°F –70°F, 20%–40% CC, 0–10 mph wind	JMc

Survey Conditions: °F = degrees Fahrenheit; CC = cloud cover; mph = miles per hour.
Biologists: EG = Elizabeth Geisler; ES = Emily Scricca; JMc = Jodi McGraw; ML = Michele Laskowski; MR = Matt Ricketts; SL = Sheldon Leiker.

3.2.1 Vegetation Communities and Land Covers

Dudek used CDFW's Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities (CDFW 2018) and the California Natural Communities List (CDFW 2020) to map vegetation in the BSA. Vegetation communities and land covers were delineated to the vegetation alliance level and, where appropriate, to the association level.

Vegetation communities and land covers were mapped in the field directly onto a 1:2,400-scale (1 inch = 200 feet), aerial-photograph-based field map of the BSA. A minimum mapping unit of 2.2 acres (1 hectare) was established to standardize the mapping protocol among biologists. A Dudek GIS analyst processed the vegetation boundaries as delineated by the field biologists and created a GIS coverage for vegetation communities using ArcGIS software. Once major linework and community designations were completed, a geodatabase was created to help ensure the data was topologically correct and met final quality assurance/quality control procedures.

3.2.2 Plant and Wildlife Species

All plant species observed during field surveys were identified and recorded. Latin and common names for plant species with a CRPR follow the nomenclature set forth in the CNPS Inventory (CNPS 2021). For plant species without a CRPR, Latin names follow the Jepson Interchange List of Currently Accepted Names of Native and Naturalized Plants of California (Jepson Flora Project 2021), and common names follow the California Natural Community List (CDFW 2020) or the USDA Natural Resources Conservation Service PLANTS Database (USDA 2021b).

Wildlife species detected during field surveys by sight, calls, tracks, scat, or other signs were recorded. Binoculars were used to aid in the identification of observed wildlife throughout the BSA. In addition to species directly observed, expected wildlife use was determined by known habitat preferences of local species and knowledge of their range and relative distributions in the area.

Sources for common and scientific names used for wildlife include Crother (2012) for reptiles and amphibians, the American Ornithological Society's checklist (Chesser et al. 2020) for birds, Wilson and Reeder (2005) for mammals, North American Butterfly Association (NABA 2001) for butterflies, and Moyle (2002) for fish.

3.2.3 Sandhills Habitat Assessment

The Santa Cruz Sandhills is a unique habitat type that only occurs on outcrops of the Zayante sands soil type in central Santa Cruz County and is known to support several special-status plant and wildlife species, including state- and federally-listed species. This endemic ecosystem provides habitat for species such as the Mount Hermon June beetle (*Polyphylla barbata*), Zayante band-winged grasshopper (*Trimerotropis infantilis*), Scotts Valley spineflower (*Chorizanthe robusta var. hartwegii*), and Santa Cruz wallflower (*Erysimum teretifolium*). Jodi McGraw Consulting (JMc) mapped areas of Sandhills habitat within the BSA. The goal of the assessment was to evaluate the occurrence of Sandhills habitat to assist with the analysis of biological resource impacts for CEQA and future permitting purposes. This section summarizes the results of the full habitat assessment for the BSA.

JMc reviewed existing documents and spatial datasets pertaining to the Sandhills ecosystem and associated vegetation communities and species occurrences, including their in-house GIS datasets (McGraw 2005a, 2005b, unpublished data), CNDDB (CDFW 2021c), U.S. Department of Agriculture Web Soil Survey (USDA 2021a), and aerial imagery (County of Santa Cruz 2016). In addition to the spatial data, JMc also reviewed information contained

in prior reports and plans assessing Sandhills habitat, including the Sandhills Conservation and Management Plan (McGraw 2004) and other survey reports prepared for other conservation and land use projects in the region.

Following the data review, JMc conducted a field assessment of the legally accessible areas of the BSA. The field assessment was used to delineate the Sandhills ecosystem and to aid classification and mapping of Sandhills communities within the BSA. The field assessment did not constitute a focused botanical survey, but any special-status plants encountered were recorded. The Sandhills Habitat Assessment is provided in Appendix B to this report.

3.2.4 Focused Botanical Surveys

Based on the habitat types present within and adjacent to the BSA, focused surveys for special-status plants were deemed necessary to support the analysis of potential impacts resulting from the Proposed Project. JMc conducted focused surveys for special-status plants within the BSA from April to July 2021 to maximize detection of species during their blooming periods. Three survey passes were conducted within potential habitat for target special-status plant species identified during the general biological survey and habitat assessments described above. The survey passes were conducted within the Proposed Project work area for the three pipeline segments with the highest priority for replacement: Brackney North, Graham Hill Road North, and Graham Hill Road South The Proposed Project work area constitutes the portion of the BSA in which all construction activities and staging would occur for these high priority segments. Field survey methods conformed to the CNPS Botanical Survey Guidelines (CNPS 2001); Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (CDFW 2018); and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants (USFWS 2000). All plant species encountered during the field surveys were identified to subspecies or variety, as applicable, to determine sensitivity status. If target species were encountered, field biologists recorded data points demarcating individual occurrences and/or edge of polygon(s) using a GPS receiver with sub-meter accuracy along with a data dictionary and assessed population numbers. The data dictionary included the species name, the number or range of individuals, and the biologist collecting the data. The focused botanical survey report is provided in Appendix C to this report.

3.2.5 Potential Jurisdictional Aquatic Resources

Prior to fieldwork, Dudek biologists conducted a desktop review of potentially jurisdictional aquatic resources (waters of the United States, waters of the state, and CFGC Section 1602 jurisdiction) within the BSA that could present constraints to the Proposed Project. This screening step involved review of existing data sources and was intended to eliminate areas of the Proposed Project from further analysis and field investigation. Potential and/or historic drainages and aquatic features were investigated based on a review of the following: USGS topographic maps (1:24,000 scale), aerial photographs, National Hydrography Dataset (NHD), the National Wetlands Inventory database (USFWS 2021), and the Natural Resources Conservation Service Web Soil Survey (USDA 2021a). In addition, hydrologic information from gauge stations within the vicinity of the BSA was obtained.

Dudek then ground-truthed results of the desktop screening for jurisdictional aquatic resources during the general biological field investigation described above. As part of the ground-truth effort, Dudek biologists documented potential aquatic resources with photographs and notes, including the estimated extent of the features. Observations within the BSA were conducted on foot except for inaccessible areas of Graham Hill Road, where a windshield assessment was performed. Results of the planning-level screening and field investigation were evaluated by the project team for review and design consideration. A Dudek GIS analyst processed the aquatic

resource extents documented by the biologists and created a GIS map of potential aquatic features using ArcGIS software. Survey Limitations

Vegetation community mapping and biological reconnaissance surveys were conducted during the winter season, which resulted in detection and identification of most perennial plant species that may occur in the BSA. Due to the timing of the surveys, annual species that bloom in spring, summer, and early fall, as well as cryptic perennials, may not have been detectable.

The botanical survey occurred in the second of two years of below-average rainfall. In Boulder Creek California, 2019-20 saw just 21.4 inches of rain, which is just 42 percent of the average 51.5 inches per year; 2020-21 received just 17 inches (33% of average; SLVWD 2021). Such drought conditions can limit establishment and survivorship of rare plants, particularly annual plants. An additional botanical survey after a "normal" rainfall year may be warranted to confirm special-status plant absence from the Proposed Project footprint after it has been defined.

Limitations of the surveys also include a diurnal bias for most wildlife, seasonal bias for resident and wintering birds, and the absence of focused trapping for small mammals, reptiles, and amphibians. The surveys were conducted during the daytime to maximize the detection of most wildlife. Birds represent the largest component of the vertebrate fauna and because most are active in the daytime, diurnal surveys maximize the number of bird observations. Conversely, diurnal surveys usually result in few observations of mammals, many of which may only be active at night. In addition, many species of reptiles and amphibians are secretive in their habits and are difficult to observe using standard meandering transects. Because surveys were conducted in the winter, non-resident birds that migrate through or nest in the area (e.g., Neotropical-Nearctic migrant landbirds) would not have been present.

The biological reconnaissance survey, vegetation mapping, habitat assessments, and the aquatic resources jurisdictional delineation were conducted within the BSA from the existing easements and publicly accessible roads and ROW. However, access was not available for all parcels within the BSA due to private residential properties. Therefore, use of aerial imagery signatures for vegetation communities and habitat suitability adjacent to the ROW within the BSA were conducted for those areas that could not be accessed on foot.

4 Results

4.1 Vegetation Communities and Land Covers

The BSA supports a total of 17 natural vegetation communities and 5 land covers. Figures 3-1 to 3-18 illustrate the distribution of vegetation communities and land covers for the northern and southern segments, respectively. Table 3 summarizes the extent of vegetation communities and land covers within the BSA. Descriptions of these vegetation communities and land covers are summarized below.

Table 3. Vegetation Communities and Land Covers within the Biological Study Area

Vegetation Alliance (Common Name) or Land Cover	CDFW CA Code	Area (acres)
Forest and Woodland Alliances and Stands		
Bigleaf maple forest and woodland (BMFW)	61.450.00	2.7
Black cottonwood forest and woodland (BCFW)	61.120.00	1.8
Box-elder forest and woodland (BFW)	61.440.00	2.4
California bay forest and woodland (CBFW)	74.100.00	20.9
California sycamore woodland (CSW)	61.310.00	12.0
Coast live oak woodland and forest (CLO)	71.060.00	90.1
Douglas fir - tanoak forest and woodland (DF-TFW)	82.500.00	4.5
Douglas fir forest and woodland (DFFW)	82.200.00	43.6
Mixed oak forest and woodland (MOFW)	71.100.00	54.9
Ponderosa pine forest and woodland (PPFW)	87.010.00	125.0
Redwood forest and woodland (RFW)	86.100.00	186.4
White alder groves (WAG)	61.420.00	13.8
Subtotal Forest and Woodland Alliances and Stands	-	*558.1*
Shrubland Alliances and Stands		
Coastal brambles (COB)	63.901.00	0.4
Coyote brush scrub (CYS)	32.060.00	6.5
Poison oak scrub (POS)	37.940.00	1.9
Silverleaf manzanita chaparral (SMC)	37.320.00	44.0
Subtotal Shrubland Alliances and Stands	-	*52.8*
Herbaceous Alliances and Stands		
Wild oats and annual brome grasslands (WOABG)	42.027.00	7.1
Subtotal Herbaceous Alliances and Stands	-	*7.1*
Non-natural Land Covers/Unvegetated Communities		
Dirt Road (DRD)	-	3.4
Disturbed Habitat (DH)	-	40.7
Parks (PARK)	-	4.9
Rural residential (DEV-RR)	-	230.4
Urban/Developed (DEV)	-	85.7
Subtotal Non-Natural Land Covers/Unvegetated Communities	-	*365.1*
Total	**-**	**983.1**

4.1.1 Forest and Woodland Alliances

4.1.1.1 Bigleaf Maple Forest and Woodland

The bigleaf maple forest and woodland alliance is characterized by bigleaf maple (*Acer macrophyllum*) being dominant or co-dominant in the tree canopy. This alliance has an intermittent to continuous canopy less than 246 feet in height (and may be two-tiered), with an infrequent or well-developed shrub layer (Sawyer et al. 2009). The herbaceous layer can vary from sparse to abundant. Species associated with the bigleaf maple forest and woodland alliance include California bay (*Umbellularia californica*), California black oak (*Quercus kelloggii*), canyon live oak (*Quercus chrysolepis*), Douglas fir (*Pseudotsuga menziesii*), incense cedar (*Calocedrus decurrens*), Pacific dogwood (*Cornus nuttallii*), Pacific yew (*Taxus brevifolia*), redwood (*Sequoia sempervirens*), valley oak (*Quercus lobata*), and white alder (*Alnus rhombifolia*).

Within the BSA, this vegetation community consists of bigleaf maple, California bay, Pacific madrone (*Arbutus menziesii*) and redwood. Understory plants include snowberry (*Symphoricarpos mollis*), toyon (*Heteromeles arbutifolia*), French broom (*Genista monspessulana*), California blackberry (*Rubus ursinus*), poison oak (*Toxicodendron diversilobum*), California man-root (*Marah fabacea*) and sword fern (*Polystichum munitum*). The bigleaf maple forest and woodland occurs along the San Lorenzo River corridor in the Brackney North and South sections of the pipeline and throughout the BSA, including the Newell Creek Road section, along significant drainages such as Newell Creek.

4.1.1.2 Black Cottonwood Forest and Woodland

The black cottonwood forest and woodland alliance is characterized by black cottonwood (*Populus trichocarpa*) being dominant or co-dominant in the tree canopy. This alliance has an intermittent to continuous canopy less than 98 feet in height with an open to continuous shrub layer (Sawyer et al. 2009). The herbaceous layer can vary from sparse to abundant. Species associated with the black cottonwood forest and woodland alliance in the Coast Range include arroyo willow (*Salix lasiolepis*), bigleaf maple, box-elder (*Acer negundo*), California sycamore (*Platanus racemosa*), coast live oak (*Quercus agrifolia*), coastal dune willow (*Salix hookeriana*), red alder (*Alnus rubra*), red willow (*Salix laevigata*), sandbar willow (*Salix exigua*), shining willow (*Salix lasiandra* var. *lasiandra*), wax myrtle (*Morella californica*), and white alder.

Within the BSA, this vegetation community consists of black cottonwood with California sycamore, California bay, box elder, big-leaf maple. The understory contains California blackberry, periwinkle (*Vinca major*), and English ivy (*Hedra helix*). This alliance primarily occurs within the Graham Hill Road North section of the BSA.

4.1.1.3 Box-elder Forest and Woodland

The box-elder forest and woodland alliance is characterized by box-elder being dominant or co-dominant in the tree canopy. This alliance has an intermittent to continuous canopy less than 66 feet in height with an open to intermittent shrub layer (Sawyer et al. 2009). The herbaceous layer can vary from sparse to abundant. Species associated with the box-elder forest and woodland alliance include black cottonwood, California sycamore, Fremont cottonwood (*Populus fremontii*), Goodding's willow (*Salix gooddingii*), Northern California black walnut (*Juglans hindsii*), Oregon ash, valley oak, and white alder.

Within the BSA, this vegetation community consists of box-elder, white alder, black cottonwood, arroyo willow, California sycamore, red osier dogwood (*Cornus sericea ssp. sericea*), and acacia (*Acacia dealbata*). This alliance primarily occurs within the Graham Hill Road North section of the BSA.

4.1.1.4 California Bay Forest and Woodland

The California bay forest and woodland alliance is characterized by California bay being dominant or co-dominant in the tree canopy. This alliance has an intermittent to continuous canopy less than 66 feet in height with an open to intermittent shrub layer (Sawyer et al. 2009). The herbaceous layer can vary from sparse to abundant. Species associated with the California bay forest and woodland alliance include beaked hazelnut (*Corylus cornuta*), bigleaf maple, California buckeye (*Aesculus californica*), California sycamore, coast live oak, Douglas fir, foothill pine (*Pinus sabiniana*), interior live oak (*Quercus wislizeni*), Pacific madrone, red alder, redwood, Southern California black walnut (*Juglans californica*), tanoak (*Notholithocarpus densiflorus*), and white alder.

Within the BSA, this vegetation community consists of California bay, coast live oak, bigleaf maple, redwood, acacia, poison oak, California blackberry, lady fern (*Athyrium filix-femina*), sword fern and polypody fern (*Polypodium californicum*). Some areas were characterized by open, sandy, landslide areas with French broom and California blackberry. This alliance is most common in the San Lorenzo River and Zayante Creek riparian corridors and is often adjacent to coast live oak woodland and redwood forest communities. Other locations where it occurs in the BSA include the Brackney North, Brackney South, Henry Cowell Redwoods State Park, Newell Creek Road, and San Lorenzo Way sections.

4.1.1.5 California Sycamore Woodland

The California sycamore woodland alliance is characterized by California sycamore and/or coast live oak being dominant or co-dominant in the tree canopy, which is less than 115 feet in height with a variable shrub layer and sparse or grassy herbaceous layer (Sawyer et al. 2009). The California sycamore woodland often occurs in gullies or along streams, springs, seeps, and associated terraces where floodplains are subject to high-intensity flooding.

Within the BSA, the California sycamore woodland forms an open to intermittent tree layer dominated by California sycamore in association with coast live oak, California bay, and box elder. The understory often has big-leaf maple, California blackberry, canyon gooseberry (*Ribes menziesii*) and cow parsnip (*Heracleum maximum*). The California sycamore woodland alliance is typically associated with significant drainages and occurs within the Felton Pump Station and San Lorenzo Way sections of the BSA.

4.1.1.6 Coast Live Oak Woodland and Forest

The coast live oak woodland alliance is characterized by coast live oak being dominant or co-dominant in the tree canopy. This alliance has an open to continuous canopy less than 98 feet in height, with a sparse to intermittent shrub canopy and a sparse or grassy ground layer (Sawyer et al. 2009). Species associated with the coast live oak woodland alliance include bigleaf maple, blue oak (*Quercus douglasii*), box elder, California bay, Engelmann oak (*Quercus engelmannii*), California sycamore, Southern California black walnut, valley oak, arroyo willow, California black oak, and Pacific madrone (Sawyer et al. 2009).

Within the BSA, this vegetation community consists of coast live oak, California bay, Pacific madrone, Douglas fir and ponderosa pine. Other species observed in the understory included coyote brush (*Baccharis pilularis*), poison oak, bracken fern (*Pteridium aquilinum var. pubescens*), California blackberry, and French broom. Where this

community occurred along riparian corridors the understory included species such as giant chain fern (*Woodwardia fimbriata*), sword fern, lady fern, pink honeysuckle (*Lonicera hispidula*), horsetail (*Equisetum sp.*), red elderberry (*Sambucus racemosa*), cow parsnip and hedge nettle (*Stachys sp.*). This alliance is relatively common and occurs in all sections of the BSA except the Brackney North and Santa Cruz Lumber Yard sections.

4.1.1.7 Douglas Fir – Tanoak Forest and Woodland

The Douglas fir-tanoak forest and woodland alliance is characterized by Douglas fir and tanoak being co-dominant in the tree canopy. This alliance has an intermittent to continuous canopy less than 246 feet in height, with a sparse to intermittent shrub canopy and a sparse to abundant herbaceous layer (Sawyer et al. 2009). Species associated with the Douglas fir-tanoak forest and woodland alliance include bigleaf maple, California bay, California black oak, canyon live oak, golden chinquapin (*Chrysolepis chrysophylla*), incense cedar, Pacific madrone, Pacific yew, Ponderosa pine (*Pinus ponderosa*), Port Orford cedar (*Chamaecyparis lawsoniana*), and sugar pine (*Pinus lambertiana*).

Within the BSA, this vegetation community consists of Douglas fir and tanoak dominant canopy together with Pacific madrone, coast live oak and Shreve oak (*Quercus parvula ssp. shrevei*). The understory consists of California huckleberry (*Vaccinium ovatum*), wood rose (*Rosa gymnocarpa*), California blackberry, poison oak, and sword fern. This alliance was limited in distribution and only occurs within the Pipeline Road section of the BSA.

4.1.1.8 Douglas Fir Forest and Woodland

The Douglas fir forest and woodland alliance is characterized by Douglas fir being the dominant or co-dominant with other hardwood trees in the canopy. This alliance has an intermittent to continuous canopy less than 246 feet in height, with a shrub layer that varies from infrequent to common and herbaceous layer that varies between sparse to abundant (Sawyer et al. 2009). Species associated with the Douglas fir forest and woodland alliance in the Coast Range include bigleaf maple, California black oak, coast live oak, golden chinquapin, incense cedar, Pacific madrone, Pacific dogwood, Port Orford cedar, redwood, sugar pine, white alder, and white fir (*Abies concolor*).

Within the BSA, this vegetation community consists of Douglas fir associated with redwood, knobcone pine (*Pinus attenuata*), coast live oak, and Pacific madrone. Understory plants included tanoak, California coffee berry (*Frangula californica*), ocean spray (*Holodiscus discolor*), wood rose, coyote brush, bracken fern, sword fern, Douglas iris (*Iris douglasiana*), yerba buena (*Satureja douglasiana*). This alliance is relatively common and occurs within the Brackney North Section, Brackney South, Graham Hill Road South, Henry Cowell Redwoods State Park, and Pipeline Road sections of the BSA.

4.1.1.9 Mixed Oak Forest and Woodland

The mixed oak forest and woodland alliance is characterized by a co-dominance of three or more oak species (*Quercus agrifolia*, *Quercus douglasii*, *Quercus garryana*, *Quercus kelloggii*, *Quercus lobata*, *and Quercus wislizeni*) in the tree canopy (Sawyer et al. 2009). The alliance has an intermittent to continuous canopy less than 98 feet in height with an infrequent to common shrub canopy, and a variable herbaceous layer (Sawyer et al. 2009). Other tree species associated with the alliance include California bay, California buckeye, Douglas fir, and Pacific madrone.

Within the BSA, this vegetation community consists of coast live oak and interior live oak as co-dominants with some redwood, ponderosa pine, Pacific madrone, and California bay. The understory includes Douglas fir, black cottonwood, arroyo willow, buckeye, tanoak, California coffee berry, coyote brush, toyon, hairy manzanita, pointleaf manzanita, California goldenbush. Other species included rushes (*Juncus sp*.), rattlesnake grass (*Briza maxima*), autumn hawkbit (*Scorzoneroides autumnalis*), broad-leaved helleborine (*Epipactis helleborine*), California yerba santa (*Eriodictyon californicum*), and sticky monkey flower. This alliance is relatively common and occurs within the Brackney North, Henry Cowell Redwoods State Park, Newell Creek Road, Pipeline Road, San Lorenzo Way, and the Santa Cruz Lumber Yard sections of the BSA.

4.1.1.10 Ponderosa Pine Forest and Woodland

The Ponderosa pine forest alliance is characterized by Ponderosa pine being dominant or co-dominant in the tree canopy. The alliance has an open to continuous canopy less than 164 feet in height with an open to continuous shrub layer and a sparse, abundant, or grassy herbaceous layer (Sawyer et al. 2009). Species associated with the alliance in the Coast Range include California black oak, canyon live oak, Coulter pine (*Pinus coulteri*), Douglas fir, incense cedar, Jeffrey pine (*Pinus jeffreyi*), lodgepole pine (*Pinus contorta* ssp. *murrayana*), mountain juniper (*Juniperus grandis*), sugar pine, tanoak, western juniper (*Juniperus occidentalis*), and white fir.

Within the BSA, this vegetation community consists of Ponderosa pine associated with Douglas fir, coast live oak, and Pacific madrone. The understory consists primarily of California coffee berry, poison oak, California blackberry, and bracken fern. Shrubs that comprise the silverleaf manzanita chapparal alliance were found within canopy gaps and the understory of some locations. This alliance occurs within the Graham Hill Road North, Graham Hill Road South, and Pipeline Road sections of the BSA.

4.1.1.11 Redwood Forest and Woodland

The redwood forest alliance is characterized by redwood being dominant or co-dominant in the tree canopy. The alliance has a continuous to intermittent canopy less than 400 feet in height with an infrequent to common shrub canopy and a variable herbaceous layer (Sawyer et al. 2009). Species associated with the alliance include bigleaf maple, California bay, red alder, giant chinquapin, tanoak, Douglas fir, and Pacific madrone among others (Sawyer et al. 2009).

Redwood forest and woodland is the most common alliance in the BSA. This vegetation community consisted of redwood and California bay as co-dominants, with some coast live oak and Douglas fir. The understory is characterized by bigleaf maple, tanoak, beaked hazelnut, thimbleberry (*Rubus parviflorus*), California blackberry, English ivy, sword fern, creeping wood sorrel (*Oxalis corniculata*), broadleaf forget me-not (*Myositis latifolia*), hairy fleabane (*Erigeron bonariensis*), rushes, greater periwinkle, pink honeysuckle, and redwood sorrel (*Oxalis oregana*). This alliance occurs in all sections of the BSA except the Felton Pump Station or Santa Cruz Lumber Yard sections.

4.1.1.12 White Alder Groves

The white alder groves alliance is characterized by white alder being dominant or co-dominant in the tree canopy. The alliance has a continuous to intermittent canopy less than 400 feet in height with an infrequent to common shrub canopy and a variable herbaceous layer (Sawyer et al. 2009). Species associated with the alliance include bigleaf maple, California bay, red alder, giant chinquapin, tanoak, Douglas fir, and Pacific madrone among others (Sawyer et al. 2009).

Within the BSA, this vegetation community consists of white alder often associated with California sycamore, black cottonwood, and bigleaf maple. Typical understory species include thimbleberry, California blackberry and ferns. This alliance occurs in the Felton Pump Station, Graham Hill Road North, Henry Cowell Redwoods State Park, Newell Creek Road, and Pipeline Road sections of the BSA.

4.1.2 Shrubland Alliances and Stands

4.1.2.1 Coastal Brambles

The coastal brambles alliance is characterized by California blackberry, salmonberry (*Rubus spectabilis*), and thimbleberry as co-dominants in the shrub layer. This alliance has an intermittent to continuous shrub canopy less than 6 feet in height and a sparse herbaceous layer (Sawyer et al. 2009). Species associated with the alliance include California huckleberry, canyon gooseberry, coastal manroot (*Marah oregana*), coastal silk tassel (*Garrya elliptica*), cow parsnip, coyote brush, red elderberry, salal (*Gaultheria shallon*), twinberry honeysuckle (*Lonicera involucrata*), and wax myrtle. Emergent trees, such as Sitka spruce (*Picea sitchensis*), may be present at low cover (Sawyer et al. 2009).

Within the BSA, this vegetation community consists of California blackberry, red elderberry, ocean spray, deer weed, French broom, sticky monkey flower, poison oak, California mugwort (*Artemisia douglasiana*), California man-root, phacelia (*Phacelia californica),* pacific false bindweed (*Calystegia purpurata*), bedstraw (*Galium sp.*), bull thistle (*Cirsium vulgare*). This alliance primarily occurs within small patches of the Brackney North and Glen Arbor Road sections of the BSA.

4.1.2.2 Coyote Brush Scrub

The coyote brush scrub alliance is characterized by coyote brush being dominant or co-dominant in the shrub canopy with bush monkeyflower (*Diplacus aurantiacus*), California blackberry, California buckwheat (*Eriogonum fasciculatum*), California coffee berry, California sagebrush (*Artemisia californica*), deer weed (*Acmispon glaber*), poison oak, purple sage (*Salvia leucophylla*), wax myrtle, white sage (*Salvia apiana*), and yellow bush lupine (*Lupinus arboreus*). This alliance has a variable shrub canopy less than 10 feet in height with a variable ground layer (Sawyer et al. 2009). Emergent tree species associated with the alliance may occur at low cover including Bishop pine (*Pinus muricata*), Douglas fir, coast live oak, or California bay (Sawyer et al. 2009).

Within the BSA, this vegetation community consists primarily of coyote brush with pink honeysuckle, bush monkeyflower, and wedgeleaf ceanothus (*Ceanothus cuneatus*). Scattered coast live oak trees are interspersed and the understory is composed of annual grasses and forbs. This alliance occurs within the Felton Pump Station, Henry Cowell Redwoods State Park, Newell Creek Road, and San Lorenzo Way sections of the BSA.

4.1.2.3 Poison Oak Scrub

The poison oak scrub alliance is characterized by poison oak being dominant in the shrub canopy. Poison oak scrub has a two-tiered intermittent to continuous shrub canopy less than 13 feet in height with a variable herbaceous layer (Sawyer et al. 2009). Species associated with the alliance include black sage (*Salvia mellifera*), blue elderberry (*Sambucus nigra*), bush monkeyflower, California sagebrush, coyote brush, heartleaf keckiella (*Keckiella cordifolia*), hollyleaf redberry (*Rhamnus ilicifolia*), laurel sumac (*Malosma laurina*), Lewis' mock orange (*Philadelphus lewisii*), purple sage, thimbleberry, and toyon. Emergent trees may be present at low cover.

Within the BSA, this vegetation community consists of poison oak, French broom, box elder, California blackberry, coyote brush, blue elderberry, old man's beard (*Clematis vitalba*), western vervain (*Verbena lasiostachys*). This alliance occurs within the Brackney South section of the BSA.

4.1.2.4 Silverleaf (Bonny Doon) Manzanita Chaparral

The silverleaf (Bonny Doon) manzanita chaparral alliance is characterized by silverleaf manzanita (*Arctostaphylos silvicola*) as being dominant or co-dominant in the shrub canopy with bush monkeyflower, California coffee berry, California sagebrush, California yerba santa, chamise (*Adenostoma fasciculatum*), glossyleaf manzanita (*Arctostaphylos sensitiva*), golden-yarrow (*Eriophyllum confertiflorum*), mock heather (*Ericameria ericoides*), silver bush lupine (*Lupinus albifrons*), toyon, wedgeleaf ceanothus, and woollyleaf manzanita (*Arctostaphylos crustacea* ssp. *crinita*). This alliance has an intermittent to continuous shrub canopy less than 19 feet in height with a sparse herbaceous layer (Sawyer et al. 2009). Emergent tree species associated with the alliance may occur at low cover including coast live oak, Douglas fir, knobcone pine, Pacific madrone, and Ponderosa pine (Sawyer et al. 2009).

Within the BSA, this vegetation community is dominated by silverleaf manzanita, buckbrush, chamise, and yerba santa. The emergent trees frequently include ponderosa pine and coast live oak. Canopy gaps within the shrubs support bush monkeyflower and herbs such as Ben Lomond spineflower (*Chorizanthe pungens var harwegiana*), Santa Cruz monkeyflower (*Diplacus rattanii ssp. decurtatus*) and hollyleaf navarretia (*Navarretia atractyloides*) (McGraw 2021a). This alliance occurs within distinct patches of the Glen Arbor Road, Graham Hill Road North, Newell Creek Road, and Pipeline Road sections of the BSA. Within the proposed alignment there are three main occurrences: atop Mount Hermon in the Graham Hill Road North section, near the intersection of Glen Arbor and Quail Hollow Roads in the Glen Arbor section, and in the western portion of the Newell Creek Road section south of the landfill (McGraw 2021a).

4.1.3 Herbaceous Alliances and Stands

4.1.3.1 Wild Oats and Annual Brome Grasslands

The wild oats and annual brome grasslands alliance is co-dominated by several grass species, including rattlesnake grass, mouse barley (*Hordeum murinum*), purple false brome (*Brachypodium distachyon*), ripgut brome (*Bromus diandrus*), slender oat (*Avena barbata*), soft brome (*Bromus hordeaceus*), and wild oat (*Avena fatua*). The alliance has an open to continuous herbaceous canopy less than 4 feet in height (Sawyer et al. 2009). Additional species in low cover associated with this semi-natural stand includes Australian saltbush (*Atriplex semibaccata*) and other *Hordeum* species.

Within the BSA, this vegetation community consists of non-native grasses such as wild oats (*Avena sp.*), soft brome, ripgut brome. Other cover includes smooth cats ear (*Hypochaeris glabra*) and English plantain (*Plantago lanceolata*), spring vetch (*Vicia sativa*). This alliance occurs within the Graham Hill Road South, Henry Cowell Redwoods State Park, San Lorenzo Way, and Santa Cruz Lumber Yard sections of the BSA.

4.1.4 Non-Natural Land Covers

The following non-natural land covers are determined by human use instead of natural vegetation and are therefore not classified by CDFW's Natural Communities List (CDFW 2020). They have been defined for this report observations in the field.

4.1.4.1 Dirt Road

The dirt road mapping unit refers to areas that have been graded and are actively used and maintained for vehicular access. These linear routes are not paved but characterized by compacted soils that generally lack vegetation. These areas provide relatively low biological value but may serve as movement routes for some wildlife species.

This mapping unit is associated with established access roads and major trails throughout the BSA. This mapping unit included sections of old pavement pieces and gravel, and adjacent vault/utility boxes installed along the roads. Perimeter plants included California blackberry, rattlesnake grass, ribwort plantain (Plantago lanceolata), rip-gut brome, tall flatsedge (*Cyperus eragrostis*), rushes, creeping wood sorrel, broadleaf forget me-not (*Myosotis latifolia*), poison oak, sticky monkey flower, bull thistle, Epilobium sp., sword fern, pacific false bindweed, and common cotoneaster. This land cover occurs within the Brackney North, Brackney South, Graham Hill Road North, and San Lorenzo Way sections of the BSA.

4.1.4.2 Disturbed Habitat

The disturbed habitat mapping unit refers to areas where soils have been recently or repeatedly disturbed by grading, compaction, or clearing of vegetation. Structures are typically not present within disturbed habitats, and these areas provide relatively low value for most plant and wildlife species. When vegetated, disturbed habitat supports predominantly non-native plant species such as ornamentals or ruderal exotic species that take advantage of disturbance.

Within the BSA, disturbed habitat corresponded with horse pastures and an abandoned Christmas tree farm, as well as unpaved roadways and urban areas. Associated species observed in the field included star thistle, *Bromus* sp., shortpod mustard (*Hirschfeldia incana*), and other non-native grasses. This mapping unit is relatively common and occurs within the Brackney South, Felton Pump Station, Graham Hill Road North, Graham Hill Road South, Henry Cowell Redwoods State Park, Newell Creek Road, Pipeline Road, and San Lorenzo Way sections of the BSA.

4.1.4.3 Parks

The parks mapping unit refers to areas where non-native ornamental species and landscaping schemes have been installed and maintained, usually as part of commercial or residential property/park. This habitat type typically supports myriad ornamental species, including, but not limited to, Bermudagrass (*Cynodon dactylon*), hottentot fig (*Carpobrotus edulis*), Peruvian peppertree (*Schinus molle*), Brazilian peppertree (*Schinus terebinthifolius*), and red apple iceplant (*Aptenia cordifolia*).

Within the BSA, parks occur near and adjacent to developed residential areas. Within the BSA, this mapping unit consists of areas that were managed as public parks, with mowed lawns, parking lots, trails and public access. This mapping unit occurs within distinct patches of the Felton Pump Station and Graham Hill Road North sections of the BSA.

4.1.4.4 Rural Residential

The rural residential mapping unit identifies land occupied by residential structures, paving, and other impermeable surfaces in remote settings. Natural and non-natural vegetation communities are often interspersed within areas of low density. These areas may support vegetation or habitat for species.

Within the BSA, ornamental vegetation associated with the rural residential mapping unit included redwoods, madrone, coast live oak, English ivy, California bay, California blackberry, French broom, beaked hazelnut, and some walnut trees. Other areas within in this mapping unit included swales within neighborhood settings covered in English ivy, surrounded by redwoods and California bay. This land cover is the most common and occurs in all sections of the BSA except the Pipeline Road and Santa Cruz Lumber Yard sections.

4.1.4.5 Urban/Developed

The urban/developed mapping unit refers to areas that have been constructed on or otherwise physically altered to the point where vegetation is no longer present. Urban or developed areas are characterized by permanent or semi-permanent structures, hardscapes, and landscaped areas that require irrigation.

Within the BSA, this mapping unit identifies developed areas for dense residential, commercial, and industrial uses. This land cover occurs in all sections of the BSA except the Brackney North section.

4.2 Plants and Wildlife Observed

4.2.1 Plants

Dudek biologists recorded 115 species of native or naturalized plants, consisting of 88 native (77%) and 27 non-native (23%) species, in the BSA during vegetation community mapping and biological reconnaissance surveys and JMc recorded 215 plant species during focused botanical surveys of the Brackney North and Graham Hill Road North and Graham Hill Road South sections. Full lists of plant species observed are provided in Appendix D, Plant Compendium, and Appendix F. Special-status plant species that were detected or have a high potential to occur within the BSA are discussed under Section 4.3.2, Special-Status Plants.

4.2.2 Wildlife

A total of 37 wildlife species, consisting of 35 native species (95%) and 2 non-native species (5%), were recorded within the BSA during surveys. A full list of observed wildlife species by taxonomic group is provided in Appendix E, Wildlife Compendium and Appendix G. Several other common wildlife species are expected to occur within the BSA and are noted below for each group of species. Special-status wildlife species that may occur but were not observed are discussed under Section 4.3.3, Special-Status Wildlife.

4.2.2.1 Fish

The BSA provides diverse habitats that support a variety of native fish species. The San Lorenzo River and its tributaries support a diverse fish assemblage including Sacramento sucker (*Catostomus occidentalis*), California roach (*Lavinia symmetricus*), and speckled dace (*Rhinichthys osculus*), all of which are native species. Other species include black crappie (*Pomoxis nigromaculatus*), channel catfish (*Ictalurus punctatus*), common carp (*Cyprinus carpio*), resident rainbow trout (*Oncorhynchus mykiss*), threadfin shad (*Dorosoma petenense*), and white catfish (*Ameiurus catus*). Several anadromous species that are considered special-status species, such as Central California Coast steelhead (steelhead) (*O. mykiss irideus*) and Pacific lamprey (*Entosphenus tridentata*), also occur and are further described in Section 4.3.3, Special-Status Wildlife.

4.2.2.2 Birds

Thirty (30) species of birds were observed during surveys. Common woodland and forest species observed include downy woodpecker (*Dryobates pubescens*), Nuttall's woodpecker (*D. nuttallii*), California scrub-jay (*Aphelocoma californica*), Steller's jay (*Cyanocitta stelleri*), and dark-eyed junco (*Junco hyemalis*). Other common species expected to occur in the BSA, based on the presence or oak woodland and/or coniferous forest, include Hutton's vireo (*Vireo huttoni*), white-breasted nuthatch (*Sitta carolinensis*), red-breasted nuthatch (*Sitta canadensis*), pygmy nuthatch (*Sitta pygmaea*), orange-crowned warbler (*Oreothlypis celata*), and brown creeper (*Certhia americana*). Common tree-nesting raptors in the region in addition to those observed include Cooper's hawk (*Accipiter cooperi*) and great horned owl (*Bubo virginianus*). Stands of emergent wetland vegetation in and adjacent to streams and wetlands provide nesting habitat for marsh wren (*Cistothorus palustris*), song sparrow (*Melospiza melodia*), and red-winged blackbird (*Agelaius phoeniceus*).

Terrestrial songbird species that breed in riparian vegetation have received increased conservation attention in recent decades due to the limited distribution and decline of riparian plant communities. Song sparrow and spotted towhee are two riparian-breeding songbirds that were observed during surveys. Additional riparian species expected to nest in the BSA include Pacific-slope flycatcher (*Empidonax difficilis*), warbling vireo (*Vireo gilvus*), black-headed grosbeak (*Pheucticus melanocephalus*), Wilson's warbler (*Cardellina pusilla*), and common yellowthroat (*Geothlypis trichas*).

4.2.2.3 Reptiles and Amphibians

Sierran treefrog (*Pseudacris sierra*) was the only amphibian species detected during surveys. Other common amphibians expected to occur in both developed and natural land cover types include arboreal salamander (*Aneides lugubris*), and California slender salamander (*Batrachoseps attenuatus*). Amphibians that would only occur in natural communities (e.g., riparian and coastal oak woodland, coastal scrub, chaparral, grassland) and occasionally in adjacent rural residential lots include California newt (*Taricha torosa*), California giant salamander (*Dicamptodon ensatus*), ensatina (*Ensatina eschscholtzii*), and western toad (*Bufo boreas*).

No reptiles were detected during surveys but several common species are expected to occur. Western fence lizard (*Sceloporus occidentalis*) and common garter snake (*Thamnophis sirtalis*) are common species in both developed and natural land cover types as long as hard surfaces for basking (e.g., fence posts, rocks, logs, sides of buildings) are present for the former and water is nearby for the latter. Other species have narrower habitat requirements and only occur in natural land cover, occasionally venturing onto rural residential lots within or adjacent to natural land cover. Species in this category include southern alligator lizard (*Elgaria multicarinata*), northern rubber boa (*Charina bottae*), California kingsnake (*Lampropeltis californiae*), gopher snake (*Pituophis catenifer*), striped racer (*Coluber lateralis*), forest sharp-tailed snake (*Contia longicauda*), ring-necked snake (*Diadophis punctatus*), and western rattlesnake (*Crotalus oreganus*).

4.2.2.4 Mammals

Five mammals, three native and two non-native, were detected during surveys. The three native species, western gray squirrel (*Sciurus griseus*), mule deer (*Odocoileus hemionus*), and dusky-footed woodrat (*Neotoma fuscipes*), are common residents of woodland and forest habitats throughout the Central Coast Range.

Other common mammals likely to inhabit the BSA include fox squirrel (*Sciurus niger*), striped skunk (*Mephitis mephitis*), brush rabbit (*Sylvilagus bachmani*), Botta's pocket gopher (*Thomomys bottae*), Virginia opossum (*Didelphis virginiana*), and raccoon (*Procyon lotor*).

4.2.2.5 Invertebrates

The total number and diversity of arthropods, including crustaceans, insects, centipedes, millipedes, and arachnids and gastropods (snails and slugs) in the BSA is unknown and impossible to estimate because many groups of arthropods and gastropods have not been studied. The following summary focuses on a few well-known species and a very broad overview of taxonomic groups. The banana slug (*Ariolimax* spp.), a common mollusk of moist forest floors, is perhaps the most well-known invertebrate to the public. Common butterflies include western tiger swallowtail (*Papilo rutulus*), cabbage white (*Pieris rapae*), acmon blue (*Plebejus acmon*), gulf fritillary (*Agraulis vanillae*), and California tortoiseshell (*Nymphalis californica*), among many others. Native aquatic invertebrate species richness is high or moderately high and includes five groups (orders) of insects that reproduce in water and transform into flying insects as adults; these include caddisflies (Trichopetera), mayflies (Ephemeroptera), stoneflies (Plecoptera), dobsonflies (Neuroptera), and dragonflies (Odonata). True flies (Diptera), true bugs (Hemiptera), and beetles (Coleoptera) are very common in terrestrial habitats but are also important components of many aquatic communities. Mount Hermon June beetle is a federally threatened species endemic to the Sandhills of central Santa Cruz County and is discussed further in Section 4.3.3.1. Grasshoppers, crickets, and katydids (Orthoptera) primarily occur in terrestrial habitats.

4.3 Special-Status Biological Resources

Special-status biological resources occurring or potentially occurring in or near the BSA were determined based on Dudek's extensive literature review and results of field surveys. The following special-status biological resources are discussed below: sensitive vegetation communities, special-status plants, special-status wildlife, jurisdictional wetlands and waters, and wildlife corridors and habitat linkages.

4.3.1 Sensitive Vegetation Communities

Sensitive vegetation communities include the following: (1) those designated as sensitive by CDFW (2020) (CDFW sensitive natural communities), which includes riparian vegetation communities; and (2) those designated as sensitive habitats by the County of Santa Cruz within Chapter 5 of the General Plan and County Code Title 16, some of which overlap with the CDFW designations. Each of these are briefly discussed below.

4.3.1.1 CDFW Sensitive Natural Communities

CDFW sensitive natural communities are 'natural communities' (of vegetation) or 'vegetation types' that have been evaluated by CDFW using NatureServe's Heritage Methodology (Master et. al. 2012) and vegetation community classifications from *A Manual of California Vegetation* (MCV; Sawyer et. al. 2009), and ranked as imperiled or vulnerable. Evaluation is done at both the global (i.e., full natural range within and outside of California), and State (i.e., within California) levels resulting in a single 'G' (global) and 'S' (state) rank ranging from 1 (i.e., very rare and threatened) to 5 (i.e., demonstrably secure). The five levels of S-ranks are defined as follows:

- **S1 = Critically Imperiled**. Critically imperiled in California because of extreme rarity (often 5 or fewer populations) or because of factor(s) such as very steep declines making it especially vulnerable to extirpation.
- **S2 = Imperiled**. Imperiled in California because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation.
- **S3 = Vulnerable.** Vulnerable in California due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
- **S4 = Apparently Secure.** Uncommon but not rare in California; some cause for long-term concern due to declines or other factors.
- **S5 = Secure.** Common, widespread, and abundant in the state.

Natural communities with an S rank of S1, S2, or S3 are considered "sensitive" by CDFW and typically addressed in the CEQA environmental review process.

Dudek biologists reviewed the MCV for sensitive vegetation communities (alliances) in the Central California Coast ecoregion that have the potential to occur within the BSA. A total of 13 sensitive natural communities were identified as occurring within the BSA. Table 4 summarizes the sensitive natural communities (alliances) that were identified as occurring in the BSA based on the field mapping conducted for the project.

Table 4. Sensitive Vegetation Communities within the Biological Study Area

Vegetation Alliance (Common Name)	CDFW CA Code	State Rarity	BSA (acres)
Forest and Woodland Alliances and Stands			
Bigleaf maple forest and woodland*	61.450.00	S3	2.7
Black cottonwood forest and woodland*	61.120.00	S3	1.8
Box-elder forest and woodland*	61.440.00	S2	2.4
California bay forest and woodland*	74.100.00	S3	20.9
California sycamore woodland*	61.310.00	S3	12.0
Douglas fir - tanoak forest and woodland	82.500.00	S3	4.5
Redwood forest and woodland	86.100.00	S3	186.4
Shrubland Alliances and Stands			
Coastal brambles	63.901.00	S3	0.4
Silverleaf manzanita chaparral	37.320.00	S1	44.0
Total			**275.1**

Note:
* indicates riparian vegetation community
State Rarity: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable (CDFW 2020)

Riparian

Riparian vegetation communities occur along streams, ponds, rivers, and lakes and are considered sensitive because of their high habitat value for native wildlife. Riparian vegetation communities within the BSA included those mapped as bigleaf maple forest and woodland, black cottonwood forest and woodland, box-elder forest and woodland, California bay forest and woodland, California sycamore forest and woodland, and white alder groves. However, smaller, unmapped stands may also occur wherever water is available.

4.3.1.2 County of Santa Cruz Sensitive Habitats

Two additional sensitive habitat types as mapped by Santa Cruz County and protected under County Code 16.32 occur within the BSA: Special Forests and Sandhills Habitat. Both habitat types were defined in the County General Plan adopted May 24, 1994. Special Forests and Sandhills Habitat within the BSA are depicted in Figures 4a and 4b for the northern and southern segments, respectively.

Special Forests

Special Forests are forests that are (1) unique natural communities, (2) limited in supply and distribution, (3) threatened by substantial disturbance from human activities, and (4) habitat for rare, endangered and/or locally unique species of plants and animals. Examples of Special Forests include San Andreas oak woodlands, woodland/maritime chaparral, indigenous Ponderosa pine, and indigenous Monterey pine forests. Within the BSA, the County has identified Special Forest within the Glen Arbor Road section and forest lands within Henry Cowell Redwoods State Park that traverses Graham Hill Road. Approximately 2.7 acres of the Glen Arbor Road section and 82.5 acres of the Graham Hill Road North section have been mapped as Special Forest.

Sandhills Habitat

The Santa Cruz Sandhills is a unique habitat type that only occurs on outcrops of the Zayante snds soil type in central Santa Cruz County and is known to support several special-status plant and wildlife species. Sandhills habitat occurs in the Scotts Valley, San Lorenzo Valley, and Bonny Doon areas. In these locations, Zayante sands soils provide habitat for several special-status species endemic to (i.e., found only in) this area, such as the Mount Hermon June beetle, the Zayante band-winged grasshopper, the Santa Cruz kangaroo rat (*D. venestus*), Scotts Valley spineflower, Santa Cruz wallflower, and silver-leaved manzanita. Like the Special Forest designation, the County maintains a map of Sandhills Habitat. This dataset was reviewed and refined as appropriate during the Sandhills habitat assessment. Results of the habitat assessment revealed that approximately 416 acres of Sandhills habitat occurs within the proposed Newell Creek Road, Glen Arbor Road, and Graham Hill Road North sections, as well as a small portion of the Graham Hill Road South section, and the existing Pipeline Road sections of the BSA.

4.3.2 Special-Status Plants

As discussed in Section 3, special-status plants include those listed, or candidates for listing, as threatened or endangered by the USFWS and CDFW, and species identified as rare by the CNPS (particularly CRPR 1A – presumed extinct in California; CRPR 1B – rare, threatened, or endangered throughout its range; and CRPR 2 – rare or endangered in California, more common elsewhere). Special-status plant species directly observed during surveys conducted from April through July 2021 (McGraw 2021b) or known to occur in the surrounding region are described in Appendix F, Special-Status Plant Species Potential to Occur within the Biological Study Area. Appendix F describes their known occurrences or potential to occur within the BSA based on their general biology (e.g., primary habitat associations, life form, blooming period, and known elevation range). Figure 5 illustrates the historical locations for special-status plant species. There is no USFWS-designated critical habitat for listed plant species within the BSA (USFWS 2020). Figure 6 illustrates the results of current focused special-status plant species surveys conducted in 2021 (McGraw 2021b).

Based on the results of the literature review and database searches (CDFW 2021a, CDFW 2021c, CNPS 2021, USFWS 2021), Dudek identified 59 special-status plant species as potentially occurring in the region surrounding the BSA. Of these, 31 species are not expected to occur due to the absence of suitable habitat or because the BSA

is outside the known range of the species; and 12 species are considered to have low potential to occur based on the presence of low-quality habitat. These species were not analyzed further, thereby refining the analysis to the remaining 16 species with potential to occur in the area.

A total of seven species were determined to have a moderate potential to occur in the BSA based on the soils, vegetation communities (habitat) present, elevation range, and previous known locations based on the CNDDB, IPaC, and CNPS Inventory: Anderson's manzanita (*Arctostaphylos andersonii*), deceiving sedge (*Carex saliniformis*), Kellogg's horkelia (*Horkelia cuneata* var. *sericea*), Point Reyes horkelia (*Horkelia marinensis*), robust spineflower (*Chorizanthe robusta* var. *robusta*), Santa Cruz wallflower, and tear drop moss (*Dacryophyllum falcifolium*). The remaining nine species were either observed or determined to have a high potential to occur in the BSA. These species are summarized in Table 5 and discussed below.

Results of the focused botanical surveys conducted in 2021 along three of the pipeline sections proposed for the first phase of project implementation (Brackney North, Graham Hill Road North, and Graham Hill Road South) documented the occurrence of three special-status plants: Ben Lomond spineflower, silverleaf (Bonny Doon) manzanita, and Ben Lomond buckwheat (McGraw 2021b). Ben Lomond spineflower and silverleaf (Bonny Doon) manzanita were detected along a 4,094-foot-long portion of the Graham Hill Road North alignment that traverses Sandhills (Figure 6). Ben Lomond spineflower occupies 10 patches totaling 294 square feet (sf), which contain a total of 1,320 individuals. Silverleaf (Bonny Doon) manzanita was mapped in 32 patches totaling 13,360 sf, which featured 125 individuals: 113 adults, 10 juveniles, and 2 seedlings. Ben Lomond buckwheat was observed outside of the proposed work area but within the BSA near the northern end of the Graham Hill Road North section.

Table 5. Special-Status Plant Species Observed or with a High Potential to Occur within the Biological Study Area

Scientific Name	Common Name	Federal/State/CRPR	Potential to Occur*
Arctostaphylos silvicola	Silverleaf (Bonny Doon) manzanita	None/None/1B.2	Observed
Chorizanthe pungens var. hartwegiana	Ben Lomond spineflower	FE/None/1B.1	Observed
Eriogonum nudum var. decurrens	Ben Lomond buckwheat	None/None/1B.1	Observed
Fissidens pauperculus	minute pocket moss	None/None/1B.1	High
Holocarpha macradenia	Santa Cruz tarplant	FT/SE/1B.1	High
Monardella sinuate ssp. nigrescens	northern curly-leaved monardella	None/None/1B.2	High
Monolopia gracilens	woodland woolythreads	None/None/1B.2	High
Plagiobothrys chorisianus var. chorisianus	Choris' popcornflower	None/None/1B.2	High
Plagiobothrys diffuses	San Francisco popcornflower	None/SE/1B.1	High

Source: CDFW 2021a; CNPS 2021.
Status Legend
***** Although the BSA provides potential habitat, the proposed work areas do not generally support suitable habitat for these species due to the disturbed and developed nature of the ROW.
Federal
FE: Federally listed as endangered
FT: Federally listed as threatened
State

SE: State listed as endangered
CRPR (California Rare Plant Rank)
List 1B: Plants rare, threatened, or endangered in California and elsewhere
Threat Rank:
.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 Fairly endangered in California (20% to 80% of occurrences threatened)

4.3.2.1 Silverleaf (Bonny Doon) manzanita

Silverleaf (Bonny Doon) manzanita (*Arctostaphylos silvicola*) is a shrub with a CRPR of 1B.2 that occurs in closed-cone coniferous forest, chaparral, lower montane coniferous forest, and inland marine sands/perennial evergreen shrub (CNPS 2021; CDFW 2021a). Suitable forest and shrub habitat are present within the BSA. As noted above, this species was observed along the ROW during the 2021 habitat assessment and focused botanical surveys. The closest CNDDB occurrence was previously documented within chaparral/sandhill habitat approximately 0.06 mile southwest of the BSA in 2014 (CDFW 2020; No. 1). As noted above, this species was observed along the ROW during the 2021 habitat assessment and focused botanical surveys.

4.3.2.2 Ben Lomond spineflower

Ben Lomond spineflower is an annual herb that is federally endangered with a CRPR of 1B.1. It occurs in lower montane coniferous forest (maritime ponderosa pine Sandhills) (CNPS 2021; CDFW 2021a). Suitable forest habitat and sandhill soils are present within all portions of the BSA, except for the Graham Hill Road South section. As noted above, this species was observed along the ROW during the 2021 habitat assessment and focused botanical surveys. The closest CNDDB occurrence was previously documented approximately 20 feet southwest of the BSA in 1988 (CDFW 2020; No. 3). Ben Lomond spineflower occupies 10 patches totaling 294 square feet (sf), which contain a total of 1,320 individuals. This species also has a high potential of occurrence in the Newell Creek Road section (McGraw 2021a).

4.3.2.3 Ben Lomond buckwheat

Ben Lomond buckwheat (*Eriogonum nudum var. decurrens)* is a perennial herb with a CRPR of 1B.1 that blooms from June to October (CNPS 2021). This species occurs on sandy soils within chaparral, cismontane woodland, and lower montane woodland coniferous forest (maritime ponderosa pine Sandhills). As noted above, this species was observed in the Graham Hill Road North section of the BSA, but outside of the project work area. Suitable Sandhills habitat is present within the Newell Creek Road, Glen Arbor Road, Graham Hill Road North, Graham Hill Road South, and Pipeline Road sections of the BSA. The closest CNDDB occurrence was documented within 0.1 mile in 2017 (CDFW 2021; No. 1).

4.11.1.4 Minute pocket moss

Minute pocket moss (*Fissidens pauperculus*) is a bryophyte (moss) with a CRPR of 1B.2. This species occurs in north coast coniferous forests. The BSA supports suitable habitat for this species in all of the pipe sections due to the prevalence of coniferous forest and riparian habitat. The CNDDB lists two occurrences within Santa Cruz County (CDFW 2021). The closest CNDDB occurrence was documented approximately two miles south of the Felton Diversion in 2001 (CDFW 2021; No.11).

4.11.1.5 Santa Cruz tarplant

Santa Cruz tarplant (*Holocarpha macradenia*) is and annual herb is an annual herb that is listed as federally threatened, state endangered with the CRPR of 1B.1. It occurs in coastal prairie, coastal scrub, valley and foothill grassland habitats. The CNDDB lists 14 occurrences documented in the vicinity of Santa Cruz and Aptos (CDFW 2021). The BSA supports grasslands within the San Lorenzo Way and Graham Hill Road South sections, as well as in Henry Cowell Redwoods State Park and the San Lorenzo Lumber Yard section of the existing NCP that may provide suitable habitat for this species.

4.11.1.6 Northern curly-leaved monardella

Northern curly-leaved monardella (*Monardella sinuata* ssp. *nigrescens*) is an annual herb with the CRPR of 1B.2. It occurs in sandy soils in coastal dune, coastal scrub, and lower montane coniferous forest habitats. Marginally suitable to suitable scrub, woodland, grassland, and/or Ponderosa pine sandhill habitat is present within the BSA, including San Lorenzo Way, Graham Hill Road North, Graham Hill Road South, as well as in Henry Cowell Redwoods State Park and the San Lorenzo Lumber Yard section of the existing NCP. The closest CNDDB occurrence was documented immediately to the northeast of the BSA in 1993 (CDFW 2021; No. 11).

4.11.1.7 Woodland woolythreads

Woodland woolythreads (*Monolopia gracilens*) is an annual herb with the CRPR of 1B.1. It occurs on serpentine soils in openings within broadleafed upland forests, chapparal, cismontane woodland, north coast coniferous forests and foothill grassland. The BSA supports suitable forest and grassland habitat for this species within the Newell Creek Road, Glen Arbor Way, San Lorenzo Way The CNDDB lists 31 occurrences throughout Santa Cruz County (CDFW 2021).

4.11.1.8 Choris' popcornflower

Choris' popcornflower (*Plagiobothrys chorisianus* var. *chorisianus*) is an annual herb with the CRPR of 1B.1. It occurs in mesic conditions within chaparral, coastal prairie, and coastal scrub. The BSA supports suitable chaparral habitat for this species within the Newell Creek road, Glen Arbor Road, and Graham Hill Road North sections. the CNDDB lists 19 occurrences, modern and historic, within the vicinity of Santa Cruz (CDFW 2021).

4.11.1.9 San Francisco popcornflower

San Francisco popcornflower (*Plagiobothrys diffusus*) is an annual herb that is state endangered with a CRPR of 1B.1. It occurs in coastal prairie and valley and foothill grasslands. The BSA supports grassland within the San Lorenzo Way and Graham Hill Road South sections, as well as in Henry Cowell Redwoods State Park and the San Lorenzo Lumber Yard section of the existing NCP that may provide suitable habitat for this species. The CNDDB lists 19 occurrences, modern and historic, within the vicinity of Santa Cruz (CDFW 2021).

4.3.3 Special-Status Wildlife

As discussed in Section 3, special-status wildlife are fish or wildlife species listed, or candidates for listing, as threatened or endangered by the USFWS and CDFW, designated as SSC by CDFW, designated as fully protected under the California Fish and Game Code, or that meet the definition of rare, threatened, or endangered as

described in the CEQA Guidelines. Appendix G, Special-Status Wildlife Species Potential to Occur within the Biological Study Area, describes the special-status wildlife species that have been observed; have low, moderate, or high potential to occur; or are not expected to occur. The potential to occur is based on documented occurrences in the region, life history and general habitat requirements, and overall suitability of the habitat within the Project area to support such species. Figure 5 illustrates the historical locations for special-status wildlife species and USFWS-designated critical habitat for federally listed wildlife species. USFWS-designated critical habitat for three listed wildlife species overlaps within the BSA: marbled murrelet, steelhead, and Zayante band-winged grasshopper (USFWS 2020).

Based on the results of the literature review and database searches (CDFW 2021b, CDFW 2021c, USFWS 2021), Dudek identified 41 special-status wildlife species as potentially occurring in the region surrounding the BSA. Of these, 21 species are not expected to occur due to the absence of suitable habitat or because the BSA is outside the known range of the species; and 7 species are considered to have low potential to occur based on the presence of low-quality habitat. These species were not analyzed further, thereby refining the analysis to the remaining 13 species with potential to occur in the area.

A total of six species were determined to have a moderate potential to occur in the BSA based on known occurrences and/or the presence of suitable habitat: pallid bat (*Antrozous pallidus*), steelhead, Townsend's big-eared bat (*Corynorhinus townsendii*), western pond turtle (*Emys* [=*Actinemys*] *marmorata*), western red bat (*Lasiurus blossevillii*), and Zayante band-winged grasshopper. The remaining seven species were determined to have a high potential to occur in the BSA. These species are summarized in Table 6 and discussed below. Species accounts for special-status wildlife that occur in the Sandhills habitat (Mount Hermon June beetle and Santa Cruz kangaroo rat) were adapted from McGraw (2021a). Secondary references (i.e., cited in McGraw [2021a] but not referenced by Dudek) have been excluded from this report for brevity but are available on request.

4.3.3.1 Invertebrates

Mount Hermon June Beetle

Mount Hermon June beetle is a member of the family Scarabaeidae (Insecta: Coleoptera) that occurs primarily on Zayante sand soil in central Santa Cruz County; the species has also been observed on sandy loam and loamy sand soils adjacent to Zayante soils (USFWS et al. 2011). Mount Hermon June beetle occurs in all Sandhills habitat of varying successional stages, including ponderosa pine forest, silverleaf manzanita chaparral and other chaparral, and coast live oak woodlands, as well as other woodlands and forests, and sand parkland (McGraw and Jordan 2021). It has also been observed in areas where native Sandhills habitat plant species have been removed, including those that are disturbed through development and that feature primarily ornamental or other non-native plant species (Arnold 2004).

Mount Hermon June beetle has high potential to occur in the BSA. There are two CNDDB occurrences that overlap the BSA along the Graham Hill Road North and Graham Hill Road South alignments (CDFW 2021c). Additionally, highly suitable Sandhills habitat occurs within the Newell Creek Road, Glen Arbor Road, and Pipeline Road sections of the BSA. Overall, Mount Hermon June beetle is likely to occur in portions of the BSA that support Zayante sand soil, including areas of transitional soils, and adjacent sandy loam soils. Within these soil types, the species can occur in all plant communities and other land cover types, including developed and disturbed areas, as well as paved areas.

Table 6. Special-Status Wildlife Species with a High Potential to Occur within the Biological Study Area

Scientific Name	Common Name	Federal/State	Potential to Occur*
Invertebrates			
Polyphylla barbata	Mount Hermon June beetle	FE/None	High
Amphibians			
Aneides flavipunctatus niger	Santa Cruz black salamander	None/SSC	High
Dicamptodon ensatus	California giant salamander	None/SSC	High
Birds			
Contopus cooperi	olive-sided flycatcher	None/SSC	High
Elanus leucurus	white-tailed kite	None/FP	High
Mammals			
Dipodomys venustus	Santa Cruz kangaroo rat	None/SS (S1)	High
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat	None/SSC	High

Source: CDFW 2021b.
Status Legend
***** Although the BSA provides potential habitat, the proposed work areas do not generally support suitable habitat for these species due to the disturbed and developed nature of the ROW.
Federal
FE: federally endangered
State
SSC: California species of special concern
FP: fully protected species
SS: Listed Special Animals List
(S1): Critically Imperiled. At very high risk of extirpation in the state due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.

4.3.3.2 Amphibians

Santa Cruz Black Salamander

The Santa Cruz black salamander (*Aneides flavipunctatus niger*) is restricted to mesic deciduous or coniferous forests in the fog belt of the outer Coast Range of San Mateo, Santa Cruz, and Santa Clara counties. It occurs in moist streamside microhabitats and is typically found under rocks near streams, in talus, and under damp woody debris.

Santa Cruz black salamander has high potential to occur in the BSA. Streams (e.g., Newell Creek and Zayante Creek), and adjacent drainages provide suitable habitat and there are documented historical occurrences of this species in the vicinity of Ben Lomond southwest of the BSA (from the 1930s and 1960s) and a more recent record (from 2012) from Henry Cowell Redwoods State Park farther south (CDFW 2021c).

California Giant Salamander

The California giant salamander occurs in wet coastal forests near streams and seeps. This species' range is limited to Mendocino County, south to Monterey County and east to Napa County. Aquatic larvae are found in cold, clear streams and occasionally occur in lakes and ponds. Adults occur in wet forests under rocks and woody debris in the vicinity of streams or lakes.

California giant salamander has high potential to occur in the BSA. Streams, drainages, and seeps in nearby uplands provide suitable habitat and Dudek observed four larvae near the existing Newell Creek Dam outlet in September 2018 during surveys for the Newell Creek Dam Inlet/Outlet Improvement Project (Dudek 2018). There are also two historic CNDDB occurrences in the vicinity: a 1930 museum specimen collected 0.25 mile west of the Newell Creek Road section (Occ. No. 132) and a 1972 observation in a roadside culvert 0.4 mile west of the Pipeline Road section (Occ. 137) (CNDDB 2021c).

4.3.3.3 Birds

Olive-sided Flycatcher

Olive-sided flycatcher (*Contopus cooperi*) is a summer resident and migrant in California from mid-April to October; the breeding season extends from early May to late August. It occurs in coniferous forests with open canopies from near sea level to 9,400 feet throughout the state, where it is mostly associated with edges, openings, and natural and human-created clearings in otherwise dense forest. Open-cup nests are placed on the upper surface of a tree branch, typically 30 to 50 feet aboveground (Shuford and Gardali 2008).

This species has high potential to occur in the BSA from May to August. There are several eBird (2021) observations in the BSA vicinity during this period and suitable habitat is present in most forest vegetation communities throughout the BSA. There are no CNDDB occurrences within or near the BSA but this species is poorly represented in the CNDDB because of its non-listed status and relatively recent addition to CDFW's SSC list.

White-tailed Kite

White-tailed kite (*Elanus leucurus*) is a fully protected raptor species that occurs throughout California, primarily west of the Sierra Nevada in lowlands and foothills. Although white-tailed kites typically occur in open habitats such as grassland, marsh, and savanna, they will also use marginal habitats such as freeway edges and medians when foraging for voles and mice. Nests are constructed in a variety of trees, with coast live oak perhaps the most common, and placed high in the crown on thin branches (Peeters and Peeters 2005).

White-tailed kite has high potential to nest but low potential to forage in the BSA. The forest and woodland vegetation communities provide suitable nest trees but the extent of open grassland or meadows for foraging is limited. The nearest CNDDB occurrence is a 2004 nest on the University of California, Santa Cruz (UCSC) Reserve approximately 1.5 miles west of the Graham Hill Road section (Occ. No. 83) (CDFW 2021c).

4.3.3.4 Mammals

Santa Cruz Kangaroo Rat

Santa Cruz kangaroo rat is a subspecies of narrow-faced woodrat endemic to the Santa Cruz Mountains. It is currently only known to inhabit two areas: Mount Hermon atop Graham Hill Road in central Santa Cruz County and chaparral within the Sierra Azul Open Space Preserve in the Summit Area of the Santa Cruz Mountains. Within the Sandhills habitat, Santa Cruz kangaroo rat is known primarily from silverleaf manzanita chaparral, though the species may also occur in adjacent areas of ponderosa pine forest that feature a significant shrub component.

Santa Cruz kangaroo rat has high potential to occur in the BSA. The Graham Hill Road North section overlaps the known Mount Hermon occurrence, where it has been trapped within Henry Cowell Redwoods State Park on the

south side of the road and in the County of Santa Cruz Juvenile Hall Parcel on the north side of the Road (Bean 2004, McGraw 2021a). The Newell Creek Road and Glen Arbor Road sections of the BSA also feature silverleaf manzanita chaparral habitat that is highly suitable for the species. Patches of Sandhills chaparral traversed by the Pipeline Road section have moderate suitability for the species. Individual Santa Cruz kangaroo rats could disperse through the Proposed Project, including the road and road ROW; habitat adjacent to the road may also support suitable burrows for this species.

San Francisco Dusky-footed Woodrat

The San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) is a subspecies of dusky-footed woodrat that occurs in forest habitats with moderate canopy and dense to moderate understories, particularly on the upper banks of riparian forests or within poison oak-dominated shrublands (CDFW 2021c). The San Francisco dusky-footed woodrat is a small-sized rodent that builds middens made of sticks, typically at the base of trees and shrubs, but sometimes in the low to mid-level canopy of a tree. The dusky-footed woodrat feeds on a variety of woody plants, fungi, flowers and seeds. This species requires ample midden building materials to construct middens of shredded grass, leaves, or other materials. This species in known to occur along Smith Grade and was observed in 2006 near the intersection with Bonny Doon Road where multiple middens were observed primarily located in redwood forest and coyote brush scrub habitat (CDFW 2021c). Woodrat middens were observed within the Brackney South, Felton Pump Station and San Lorenzo Way sections of BSA during January 2021 field surveys.

4.3.3.5 Listed Species with Low or Moderate Potential to Occur

The federally endangered Zayante band-winged grasshopper is known to occur in the Sandhills habitat but has moderate potential to occur in the BSA. Areas along the Newell Creek Road and Graham Hill Road North sections feature open areas of silverleaf manzanita chaparral that are moderately suitable, the Glen Arbor Road section supports low-quality habitat, and the species is not expected to occur along the Graham Hill Road South section. The small patch of Sandhills habitat along Pipeline Road has low suitability for the species. Zayante band-winged grasshopper has limited potential to occur in road turn outs on Zayante soil adjacent to suitable habitat in the proposed work area; these areas feature loose sand soil and open canopies as well as sparse, primarily herbaceous vegetation that are suitable for this species.

Two listed anadromous fish species, coho salmon (*Oncorhynchus kisutch*) (Central California Coast Evolutionarily Significant Unit [ESU]) and steelhead (Central California Coast Distinct Population Segment [DPS]) are known to occur in the San Lorenzo River watershed but have low or moderate potential to occur in the BSA. Coho salmon is federally and state-listed as endangered and steelhead is federally listed as threatened. Suitable coho salmon spawning and rearing habitat is present in the San Lorenzo River and its tributaries but very few coho have been observed in the watershed since the late 1980s and the species is likely absent from Newell Creek due to a natural bedrock shelf approximately 0.7 mile downstream of Newell Creek Dam that acts as a barrier to anadromous fish passage (NMFS 2012, HES 2017). Coho salmon therefore has low potential to occur in the BSA. The same bedrock feature that blocks coho salmon access to upper Newell Creek is also considered to limit steelhead access except during abnormally high flows; spawning and rearing habitat quality is considered poor in this reach, as well (HES 2017). Steelhead are known to occur in the lower reaches of Newell Creek and other creeks within the BSA (e.g., Fall, Bean, and Zayante Creeks) and considered to have a moderate potential to occur in the BSA.

The federally threatened California red-legged frog (*Rana draytonii*) is known to occur in the region (Santa Cruz Mountains) but has low potential to occur in the BSA. Newell Creek and other streams in the BSA are suitable for foraging and movement but the lack of deep plunge pools or other areas of still or slow-moving water and the

presence of non-native predatory fish preclude breeding (Dudek 2018). Most aquatic features in the BSA are narrow, steep ephemeral drainages that do not pond water or support emergent vegetation. There are several CNDDB occurrences within 1 to 4 miles of the BSA, with the closest approximately 1 mile west of the Santa Cruz Lumber Yard section in Bull Creek, where an adult was seen in 2004 (Occ. No. 854) (CDFW 2021c). Protocol-level (USFWS 2005) surveys for this species along Newell Creek and other City watershed lands in 2001 did not detect any red-legged frogs (City of Santa Cruz Water Department 2013) and a follow-up survey for the proposed hydroelectric project at Newell Creek Dam in 2013 also had negative results (Biotic Resources Group 2013).

The federally and state-endangered marbled murrelet (*Brachyramphus marmoratus*) is known to occur in the region but has very low potential to occur in the BSA at Henry Cowell Redwoods State Park. Most forest in this area is second-growth, having been extensively logged since the late 19th century (although timber harvesting on City-owned lands ceased about 20 years ago), and is therefore unsuitable for nesting murrelets. The closest CNDDB occurrence is a 2001 observation of "[two] birds circling below the [forest] canopy" in the Fall Creek sub-watershed of Henry Cowell Redwoods State Park, approximately 2 miles west of the Glen Arbor Road section (Occ. No. 3) (CDFW 2021c). This area also represents the southernmost marbled murrelet breeding location in the Santa Cruz Mountains and the "only occupied murrelet site in the San Lorenzo River watershed" (Singer 2017). Dudek biologists also observed a single murrelet flying approximately 0.2 miles northwest of the Newell Creek Road section of the BSA during surveys for the Newell Creek Dam project in 2018 (Dudek 2018), presumably toward higher-quality habitat to the northwest.

4.3.4 Potential Jurisdictional Aquatic Resources

Potentially jurisdictional aquatic resources, including federal and state jurisdictional wetlands and non-wetland waters, occur throughout the BSA. Federal and state jurisdictional aquatic resources are regulated under the CWA, CFGC, Porter-Cologne Water Quality Act, and the California Coastal Act (see Section 2, Regulatory Setting, for additional information about the related laws and regulations). For the purposes of this assessment, the following riparian vegetation communities potentially support jurisdictional wetlands and waters under federal and state regulations:

- Black cottonwood forest and woodland
- Bigleaf maple forest and woodland
- Box-elder forest and woodland
- California bay forest and woodland
- California sycamore woodland
- White alder groves

Refer to the vegetation community descriptions in the Section 4.1 above for the occurrence and description of riparian habitat within the BSA. Due to the homogenous canopy where streams flow through certain forested areas that are not typically considered riparian vegetation, such as redwoods and coast live oak, a riparian buffer was applied to streams and creeks to capture the riparian corridor. The Santa Cruz County riparian corridor buffer of 50 feet off the OHWM was applied to the perennial and intermittent streams within the BSA to encompass the riparian

corridor in the forested areas that were not comprised of typical riparian vegetation. It should be noted that unmapped stands of potentially jurisdictional riparian vegetation may also occur wherever water is available.

Potentially jurisdictional aquatic resources identified in the field included perennial and intermittent streams, ephemeral drainages, and wetlands. There were approximately 86 non-wetland waters and 1 wetland identified within the BSA. The majority of the non-wetland waters are ephemeral drainages and include ditches, culverts, and swales. There are six major, named streams and creeks within the BSA: San Lorenzo River, Newell Creek, Zayante Creek, Bean Creek, Powder Mill Creek, and Camp Evers Creek. Other unnamed, intermittent drainages also occur within the BSA based on mapping compiled by the County within the Streams dataset (Santa Cruz County 2020). All of the named creeks within the BSA are tributaries to the San Lorenzo River. The San Lorenzo River is a perennial drainage that originates in the Santa Cruz mountains, flows through the City of Santa Cruz, and ultimately drains into the Pacific Ocean. Figure 4 illustrates the location and extent of potentially jurisdictional aquatic resources within the BSA.

4.3.5 Wildlife Corridors/Habitat Linkages

Wildlife corridors are linear features that connect large patches of natural open space and provide avenues for the migration of animals. Wildlife corridors contribute to population viability by assuring continual exchange of genes between populations, providing access to adjacent habitat areas for foraging and mating, and providing routes for recolonization of habitat after local extirpation or ecological catastrophes (e.g., fires).

Habitat linkages are small patches that join larger blocks of habitat and help reduce the adverse effects of habitat fragmentation. Habitat linkages provide a potential route for gene flow and long-term dispersal of plants and animals and may also serve as primary habitat for smaller animals, such as reptiles and amphibians. Habitat linkages may be continuous habitat or discrete habitat islands that function as steppingstones for dispersal.

The BSA has value as a potential habitat linkage between areas of adjacent forest habitats. Regionally significant drainages such as Newell Creek , Zayante Creek, and San Lorenzo River flow through and along the BSA. These creek corridors are likely used by common and special-status wildlife species as cover and foraging habitat and to move between adjacent similar habitats. However, the BSA does not overlap with any large landscape blocks (Penrod 2014b) or critical linkages (Penrod 2014a) mapped by Penrod et al. (2013).

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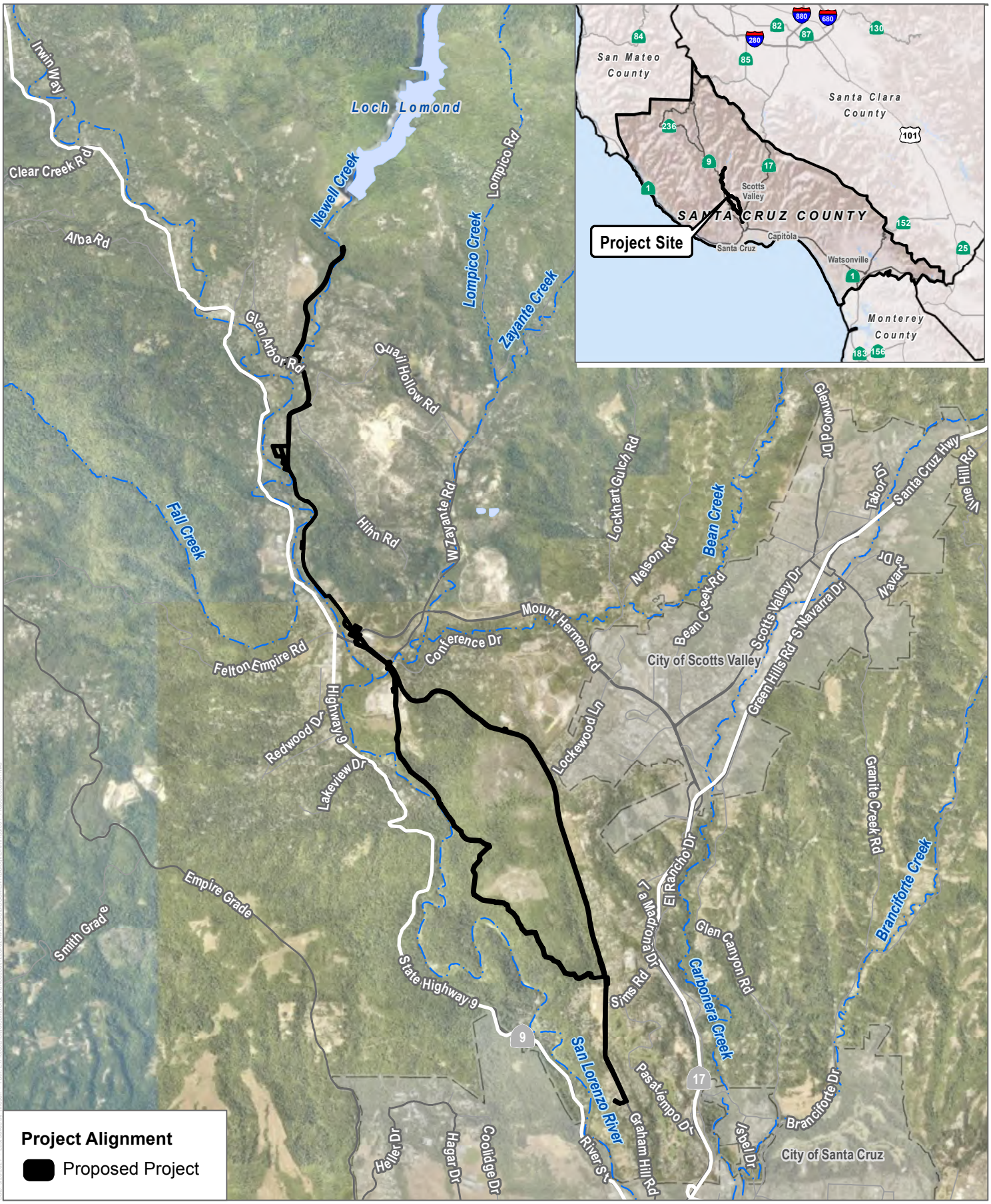

SOURCE: ESRI 2021, City of Santa Cruz 2021

DUDEK

0 0.5 1 Miles

FIGURE 1

Project Location

Biological Resources Assessment, Newell Creek Pipeline Project

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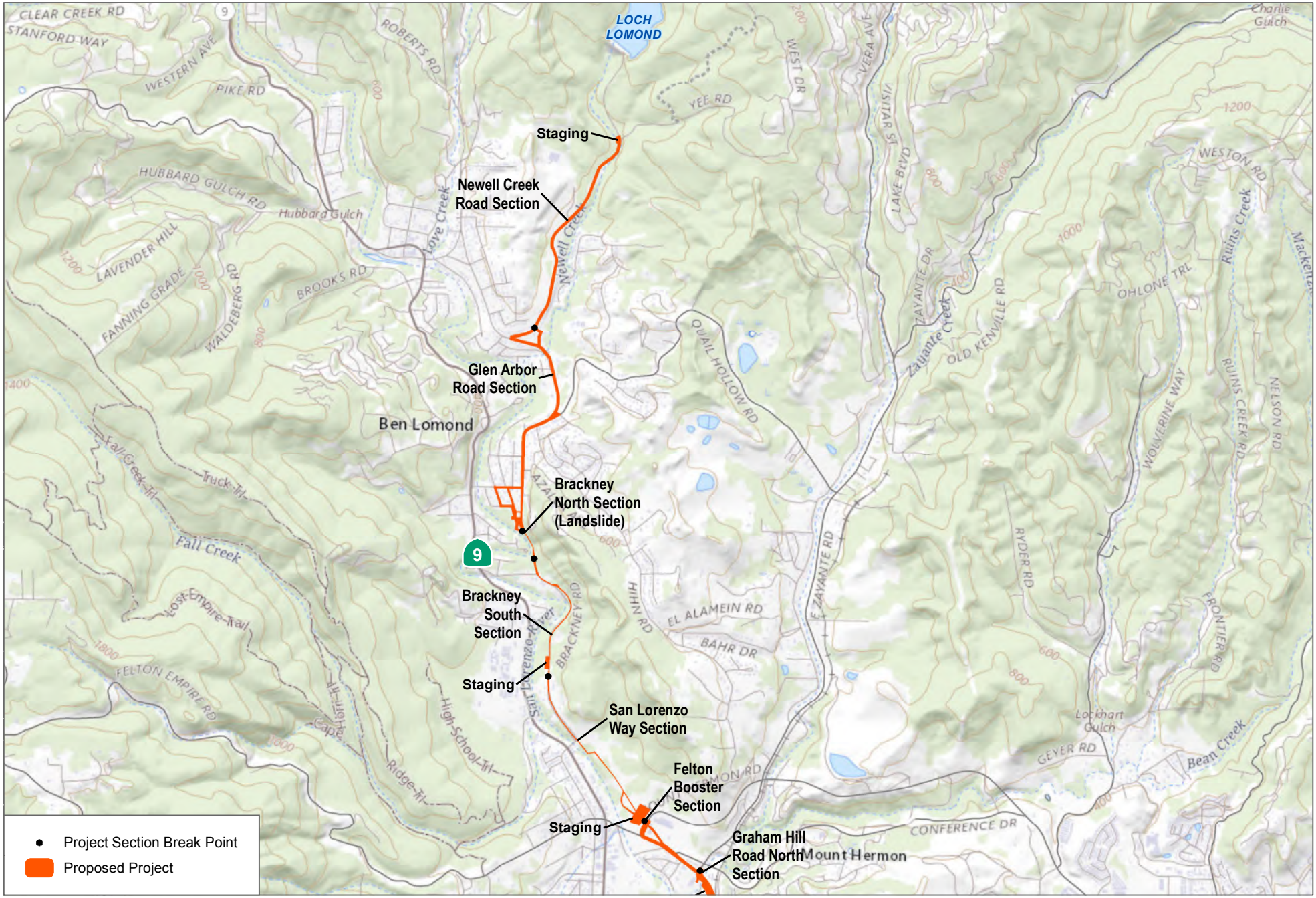

SOURCE: ESRI 2020, HDR 2019 County of Santa Cruz 2020, City of Santa Cruz Water Department 2020

DUDEK

0 1,500 3,000 Feet

FIGURE 2-1

Proposed Project - Northern Segment

Biological Resources Assessment, Newell Creek Pipeline Project

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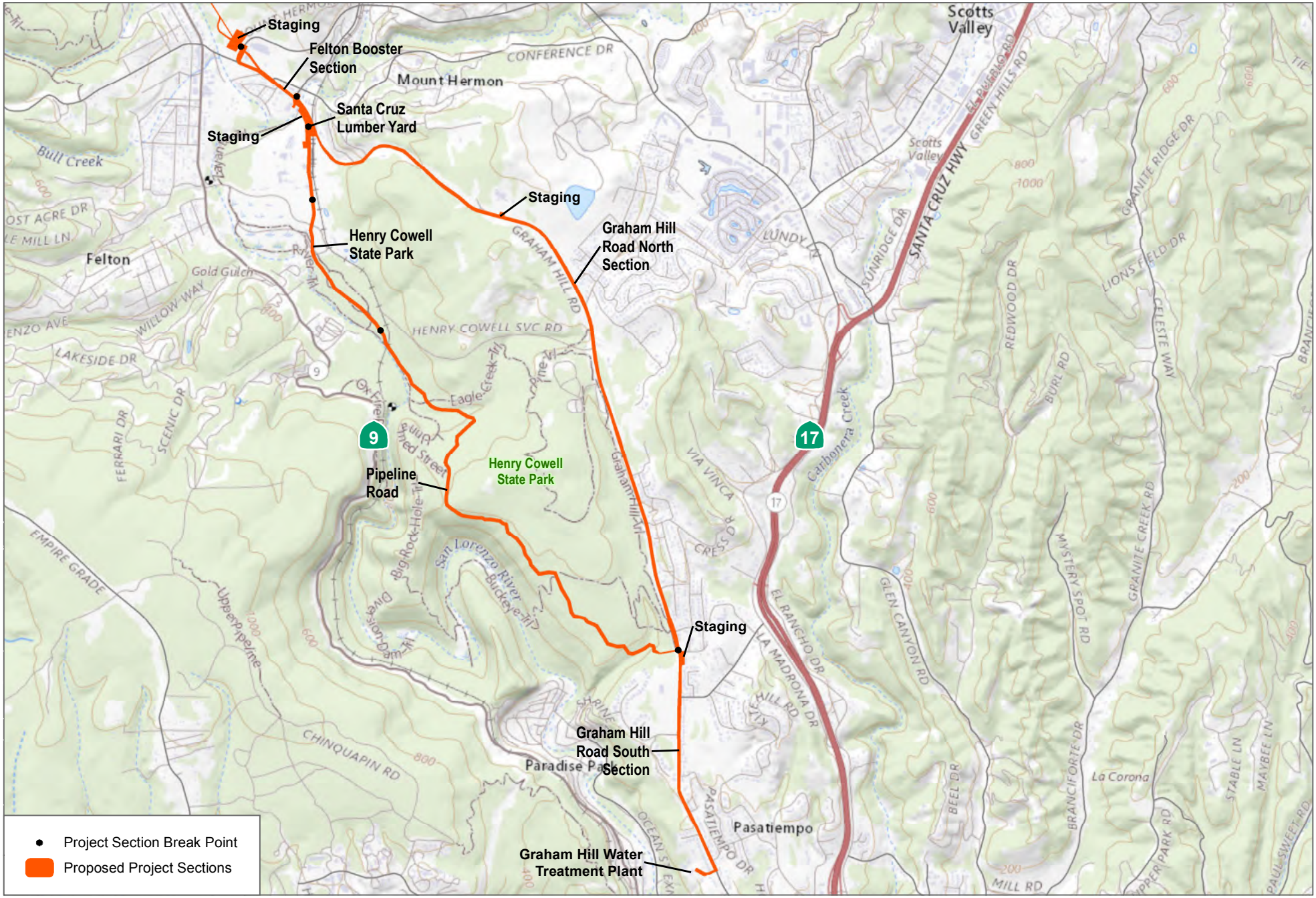

SOURCE: USGS National Map 2021, HDR 2019 County of Santa Cruz 2020, City of Santa Cruz Water Department 2020

DUDEK

FIGURE 2-2

Proposed Project - Southern Segment

Biological Resources Assessment, Newell Creek Pipeline Project

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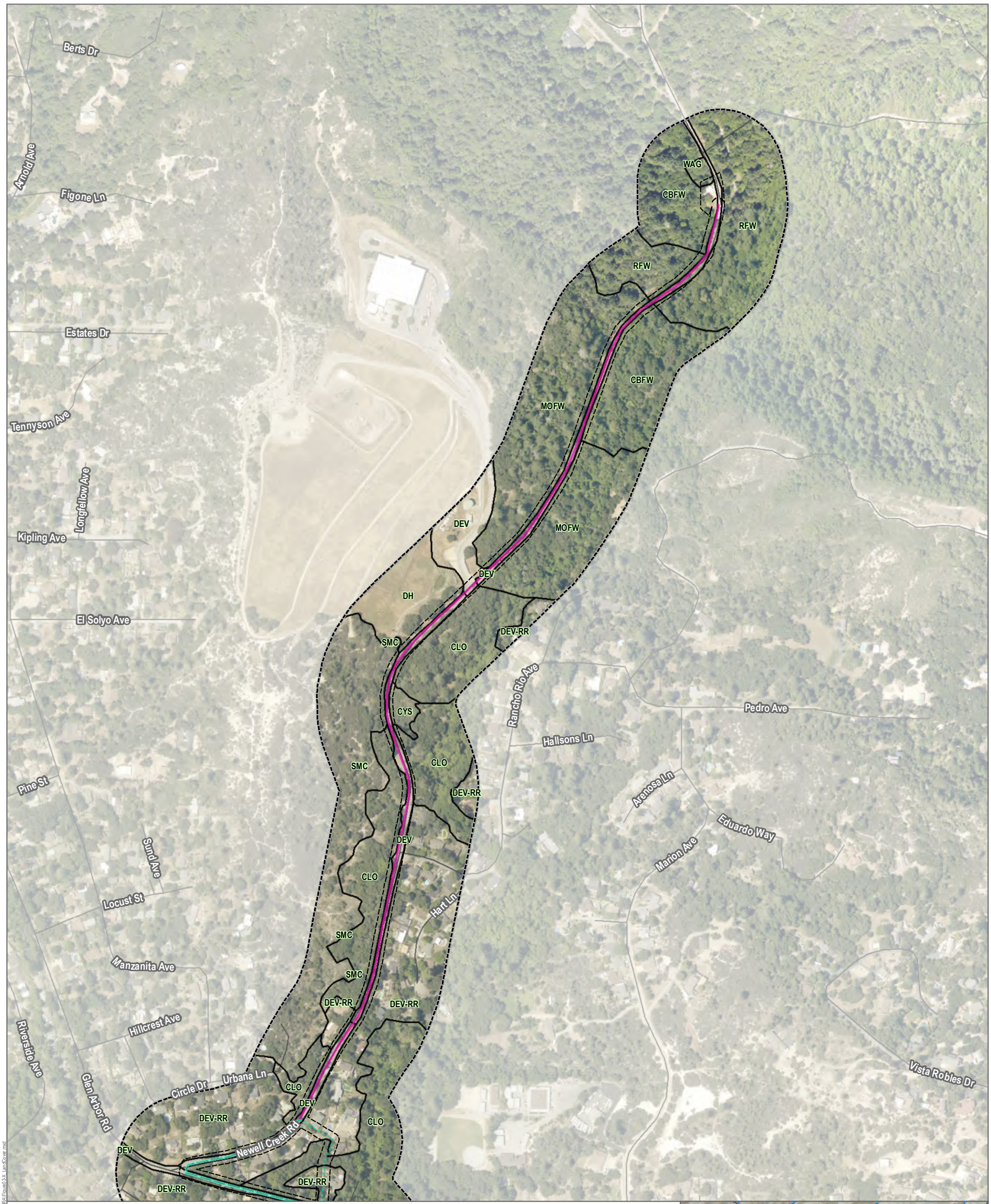


SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020

DUDEK

0 230 460 Feet

FIGURE 3-1

Vegetation Communities and Land Covers

Biological Resources Assessment, Newell Creek Pipeline Project

Proposed Alignment Work Area Boundary

Study Area

Vegetation Communities and Land Covers

BMFW: Bigleaf Maple Forest and Woodland

CBFW: California Bay Forest and Woodland

CLO: Coast Live Oak Woodland and Forest

COB: Coastal Brambles

DEV-RR: Rural Residential

DEV: Urban/Developed

DFFW: Douglas Fir Forest and Woodland

DRD: Dirt Road

MOFW: Mixed Oak Forest and Woodland

RFW: Redwood Forest and Woodland

SMC: Silverleaf Manzanita Chaparral

Pipeline Sections

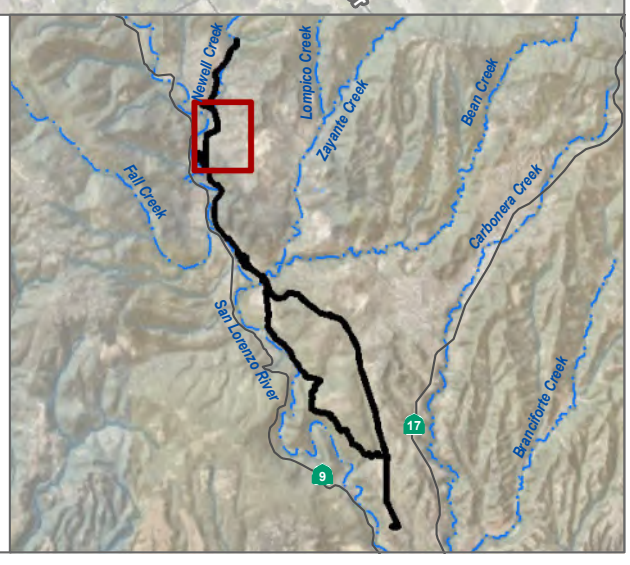
Brackney North Section (Brackney Landslide Area Pipeline Risk Reduction Project)

Glen Arbor Road Section

Newell Creek Road Section

Glen Arbor Road Section

Glen Arbor Road Section



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SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020

DUDEK

0 230 460 Feet

FIGURE 3-2

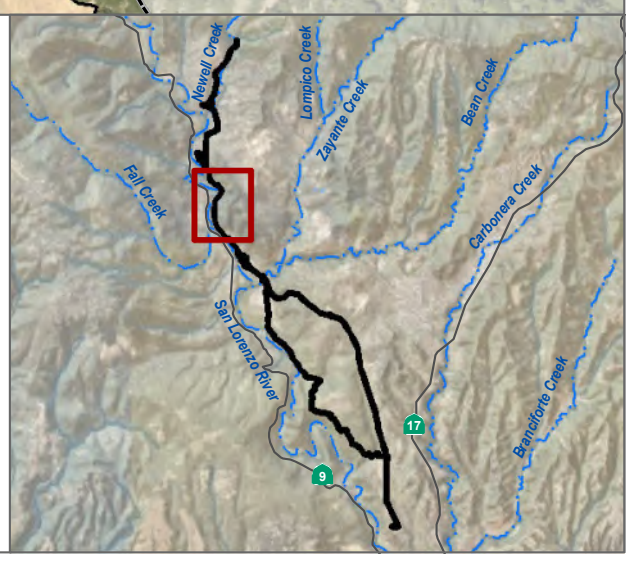
Vegetation Communities and Land Covers

Biological Resources Assessment, Newell Creek Pipeline Project

- Proposed Alignment Work Area Boundary
- Study Area
- Vegetation Communities and Land Covers
  - BMFW: Bigleaf Maple Forest and Woodland
  - CBFW: California Bay Forest and Woodland
  - CLO: Coast Live Oak Woodland and Forest
  - COB: Coastal Brambles
  - CSW: California Sycamore Woodland
  - CYS: Coyote Brush Scrub
  - DEV-RR: Rural Residential
  - DEV: Urban/Developed
  - DFFW: Douglas Fir Forest and Woodland
  - DH: Disturbed Habitat
  - DRD: Dirt Road
  - MOFW: Mixed Oak Forest and Woodland
  - POS: Poison Oak Scrub
  - RFW: Redwood Forest and Woodland

Pipeline Sections

- Brackney North Section (Brackney Landslide Area Pipeline Risk Reduction Project)
- Brackney South Section
- Glen Arbor Road Section
- San Lorenzo Way Section



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SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020

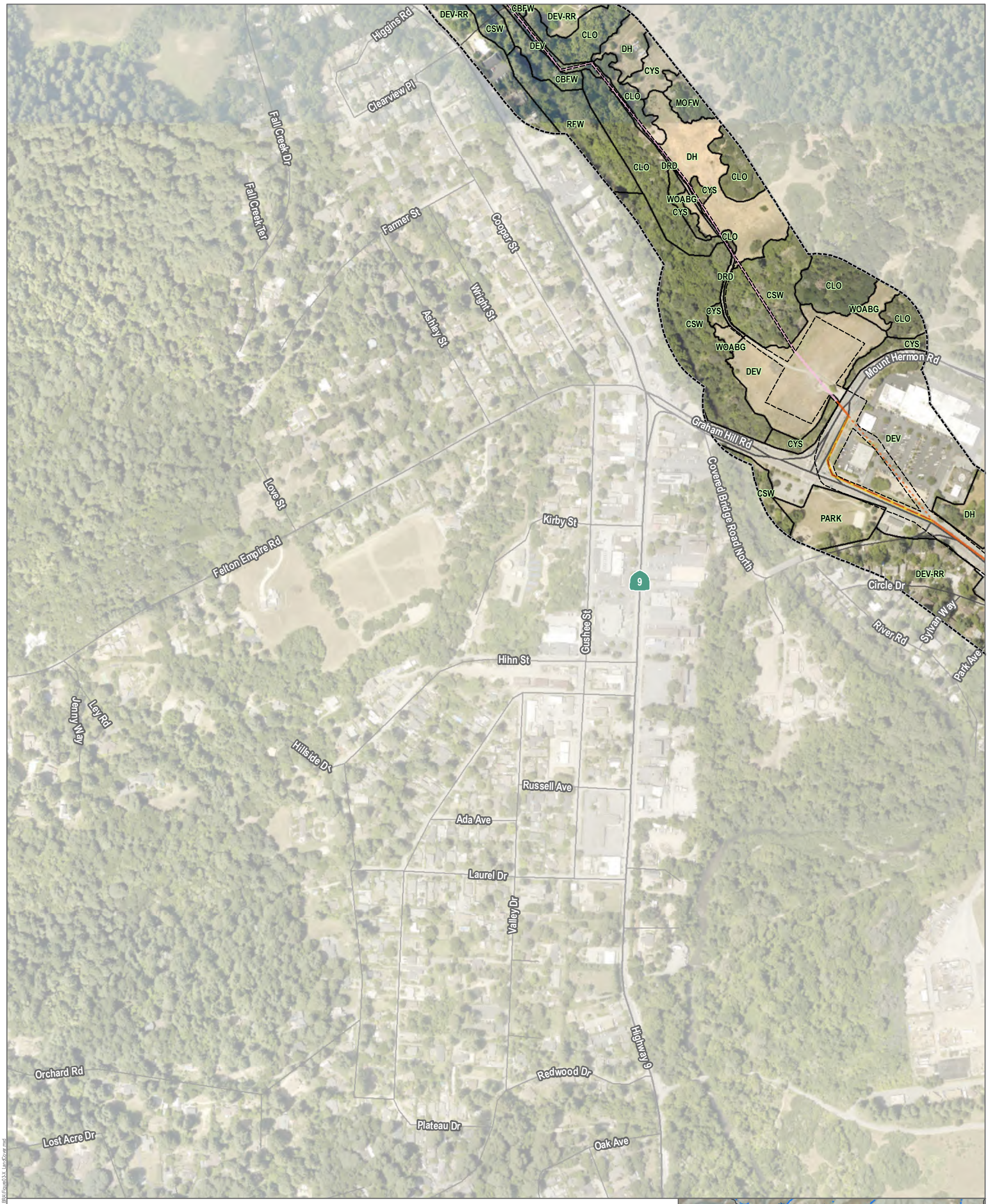
DUDEK

0 230 460 Feet

FIGURE 3-3

Vegetation Communities and Land Covers

Biological Resources Assessment, Newell Creek Pipeline Project



Proposed Alignment Work Area Boundary

Study Area

Vegetation Communities and Land Covers

CBFW: California Bay Forest and Woodland

CLO: Coast Live Oak Woodland and Forest

CSW: California Sycamore Woodland

CYS: Coyote Brush Scrub

DEV-RR: Rural Residential

DEV: Urban/Developed

DH: Disturbed Habitat

DRD: Dirt Road

MOFW: Mixed Oak Forest and Woodland

PARK: Parks

RFW: Redwood Forest and Woodland

WOABG: Wild Oats and Annual Brome Grassland

Pipeline Sections

Felton Booster Pump Station Section

San Lorenzo Way Section

Felton Booster Pump Station Section

Felton Booster Pump Station Section

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SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020

DUDEK

0 230 460 Feet

FIGURE 3-4

Vegetation Communities and Land Covers

Biological Resources Assessment, Newell Creek Pipeline Project

SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020

DUDEK

0 230 460 Feet

FIGURE 3-5

Vegetation Communities and Land Covers

Biological Resources Assessment, Newell Creek Pipeline Project

Proposed Alignment Work Area Boundary

Study Area

Vegetation Communities and Land Covers

CBFW: California Bay Forest and Woodland

CLO: Coast Live Oak Woodland and Forest

CYS: Coyote Brush Scrub

DEV-RR: Rural Residential

DEV: Urban/Developed

DFFW: Douglas Fir Forest and Woodland

DH: Disturbed Habitat

DRD: Dirt Road

MOFW: Mixed Oak Forest and Woodland

PPFW: Ponderosa Pine Forest and Woodland

RFW: Redwood Forest and Woodland

WAG: White Alder Groves

WOABG: Wild Oats and Annual Brome Grassland

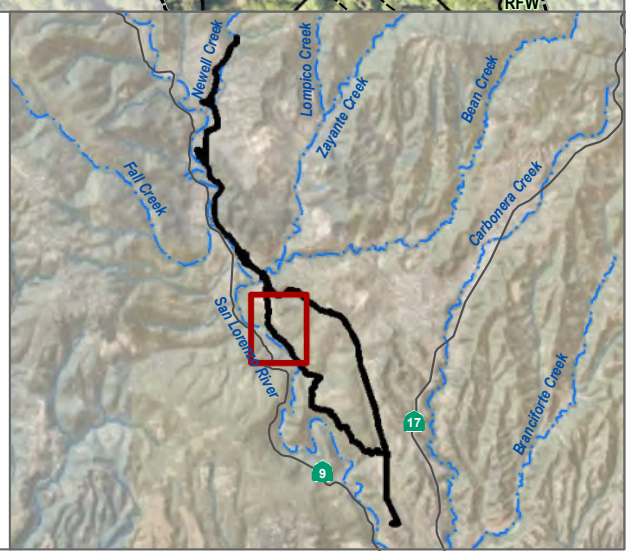
Pipeline Sections

Graham Hill Road North Section

Henry Cowell State Park

Pipeline Road

Santa Cruz Lumber Yard



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SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020

DUDEK

0 230 460 Feet

FIGURE 3-6

Vegetation Communities and Land Covers

Biological Resources Assessment, Newell Creek Pipeline Project

SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020

DUDEK

0 230 460 Feet

FIGURE 3-7

Vegetation Communities and Land Covers

Biological Resources Assessment, Newell Creek Pipeline Project

Proposed Alignment Work Area Boundary

Study Area

Vegetation Communities and Land Covers

BCFW: Black cottonwood forest and woodland

CLO: Coast Live Oak Woodland and Forest

DEV-RR: Rural Residential

DEV: Urban/Developed

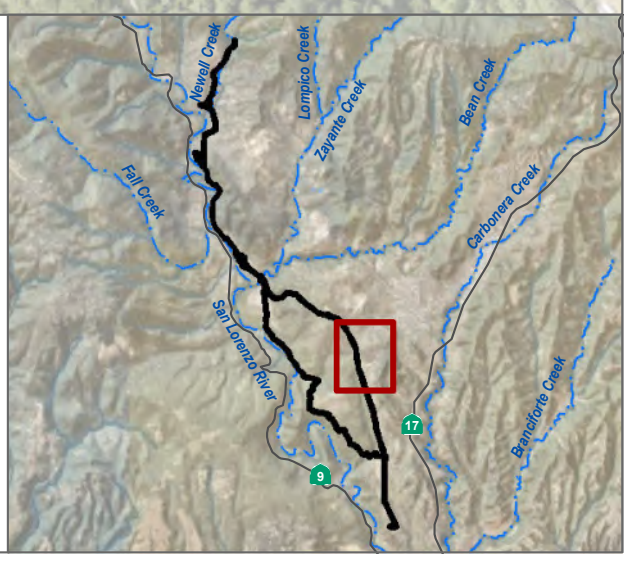
DH: Disturbed Habitat

PPFW: Ponderosa Pine Forest and Woodland

SMC: Silverleaf Manzanita Chaparral

Pipeline Sections

Graham Hill Road North Section



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SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020

DUDEK

0 230 460 Feet

FIGURE 3-8

Vegetation Communities and Land Covers

Biological Resources Assessment, Newell Creek Pipeline Project

Proposed Alignment Work Area Boundary

Study Area

Vegetation Communities and Land Covers

CLO: Coast Live Oak Woodland and Forest

DEV: Urban/Developed

DF-TFW: Douglas Fir- Tanoak Forest and Woodland

DFFW: Douglas Fir Forest and Woodland

MOFW: Mixed Oak Forest and Woodland

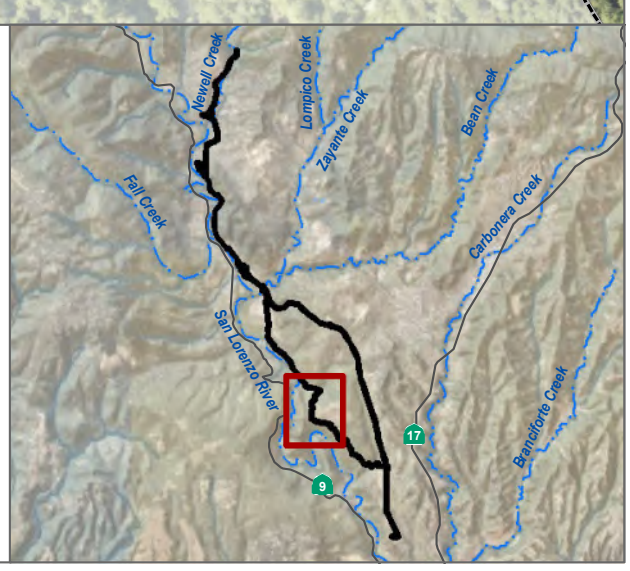
RFW: Redwood Forest and Woodland

SMC: Silverleaf Manzanita Chaparral

WAG: White Alder Groves

Pipeline Sections

Pipeline Road



SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020

DUDEK

0 230 460 Feet

FIGURE 3-9

Vegetation Communities and Land Covers

Biological Resources Assessment, Newell Creek Pipeline Project

SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020

DUDEK

0 230 460 Feet

FIGURE 3-10

Vegetation Communities and Land Covers

Biological Resources Assessment, Newell Creek Pipeline Project

SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020

DUDEK

0 230 460 Feet

FIGURE 3-11

Vegetation Communities and Land Covers

Biological Resources Assessment, Newell Creek Pipeline Project

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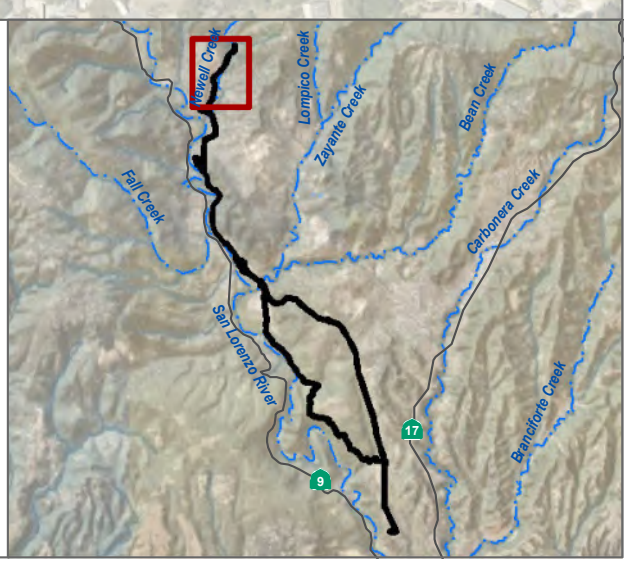
Berts Dr
Arnold Ave
Figone Ln
Estates Dr
Tennyson Ave
Longfellow Ave
Kipling Ave
El Solyo Ave
Pine St
Sund Ave
Locust St
Manzanita Ave
Riverside Ave
Hillcrest Ave
Circle Dr
Urbana Ln
Glen Arbor Rd
Glen Arbor Road Section
Newell Creek Road Section
Newell Creek Rd
Newell Creek
Hart Ln
Rancho Rio Ave
Pedro Ave
Hallsons Ln
Arenosa Ln
Eduardo Way
Marion Ave
Vista Robles Dr

Proposed Alignment Work Area Boundary
Project Section Break Point
Study Area
Sandhills Ecosystems (McGraw 2021)

Potentially Jurisdictional Aquatic Resources

Streams (Dudek 2021)
Streams (Santa Cruz County 2020)
Riparian Communities (Dudek 2021)



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SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020, McGraw 2021

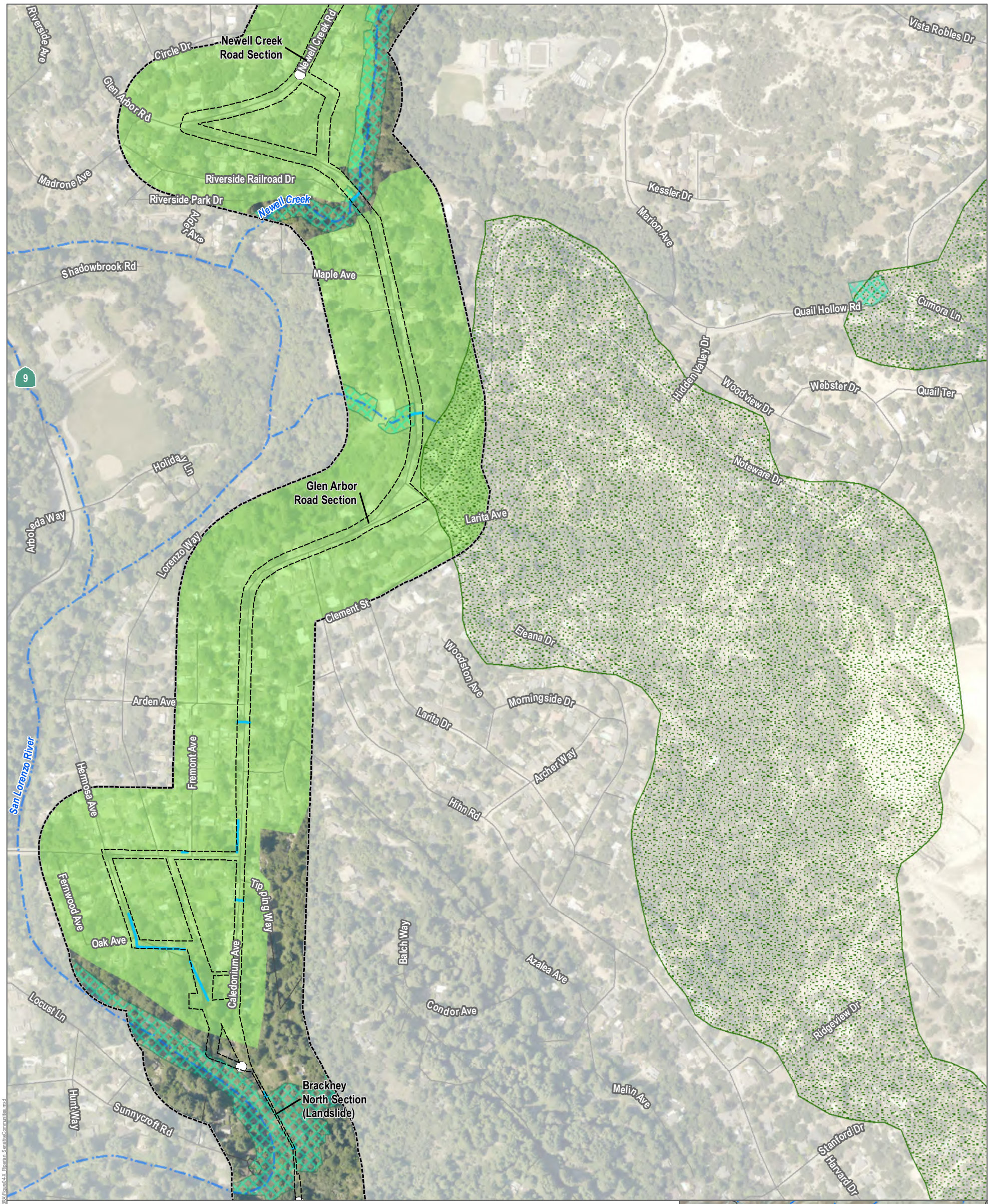
DUDEK

0 230 460 Feet

FIGURE 4-1

Sensitive Vegetation Communities and Potentially Jurisdictional Aquatic Resources

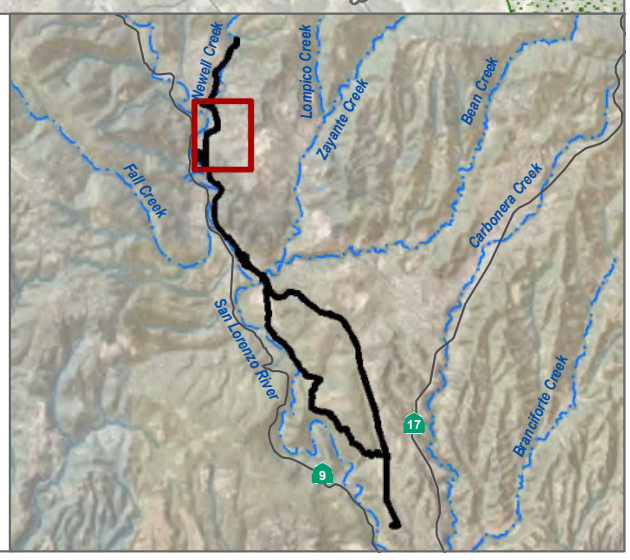
Biological Resources Assessment, Newell Creek Pipeline Project



- Proposed Alignment Work Area Boundary
- Project Section Break Point
- Study Area
- Special Forests (Santa Cruz County 2020)
- Sandhills Ecosystems (McGraw 2021)
- Riparian Communities (Dudek 2021)

Potentially Jurisdictional Aquatic Resources

- Streams (Dudek 2021)
- Streams (Santa Cruz County 2020)



SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020, McGraw 2021

DUDEK

0 230 460 Feet

FIGURE 4-2

Sensitive Vegetation Communities and Potentially Jurisdictional Aquatic Resources

Biological Resources Assessment, Newell Creek Pipeline Project

Brackney North Section (Landslide)
Brackney South Section
San Lorenzo Way Section
Locust Ln
Hunt Way
Sunnycroft Rd
San Lorenzo River
Cottage Ave
Bridge St
Brackney Rd
Hillview Dr
Lazywoods Rd
El Solyo Heights Dr
Capelli Dr
Hacienda Way
Fall Creek Dr
Fall Creek
Higgins Rd
Clearview Pl
Cooper St
Rose Acres Ln
Condor Ave
Melin Ave
Ridgeview Dr
Stanford Dr
Harvard Dr
Crown Dr
Hihn Rd
9

Proposed Alignment Work Area Boundary
Project Section Break Point
Study Area
Special Forests (Santa Cruz County 2020)
Sandhills Ecosystems (McGraw 2021)
Riparian Communities (Dudek 2021)

Potentially Jurisdictional Aquatic Resources

Streams (Dudek 2021)
Streams (Santa Cruz County 2020)

Newell Creek
Lompico Creek
Zayante Creek
Bean Creek
Carbonera Creek
Fall Creek
San Lorenzo River
Branciforte Creek
17
9

Date: 9/22/2021 - Last saved by: tfriesen - Path: Z:\Projects\Civil\SantaCruz_Ashleafed\(12287029\MAP\DOCS\DOCUMENT\Bdrosyk\BRA\Figure3-4-X_Riparian_SensitiveCommunities.mxd

SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020, McGraw 2021

DUDEK

0 230 460 Feet

FIGURE 4-3

Sensitive Vegetation Communities and Potentially Jurisdictional Aquatic Resources

Biological Resources Assessment, Newell Creek Pipeline Project

Higgins Rd
Clearview Pl
Fall Creek Dr
Fall Creek Ter
Fall Creek
Farmer St
Cooper St
Wright St
Ashley St
San Lorenzo Way Section
Mount Hermon Rd
Graham Hill Rd
Felton Booster Section
Covered Bridge Road North
Love St
Kirby St
Felton Empire Rd
9
Circle Dr
Sylvan Way
River Rd
Park Ave
San Lorenzo River
Gushee St
Hihn St
Jenny Way
Ley Rd
Hillside Dr
Bull Creek
Russell Ave
Ada Ave
Laurel Dr
Valley Dr
Zayante Creek
Highway 9
Orchard Rd
Redwood Dr
Shingle Mill Creek
Plateau Dr
Lost Acre Dr
Oak Ave

Proposed Alignment Work Area Boundary

Project Section Break Point

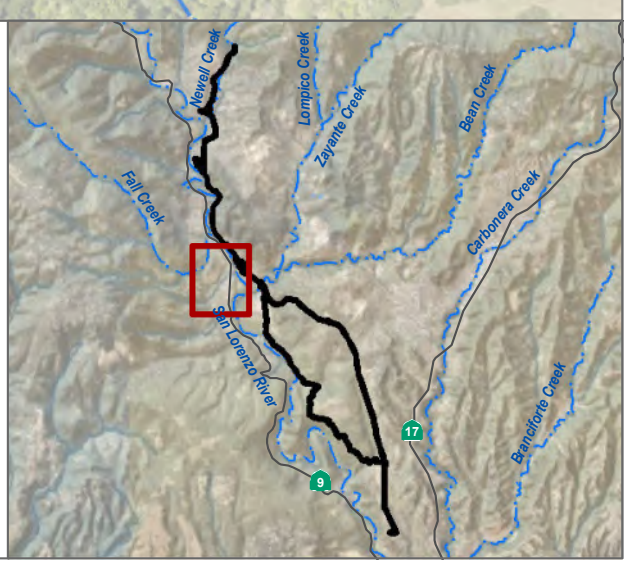
Study Area

Potentially Jurisdictional Aquatic Resources

Streams (Dudek 2021)

Streams (Santa Cruz County 2020)

Riparian Communities (Dudek 2021)



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SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020, McGraw 2021

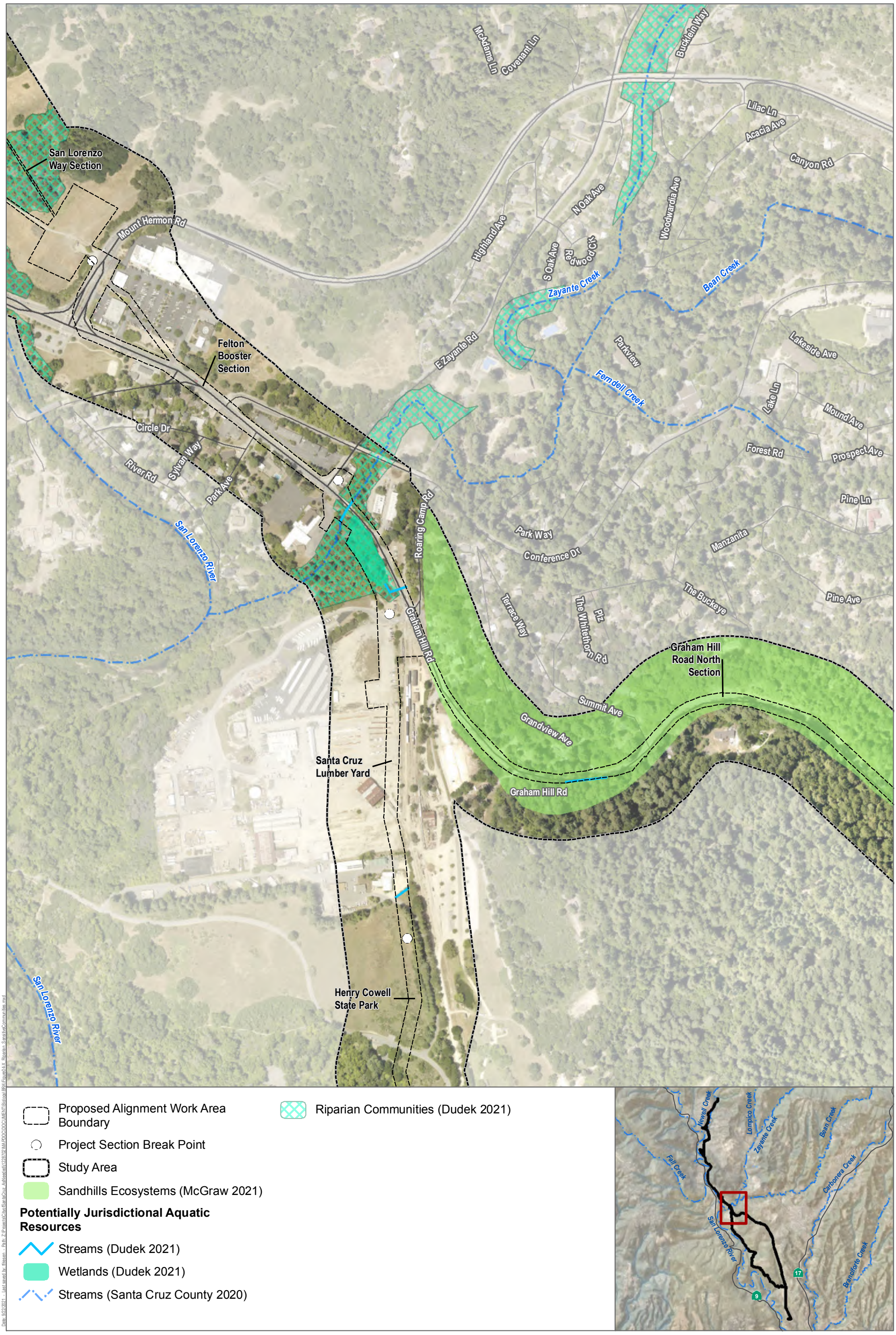
DUDEK

0 230 460 Feet

FIGURE 4-4

Sensitive Vegetation Communities and Potentially Jurisdictional Aquatic Resources

Biological Resources Assessment, Newell Creek Pipeline Project



SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020, McGraw 2021

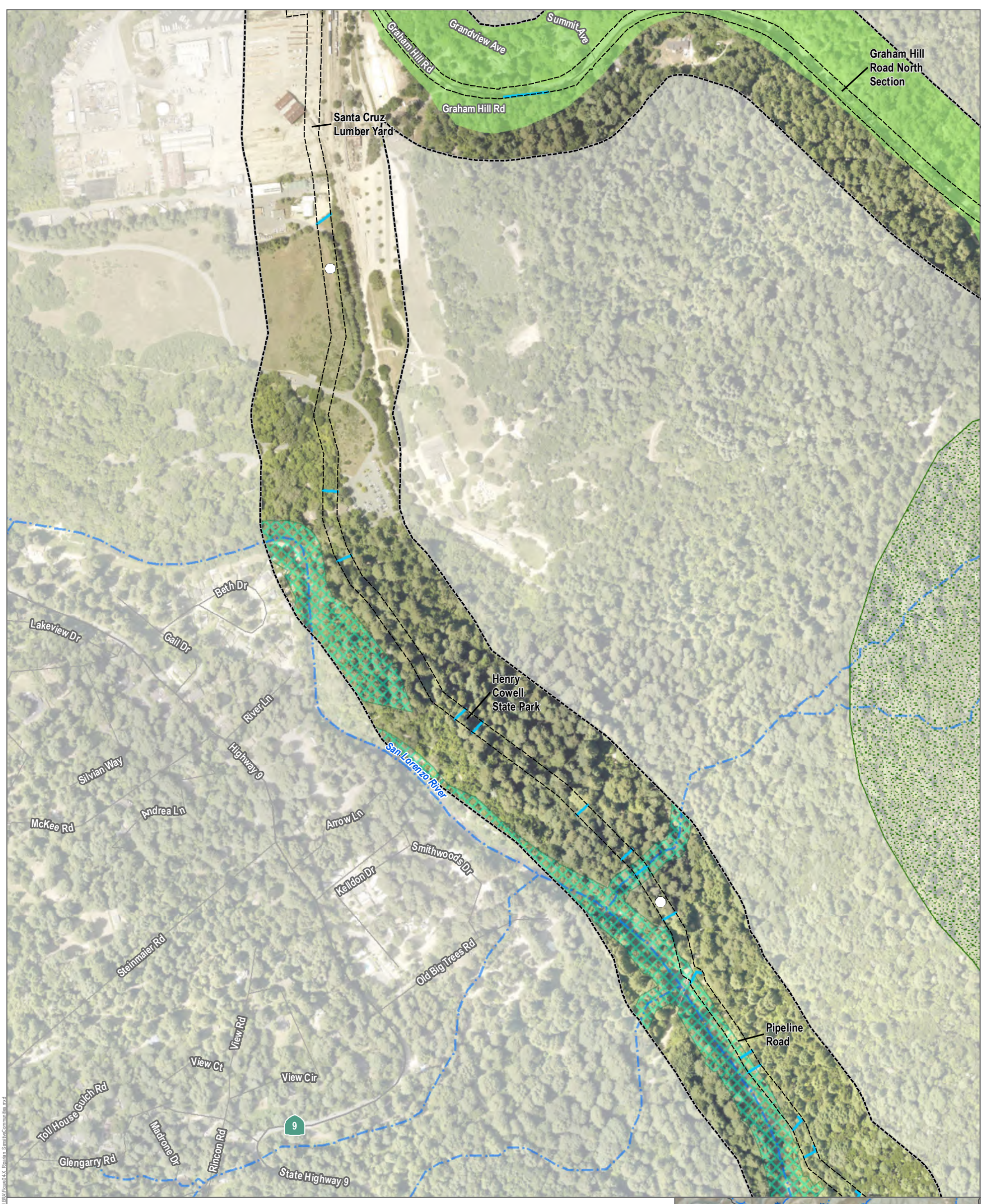
DUDEK

0 230 460 Feet

FIGURE 4-5

Sensitive Vegetation Communities and Potentially Jurisdictional Aquatic Resources

Biological Resources Assessment, Newell Creek Pipeline Project



SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020, McGraw 2021

DUDEK

0 230 460 Feet

FIGURE 4-6

Sensitive Vegetation Communities and Potentially Jurisdictional Aquatic Resources

Biological Resources Assessment, Newell Creek Pipeline Project

Lake Ln
Mound Ave
Azalea Ave
Forest Rd
Ferndell Creek
Prospect Ave
Madrone Ave
Ln
Pine Ln
Pine Ave
Ridge Way
Quarry Rd
Graham Hill Rd
N Big Tree Rd
Graham Hill Road North Section
Worth Ln
Bobs Ln
Fox Ct
Casela Way

Proposed Alignment Work Area Boundary

Project Section Break Point

Study Area

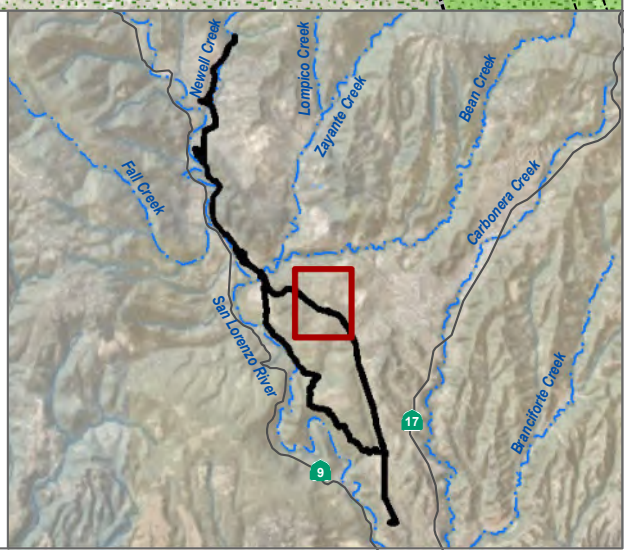
Special Forests (Santa Cruz County 2020)

Sandhills Ecosystems (McGraw 2021)

Potentially Jurisdictional Aquatic Resources

Streams (Dudek 2021)

Streams (Santa Cruz County 2020)



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SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020, McGraw 2021

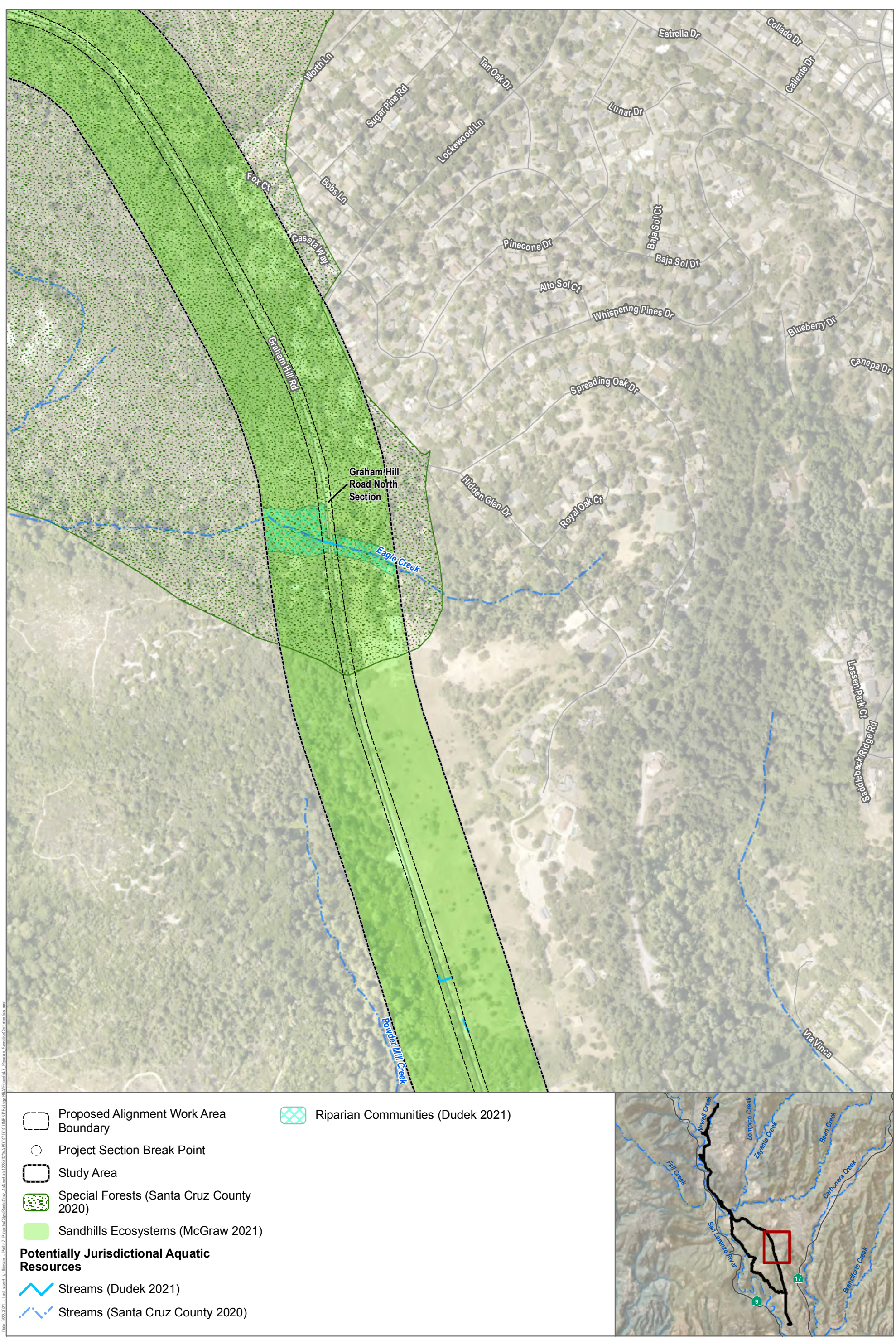
DUDEK

0 230 460 Feet

FIGURE 4-7

Sensitive Vegetation Communities and Potentially Jurisdictional Aquatic Resources

Biological Resources Assessment, Newell Creek Pipeline Project



SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020, McGraw 2021

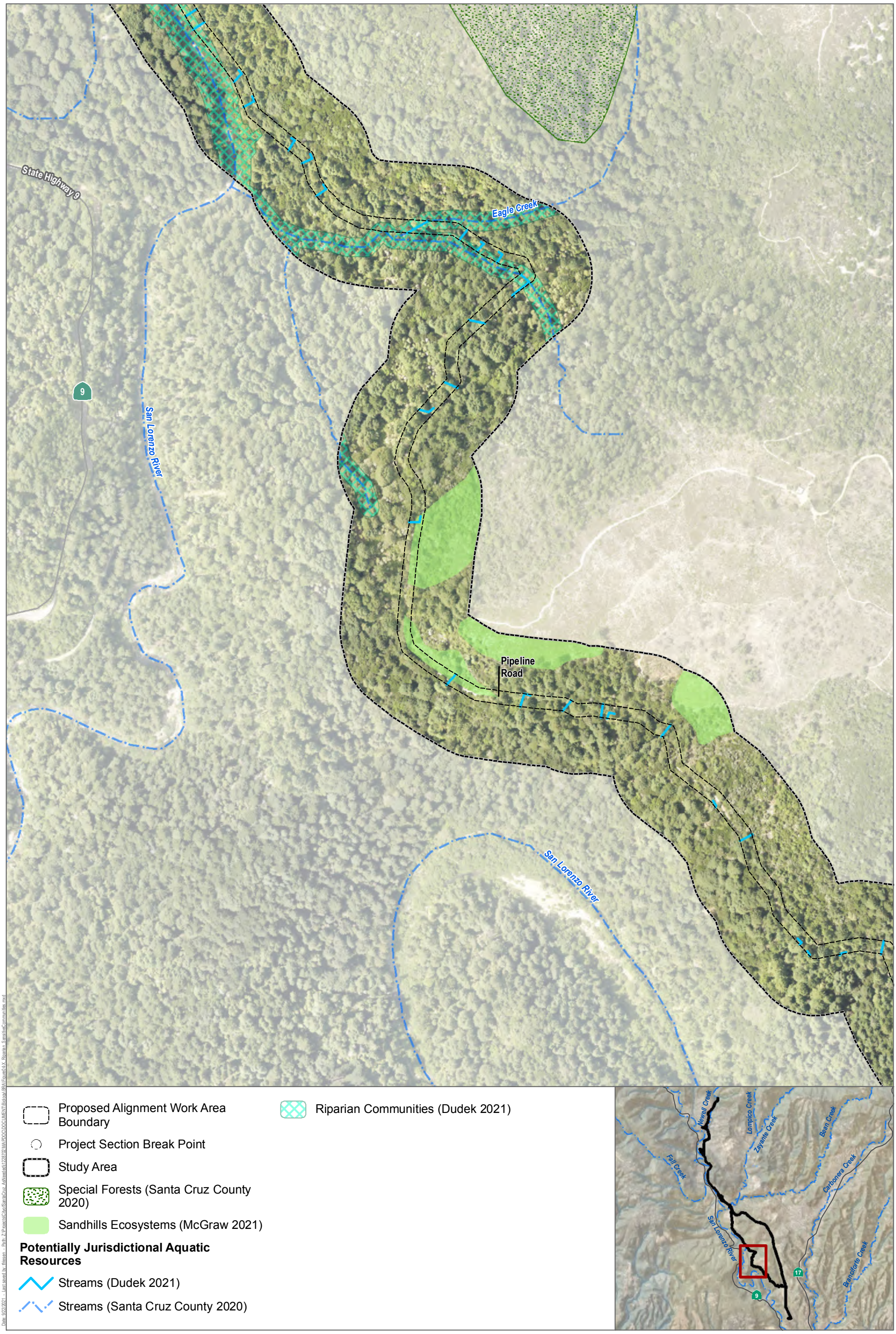
DUDEK

0 230 460 Feet

FIGURE 4-8

Sensitive Vegetation Communities and Potentially Jurisdictional Aquatic Resources

Biological Resources Assessment, Newell Creek Pipeline Project



SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020, McGraw 2021

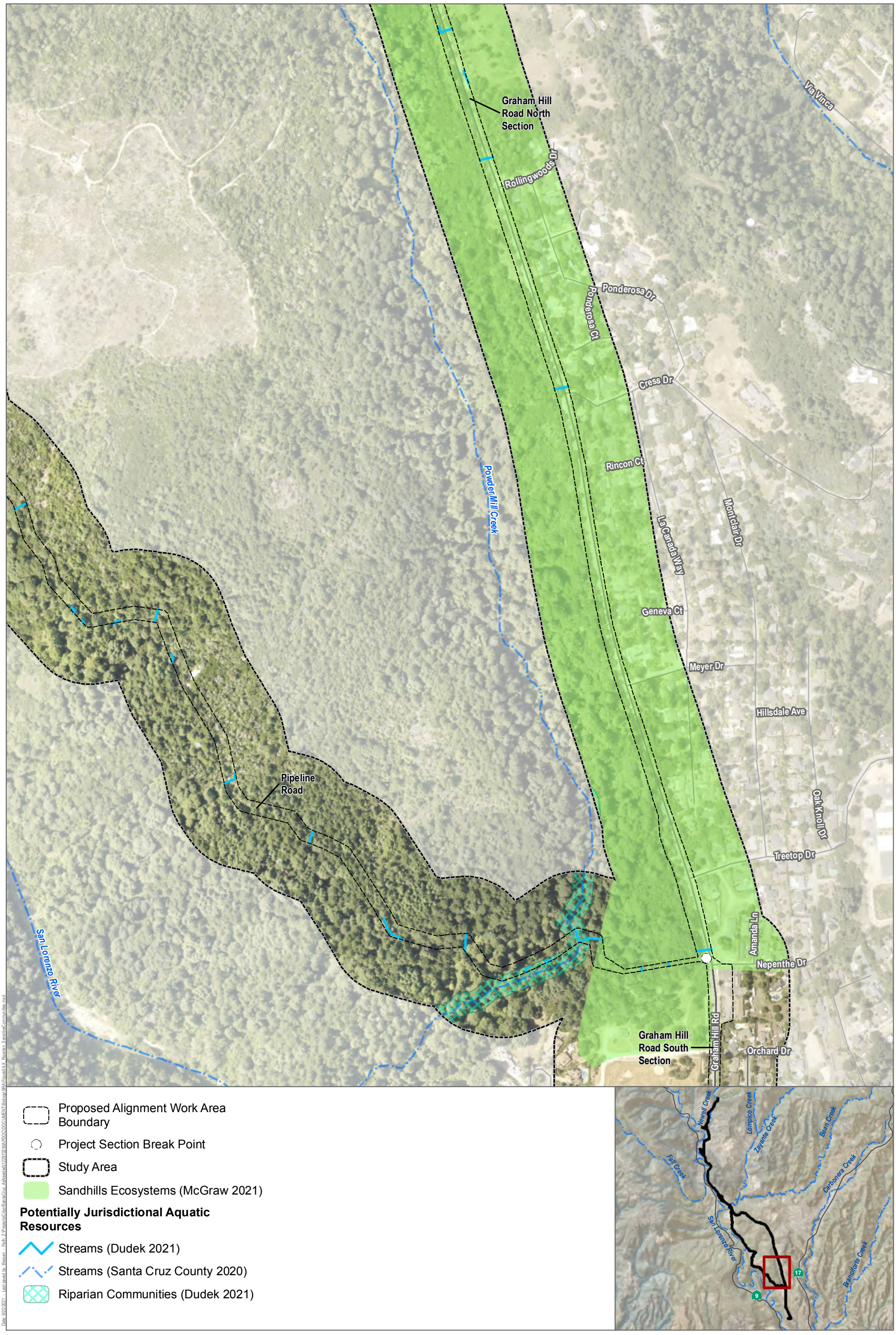
DUDEK

0 230 460 Feet

FIGURE 4-9

Sensitive Vegetation Communities and Potentially Jurisdictional Aquatic Resources

Biological Resources Assessment, Newell Creek Pipeline Project



SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020, McGraw 2021

DUDEK

0 230 460 Feet

FIGURE 4-10

Sensitive Vegetation Communities and Potentially Jurisdictional Aquatic Resources

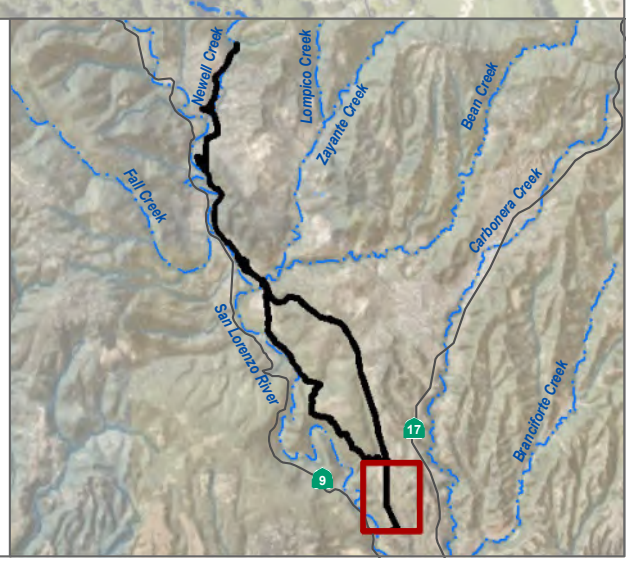
Biological Resources Assessment, Newell Creek Pipeline Project

Nepenthe Dr
Santa Cruz Hwy
La Madrona Dr
Powder Mill Creek
Orchard Dr
Graham Hill Road South Section
Pied Piper Ln
Firehouse Ln
Sims Rd
Kite Hill Rd
Lawridge Rd
Panorama Ln
Shrine Way
Palomino Way
Henry Cowell Dr
San Lorenzo River
Bridlewood Ct
Deer Path Rd
Moreno Dr
Pasatiempo Dr
Ocean Street Extension
Hidden Creek Ln
Brooktree Ln
Clubhouse Rd
Mosswood Ct
Ridge Ln
Oak Rd
Westwood Rd
Moss Ln
Keystone Way
Saint Alban St
State Highway 9
Saint Bernard St
Graham Hill Rd
Hollins Dr
Quail Crossing
9

- Proposed Alignment Work Area Boundary
- Project Section Break Point
- Study Area
- Sandhills Ecosystems (McGraw 2021)

Potentially Jurisdictional Aquatic Resources

- Streams (Dudek 2021)
- Streams (Santa Cruz County 2020)
- Riparian Communities (Dudek 2021)



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SOURCE: ESRI Imagery (Accessed 2021), County of Santa Cruz 2020, McGraw 2021

DUDEK

0 230 460 Feet

FIGURE 4-11

Sensitive Vegetation Communities and Potentially Jurisdictional Aquatic Resources

Biological Resources Assessment, Newell Creek Pipeline Project

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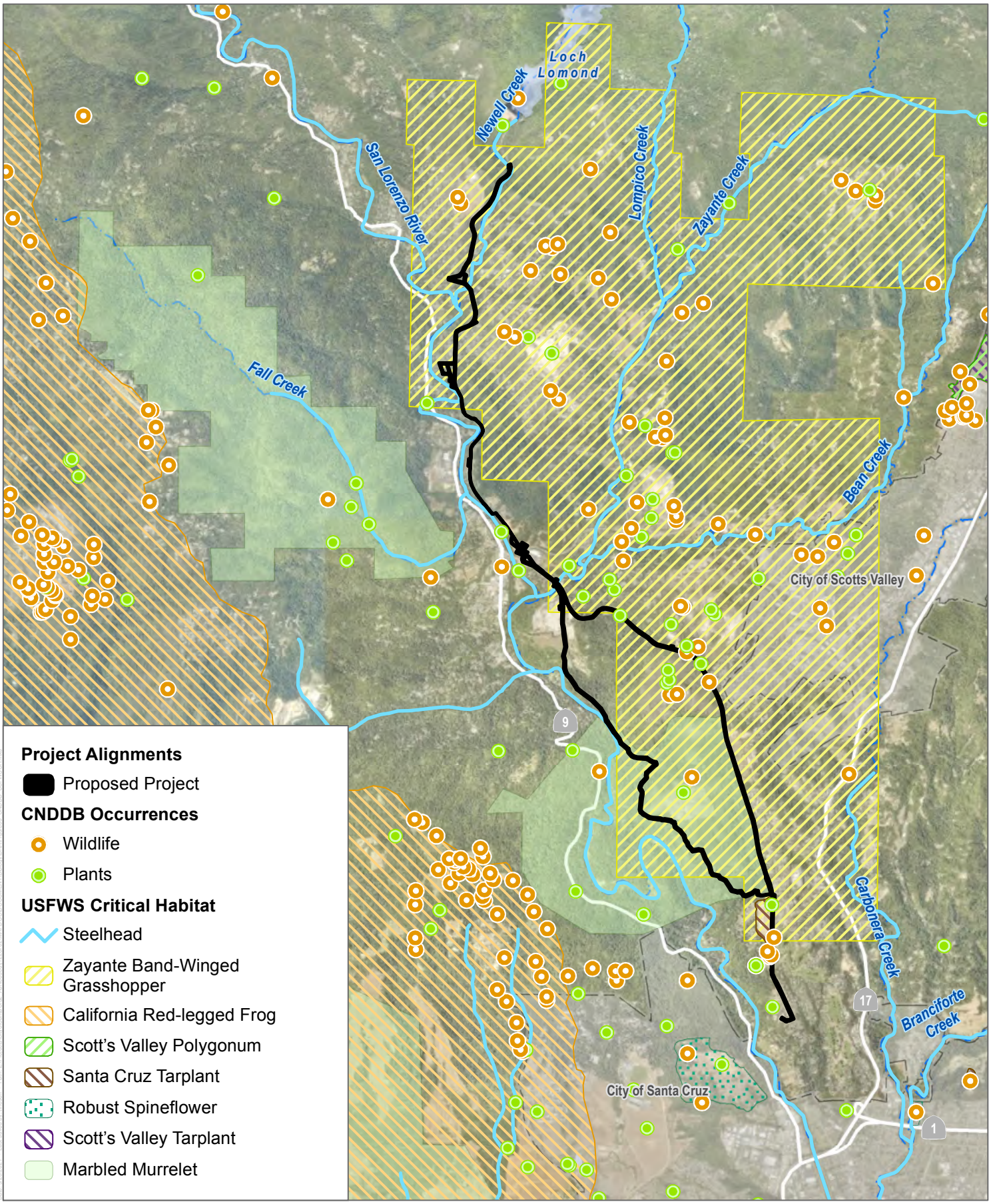

SOURCE: ESRI 2021, City of Santa Cruz 2021, CDFW 2021, USFWS 2020

DUDEK

0 0.5 1 Miles

FIGURE 5

Historical Special-Status Species Locations and USFWS Critical Habitat

Biological Resources Assessment, Newell Creek Pipeline Project

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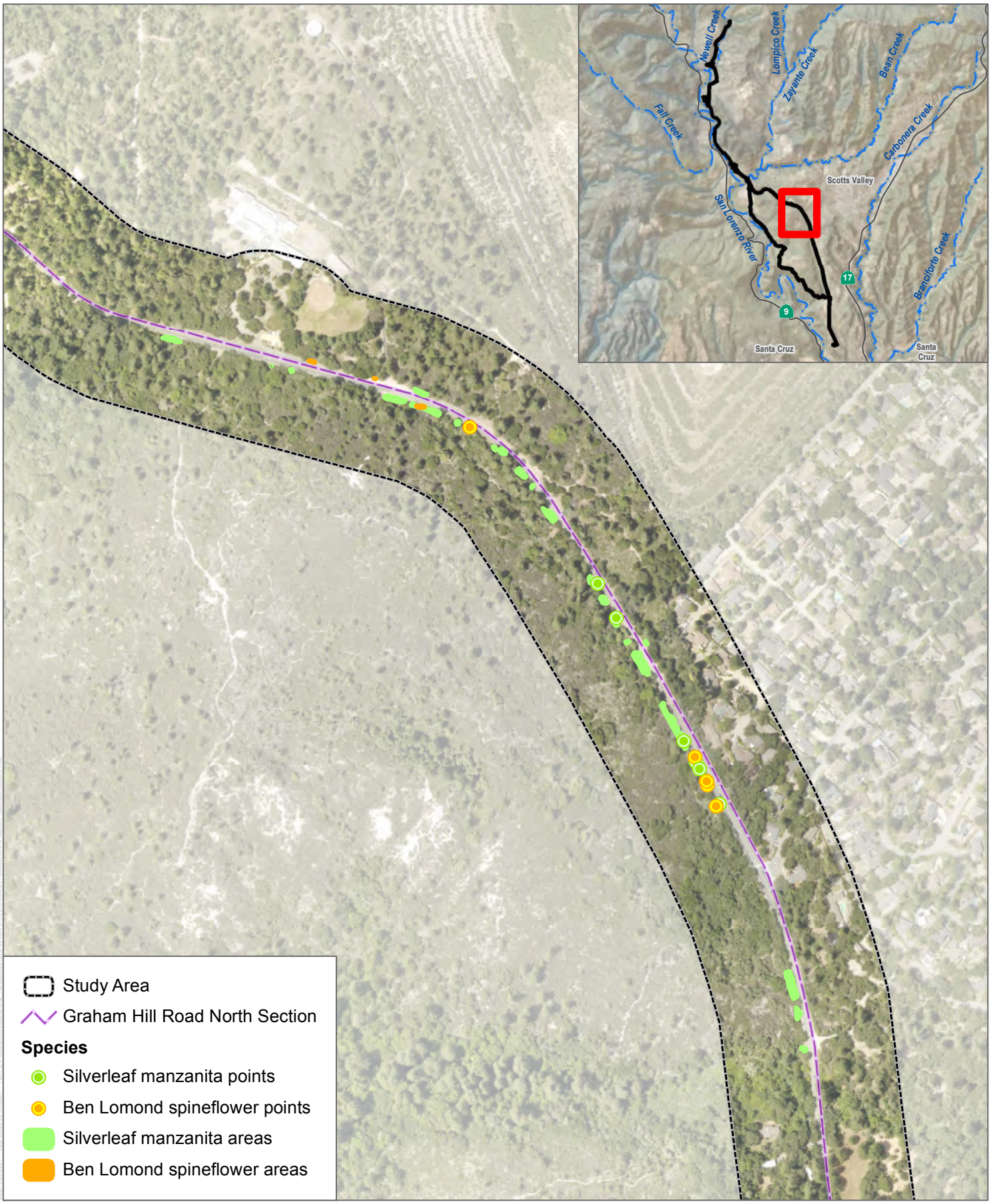

SOURCE: ESRI 2021, City of Santa Cruz 2021, McGraw 2021

DUDEK

0 0.0475 0.095 Miles

FIGURE 6

Special-Status Species Locations

Biological Resources Assessment, Newell Creek Pipeline Project

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Appendix A
Site Photographs

Photo 1: Northern Segment – Newell Creek Road Section

Photo 2: Northern Segment – Glen Arbor Road Section.

Photo 3: Northern Segment – Brackney North Section

Photo 4: Northern Segment – Brackney South Section

Photo 5: Northern Segment – San Lorenzo Road Section

Photo 6: Northern Segment – Felton Pump Station Section

Photo 7: Southern Segment – Santa Cruz Lumber Yard Section

Photo 8: Southern Segment – Henry Cowell State Park Section

Photo 9: Southern Segment – Pipeline Road Section

Photo 10: Southern Segment – Graham Hill Road North Section

Photo 11: Southern Segment – Graham Hill Road North Section (Zayante Creek)

Photo 12: Southern Segment – Graham Hill Road South Section

Appendix B

Sandhills Habitat Assessment

SANDHILLS HABITAT ASSESSMENT FOR THE NEWELL CREEK PIPELINE REPLACEMENT PROJECT

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1 Introduction

1.1 Project

The City of Santa Cruz Water Department (SCWD) is planning to implement the Newell Creek Pipeline Replacement Project, which will install a new pipeline to convey water from the Loch Lomond Reservoir to the Graham Hill Water Treatment Plant. Currently, water is conveyed from the Newell Creek Dam, which creates the reservoir, to the water treatment plant via the 9.25-mile Newell Creek Pipeline (Figure 1). The pipeline was constructed in 1960 and is reaching the end of its useful life; accordingly, the City has conducted a series of technical studies to evaluate replacement and/or rehabilitation alternatives.

Based on its prior analysis, SCWD proposes to replace 8.75 miles of the existing pipeline with a new 24- to 30-inch pipe. The pipeline would generally be installed underneath existing, paved roads, in the road right-of-way (ROW), and/or existing SCWD easements. The proposed northern segment from Newell Creek Access Road Bridge to the Felton Booster Pump Station would generally follow the existing pipeline alignment, with a few short re-alignments to avoid crossing private property; wherever possible, the new pipeline would be installed parallel to the existing pipeline. The proposed southern NCP segment, which extends from the booster pump station to the water treatment plant, generally includes a new pipeline section along Graham Hill Road. Once the new pipeline is installed and the interconnections are made, the existing pipeline would be removed or abandoned in place (DUDEK 2020).

1.2 Sandhills Ecosystem and Species

The proposed project occurs within central Santa Cruz County, which features the Santa Cruz Sandhills (Sandhills)—an endemic ecosystem found on outcroppings of Zayante Sand Soil in central Santa Cruz County (Marangio and Morgan 1987, McGraw 2004b). The Sandhills support four endemic plants, two of which are federally listed as endangered and one of which is also state listed as endangered, and two endemic insects that are both federally endangered (Table 1). The Sandhills also support Santa Cruz kangaroo rat (*Dipodomys venustus venustus*), which is currently only known from two locations, one of which is in the Sandhills (Table 1).

1.3 Assessment Goal and Objectives

To assist SCWD with planning and permitting of the project, Jodi McGraw Consulting (JMc) conducted a habitat assessment to evaluate the occurrence of Sandhills ecosystems, communities, and special-status species within proposed and alternative pipeline alignments. The objectives of the assessment were to:

1. **Synthesize existing information** including plans, reports, and spatial data (i.e., geographic information systems data) to identify known or likely occurrences of Sandhills systems in the region;
2. **Map the Sandhills ecosystem**, using existing data, on-the-ground assessments of accessible areas, and remote sensing (i.e., analysis of aerial imagery) within 300 feet of the Proposed Project Sections and Alternative Sections (Figure 1);

Table 1: Special-Status Plants and Animals of the Santa Cruz Sandhills

Name	Status[1]	Habitat
Santa Cruz kangaroo rat (*Dipodomys venustus venustus*)	Special Animal	Shrub-dominated communities on sandy soils in the Santa Cruz Mountains, including silverleaf manzanita chaparral
Mount Hermon June beetle (*Polyphylla barbata*)	Federally Endangered	Zayante soil and adjacent transitional soils in central Santa Cruz County
Zayante band-winged grasshopper (*Trimerotropis infantilis*)	Federally Endangered	Open sand parkland and adjacent chaparral gaps with sparse herbaceous understory
Ben Lomond spineflower (*Chorizanthe pungens* var. *hartwegiana*)	Federally Endangered; CRPR 1B.1	Openings in sand parkland and chaparral gaps, away from woody vegetation, dense grasses, and litter
Ben Lomond buckwheat (*Eriogonum nudum* var. *decurrens*)	CRPR 1B.1	Sand parkland and chaparral canopy gaps as well as areas of sparse canopy cover in ponderosa pine forest and coast live oak woodland
Ben Lomond wallflower (*Erysimum teretifolium*)	Federally Endangered; California Endangered; CRPR 1B.1	Openings in sand parkland and chaparral canopy gaps, away from woody vegetation, dense grasses, and litter
Silverleaf (Bonny Doon) manzanita (*Arctostaphylos silvicola*)	CRPR 1B.2	Silverleaf manzanita chaparral, and understory of ponderosa pine forest

[1] Status Designation Descriptions

Federally Endangered: Listed under the Federal Endangered Species Act; species in danger of extinction throughout all or significant portions of its range.

Special Animal: On the California Department of Fish and Wildlife list of Special Animals (CDFW 2019).

State Endangered: Listed on the California Endangered Species Act; species whose continued existence in California is jeopardized.

California Rare Plant Rank (CRPR) 1B (CNPS 2021): Most plants in this category are endemic to California and have experienced significant declines over several decades; these plants are rare, threatened, or endangered throughout California and elsewhere. Decimals represent a "Threat Rank" (e.g., "List 1B.1"):

CRPR 1B.1: Seriously threatened populations in California, with over 80% of occurrences are threatened.

CRPR 1B.2: Marginally threatened populations in California, with between 20% and 80% of occurrences threatened.

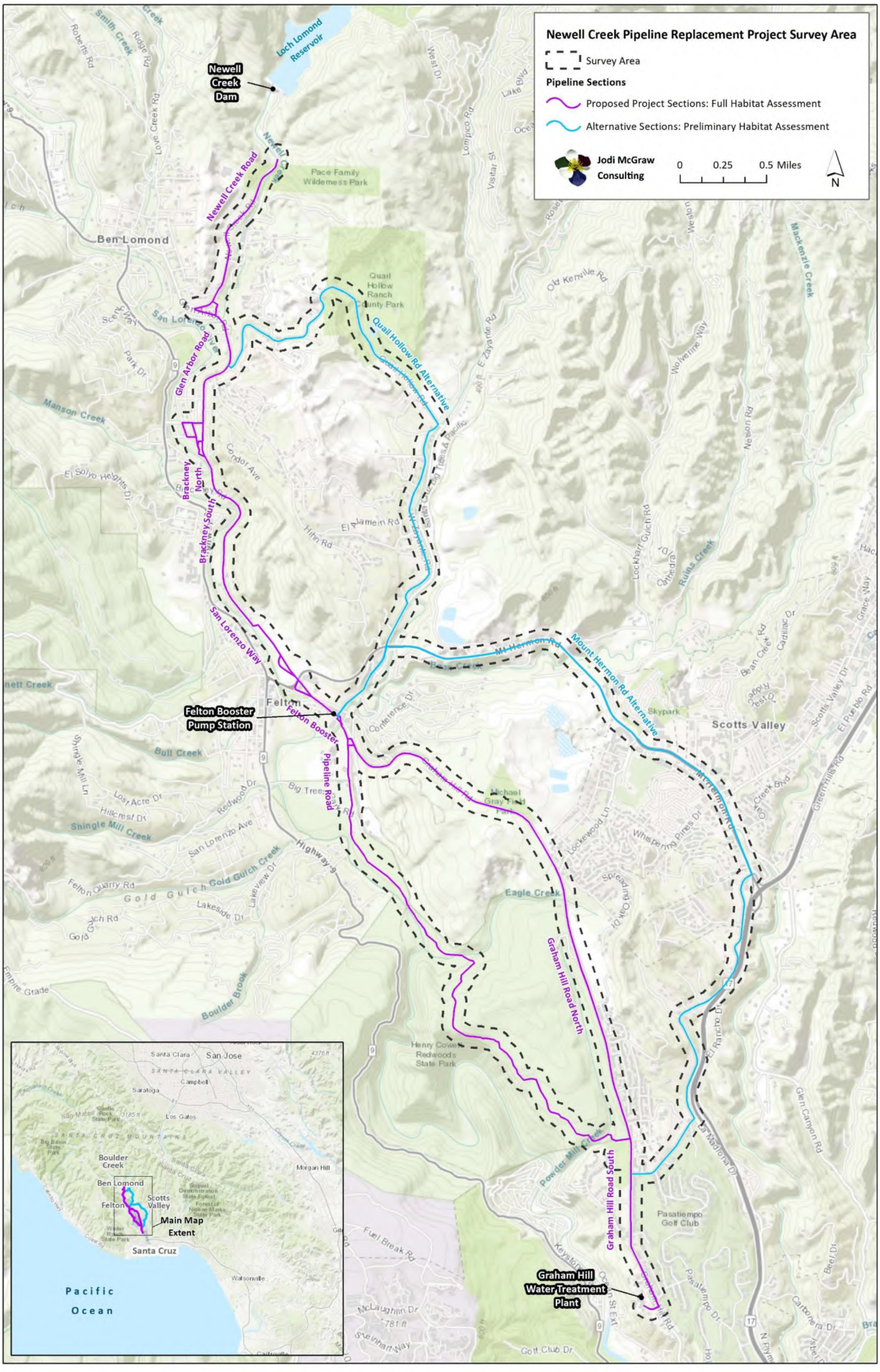

Figure 1: Newell Creek Pipeline Replacement Project Survey Area

3. **Characterize and map Sandhills communities** within the Proposed Project Sections (only), and evaluate their condition including land uses, succession, or transitional soil conditions, among other factors, that can influence their use by special-status species; and
4. **Assess habitat for seven special-status Sandhills species (Table 1),** based on the community type and condition, as well as proximity to occupied habitat, and observations made during the assessment.

1.4 Report

The *Methods* (Section 2) outlines how habitat assessment objectives were achieved while the *Results* (section 3) describes the findings. The information in this habitat assessment can inform SCWD's efforts to plan and permit the project; specifically, it can aid evaluation of the proposed and alterative projects under the California Environmental Quality Act (CEQA) and help inform development of mitigations to reduce impacts of the project on sensitive biological resources as part of CEQA and in compliance with the Federal Endangered Species Act. Specific recommendations will be developed as part of a subsequent phase of this Sandhills component of the project.

2 Methods

2.1 Study Region

The Newell Creek Pipeline Replacement Project (Project) Area is located in the San Lorenzo Valley and adjacent Scotts Valley areas in central Santa Cruz County, between the City of Santa Cruz to the south, the town of Ben Lomond to the north and west, and the City of Scotts Valley in the east (Figure 1). The region features a relatively high concentration of Zayante soils that support the Sandhills ecosystem (McGraw 2004b).

2.2 Assessment Areas and Approach

The habitat assessment evaluated the occurrence of Sandhills systems (ecosystems, communities, and special-status species) within nine pipeline sections that total 22.69 miles. These include 13.08 (58% of the total length) within the Proposed Project and 9.60 miles (42%) of total within the two Alternative Sections (Table 2, Figure 1).

Table 2: Project Pipeline Sections subject to Two Levels of Sandhills Assessment

Assessment Type and Pipeline Section	Length (feet)	Miles	% of Total
Proposed Project Sections Subject to Full Habitat Assessment	**69,073**	**13.08**	**58%**
Brackney North Section	734	0.14	1%
Brackney South Section	3,320	0.63	3%
Felton Booster Section	2,617	0.50	2%
Glen Arbor Road Section	9,545	1.81	8%
Graham Hill Road North Section	18,385	3.48	15%
Graham Hill Road South Section	5,866	1.11	5%
Newell Creek Road Section	5,036	0.95	4%
Pipeline Road Section	18,418	3.49	15%
San Lorenzo Way Section	5,152	0.98	4%
Alternative Sections Subject to Preliminary Habitat Assessment	**50,707**	**9.60**	**42%**
Mount Hermon Rd Alternative Section	29,392	5.57	25%
Quail Hollow Rd Alternative Section	21,315	4.04	18%
All Sections	**119,780**	**22.69**	**100%**

As outlined in Table 3, the Proposed Project sections (Table 2) were subject to a Full Habitat Assessment, which assessed habitat for individual species; the Alternative Sections (Table 2) were subject to a

Preliminary Habitat Assessment, which entailed mapping the Sandhills ecosystem, but did not include differentiating the communities or assessing habitat for the special-status species (Table 3).

Table 3: Levels of Assessment Used to Evaluate Sandhills Systems

Assessment Level	Use	Description of Assessment
Full Habitat Assessment	Nine Proposed Project Pipeline Sections (Table 2)	Classified the Sandhills according to one of three main Sandhills community types, and assessed each mapped Sandhills patch according to suitability of the habitat for seven special-status species that inhabit the Sandhills.
Preliminary Habitat Assessment	Two Alternative Sections (Table 2)	Mapped areas featuring the Sandhills ecosystem; did not differentiate Sandhills communities nor assess habitat for special-status species

In areas subject to both the Full and Preliminary Habitat Assessment, Sandhills ecosystems were evaluated with respect to the following geographic areas:

1. **Pipeline Sections**: the nine Proposed Project sections, as well as the two Alternative Sections;
2. **Project Work Area**: the anticipated areas of work around the Proposed Project pipeline alignment, which includes the road right-of-way and adjacent work areas, including anticipated staging areas; and
3. **Survey Area*:*** the 1,618-acre area assessed for the project. For the Proposed Project sections, the Project Work Area was buffered by 300 feet (on either side) while the same buffer (300 feet) was used to develop the Proposed Project survey area. For the Alternative Sections, a 300-foot buffer was applied to the centerline of the two pipeline alignments, for which specific Project Work Areas have not been defined.

2.3 Assessment Methods

For this assessment, the Sandhills ecosystem was delineated within the 1,618-acre survey area associated with all 11 pipeline sections (Table 2), and Sandhills communities and special-status Sandhills species habitat were differentiated for the Proposed Project survey area, via two methods:

1. Review existing documents and spatial data; and
2. Conduct on-the-ground assessment.

2.3.1 Review Existing Documents and Spatial Data

First, a geographic information system featuring existing spatial data and high-resolution aerial imagery, was assembled and reviewed to identify known or likely locations of the Sandhills ecosystem, communities, and special-status species (Table 4).

Table 4: Spatial Data Used to Map the Sandhills Ecosystem, Communities, and Habitat for Special-Status Species

Layer and Source	Description	Use in the Project
Sandhills (McGraw 2005a)	Areas of Sandhills habitat mapped based on analysis of aerial imagery and ground truthing. Each patch is attributed according to the rare species observed in the patch	Identify known patches of the Sandhills ecosystem within the survey areas and note special-status species occurrences, where indicated at the appropriate spatial scale
Sand Parkland (McGraw 2005b)	Areas supporting sand parkland, which is an exceptionally rare and diverse Sandhills community that supports Zayante band-winged grasshopper and Ben Lomond wallflower	Evaluate occurrences of sand parkland habitat within the survey areas to assess potential for occupancy by special-status species
Zayante Soils (USDA 1980)	Soil mapping units classified as Zayante Coarse Sand and Zayante-Rock Outcrop Complex	Identify additional, potential patches of Sandhills ecosystem
California Natural Diversity Database (CDFW 2020)	Occurrences of four endangered species mapped within CNDDB: Mount Hermon June beetle, Zayante band-winged grasshopper, Ben Lomond spineflower, and Ben Lomond (Santa Cruz) wallflower	Identify known occurrences of the special-status species, which were used to indicate that the species have been 'observed' within the mapped patches of Sandhills ecosystem
Endangered Sandhills Species Data (J. McGraw unpublished data)	Additional mapped occurrences of rare Sandhills species based on prior surveys	Identify known occurrences of the special-status species, which were used to indicate that the species have been 'observed' within the mapped patches of the Sandhills ecosystem
Aerial Imagery (County of Santa Cruz 2016)	High-resolution (3"- pixel) aerial imagery of the Study Region	Identify Sandhills ecosystem and differentiate Sandhills communities based on the signature of two main indicators: silverleaf manzanita and ponderosa pine

In addition to the spatial data, a review was conducted of prior reports and plans assessing Sandhills, including the *Sandhills Conservation and Management Plan* (McGraw 2004b) and survey reports prepared for other conservation and land use projects in the region.

2.3.2 Conduct On-the-Ground Assessments

To further evaluate the occurrence of Sandhills systems in the Project Area, a visual assessment was conducted in the following areas where access was provided on the ground:

- County and City road rights-of-way (i.e., all public road ways)

- City of Santa Cruz properties and easements:
    - Graham Hill Water Treatment Plant located at 715 Graham Hill Road; and
    - The pipeline alignment itself, over which the SCWD has an easement that grants access;
- Public lands:
    - Henry Cowell Redwoods State Park; and
    - Pace Property (County of Santa Cruz Parks Department);
- Other lands open for access:
    - Mount Hermon Christian Conference Center; and
    - Roaring Camp Railroads.

For the Proposed Project sections, the on-the ground assessment entailed walking the pipeline alignment on foot, and entering the Proposed Project survey area where it was accessible and where needed to evaluate Sandhills biological systems. Specifically, on-the-ground assessment of the proposed pipeline area was used to delineate the Sandhills ecosystem and to aid classification and delimitation of the Sandhills communities. Where access was precluded, binoculars and aerial imagery were used to assess habitat conditions.

Observations were recorded for the special-status plants, including primarily the two perennial species which are conspicuous during the winter when the assessment was conducted, silverleaf manzanita and Ben Lomond buckwheat; however, the field assessment was not designed to constitute a focal-species survey or otherwise map the individual plants or other species. Separate focal-species surveys would need to be conducted during the appropriate season following a protocol designed to identify and map their areal extent individually, as needed.

For the Alternative Sections, the on-the-ground assessment primarily consisted of a windshield survey to check areas where the occurrence of Sandhills biological systems was uncertain following the review of existing spatial data.

2.4 Classification and Mapping Methods

The review of existing information and the on-the-ground assessment were used to delineate Sandhills ecosystems within the 1,618-acre survey area. Within the Proposed Project survey area, which was subject to the Full Habitat Assessment, Sandhills communities and habitat for special-status species were also mapped, as outlined below.

2.4.1 Sandhills Ecosystem

The Sandhills ecosystem was mapped to include areas that: 1) are known to include Sandhills biological systems based on direct observations, and 2) areas that are more likely than not to include Sandhills biological systems, based on available information. The Sandhills ecosystem was mapped based on the occurrence of one or both of the following:

1. **Sandhills Soils:** Zayante sand soil observed on the ground, and/or in soils mapping units (USDA 1980). Areas featuring soils that appeared transitional between Zayante soils and the loam soils

in the region were included in the mapping where they occurred adjacent to Zayante soils, as these areas can support special-status species of the Sandhills, including the Mount Hermon June beetle.

2. **Sandhills Indicator Species:** Direct observations and records of species that are indicators of the Sandhills ecosystem, including two dominant Sandhills species that, within Santa Cruz County, are found primarily in the Sandhills ecosystem supported by Zayante sand soil: ponderosa pine (*Pinus ponderosa*) and silverleaf manzanita (*Arctostaphylos silvicola*).

While Sandhills indicator species are helpful in mapping Sandhills ecosystems, their presence was not requisite; instead, Zayante soils alone were sufficient to include an area within the mapped Sandhills ecosystem. This is because Zayante soils can support special-status Sandhills species even where the dominant Sandhills plant species are absent, as a result of one or more of the following (Arnold 2004, McGraw 2004b, McGraw 2013, and McGraw and Jordan 2021):

1. land use modifications such as development, which can remove the dominant native Sandhills plants, but does not eliminate habitat for the special-status species;
2. succession, which can cause ponderosa pine and silverleaf manzanita to be (temporarily) absent; and
3. in areas with mesic conditions, including north-facing slopes, areas featuring greater soil moisture (i.e., wetlands and along streams), and/or areas featuring transitional soils (i.e., soils with characteristics intermediate between Zayante soils and loam soils), which are dominated by coast live oak (*Quercus agrifolia*), which is also found on loam soils in the region.

Because the intent of the assessment was to identify all Sandhills biological resources, there was no minimum mapping unit. Sandhills ecosystems were mapped irrespective of roads, buildings, and other features that can remove or degrade habitat for species; these features could be addressed in finer-scale mapping, as needed.

2.4.2 Sandhills Communities and Habitat Conditions

In the Proposed Project survey area, where the Full Habitat Assessment was conducted, areas within the Sandhills ecosystem were classified into one of three main community types (Table 5); the exception was at the Ben Lomond Transfer Station, where the Zayante soils were mapped as “landfill”.

Sandhills communities were not differentiated within the Alternative Sections survey area, which was instead subject to a Preliminary Habitat Assessment designed to identify the Sandhills ecosystem (Section 2.2).

The Sandhills community types used in this habitat assessment are not meant to provide a detailed resolution of the plant communities in the survey area and instead, they were used to aid determination of habitat for Sandhills species based on key differences in plant community structure and species composition (Table 5).

Table 5: Sandhills Community Types Classified within the Proposed Project Survey Area where the Sandhills ecosystem was Subject to a Full Habitat Assessment

Community	Description
Silverleaf manzanita chaparral	Areas domianted by shrubs including silverleaf manzanita, with scattered (relatively open canopy of) trees including ponderosa pine and coast live oak
Ponderosa pine forest	Forests featuring ponderosa pine and associated hardwoods including coast live oak, Pacific madrone (*Arbutus menziesii*), that feature emergent or even abundant Pacific Douglas-fir (*Pseudotsuga menziesii*) in areas of transitional soil or successional areas. These forest may feature silverleaf manzanita in the understory at low to moderate abundance.
Coast live oak woodland	Hardwood woodlands on Zayante soil that have limited (or no) ponderosa pine and silverleaf manzanita (though the latter are often senescent or dead in the understory). This community typically occurs in mesic microsites including north-facing slopes, areas along streams or near wetlands, and transitional soils, as well as long-unburned areas.

The Sandhills community patches were also assessed according to their condition using the categories outlined in Table 6. These categories were created to aid assessment of habitat for the seven species, some of which can be affected by land use modifications and succession or transitional conditions.

Table 6: Sandhills Community Conditions used to Aid Assessment of Species Habitat

Condition	Description
Intact/relatively intact	Sandhills communities that have only limited impacts from human activities and land uses and are dominated by species typical of the community
Modified by land use	Sandhills communities that have been altered by human land use activities, including development, sand mining, and road building. This condition was used to characterize residentially developed areas in the Sandhills.
Transitional/ successional	Sandhills communities that feature plant species composition and structure that is intermediate between typical Sandhills communities and non-Sandhills communities. Specifically, plant communities that have denser canopy cover and/or a higher percentage cover of plant species found on loam soils but not typically observed on Zayante soils. This can occur due to two non-mutually exclusive factors: • transitional soils: soils that are transitional between typical Zayante coarse sand soil and loam soils (i.e., due to different parent material, microclimate, hydrology, and vegetation development, among other factors); and • Succession: areas that have been long unburned, where species that predominate on loam soils, including Pacific Douglas-fir, have become established in the absence of fire. These transitional/successional communities often support Mount Hermon June beetle but currently lack other Sandhills special-status species presently, though they could reoccupy the areas following fire or other disturbances that open up habitat and reset successional processes (McGraw 2004b).

2.4.3 Species Habitat

For each of the seven species, the Sandhills community patches in the Proposed Project survey area were classified into one of five categories. An additional 'not assessed' category was used for the Alternative Sections survey area, where species habitat was not classified within the Sandhills ecosystem (Table 7). The "potential to occur" categories were applied to the plant community patches based on the plant species composition and structure and the habitat condition within the plant community patch; the 'potential to occur' categories may not apply to all areas within very heterogeneous habitat patches. The Mount Hermon June beetle is ubiquitous within the Sandhills Ecosystem, and also occurs on loam soils adjacent to Zayante soils; therefore, the 'Not Expected" category was not used for this species.

Table 7: Categories Used to Assess the Special-Status Species Potential to Occur

Category	Description
Observed	The species is known to utilize the Proposed Project survey area, based on prior records and/or observations made during the assessment.
High	The species is not known to occur in the Proposed Project survey area, but is likely to be present based on suitable habitat and/or occurrences in proximity.
Moderate	The species has an even probability of being present in the Proposed Project survey area as not.
Low	The species has a low probability of being in the Proposed Project survey area due to current low habitat suitability; in some cases, fire, succession, or other natural processes could increase habitat suitability.
Not Expected	The species is unlikely to be present in the Proposed Project survey area due to currently unsuitable habitat; in some cases, fire, succession, or other natural processes could render the habitat suitable for the species.
Not Assessed	Used for the Alternative Sections survey area only, where species habitat was not assessed.

3 Results

3.1 Sandhills Ecosystem

Within the total 1,618-acre Proposed Project survey area and Alternative Sections survey area, a total of 745 acres occur within the Sandhills ecosystem (Table 8, Figure 2). The Proposed Project Survey Area, which is centered on the Proposed Project Work Area, features 416 acres of the Sandhills ecosystem, which is concentrated in the Graham Hill Road North Section, with smaller areas of Sandhills ecosystems also found in the Glen Arbor Road, Newell Creek Road, Graham Hill Road South, and Pipeline Road sections (Table 8, Figure 2). The Alternative Sections survey area contain an additional 329 acres of the Sandhills ecosystem (Table 8, Figure 2). No areas underlain by Zayante soil were observed in the other Proposed Project survey areas along the Brackney (North and South), Felton Booster, and San Lorenzo Way sections (Table 2, Figure 2).

Table 8: Sandhills Ecosystem within the Survey Areas

Project Area	Acres[1]	Percentage[2]
Proposed Project Survey Area (Full Habitat Assessment)	**416**	**56%**
Glen Arbor Road	87	12%
Graham Hill Road North	238	32%
Graham Hill Road South	12	2%
Newell Creek Road	71	10%
Pipeline Road	9	1%
Brackney North	0	0%
Brackney South	0	0%
Felton Booster	0	0%
San Lorenzo Way	0	0%
Alternative Sections Survey Area (Preliminary Habitat Assessment)	**329**	**44%**
Mount Hermon Road	160	21%
Quail Hollow Road	169	23%
All Survey Areas	**745**	**100%**

[1] Numbers may not total correctly due to rounding error.
[2] Percentage of total acres of the Sandhills ecosystem mapped within the survey area

3.2 Sandhills Communities

The Proposed Project survey area features three main Sandhills communities, which were classified based on their structure and species composition and also characterized according to their conditions that can influences species habitat, including land use (Section 2.4.2; Tables 5 and 9, Figure 3).

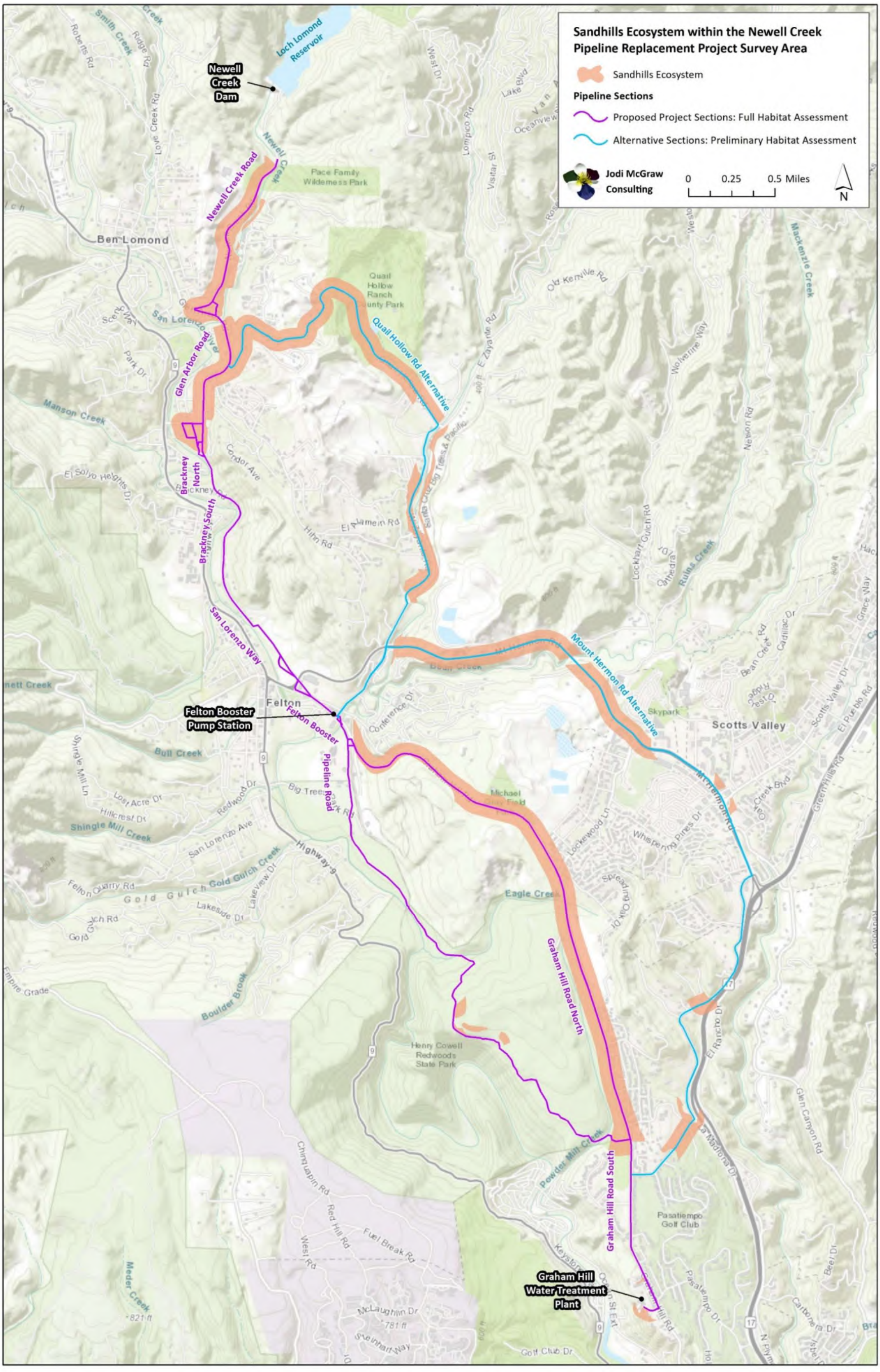

Figure 2: Sandhills Ecosystem within the Newell Creek Pipeline Replacement Project Survey Area

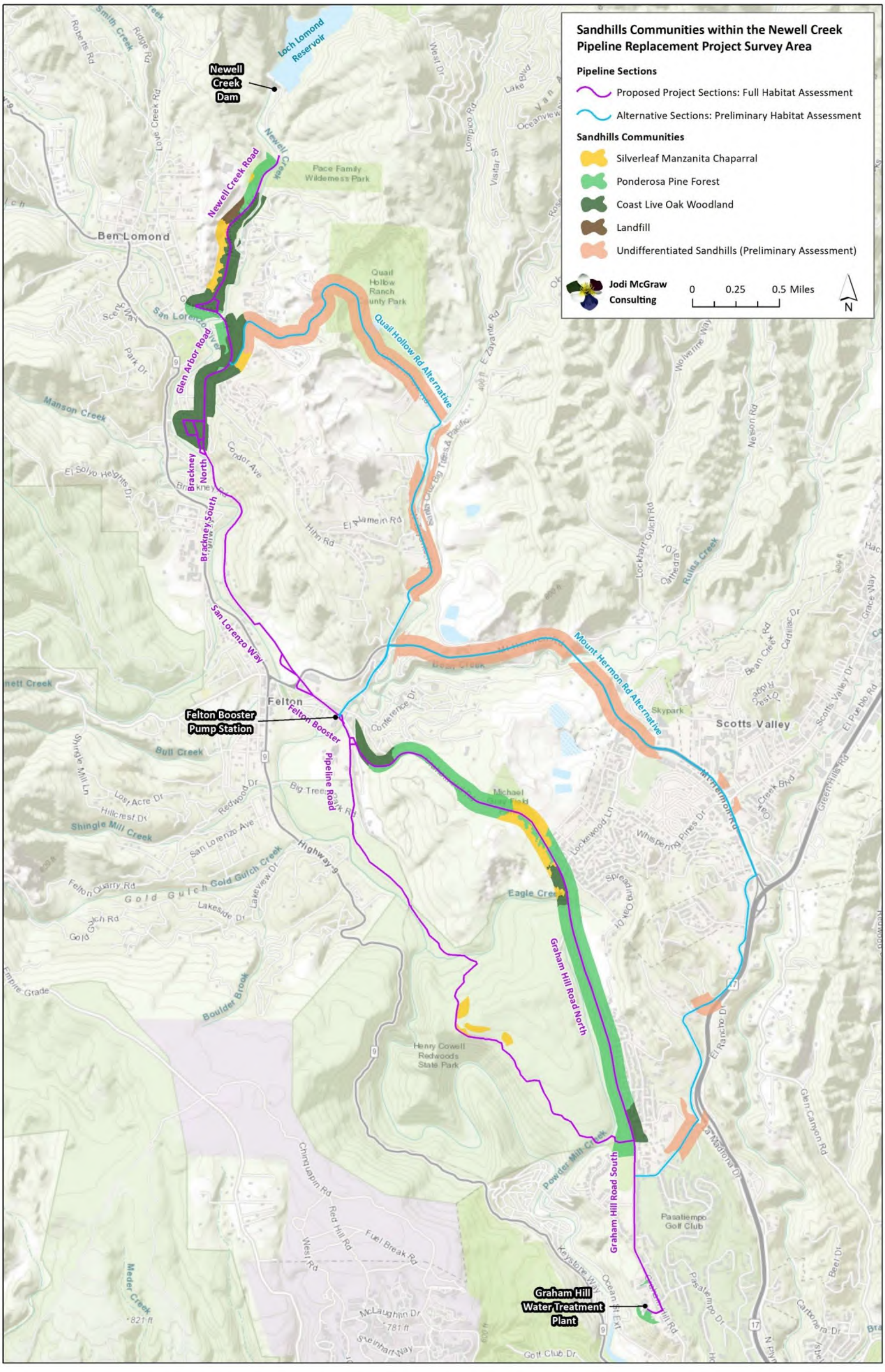

Figure 3: Sandhills Communities within the Newell Creek Pipeline Replacement Project Survey Area

Table 9: Sandhills Community Patches According to their Condition

	Acres in Sandhills Community Conditions (Table 6)[1]				
Sandhills Communities (Table 5)	**Intact/Relatively Intactly**	**Successional/ Transitional**	**Modified by Land Use**	**Mixed (Intact and Modified)**	**Total**
Proposed Project Survey Area	96	143	177		416
silverleaf manzanita chaparral	25	22			48
ponderosa pine forest	58	104	60		221
coast live oak woodland	13	16	113		142
landfill			5		5
Undifferentiated Sandhills Communities in the Alternative Sections Survey Area	160	13	136	20	329
All Sandhills Communities	**256**	**156**	**314**	**20**	**745**

[1] Numbers may not total correctly due to rounding error.

3.2.1 Silverleaf Manzanita Chaparral

3.2.1.1 Description and Occurrence in the Survey Area

A total of 48 acres within the Proposed Project survey area were classified as silverleaf manzanita chaparral (Table 9, Figure 3). This community is dominated by shrubs including silverleaf manzanita, buckbrush (*Ceanothus cuneatus* var. *cuneatus*), chamise (*Adenostoma fasciculatum*), and yerba santa (*Eriodictyon californicum*) and feature a relatively open canopy of trees including ponderosa pine and coast live oak. Canopy gaps within the silverleaf manzanita support subshrubs such as sticky monkeyflower (*Diplacus aurantiacus*) and herbs such as Ben Lomond spineflower, Santa Cruz monkeyflower (*Diplacus rattanii* ssp. *decurtatus*), and hollyleaf navarretia (*Navarretia atractyloides*; McGraw 2004b).

Within the Proposed Project survey area, silverleaf manzanita chaparral occurs in four main locations: atop Mount Hermon in the Graham Hill Road North Section, near the intersection of Glen Arbor Road and Quail Hollow Road in the Glen Arbor Road Section, in the western portion of the Newell Creek Road Section south of the landfill, and in small patches near the center of Pipeline Road section (Figure 3). Though the sandhills plant communities were not differentiated or mapped as part of the Preliminary Habitat Assessment conducted within the Alterative Sections survey area, silverleaf manzanita chaparral occurs within the survey areas for both the Quail Hollow Road and Mount Hermon Road Alternative Sections (J. McGraw, pers. obs. 2021).

3.2.1.2 Condition

Of the total 48 acres of silverleaf manzanita chaparral within the Proposed Project survey area, 22 acres (47%) where characterized as successional, as the shrubs occurred in areas that are long-unburned

where tree canopy is greater; in the absence of fire, these areas may succeed to ponderosa pine forest or coast live oak (McGraw 2004b).

3.2.1.3 Status

Silverleaf manzanita chaparral is a Provisional Alliance in the Manual of California Vegetation (37.320.00; Sawyer et al. 2021). The community has a global rank of G1 and a state rank of S1.2 reflecting the extremely limited distribution (Sawyer et al. 2021); as a result, it meets the criteria for a sensitive plant community (CDFW 2009, CDFW 2020). Silverleaf manzanita chaparral is a type of maritime chaparral, which is a designated sensitive habitat by the County of Santa Cruz (1994).

3.2.2 Ponderosa Pine Forest

3.2.2.1 Description and Occurrence in the Survey Area

Within the Proposed Pipeline survey area, most of the Sandhills habitat (221 acres or 53% of the total) was classified as ponderosa pine forest (Table 9, Figure 3). These forests feature ponderosa pine and associated hardwoods including primarily coast live oak and Pacific madrone in the overstory; the understory consists of primarily shade-tolerant shrubs, vines, and ferns including coffee berry (*Frangula* californica), poison oak (*Toxicodendron diversilobum*), California blackberry (*Rubus ursinus*), and bracken fern (*Pteridium aquilinum* var. *pubescens*). Canopy gaps often feature shrubs and herbs found in the silverleaf manzanita chaparral (McGraw 2004b).

Within the Proposed Project survey area, most of the Sandhills ponderosa pine forest occurs along the Graham Hill Road sections (North and South), with smaller patches occurring in the survey areas along the Newell Creek Road and Glen Arbor Road sections (Figure 3). Though the sandhills plant communities were not differentiated or mapped as part of the Preliminary Habitat Assessment, ponderosa pine forest occurs within the survey areas for both the Quail Hollow Road and Mount Hermon Road Alternative Sections (J. McGraw, pers. obs. 2021).

3.2.2.2 Condition

Approximately 60 acres (27%) of the ponderosa pine forest in the Proposed Project survey area features land uses including residential development, that can degrade the quality of the habitat. Nonetheless, such partially-developed areas can support Sandhills special-status species, including the Mount Hermon June beetle (USFWS et al. 2011).

Nearly half of the ponderosa pine forest (104 acres or 47%) in the Proposed Project survey area supports relatively high cover of Pacific Douglas-fir and hardwoods and low abundance of ponderosa pine, most of which are mature. These forests occur on soils that are transitional between Zayante coarse sand soil and loam soils, in areas with otherwise more mesic soil conditions including near streams or north-facing slopes, and/or in areas that have been long unburned. These transitional soils and successional conditions allow for establishment of trees such as Pacific Douglas-fir and growth of hardwoods that outcompete ponderosa pine for light and limit its establishment (McGraw 2004b).

Due to the low density of ponderosa pine, these transitional/successional ponderosa pine forests would not be classified as ponderosa pine forest in a general plant community classification, including one

conducted based on the *Manual of California Vegetation* (Sawyer et al. 2021). However, they were classified as ponderosa pine forest for purposes of this Sandhills assessment as, unlike the forests dominated by oaks and Pacific Douglas-fir that occur on loam soils, these forests on Zayante sand soil can support populations of the Mount Hermon June beetle and perhaps also silverleaf manzanita in the understory, which are often senescent due to long fire-free period.

3.2.2.3 Status

The coastal, low-elevation ponderosa pine forests in the Sandhills have not been previously characterized or classified in the *Manual of California Vegetation* (MCV; Sawyer et al. 2021), which instead describes ponderosa pine forests from analysis of their structure and species composition further inland and/or at higher elevation. For these reasons, Sandhills stands do not fit the classification criteria for 'ponderosa pine forest' under the MCV, which requires 50% relative cover of ponderosa pine; Sandhills stands are typically not densely stocked with ponderosa pine and instead co-dominate with hardwoods. Sandhills plant communities are currently being analyzed as part of a project to classify and map plant communities in the Santa Cruz Mountains (J. Evens, pers. comm. 2020). Future versions of the MCV are anticipated to include Sandhills ponderosa pine forests and other Sandhills communities. Like silverleaf manzanita chaparral, these currently undescribed Sandhills communities are anticipated to be recognized as sensitive communities due to their limited geographic range.

All Sandhills ecosystems defined as areas of Zayante sand soil in central Santa Cruz County are currently considered "Sensitive Habitat" under the County of Santa Cruz Sensitive Habitat Ordinance as they provide habitat for rare and endangered species. Additionally, the County recognizes Indigenous ponderosa pine as a Sensitive Habitat as well as Special Forest (County of Santa Cruz 1994).

3.2.3 Coast Live Oak

3.2.3.1 Description and Occurrence in the Survey Area

The Proposed Project survey area features a total of 142 acres of woodlands on Zayante soil that are dominated by coast live oak and feature primarily shade-tolerant vines and herbs in the understory (Table 9, Figure 3). Unlike the ponderosa pine forests, these Sandhills coast live oak woodlands have limited (or no) ponderosa pine and, due to the dense canopy, they also have limited silverleaf manzanita, though senescent or dead shrubs canopy occur in the understory. Sandhills coast live oak woodland typically occurs in mesic microsites including north-facing slopes, areas along streams or near wetlands, and on transitional soils; they may also be preferentially found in areas that are long unburned. These coast live oak woodlands feature different plant species composition than the more widespread coast live oak woodlands on loam soils in the region; they also support rare Sandhills species such as the Mount Hermon June beetle (Section 3.3.2.1).

The Sandhills coast live oak woodlands are concentrated along the Newell Creek Road and Glen Arbor Road sections, though also occur patchily along Graham Hill Road (North and South sections; Figure 3). The survey area along both the Quail Hollow Road and Mount Hermon Road alternative sections also features Sandhills coast live oak woodlands (J. McGraw, pers. obs. 2021)

3.2.3.2 Condition

Of the 142 acres of Sandhills coast live oak woodland in the Proposed Project survey area, 16 acres (11%) were characterized as successional/transitional, as they occur at the ecotone between the Sandhills and riparian communities along Newell Creek and along the San Lorenzo River.
An additional 113 acres (80%) of the coast live oak woodland is modified by land use activities, which principally include residential development. In areas of relatively high-density residential development, as occur along the Newell Creek Road and Glen Arbor Road sections of the Proposed Project , some of these mapped Sandhills coast live oak woodlands feature scattered remnant coast live oak in a matrix of buildings, hardscapes, and ornamental landscapes. As with the ponderosa pine forests modified by development, these areas in the Sandhills can continue to support rare Sandhills species, including most notably, Mount Hermon June beetle (USFWS et al. 2011).

3.2.3.3 Status

Like the Sandhills ponderosa pine forests, coast live oak woodlands in the Sandhills have not been previously characterized or classified in the *Manual of California Vegetation* (Sawyer et al. 2021). The Sandhills plant communities are currently being analyzed as part of a project to classify and map plant communities in the Santa Cruz Mountains (J. Evens, pers. comm. 2020). Future versions of the MCV are anticipated to include Sandhills coast live oak woodlands and other Sandhills communities that are currently omitted. Like silverleaf manzanita chaparral, these undescribed communities are anticipated to be recognized as sensitive communities due to their limited geographic range. As noted above, All Sandhills ecosystems defined as areas of Zayante sand soil in central Santa Cruz County are currently considered “Sensitive Habitat” under the County of Santa Cruz Sensitive Habitat Ordinance as they provide habitat for rare and endangered species.

3.2.3.4 Undifferentiated Sandhills Communities

The Alternative Sections survey area contains a total of 329 acres of Sandhills ecosystem that was not mapped according to the community type (Table 9, Figure 3). These undifferentiated Sandhills communities include the three communities within survey area for the Proposed Project, which occur in various conditions including with varying degrees of prior land use modifications. The survey area along Quail Hollow Road and Mount Hermon Road Alternative Sections also includes sand parkland—an exceptionally rare Sandhills community type characterized by an open canopy of ponderosa pine with a diverse understory of herbaceous plants and subshrubs, which provides habitat for the Zayante band-winged grasshopper as well as the Mount Hermon June beetle and the three herbaceous Sandhills endemic plants (Table 1; Marangio and Morgan 1987, McGraw 2004b).

3.3 Sandhills Species Habitat

Five of the seven Sandhills special-status species evaluated in this assessment have been observed within the Proposed Project survey area (Table 10, Figures 4-10). The other two species, Ben Lomond wallflower and Zayante band-winged grasshopper, have moderate potential to occur within open silverleaf manzanita chaparral in a relatively small portion (11 and 16 acres, respectively) of the survey area along the Newell Creek Road Section (Table 10, Figures 4-10). In addition, Zayante band-winged grasshopper has moderate potential to occur in a 2-acre area of recently burned Sandhills within the survey area along the Pipeline Road Section (Figure 9).

Table 11 identifies the potential for the special-status Sandhills species to occur in the Alternative Sections survey area, where species habitat was not individually mapped (Section 2.2). The Quail Hollow Road and Mount Hermon Road sections feature Sandhills habitat in which all Sandhills special-status species have been observed *except* for the Santa Cruz kangaroo rat, which has moderate and high potential, respectively, to occur in the Mount Hermon Road and Quail Hollow Road Alternative Sections.

Table 10: Species Habitat within the Areas Mapped in the Sandhills Ecosystem within the Survey Areas

	Habitat Assessment Categories (Acres)[1]						
Habitat	Observed	High	Moderate	Low	Not Expected	Not Assessed	Total
Mount Hermon June beetle	112	140	122	42		329	745
Zayante band-winged grasshopper			20	33	367	329	745
Santa Cruz Kangaroo rat	28	31	32	54	270	329	745
Ben Lomond spineflower	25	14	49	160	168	329	745
Ben Lomond wallflower			11	46	360	329	745
Ben Lomond buckwheat	25	10	49	190	142	329	745
Silverleaf manzanita	113		61	157	85	329	745

[1] **Species habitat assessment categories. Note that numbers may not sum due to rounding error.**

Observed: The species is known to utilize the area, based on prior records and/or observations made during the assessment.

High: The species is not known to occur in the area, but is likely to be present based on suitable habitat and/or occurrences in proximity.

Moderate: The species has an even probability of being present in the area as not

Low: The species has a low probability of being in the area due to current low habitat suitability; in some cases, fire, succession, or other natural processes could increase habitat suitability.

Not Expected: The species is unlikely to be present in the area due to currently unsuitable habitat; in some cases, fire, succession, or other natural processes could render the habitat more suitable.

Not Assessed: Area within the Alternative Sections survey area, which was subject only to a preliminary Sandhills assessment, during which individual species habitat was not assessed.

Table 11: Assessment of Species Habitat within the Alternative Sections Survey Areas

	Alternative Sections	
Species	Mount Hermon Rd	Quail Hollow Rd
Mount Hermon June beetle	Observed	Observed
Zayante band-winged grasshopper	Observed	Observed
Santa Cruz Kangaroo rat	Moderate	High
Ben Lomond spineflower	Observed	Observed
Ben Lomond wallflower	Observed	Observed
Ben Lomond buckwheat	Observed	Observed
Silverleaf manzanita	Observed	Observed

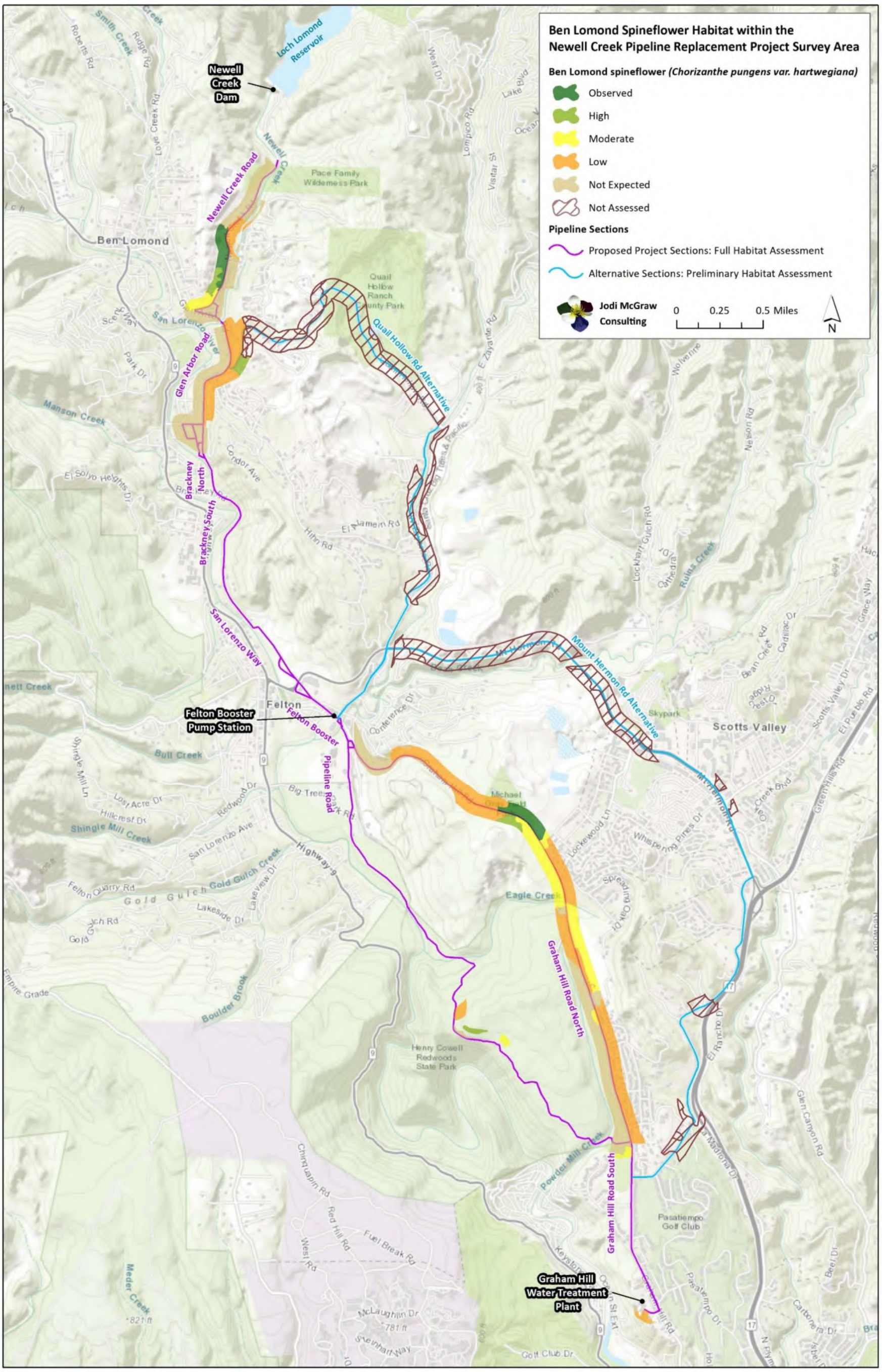

Figure 4: Ben Lomond Spineflower Habitat within the Proposed Project Survey Area

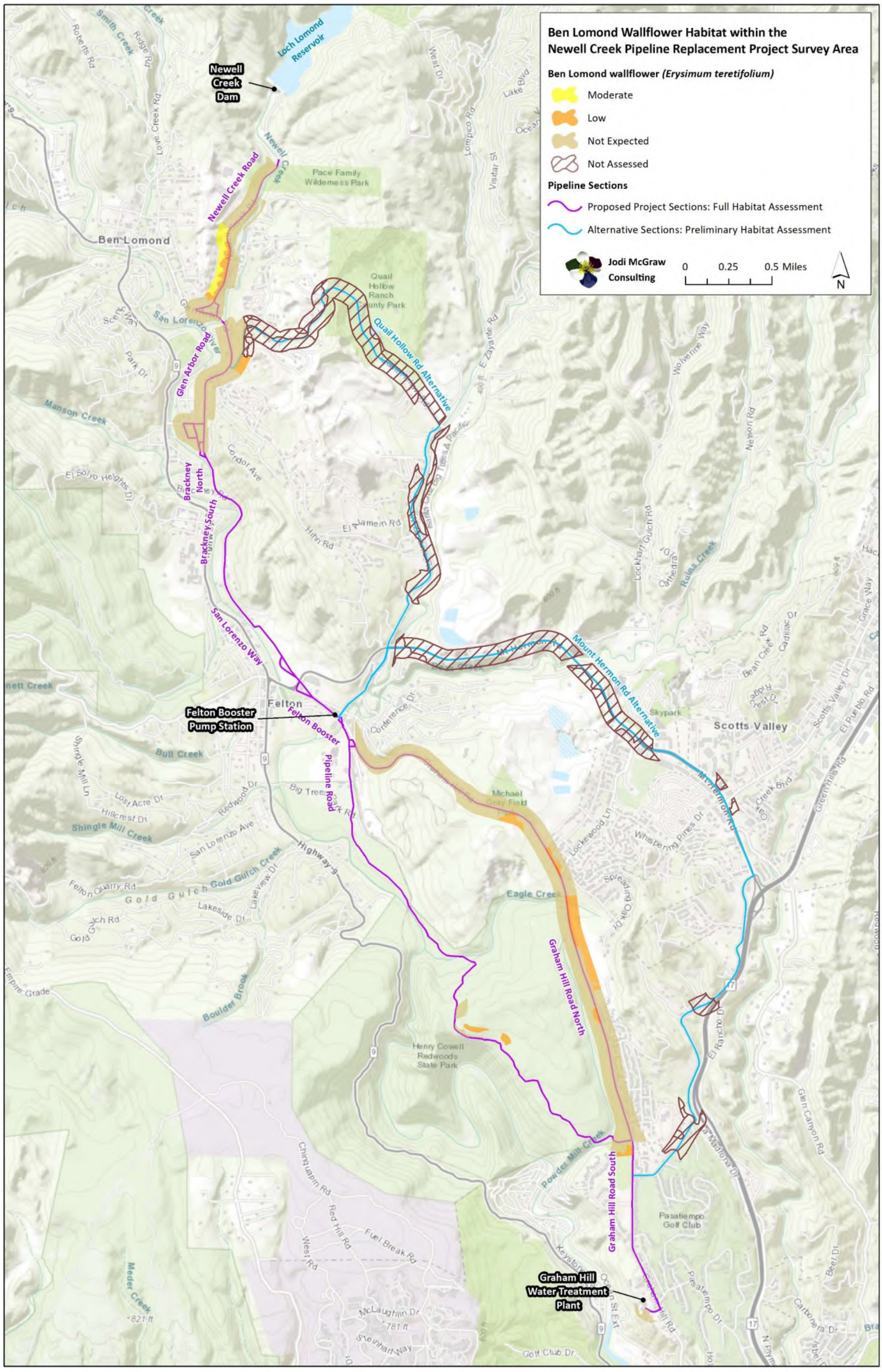

Figure 5: Ben Lomond Wallflower Habitat within the Proposed Project Survey Area

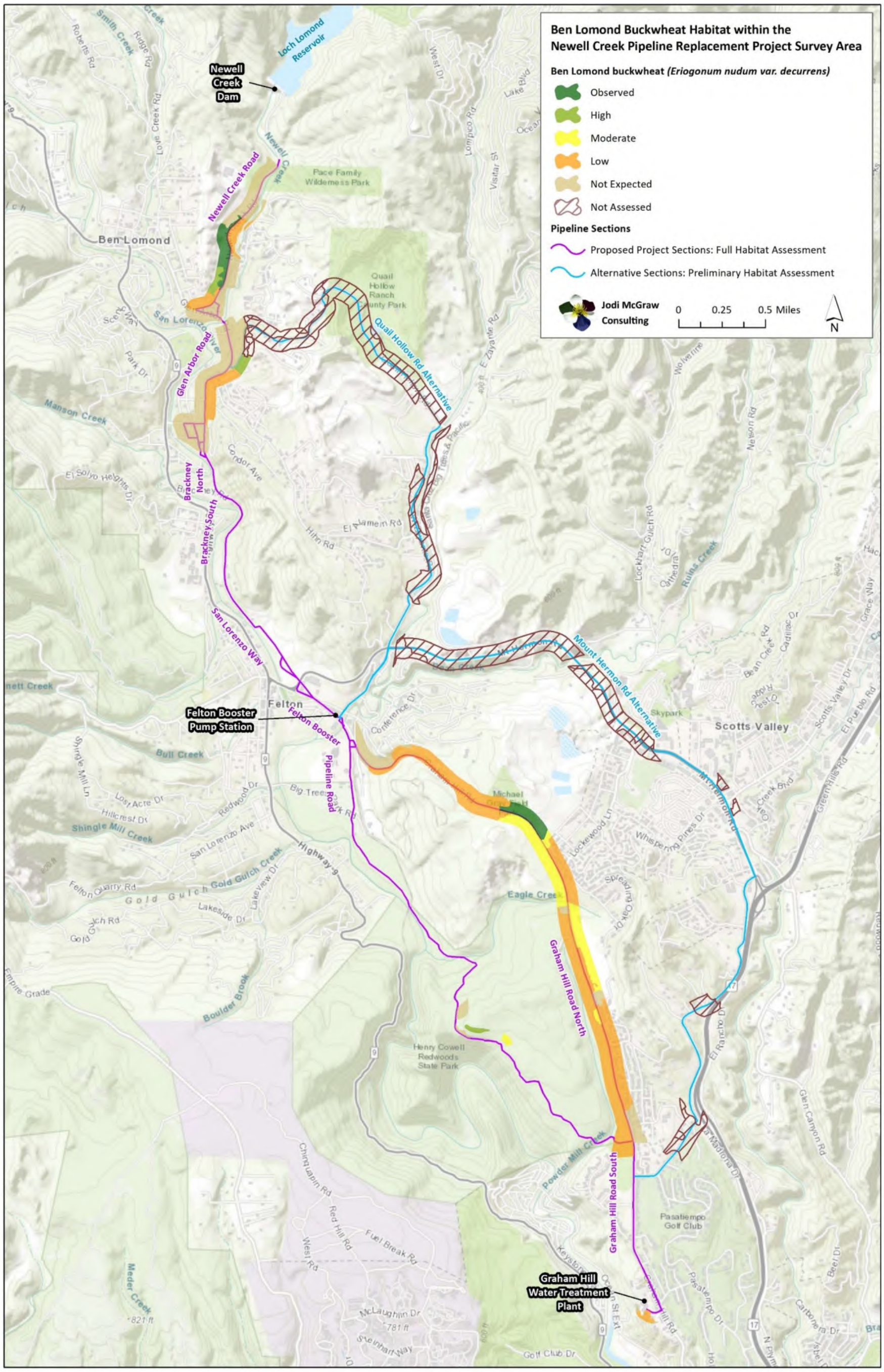

Figure 6: Ben Lomond Buckwheat Habitat within the Proposed Project Survey Area

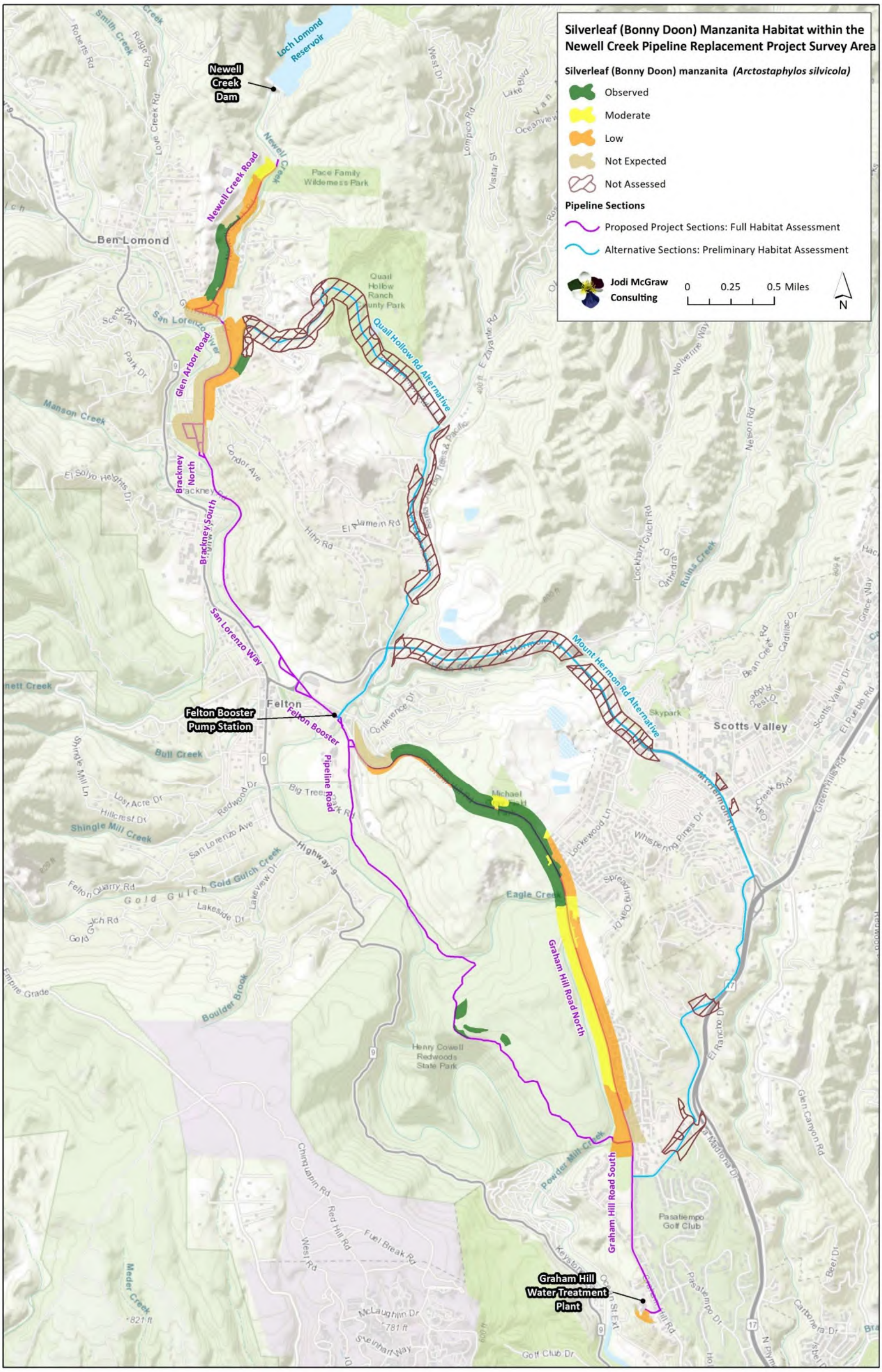

Figure 7: Silverleaf (Bonny Doon) Manzanita Habitat within the Proposed Project Survey Area

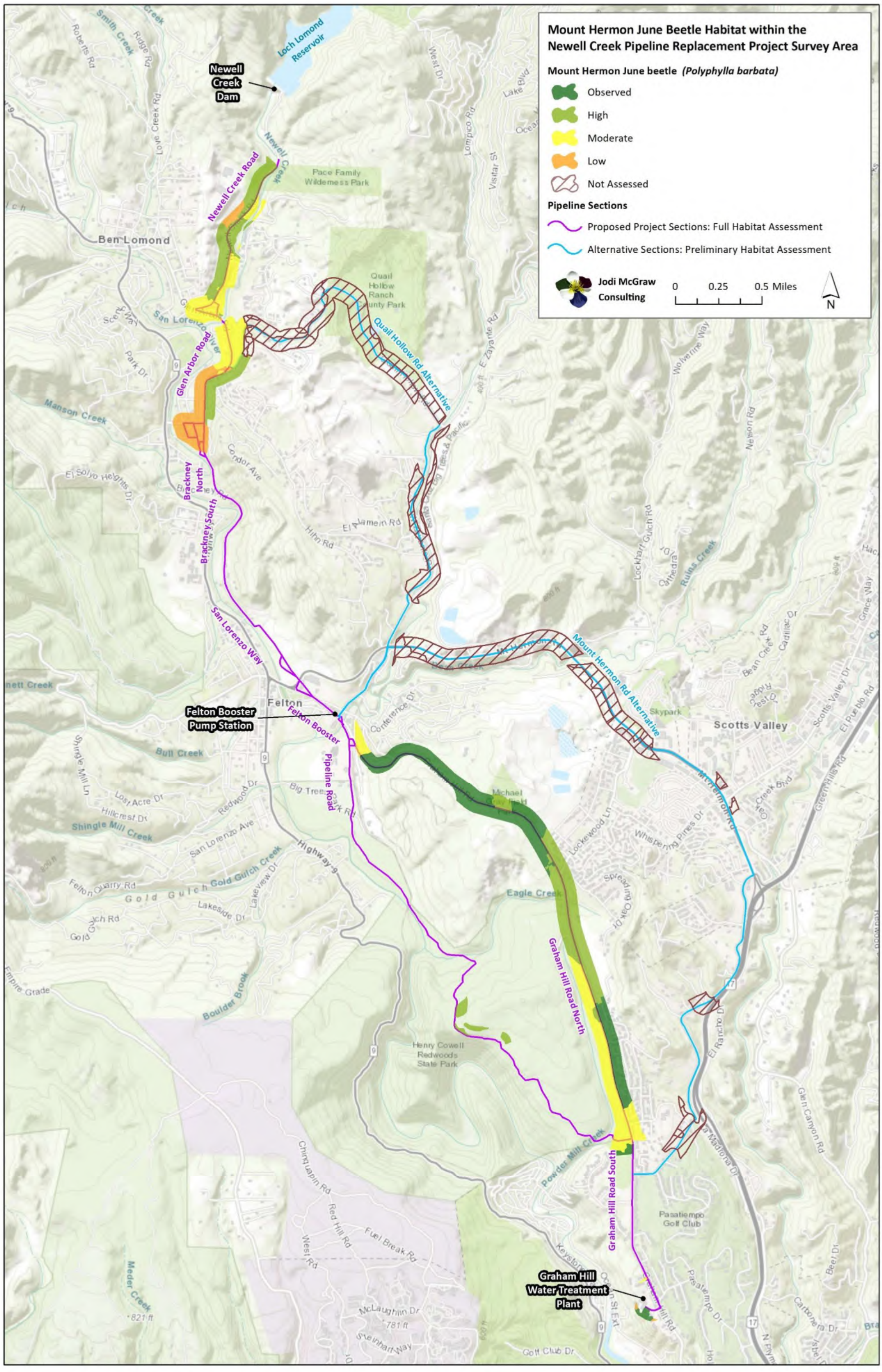

Figure 8: Mount Hermon June Beetle Habitat within the Proposed Project Survey Area

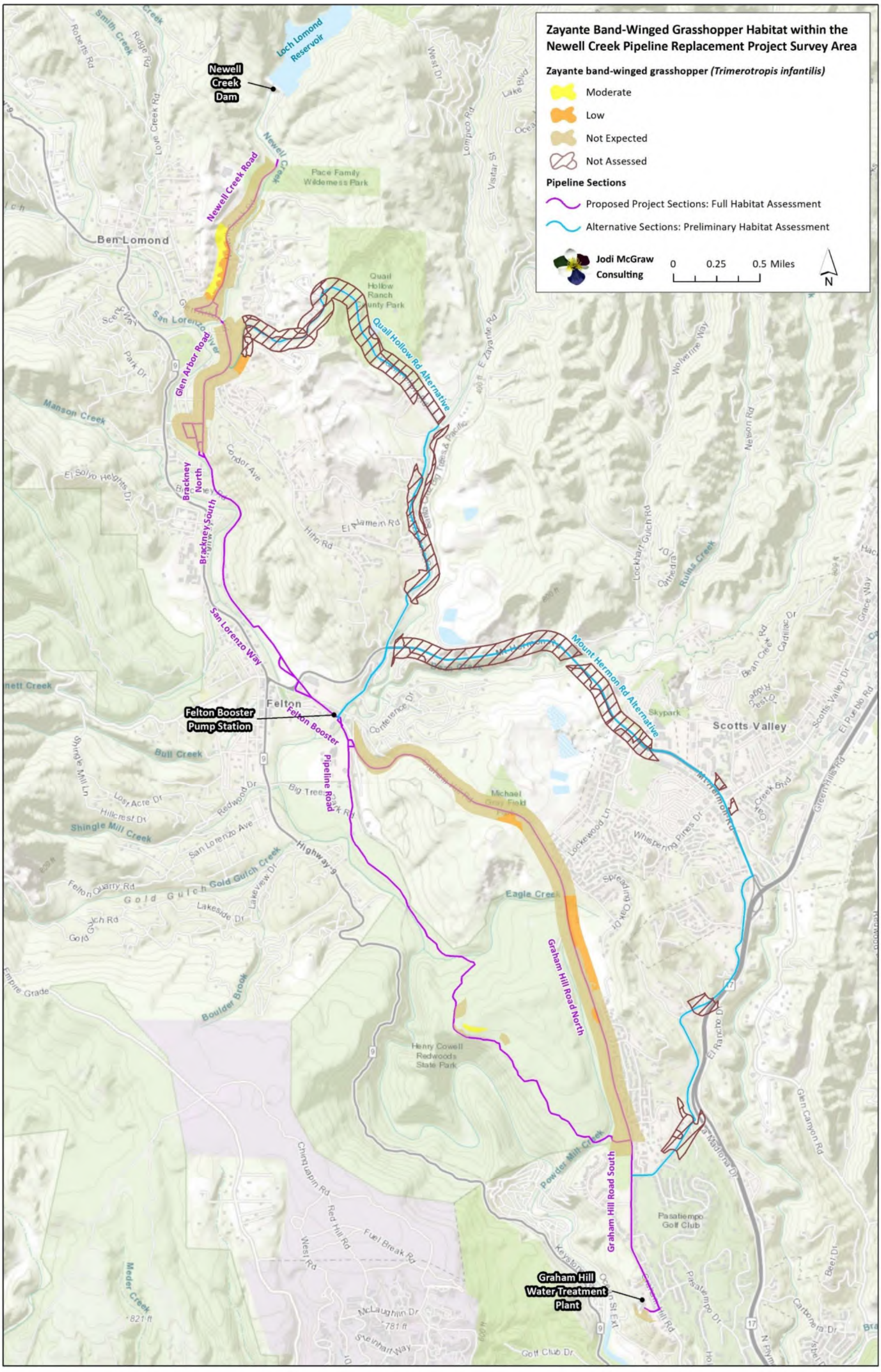

Figure 9: Zayante Band-Winged Grasshopper Habitat within the Proposed Project Survey Area

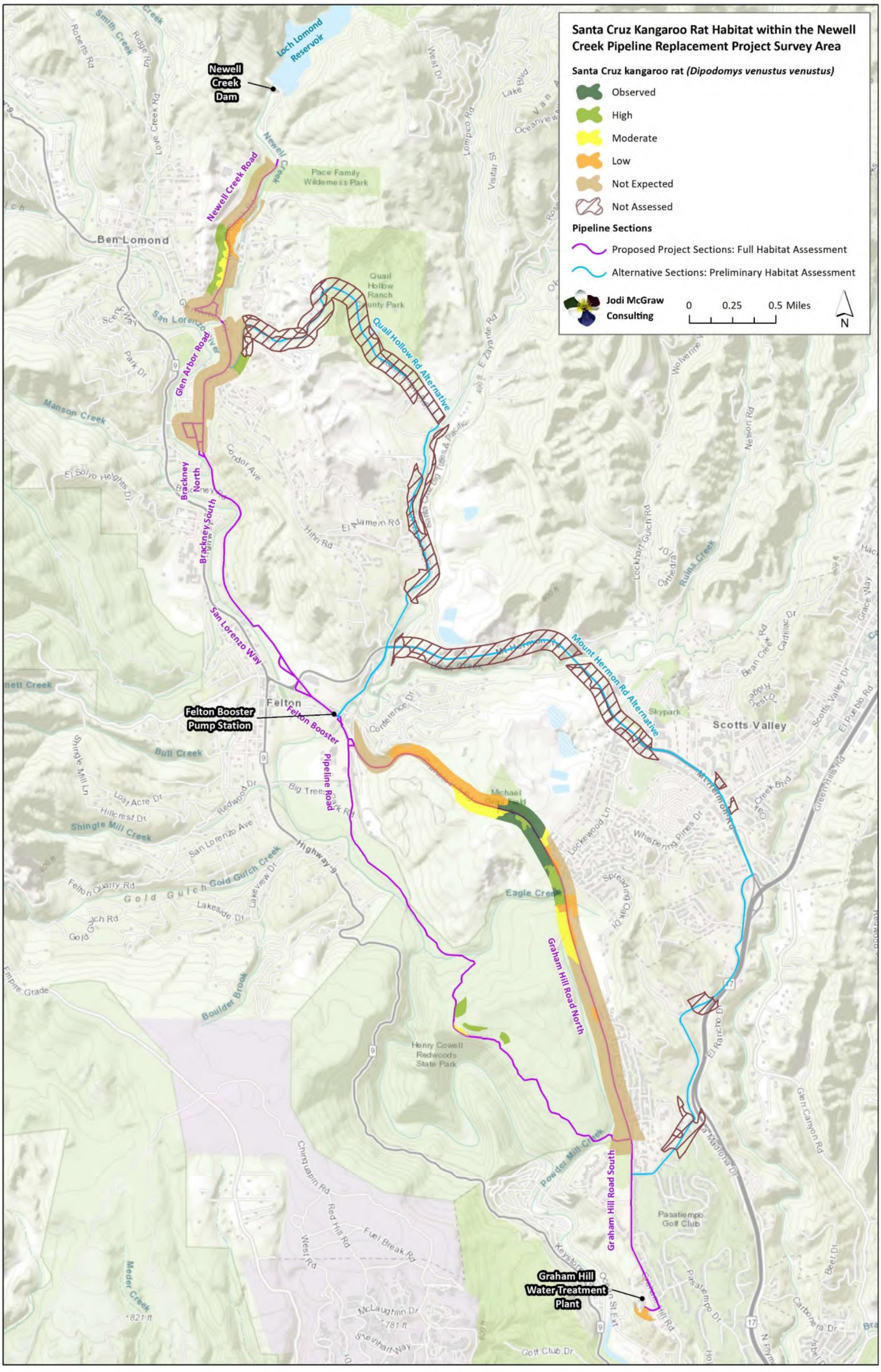

Figure 10: Santa Cruz Kangaroo Rat Habitat within the Proposed Project Survey Area

The following sections briefly describes the species and the occurrence of their habitat within the Proposed Project survey area, which is illustrated in Figures 4-10. It also briefly discusses their occurrence in the Alternative Sections survey area.

3.3.1 Plants

3.3.1.1 Ben Lomond Spineflower

3.3.1.1.1 Description and Status

Ben Lomond spineflower is a small annual herb of the buckwheat family (Polygonaceae). The species is endemic to the Sandhills where it primarily inhabits open, sparsely vegetated areas (McGraw and Levin 1998, McGraw 2004a,b) in sand parkland and gaps within the Sandhills chaparral, though can also be found at low abundance around the edges of trees or in canopy gaps in Sandhills woodlands and forests (McGraw 2004b, McGraw 2015). The disturbance-adapted species preferentially occurs in areas of natural disturbance, including slides, trails, and on gopher mounds, which maintain open canopy and soil conditions it requires (McGraw 2004a). As a result of its adaptation to disturbance, Ben Lomond spineflower also inhabits areas that have been modified by prior land use, including sand mines, residentially developed areas, and road turn outs (McGraw 2004b, USFWS et al. 2011). The Ben Lomond spineflower was listed as federally endangered on February 4, 1994 (USFWS 1994), Critical habitat has not been designated for the species, which has a California Rare Plant Rank of 1B.1 reflecting that the species is seriously threatened, with over 80% of occurrences are threatened (CNPS 2021).

3.3.1.1.2 Habitat in the Survey Area

Ben Lomond spineflower has been observed in the silverleaf manzanita chaparral and ponderosa pine forest in the Newell Creek Road Section and Graham Hill Road North Section, respectively (CDFW 2020, McGraw and Chrislock 2020, J. McGraw, pers. obs. 2021, Figure 4). The species is also known to occur in the Quail Hollow Road and Mount Hermon Road Alternative Sections. The rare annual has high potential to occur within patches of open habitat observed in the survey areas for the Glen Arbor Road and Pipeline Road sections but only moderate potential in the Graham Hill Road South Section survey area (Tables 10 and 11).

Because of its adaptation to disturbance, Ben Lomond spineflower has the potential to occur within the Proposed Project Work Area, including road turn outs in the road right-of-way that could be used for vehicle equipment and staging. A focal species survey would need to be conducted during the flowering season (April-June) to evaluate the species' occurrence within the Proposed Project Work Area.

3.3.1.2 Ben Lomond (Santa Cruz) Wallflower

3.3.1.2.1 Description and Status

A member of the mustard family (Brassicaceae), Ben Lomond wallflower is a biennial to short-lived perennial herb that forms a basal rosette of long, linear leaves. After two to three (rarely four) years, plants bolt and produce dense, terminal spikes (racemes) of four-petaled, yellow flowers; Ben Lomond wallflower fruits are long, slender capsules.

Endemic to the Sandhills, Ben Lomond wallflower is restricted to sandy soils of the Zayante series where the species primarily occurs in sand parkland, though it also inhabits sand chaparral gap associations adjacent to sand parkland and canopy gaps in Sandhills woodlands and forests (McGraw 2004a,b, McGraw 2015). Within these open canopy areas, Ben Lomond wallflower primarily occurs on recently or chronically disturbed areas, such as slides and along trail corridors (McGraw 2004a,b). While it can inhabit previously mined areas and cut slopes along road ways, the species is not frequently observed in residentially developed areas (USFWS et al. 2011).

Ben Lomond wallflower was listed as federally endangered on February 4, 1994 (USFWS 1994). Critical habitat has not been designated for the Ben Lomond wallflower, which has a California Rare Plant Rank of 1B.1 reflecting that the species is seriously threatened, with over 80% of occurrences are threatened (CNPS 2021).

3.3.1.2.2 Habitat in the Survey Area

Ben Lomond wallflower has not been previously observed in Proposed Project survey area, though it has moderate potential to occur in open habitat west of Newell Creek Road including the road cuts in the right-of-way (Table 10, Figure 5). The species has low potential to occur in open habitat within the Glen Arbor Road, Graham Hill Road (North and South), and Pipeline Road sections of the Proposed Project survey area (Table 10). Ben Lomond wallflower is known to inhabit the sand parkland, sand chaparral gaps, and cut slopes within the survey areas for the Quail Hollow and Mount Hermon Road Alternative Sections (Table 11).

Like Ben Lomond spineflower, Ben Lomond wallflower has the potential to occur in areas of open sand soil within the Proposed Project Work Area. The biennial/short-lived perennial is less commonly observed than the annual Ben Lomond spineflower in areas that are chronically disturbed, such as road turn outs, as too-frequent disturbance precludes reproduction; however, there is some limited potential for the species to be present in road cuts or other less frequently disturbed but open sand soil areas in the Proposed Project Work Area. A focal species survey would need to be conducted during the flowering season (April-June) to evaluate the species' occurrence within the Proposed Project Work Area.

3.3.1.3 Ben Lomond Buckwheat

3.3.1.3.1 Description and Status

Ben Lomond buckwheat (*Eriogonum nudum* var. *decurrens*) is a perennial herb or suffrutescent (subshrub) in the buckwheat family (Polygonaceae). Within the Sandhills, Ben Lomond buckwheat is found in both the sand parkland and canopy gaps in Sandhills chaparral (McGraw 2004b, McGraw 2015). In sand parkland, Ben Lomond buckwheat is preferentially found near the canopy edge but also occurs in open areas away from woody vegetation as well as underneath the canopy of ponderosa pines, which may increase soil moisture and reduce desiccation stress and thus facilitate survivorship of the perennial plant through the hot dry summers (McGraw 2004a,b).

Endemic to the Sandhills, the species has a California Rare Plant Rank of 1B.1, which reflects its serious endangerment resulting from its geographic range, habitat specificity, and multiple threats to remaining populations (CNPS 2021).

3.3.1.3.2 Habitat in the Survey Area

Ben Lomond buckwheat has been observed in the silverleaf manzanita chaparral along the Newell Creek Road Section and in the ponderosa pine forest along the Graham Hill Road North Section of the Proposed Project survey area (J. McGraw, pers. obs. 2021, Figure 5). The species also is known to occur in the survey areas for the Quail Hollow Road and Mount Hermon Road Alternative Sections. The rare annual has high potential to occur within patches of open habitat observed in the survey areas for the Glen Arbor Road and Pipeline Road sections, but only moderate potential in the survey area for the Graham Hill Road South Section (Tables 10 and 11, Figure 6).

Ben Lomond buckwheat was observed on road cuts and in road turn outs within and immediately adjacent to the Proposed Project Work Area within the Newell Creek Road and Graham Hill Road North sections (J. McGraw, pers. obs. 2021); the species has the potential to occur in similar open sandy habitat in the road right-of-way that could be used for vehicle equipment and staging. A focal species survey would need to be conducted, ideally during the species' flowering season (June - August), to fully evaluate its occurrence within the Proposed Project Work Area.

3.3.1.4 Silverleaf (Bonny Doon) Manzanita

Silverleaf manzanita is a large, evergreen shrub (1-6 m) in the heath family (Ericaceae), which is named for the grey-green color of its leaves. Silverleaf manzanita is one of the dominant species in the Sandhills, and a key indicator of the Sandhills ecosystem (Sections 2.4.1 and 2.4.2). Within the Sandhills, the species primarily occurs in Sandhills chaparral communities, including silverleaf manzanita chaparral; it also occurs at lower density in the mixed sand chaparral, which also supports crinite manzanita (*Arctostaphylos crustacea* spp. *crinita*), buck brush, chamise, yerba santa, and other chaparral shrubs (McGraw 2004b). As Sandhills chaparral communities are successional in the absence of fire (McGraw 2004b), silverleaf manzanita can be found at lower abundance in the understory of ponderosa pine forest, coast live woodland, and other forests and woodlands on Zayante sand soil, particularly in areas that are long unburned.

Endemic to the Sandhills, silverleaf manzanita has a California Rare Plant Rank of 1B.2, which reflects its fairly endangered as a result of its geographic range, habitat specificity, and multiple threats to remaining populations (CNPS 2021).

3.3.1.4.1 Habitat in the Survey Area

Silverleaf manzanita, which is a large conspicuous shrub that can be detected from aerial imagery, was observed as part of this study in all sections of the Proposed Project survey area featuring the Sandhills ecosystem, except Graham Hill Road South (Table 10, Figure 7); the species also was observed in the survey area for both Alternative Sections (Table 11).

Silverleaf manzanita grows in and adjacent to the Proposed Project Work Area, including in the road right-of-way. A focal species survey can be implemented to examine its specific distribution within the Project Work Area any time of the year.

3.3.2 Animals

3.3.2.1 Mount Hermon June Beetle

3.3.2.1.1 Description and Status

Mount Hermon June beetle is a member of the family Scarabaeidae (Insecta: Coleoptera) that occurs primarily in Sandhills communities on Zayante sand soil in central Santa Cruz County; the species has also been observed on sandy loam and loamy sand soils adjacent to Zayante soils (USFWS et al. 2011). Mount Hermon June beetle occurs in all Sandhills communities of varying successional stages, including ponderosa pine forest, silverleaf manzanita chaparral and other Sandhills chaparral, and Sandhills coast live oak woodlands as well as other Sandhills woodlands and forests, and sand parkland (McGraw and Jordan 2021). The endangered beetle has also been observed in areas where native Sandhills plant species have been removed, including those that are disturbed through development and that feature primarily ornamental or other non-native plant species (Arnold 2004).

Mount Hermon June beetle is univoltine (i.e., has only one generation per year) and largely fossorial. Larvae feed on roots of a variety of plants, as well as mycorrhizae (Hill and O'Malley 2009). They have been observed at depths of up to 2 meters and have been encountered beneath pavement (McGraw and Chrislock 2019). Adult males emerge from the soil at night between May and September to fly in search of mates. The Mount Hermon June beetle was listed as federally endangered on January 24, 1997 (USFWS 1997). Critical habitat has not been designated for this species.

3.3.2.1.2 Habitat in the Survey Area

Mount Hermon June beetle has been observed in the Proposed Project survey area along the Graham Hill Road North and Graham Hill Road South sections (CDFW 2020). The other sections of the Proposed Project, Glen Arbor Road, Newell Creek Road, and Pipeline Road, also traverse Sandhills habitat that is highly suitable for the species (Table 10, Figure 8). The Mount Hermon June beetle has also been observed along two Alternative Sections, Mount Hermon Road and Quail Hollow Road (Table 11; USFWS et al. 2011, CDFW 2020, McGraw 2021). Overall, Mount Hermon June beetle is likely to occur in portions of the Proposed Project Work Area that feature Zayante sand soil, including areas of transitional soils; the endangered beetle also has potential to occur on adjacent sandy loam and sandy loam soil. Within these soil types, the species can occur in all plant communities and other land cover types, including developed and disturbed areas, as well as paved areas.

3.3.2.2 Zayante Band-Winged Grasshopper

3.3.2.2.1 Description and Status

Zayante band-winged grasshopper is a member of the family Acrididae (Insecta: Orthoptera). The species is endemic to the Sandhills, where it occurs in open, sunlit areas that are sparsely vegetated (Arnold 2004). Zayante band-winged grasshopper is most commonly observed within sand parkland, particularly areas domianted by native forbs in sand parkland. However, Zayante band-winged grasshopper is also observed within canopy gaps in Sandhills chaparral communities, including silverleaf manzanita chaparral, particularly those adjacent to sand parkland (McGraw et al. 2020).

Zayante band-winged grasshopper was listed as federally endangered on January 24, 1997 (USFWS 1997). In 2001, the Service designated 10,560 acres in central Santa Cruz County within the known distribution of the Zayante band-winged grasshopper as critical habitat for the species. The primary constituent elements of critical habitat for the Zayante band-winged grasshopper are the presence of Zayante soils, the occurrence of Zayante Sandhills habitat, and the associated plant species, and certain microhabitat conditions, including areas that receive large amounts of sunlight, widely scattered tree and shrub cover, bare or sparsely vegetated ground, and loose sand (USFWS 2001).

3.3.2.2.2 Habitat in the Survey Area

The survey areas centered on the Newell Creek Road, Pipeline Road, and Graham Hill Road North sections of the Proposed Project feature open areas of silverleaf manzanita chaparral that is moderately suitable for Zayante band winged grasshopper; the Glen Arbor Road Section features habitat of low suitability while the species is not expected to occur along the Graham Hill Road South Section (Table 10, Figure 9). Zayante band-winged grasshopper has been observed in the Sandhills habitat within the survey areas along the Mount Hermon Road and Quail Hollow Road Alternative Sections (Table 11).

Within the Proposed Project Work Area, which is centered on the roads and features adjacent right-of-ways, Zayante band-winged grasshopper has some limited potential to occur within road turn outs on Zayante soil adjacent to suitable habitat; these areas feature loose sand soil and open canopies as well as sparse, primarily herbaceous vegetation that are suitable for this species.

3.3.2.3 Santa Cruz Kangaroo Rat

3.3.2.3.1 Description and Status

Santa Cruz kangaroo rat (*Dipodomys venustus venustus*) is five-toed, narrow-faced rodent in the family Heteromyidae. Though historically known from locations in the foothills of the Santa Cruz Mountains (Best 1992, Bolster 1998), the subspecies is currently only known to inhabit two areas: Mount Hermon atop Graham Hill Road in central Santa Cruz County (Bean 2004) and chaparral within the Sierra Azul Open Space Preserve in the Summit Area of the Santa Cruz Mountains (K. Hickman, pers. com. 2019). Within the Sandhills, Santa Cruz kangaroo rat is known primarily from silverleaf manzanita chaparral (Roest 1988, Bean 2004), though the species may also occur in adjacent areas of ponderosa pine forest that feature a significant shrub component. Santa Cruz kangaroo rats are nocturnal, granivorous, and inhabit underground burrows. The diet of the Santa Cruz kangaroo rat consists almost entire of the seeds of annual plants, which they collect during the summer and store in surface caches (Bean 2004).

Although not designated as a Species of Special Concern, Santa Cruz kangaroo rat is on the California Department of Fish and Wildlife's Special Animals List (CDFW 2019); the species is critically imperiled due to its limited distribution and abundance.

3.3.2.3.2 Habitat in the Survey Area

The Graham Hill Road North Section of the proposed project bisects the Santa Cruz kangaroo rat occurrence atop Mount Hermon, where the species has been trapped within Henry Cowell State Park on the south side of the road (Bean 2004) and in the County of Santa Cruz Juvenile Hall Parcel on the north

side of the Road (Biosearch Associates 2013). The survey areas along the Newell Creek Road, Glen Arbor Road, and Pipeline Road sections of the Proposed Project survey area all feature silverleaf manzanita chaparral habitat that is highly suitable for the species (Figure 10). The patches of Sandhills chaparral in the Mount Hermon Road Alternative Section survey area have moderate suitability for the species, while those along the Quail Hollow Road Alternative Section are highly suitable (Table 11).

Santa Cruz kangaroo rat could disperse within the Proposed Project Work Area, including the road and road right-of-way; habitat adjacent to the road may also features burrows for this species, which has been trapped near Graham Hill Road (Biosearch Associates 2013). The species was observed during installation of a water pipeline within a road atop Mount Hermon (J. McGraw, pers. obs. 2016).

4 Summary

The 1,618-acre Newell Creek Pipeline Replacement Project survey area, which includes both the survey areas for both the Proposed Project and Alternative Sections, feature a total of 745 acres within the Sandhills ecosystem (Table 8, Figure 2), which is defined based on the preserve of Zayante sand soil (Section 2.4.1). Of the total 745 acres of Sandhills ecosystem, 407 acres are in the Proposed Project survey area, where they are concentrated in the Graham Hill Road North Section, with smaller areas of Sandhills ecosystems also found in the Glen Arbor Road, Newell Creek Road, and Graham Hill Road South sections (Table 8, Figure 2). The remaining 329 acres of the Sandhills ecosystem mapped as part of this survey are within the Alternative Sections survey area contains (Table 8, Figure 2).

Sandhills Communities

The Proposed Project survey area features three main Sandhills communities, which were classified based on their structure and species composition and also characterized according to their conditions that can influences species habitat, including land use (Section 2.4.2, Tables 5 and 9, Figure 3).

1. **Silverleaf manzanita chaparral (Section 3.2.1):** 48 acres are dominated by shrubs including the Sandhills endemic silverleaf manzanita (*Arctostaphylos silvicola*). This form of northern maritime chaparral is a sensitive plant community (CDFW 2020) and a sensitive habitat (County of Santa Cruz 1994).
2. **Ponderosa pine forest (Section 3.2.2):** 221 acres feature forests that contain ponderosa pine (*Pinus ponderosa*) and associated hardwoods including primarily coast live oak (*Quercus agrifolia*) and Pacific madrone (*Arbutus menziesii*) in with an understory of shade-tolerant shrubs, vines, and ferns. Though Sandhills ponderosa pine forests are not classified in the *Manual of California Vegetation* (Sawyer et al. 2021) and, therefore, are not listed as a sensitive habitat (CDFW 2020), this unique community is recognized as a sensitive habitat and special forest by the County of Santa Cruz (1994).
3. **Coast live oak woodland (Section 3.2.3):** 142 acres support woodlands on Zayante soil that are dominated by coast live oak and feature primarily shade-tolerant vines and herbs in the understory. Located in mesic microsites including at the ecotone between Sandhills and other systems (e.g., riparian forests), these coast live oak woodlands feature different plant species composition than the more widespread coast live oak woodlands on loam soils in the region; they also support rare Sandhills species such as the Mount Hermon June beetle (Section 3.3.2.1). Like the Sandhills ponderosa pine forests, coast live oak woodlands in the Sandhills have not been previously characterized and therefore are not yet classified as sensitive natural communities (CDFW 2020); however, like all Sandhills habitat that support rare and endangered species, they meet the criteria for sensitive habitat by the County of Santa Cruz (1994).

The Alternative Sections survey area also features the three communities classified in the survey area for the Proposed Project, as well as other Sandhills community types, including sand parkland, which is extremely rare (~250 acres) and highly diverse and supports additional rare species (McGraw 2004b).

The Sandhills communities in the survey areas (Table 6) vary in the following conditions that can influence their use by rare Sandhills species: 1) 314 acres feature modifications due to prior land uses, including primarily development and road building; and 2) 156 acres support transitional and successional communities that occur on soils that are transitional between typical Zayante coarse sand

soil and loam soils and/or occur in areas that have been long unburned, where species that predominant on loam soils, including Pacific Douglas-fir (*Pseudotsuga menziesii*), have become established in the absence of fire. These conditions were characterized as part of the community mapping to aid evaluation of the rare species habitat (Table 9).

Sandhills Species

Five of the seven special-status Sandhills species evaluated as part of this assessment (Table 1) have been previously observed, and/or were observed during the course of this assessment, within the Proposed Project survey area (Table 10, Figures 4-10). The other two species, Ben Lomond wallflower and Zayante band-winged grasshopper, have moderate potential to occur within open silverleaf manzanita chaparral in a relatively small portion (11 and 16 acres, respectively) of the Newell Creek Road Section of the Proposed Project survey area (Figures 5 and 9). In addition, Zayante band-winged grasshopper has moderate potential to occur in a 2-acre area of recently burned Sandhills within the survey area along the Pipeline Road Section (Figure 9).

The Quail Hollow Road and Mount Hermon Road Alternative Sections both feature Sandhills habitat in which all Sandhills special-status species have been previously observed, *except* for the Santa Cruz kangaroo rat, which has moderate potential to occur in the Mount Hermon Road Alternative Section and high potential to occur in the Quail Hollow Road Alternative Section (Table 11).

The following briefly summarizes the results of the habitat assessment for the special-status Sandhills species, which are described in greater detail in the referenced sections.

- **Ben Lomond spineflower (Section 3.3.1.1):** This federally listed endangered annual plant endemic to the Sandhills inhabits canopy gaps in all three mapped Sandhills communities. The species has been previously observed and has moderate to high potential to occur in all of the Proposed Project survey area sections except Graham Hill Road South (Table 10, Figure 4). The species is known to occur in the Quail Hollow Road and Mount Hermon Road Alternative Sections (Table 11). Adapted to disturbance, it has high potential to occur within road turn outs and other areas of open Zayante sand soil in the Project Work Area.
- **Ben Lomond wallflower (Section 3.3.1.2):** This state and federally listed endangered biennial to short-lived perennial plant endemic to the Sandhills occurs primarily in sand parkland community, which does not occur in the Proposed Project survey area; however, it can also occur in canopy gaps within other Sandhills communities including silverleaf manzanita chaparral. The species has moderate potential to occur in the survey area along the Newell Creek Road Section (Table 10, Figure 5) and has been observed along the Alternative Sections (Table 11). Although adapted to disturbance, Ben Lomond wallflower is unlikely to inhabit road turn outs, though it may occur on road cuts and other less frequently disturbed areas of open Zayante sand soil in the Project Work Area.
- **Ben Lomond buckwheat (Section 3.3.1.3):** This rare (CRPR 1B.1) perennial plant endemic to the Sandhills occurs in all three mapped Sandhills communities in the Proposed Project survey area, where it is found in open areas as well as near shrubs and trees. Within the Proposed Project survey area, the species was observed within the Newell Creek Road and Graham Hill Road North sections during the assessment and has moderate potential to occur in the Glen Arbor Road section (Figure 6); Ben Lomond buckwheat has also been previously observed within the Quail Hollow Road and Mount Hermon Road Alternative Sections survey area (Table 11). Ben

Lomond buckwheat inhabits road cuts and road turn outs featuring Zayante sand soil within and adjacent to the Project Work Area.

- **Silverleaf manzanita (Section 3.3.1.4):** This rare (CRPR 1B.1) shrub endemic to the Sandhills dominates the silverleaf manzanita chaparral, and also occurs in the understory (albeit at lower abundance) in the ponderosa pine forest and (to a lesser extent) coast live oak woodland in the Proposed Project survey area. Silverleaf manzanita was observed during the assessment along all of the Proposed Project sections and Alternative Sections except Graham Hill Road South (Tables 10 and 11, Figure 7). Silverleaf manzanita grows in and adjacent to the road right-of-way within the Project Work Area.
- **Mount Hermon June beetle (Section 3.3.2.1)**: This federally listed endangered insect is endemic to the Sandhills, where it occurs throughout the full range of Sandhills communities as well as other land cover types, including developed areas; it has also been previously observed within sandy loam soils adjacent to the Sandhills. The fossorial beetle has been previously observed or has high potential to occur within the survey areas for all of the Proposed Project sections and Alternative Sections (Tables 10 and 11, Figure 8). It can occur in portions of the Project Work Area that are in or near the Sandhills ecosystem, including the unpaved areas adjacent to the road as well as underneath pavement, where larvae of the species follow roots on which they feed.
- **Zayante band-winged grasshopper (Section 3.3.2.2):** This federally listed endangered insect is endemic to the Sandhills, where it primarily inhabits the sand parkland community, canopy gaps in Sandhills chaparral communities adjacent to sand parkland, and other areas of open, loose sand soil that are sparsely vegetated by primarily herbaceous plants and subshrubs. Zayante band-winged grasshopper has moderate potential to occur in the Newell Creek Road section of the Proposed Project survey area, while the species inhabits habitat bisected by both the Quail Hollow Road and Mount Hermon Road Alternative Sections (Tables 10 and 11, Figure 9). Zayante band-winged grasshopper could disperse into areas of loose sand soil adjacent to the road including road turn outs in the Project Work Area where it occurs adjacent to occupied habitat.
- **Santa Cruz kangaroo rat (Section 3.3.2.3):** Endemic to shrublands in the Santa Cruz Mountains Bioregion, this exceptionally rare animal is known from only two locations, one of which is atop Mount Hermon between Felton and Scotts Valley. Occupied habitat for the species in this location is bisected by Graham Hill Road, which is part of the Proposed Project pipeline alignment (Table 10, Figure 10). The species has the potential to occur in the silverleaf manzanita chaparral community in and near the Project Work Area and was previously observed during installation of a prior water pipeline in this area.

This habitat assessment is provided to aid evaluation of the Proposed Project and its alternatives under the California Environmental Quality Act (CEQA). It can also be used to inform development of mitigations to reduce impacts of the project on sensitive biological resources of the Sandhills under CEQA and in compliance with the Federal Endangered Species Act. Specific recommendations will be developed as part of a subsequent phase of this project.

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Appendix C

Rare Plant Survey

RARE PLANT SURVEY FOR THE NEWELL CREEK PIPELINE IMPROVEMENT PROJECT: BRACKNEY NORTH, GRAHAM HILL ROAD NORTH, AND GRAHAM HILL ROAD SOUTH PIPELINE SECTIONS

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1 Introduction

1.1 Project

The City of Santa Cruz Water Department (City) is planning to implement the Newell Creek Pipeline Improvement Project, which will install a new pipeline to convey water from the Loch Lomond Reservoir to the Graham Hill Water Treatment Plant. Currently, water is conveyed from the Newell Creek Dam, which creates the reservoir, to the water treatment plant via the 9.25-mile Newell Creek Pipeline (Figure 1). The pipeline was constructed in 1960 and is reaching the end of its useful life; accordingly, the City has conducted a series of technical studies to evaluate replacement and/or rehabilitation alternatives.

Based on its prior analysis, the City proposes to replace 8.75 miles of the existing pipeline with a new 24-inch pipe. The pipeline would generally be installed underneath existing, paved roads, in the road right-of-way (ROW), existing City easements, or withing a new easement in the case of the Brackney North section. The proposed northern segment from Newell Creek Access Road Bridge to the Felton Booster Pump Station would generally follow the existing pipeline alignment, with a few short re-alignments to avoid crossing private property, except for one location in the Brackney North section; wherever possible, the new pipeline would be installed parallel to the existing pipeline, except in the Brackney North section. The proposed southern segment, which extends from the booster pump station to the water treatment plant, generally includes a new pipeline section along Graham Hill Road. Once the new pipeline is installed and the interconnections are made, the existing pipeline would be removed or abandoned in place (City of Santa Cruz 2021).

1.2 Pipeline Alignment

Although the proposed project alignment occurs largely within paved roads, portions of the alignment (e.g., Brackney North) occur within an unpaved City easement on private property. Moreover, the Project Work Area, which is where construction activities are anticipated to occur for three proposed pipeline segments (Brackney North, Graham Hill North, and Graham Hill South), includes unpaved areas adjacent to the paved roadway. This Project Work Area includes patches of native plant communities including coast live oak woodland, coast redwood forest, and riparian woodlands (Dudek 2021a) as well as outcroppings of Zayante sand soil which support the Santa Cruz Sandhills (Sandhills)—an endemic ecosystem in central Santa Cruz that supports several special-status plants and animals (McGraw 2021).

1.3 Rare Plant Survey Goal and Objectives

To assist the City with planning and permitting of the project, including preparation of the project Environmental Impact Report, Jodi McGraw Consulting (JMc) conducted a rare plant survey to evaluate the occurrence of special-status plant species within three of the pipeline alignments where project activities are anticipated to occur in earlier phases of project: Brackney North, Graham Hill North, and Graham Hill South. The proposed project includes multiple phases which will be implemented in later years; however, this rare plant survey was focused on the highest priority segments, which are stated above. For the purposes of this report, rare and special-status plant species are used interchangeably and include: 1) species designated as either rare, threatened, or endangered by the California Department of Fish and Wildlife (CDFW) or U.S. Fish and Wildlife Service (USFWS) and are protected under either California Endangered Species Act (CESA; CFCG 2050 et seq.) or Federal Endangered

Species Act (FESA; 16 USC 1531 et seq.); 2) species that are candidate species being considered or proposed for listing under CESA or FESA; 3) species that are included on the CDFW Special Vascular Plants, Bryophytes, and Lichens List (CDFW 2021a) or species with a California Rare Plant Rank (CRPR) of 1 or 2 in the California Native Plant Society's Inventory of Rare and Endangered Plants of California (CNPS Inventory; CNPS 2021); and/or 4) species given protection under the County's General Plan/Local Coastal Program and applicable ordinances.

The goal of this rare plant survey was to map the distribution and quantify the abundance of rare plant species within the Project Work Area for the three pipeline alignments, which collectively constitute the Survey Area. This survey was focused on the pipeline alignments with the highest priority for replacement out of the entire Newell Creek Pipeline - Brackney North, Graham Hill North, and Graham Hill South. The objectives of the survey were to:

1. **Identify target plant species:** Compile a list of the special-status plant species that have moderate to high potential to occur within the Survey Area based on a review of databases and spatial data, and prior assessments for the proposed project, including the plant communities map (Dudek 2021a) and Sandhills habitat assessment (McGraw 2021);
2. **Survey for rare plants**, throughout the period flowering period for the target species, based on their published phenologies and observations of reference sites (known occurrences);
3. **Map all special-status plants observed**, including target and non-target species, following mapping rules designed to facilitate accurate delineation of their occurrences using global positioning systems and geographic information systems technology;
4. **Assess the abundance of each species** in each mapped patch; and
5. **Compile a floristic species list** of all plants observed in each of the three alignments.

1.4 Report

The *Methods* (Section 2) outlines how survey objectives were achieved while the *Results* (Section 3) describes the findings. The information in this rare plant survey report can inform the City's efforts to plan and permit the project; specifically, it can aid in the evaluation of the proposed project and project alternatives under the California Environmental Quality Act (CEQA) and help inform development of mitigations to reduce impacts of the project on special-status plants.

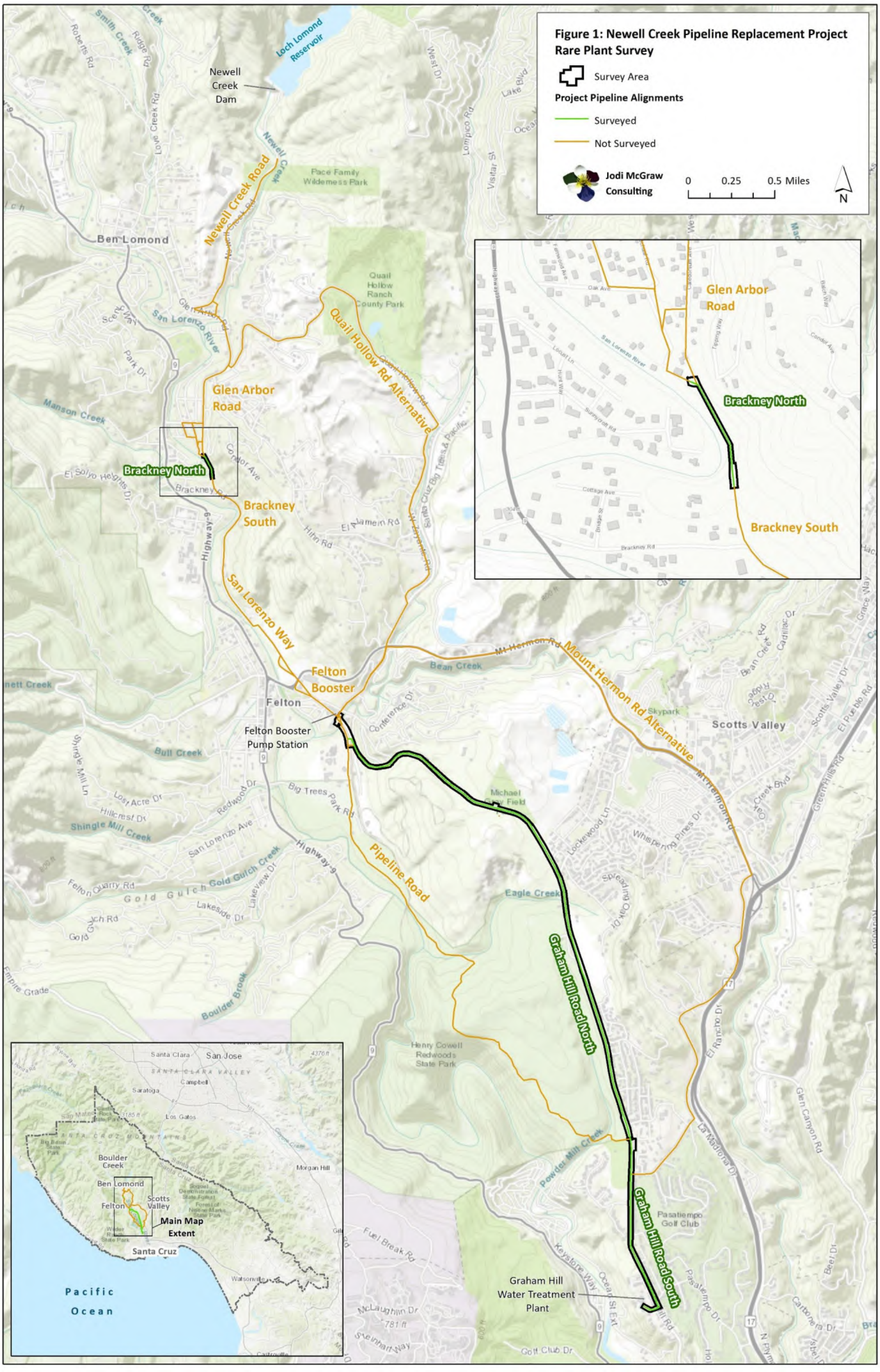

Figure 1: Newell Creek Pipeline Improvement Project Rare Plant Survey Area

2 Methods

2.1 Study Region

The Newell Creek Pipeline Improvement Project (Project) Area is located between the City of Santa Cruz to the south, the town of Ben Lomond to the north and west, and the City of Scotts Valley in the east (Figure 1).

2.2 Survey Area

The Survey Area for this rare plant survey was the Project Work Area for three pipeline alignments which totals 40.7 acres (Table 1). The Project Work Area (and thus Survey Area) captures the area around the project pipeline in which all construction activities, including grading, excavation, and staging would occur.

Table 1: Project Pipeline Sections subject to Rare Plant Survey

Pipeline Section	Length (feet)	Project Work Area/Survey Area (Acres)	% of Total Survey Area
Brackney North	734	0.3	0.7%
Graham Hill Road North	18,385	30.0	73.7%
Graham Hill Road South	5,866	10.5	25.7%
Total	**24,985**	**40.7**	**100.0%**

2.3 Target Species

A list of target rare plant species was initially identified for the survey in coordination with biologists from Dudek. First, Dudek biologists assembled a list of special-status plant species potentially occurring within the entire Newell Creek Pipeline Improvement Project, plus a 300-foot buffer on both sides of the proposed pipeline. This list was based on a comprehensive literature review and database search of the following sources: County of Santa Cruz Online GIS database (County of Santa Cruz 2021), the CDFW California Natural Diversity Database (CDFW 2021), the USFWS Inventory for Planning and Conservation (IPaC) database (USFWS 2021), the CNPS Inventory of Rare and Endangered Plants data (CNPS Inventory) (CNPS 2021), and the U.S. Department of Agriculture Web Soil Survey (USDA 1980). Each species was evaluated for its potential to occur in the Project Area based on its documented occurrences in the region, life history, and general habitat requirements. These species were then determined to have low, moderate, or high potential to occur; or were not expected to occur within the Project Area, based on the overall suitability of the habitat within the Project Area to support such species. The list and potential to occur determinations also reflected the prior Sandhills habitat assessment, which identified occurrences of special-status plants of the Sandhills within the entire Project Area (McGraw 2021).

Second, Jodi McGraw Consulting reviewed the overall project list of special-status plants with potential to occur in the overall NCP Project Area to identify those with potential to occur in the Survey Area. This target species list is identified in Table 2.

This target species list was used to focus the survey on the rare plants most likely to be observed; specifically, the target species list was used to inform the timing of surveys by evaluating the phenology of the target species in references sites (Section 2.4). However, all plant species were evaluated for their occurrence in the Survey Area as part of the floristic analysis (Section 2.5).

2.4 Reference Sites

To inform the timing of the surveys, reference sites for the target species were selected by using the CNDDB (CDFW 2021) and CalFlora (CalFlora 2021) to identify known occurrences of the rare plants. Where multiple occurrences were identified in Santa Cruz County, the occurrence with habitat most similar to that within the Survey Area, based on the abiotic conditions, plant community, and proximity, was selected. The designated reference sites were checked for the occurrence of target rare plants based on their flowering period (Table 2) and the results were used to time the surveys.

2.5 Surveys

The Survey Area was visually evaluated for the occurrence of rare plants including the target species as well as any other rare plant species. The surveys occurred during three timeframes designed to span the flowering season for the target species and most plant species in the region:

- Early Season: April 19, 21, and 22;
- Mid-Season: June 3 and 4; and
- Late-Season: July 14 and 15.

During each survey period, Dr. Jodi McGraw walked the Survey Area and compiled a list of plant species encountered (Appendix A). This list does not include ornamental plant species installed into landscaped areas, including along Graham Hill Road; instead it includes native and naturalized non-native plant species that occur in natural and semi-natural environments. During the June 3 survey, local bryologist Ken Kellman examined the Brackney site and identified moss samples collected by Jodi McGraw from the other pipeline alignments, which had far fewer bryophytes and lacked suitable habitat for the rare bryophytes targeted (Table 2). The locations of rare plant species were recorded using a GPS. These initial mapped locations were revisited for detailed mapping and assessment of abundance when the plant species were deemed to be maximally visible, based on their phenology.

2.6 Mapping

On April 26 and 27, the rare plant species encountered during the mid-April site visit were revisited to:

1. Map the locations of discrete patches; and
2. Quantify abundance of the plants within each patch.

Table 2: Target rare plant species with moderate to high potential to occur in the Project Work Area/Survey Area, showing Habitat and Reference Site Location and Observations (adapted from Dudek 2021b)

Species	Status (Federal/State/CRPR)	Primary Habitat Associations, Life Form, Flowering Period, and Elevation Range (feet)	Reference Site and Observations
Anderson's manzanita (*Arctostaphylos andersonii*)	None/None/1B.2	Broad-leafed upland forest, Chaparral, North Coast coniferous forest; openings, edges/perennial evergreen shrub/Nov–May/197–2,490	Perennial species that can be detected year-round
Silverleaf (Bonny Doon manzanita) (*Arctostaphylos silvicola*)	None/None/1B.2	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest; inland marine sands/perennial evergreen shrub/Jan–Mar/394–1,965	Perennial species that can be detected year-round
deceiving sedge (*Carex saliniformis*)	None/None/1B.2	Coastal prairie, Coastal scrub, Meadows and seeps, Marshes and swamps (coastal salt); mesic/perennial rhizomatous herb/June(July)/10–755	Checked Upper UCSC forested areas though not detected; species is perennial, however.
Ben Lomond spineflower (*Chorizanthe pungens* var. *hartwegiana*)	FE/None/1B.1	Lower montane coniferous forest (maritime ponderosa pine sandhills)/annual herb/Apr–July/295–2,000	Observed in flower April 2021 at Quail Hollow Quarry Conservation Areas
robust spineflower (*Chorizanthe robusta* var. *robusta*)	FE/None/1B.1	Chaparral (maritime), Cismontane woodland (openings), Coastal dunes, Coastal scrub; sandy or gravelly/annual herb/Apr–Sep/10–985	Observed in flower May 2021 along Ponza Lane (Soquel Hills Area)
tear drop moss (*Dacryophyllum falcifolium*)	None/None/1B.3	North Coast coniferous forest; carbonate/moss/N.A./	Perennial species that can be detected year-round
Ben Lomond buckwheat (*Eriogonum nudum* var. *decurrens*)	None/None/1B.1	Chaparral, Cismontane woodland, Lower montane coniferous forest (maritime ponderosa pine sandhills); sandy/perennial herb/June–Oct/164–2,620	Perennial species that can be detected year-round

Table 2: Target rare plant species with moderate to high potential to occur in the Project Work Area/Survey Area, showing Habitat and Reference Site Location and Observations (adapted from Dudek 2021b)

Species	Status (Federal/State/CRPR)	Primary Habitat Associations, Life Form, Flowering Period, and Elevation Range (feet)	Reference Site and Observations
Santa Cruz wallflower (*Erysimum teretifolium*)	FE/SE/1B.1	Chaparral, Lower montane coniferous forest; inland marine sands/perennial herb/Mar–July/394–2,000	Observed in flower April 2021 at Quail Hollow Quarry Conservation Areas
minute pocket moss (*Fissidens pauperculus*)	None/None/1B.2	North Coast coniferous forest (damp coastal soil)/moss/N.A./33–3,355	None needed (perennial)
Santa Cruz tarplant (*Holocarpha macradenia*)	FT/SE/1B.1	Coastal prairie, Coastal scrub, Valley and foothill grassland; often clay, sandy/annual herb/June–Oct/33–720	Observed in flower July 2021 at Arana Gulch
Kellogg's horkelia (*Horkelia cuneata* var. *sericea*)	None/None/1B.1	Closed-cone coniferous forest, Chaparral (maritime), Coastal dunes, Coastal scrub; sandy or gravelly, openings/perennial herb/Apr–Sep/33–655	Observed in flower April 2021 at Marshall Field (UCSC Upper Campus)
Point Reyes horkelia (*Horkelia marinensis*)	None/None/1B.2	Coastal dunes, Coastal prairie, Coastal scrub; sandy/perennial herb/May–Sep/16–2,475	Observed in flower April 2021 at Marshall Field (UCSC Upper Campus)
northern curly-leaved monardella (*Monardella sinuata* ssp. *nigrescens*)	None/None/1B.2	Chaparral (SCR Co.), Coastal dunes, Coastal scrub, Lower montane coniferous forest (SCR Co., ponderosa pine sandhills); Sandy./annual herb/(Apr)May–July(Aug–Sep)/0–985	Observed in flower June 2021 at Quail Hollow Quarry Conservation Areas
woodland woolythreads (*Monolopia gracilens*)	None/None/1B.2	Broad-leafed upland forest (openings), Chaparral (openings), Cismontane woodland, North Coast coniferous forest (openings), Valley and foothill grassland; Serpentine/annual herb/(Feb)Mar–July/328–3,935	Checked Quail Hollow Ranch County Park Woodrat Trail April and May 2021; not detected, however.

Table 2: Target rare plant species with moderate to high potential to occur in the Project Work Area/Survey Area, showing Habitat and Reference Site Location and Observations (adapted from Dudek 2021b)

Species	Status (Federal/State/CRPR)	Primary Habitat Associations, Life Form, Flowering Period, and Elevation Range (feet)	Reference Site and Observations
Choris' popcornflower (*Plagiobothrys chorisianus* var. *chorisianus*)	None/None/1B.2	Chaparral, Coastal prairie, Coastal scrub; mesic/annual herb/Mar–June/10–525	Checked Moore Creek Preserve, Woods Cove Preserve, and Marshall Field; not detected, however.
San Francisco popcornflower (*Plagiobothrys diffusus*)	None/SE/1B.1	Coastal prairie, Valley and foothill grassland/annual herb/Mar–June/197–1,180	Observed in flower in May 2021 at Marshall Field.

No other rare plant species were encountered during the mid-season and late-season assessments; as a result, no additional mapping occurred.

On April 26 and 27, the area in which the rare plants were previously recorded during the surveys (Section 2.5) was carefully walked and the patches were mapped using the following mapping rules, which were designed to precisely delineate patches.

All rare plants of the same species within 4 meters (m) of each other were operationally defined as being in the same patch. Patches occupying less than a 1 m^2 area were mapped using point features, for which the actual dimensions were recorded. Patches greater than 1 m^2 were mapped as convex polygons using the GPS, by collecting vertices to capture the outer boundaries of the patch.

Abundance was assessed using a census (complete count). For perennial species, the count was conducted by life stage:

1. **Seedling:** first year plant (plant that established during the current growing season);
2. **Juvenile:** plant that is not a first-year plant and is not reproductive;
3. **Adult:** plant that features flowers or fruits or has reproduced in the past (as evidenced by prior reproductive structures).

Silverleaf manzanita, Bonny Doon manzanita, (*Arctostaphylos silvicola*) grows through a process known as layering, in which later branches become rooted, which can make it difficult to differentiate and account individuals, particularly where they occur with overlapping canopies. The number of adults was determined by tracing branches back to the main origin (trunk); however, there may be some error in the census as a result of this.

Additionally, silverleaf manzanita hybridizes with other manzanitas, including crinite manzanita (*A. crustacea* ssp. *crinita*)—a burl forming species with which silverleaf manzanita, an obligate seeding species, co-occurs in the Survey Area. When other vegetative characteristics, including most notably the presence of hairs (bristles) on the leaves and stems were intermediate or variable, plants lacking a visible burl were counted as *A. silvicola* whereas plants with a burl were considered *A. crustacea* ssp. *crinita*.

3 Results

3.1 Rare Species

Two rare plant species were encountered during the survey of the Graham Hill Road North Project Area :

- Ben Lomond spineflower (*Chorizanthe pungens* var. *hartwegiana*); and
- Silverleaf (Bonny Doon) manzanita (*Arctostaphylos silvicola*).

In addition, Ben Lomond buckwheat (*Eriogonum nudum* var. *decurrens*) was observed in two locations just 35 feet north of the Graham Hill Road North Project Work Area/Survey Area.

No rare plants were observed in the Graham Hill Road South or Brackney North project areas.

Across the entire Survey Area, a total of 215 plant species were observed (Appendix A).

3.2 Distribution and Abundance

The two rare plant species were observed along a 4,094-foot-long portion of the Graham Hill Road North Alignment spanning just west of 3650 Graham Hill Road to the northwest and 3000 Graham Hill Road to the southeast (Figures 2-1 through 2-5). This portion of the project alignment traverses Zayante sand soil which supports Sandhills plant communities, to which the rare species are endemic.

The following sections describe the number and size of patches as well as the abundance (count) of plants of each of the species within the Project Work Area/Survey Area. It is important to note that the patches mapped are oftentimes part of larger patches that extend outside of the Project Work Area/Survey Area, just beyond which there are additional unmapped occurrences as well.

3.2.1 Ben Lomond Spineflower

Ben Lomond spineflower was observed in 10 patches totaling just 294 square feet. Patches were small, ranging between 0.0064 square feet (sf) and 146 sf, and averaging just 29 sf. They occurred in canopy gaps between established shrubs and trees, and in turn outs along Graham Hill Road.

The patches featured a total of approximately 1,320 flowering (adult) plants (Table 3). Patches featured between 1 and 470 plants, with an average of 132 plants (Std. Dev. = 177.5; Appendix B).

Table 3: Rare plants patches in the Survey Area

	Number of	Patch Area (sf)				Number of Plants			
Species	Patches	Total	Mean	Minimum	Maximum	Total	Seedlings	Juveniles	Adults
Ben Lomond spineflower	10	294	29	0.0064	146	1,320	0	0	1,320
Silverleaf Manzanita	32	13,360	418	0.2085	2,132	125	2	10	113
Total	42	13,654	325	0.0064	2,132	1,445	2	10	1,433

Figure 2-1: Rare Plants within the Newell Creek Pipeline Improvement Project Survey Area

Figure 2-2: Rare Plants within the Newell Creek Pipeline Improvement Project Survey Area

Figure 2-3: Rare Plants within the Newell Creek Pipeline Improvement Project Survey Area

Figure 2-4: Rare Plants within the Newell Creek Pipeline Improvement Project Survey Area

Figure 2-5: Rare Plants within the Newell Creek Pipeline Improvement Project Survey Area

Ben Lomond spineflower is a small annual herb of the buckwheat family (Polygonaceae). The species is endemic to the Sandhills where it primarily inhabits open, sparsely vegetated areas (McGraw and Levin 1998, McGraw 2004a,b) in sand parkland and gaps within the Sandhills chaparral, though can also be found at low abundance around the edges of trees or in canopy gaps in Sandhills woodlands and forests (McGraw 2004b, McGraw 2015). This disturbance-adapted species preferentially occurs in areas of natural disturbance, including slides, trails, and on gopher mounds, which maintain the open canopy and soil conditions it requires (McGraw 2004a). As a result of its adaptation to disturbance, Ben Lomond spineflower also inhabits areas that have been modified by prior land use, including sand mines, residentially developed areas, and road turn outs (McGraw 2004b, USFWS et al. 2011). The Ben Lomond spineflower was listed as federally endangered on February 4, 1994 (USFWS 1994). Critical habitat has not been designated for the species, which has a California Rare Plant Rank of 1B.1 reflecting that the species is seriously threatened in California, with over 80% of occurrences that are threatened (CNPS 2021).

3.2.2 Silverleaf Manzanita

Silverleaf manzanita was observed in a total of 32 patches which total 13,360 sf. Patch size ranged from just 0.2085 sf to 2,132 sf, with an average of 418 sf (Table 3). The patches contain a total of 125 individuals of which 113 were adults, 10 were juveniles, and 2 were seedlings.

Silverleaf manzanita is a large, evergreen shrub (1-6 m) in the heath family (Ericaceae), which is named for the grey-green color of its leaves. Silverleaf manzanita is one of the dominant species in the Sandhills, and a key indicator of the Sandhills ecosystem (McGraw 2004b). Within the Sandhills, the species primarily occurs in Sandhills chaparral communities, including silverleaf manzanita chaparral; it also occurs at lower density in the mixed sand chaparral, which also supports crinite manzanita (*Arctostaphylos crustacea* spp. *crinita*), buck brush, chamise, yerba santa, and other chaparral shrubs (McGraw 2004b). As Sandhills chaparral communities are successional in the absence of fire (McGraw 2004b), silverleaf manzanita can be found at lower abundance in the understory of ponderosa pine forest, coast live oak woodland, and other forests and woodlands on Zayante sand soil, particularly in areas that are long unburned.

Endemic to the Sandhills, silverleaf manzanita has a California Rare Plant Rank of 1B.2, which reflects its fairly endangered in California, with 20% to 80% of occurrences that are threatened, as a result of its geographic range, habitat specificity, and multiple threats to remaining populations (CNPS 2021).

4 Summary and Conclusions

The Project Work Area for the Graham Hill Road North alignment supports Ben Lomond spineflower, a federally listed endangered and CRPR 1B.1 annual plant, and silverleaf manzanita (Bonny Doon manzanita), a shrub designated CRPR 1B.2. The two rare plant species occur along a 4,094-foot-long portion of the pipeline alignment that traverses the Santa Cruz Sandhills; the patches were observed just west of 3650 Graham Hill Road in the northwest and 3000 Graham Hill Road in the southeast (Figures 2-1 to 2-5).

Ben Lomond spineflower occupies 10 patches totaling 294 square feet, which contain a total of 1,320 individuals. Silverleaf manzanita was mapped in 32 patches totaling 13,360 sf, which featured 125 individuals: 113 adults, 10 juveniles, and 2 seedlings.

These plants, which are endemic to the Santa Cruz sandhills ecosystem, occur with a much broader distribution atop the Mount Hermon area that is traversed by the pipeline, including additional area just beyond the Work Area/Survey Area; that is, many of the mapped patches extend further away from the paved roadway in which the pipeline is located. Ben Lomond buckwheat was observed in two locations just 35 feet north of the Project Work Area. These and other sandhills rare plants may also occur as dormant seed in the soil (i.e., the soil seed bank).

No other rare plant species, including the other 14 target plant species (Table 2), were observed in the Project Work Area/Survey Area, which featured a total of 215 native and naturalized non-native plant species (Appendix A). The Survey Area also features additional ornamental plant species in landscaped areas. There is some potential that additional target or other rare species occur below ground in the soil seed bank, evading detection during this survey. Some of the target species, such as Santa Cruz wallflower, are disturbance-adapted and establish following fire or other natural or anthropogenic factors that removes established vegetation, frees-up resources, and/or promotes seed germination (McGraw 2004a).

The survey occurred in the second of two years of below-average rainfall. In Boulder Creek California, 2019-20 saw just 21.4 inches of rain, which is just 42% of the average 51.5 inches per year; 2020-21 received just 17 inches (33% of average; SLVWD 2021). Such drought conditions can limit establishment and survivorship of rare plants, particularly annual plants.

Roadside mowing may have also reduced the ability to detect rare plants in the Graham Hill Road North alignment Work Area. The April surveys were initiated just as the County of Santa Cruz Public Works Department initiated mowing along Graham Hill Road. The April survey occurred before the mowing occurred in all areas except an approximately 0.25-mile long stretch of the southern portion of the Graham Hill Road North alignment, where crews had mowed prior to initiation of the survey. Mowing could have precluded detection of plants there as well as elsewhere in subsequent surveys (early June and mid-July) by removing the established plants.

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Appendix A: Plant Species List

Table A-1: Plant species observed during the survey. Exotic vascular plant species shown in bold font.

Section	Family	Scientific Name	Common Name
Mosses	Bryaceae	*Rosulabryum* sp.	
Mosses	Orthotrichaceae	*Orthotrichum* sp.	
Mosses	Leptodontaceae	*Alsia californica*	
Mosses	Brachytheciaceae	*Homalothecium arenarium*	
Mosses	Grimmiaceae	*Grimmia trichophylla*	
Mosses	Dicranaceae	*Dicranoweisia cirrata*	
Mosses	Leskeaceae	*Claopodium whippleanum*	
Mosses	Pottiaceae	*Didymodon vinealis*	
Mosses	Pottiaceae	*Syntrichia laevipila*	
Mosses	Pottiaceae	*Timmiella crassinervis*	
Mosses	Pottiaceae	*Weissia controversa*	
Mosses	Brachytheciaceae	*Brachythecium albicans*	
Mosses	Brachytheciaceae	*Scleropodium touretii*	
Mosses	Brachytheciaceae	*Scleropodium californicum*	
Mosses	Brachytheciaceae	*Homalothecium nuttallii*	
Mosses	Orthotrichaceae	*Orthotrichum coulteri*	
Mosses	Lembophyllaceae	*Isothecium cristatum*	
Mosses	Leucodontaceae	*Nogopterium gracile*	
Mosses	Leucodontaceae	*Antitrichia californica*	
Mosses	Bryaceae	*Gemmabryum kunzei*	
Mosses	Leptodontaceae	*Alsia californica*	
Mosses	Cryphaeaceae	*Dendroalsia abietina*	
Mosses	Polytrichaceae	*Atrichum selwynii*	
Mosses	Mielichoferiaceae	*Epipterygium tozeri*	
Liverworts	Aytoniaceae	*Cryptomitrium tenerum*	
Liverworts	Targioniaceae	*Targionia hypophylla*	
Ferns	Dennstaedtiaceae	*Pteridium aquilinum* var. *pubescens*	bracken fern
Ferns	Dryopteridaceae	*Dryopteris arguta*	coastal wood fern
Ferns	Dryopteridaceae	*Polystichum munitum*	western sword fern
Ferns	Equisetaceae	*Equisetum telmateia ssp. braunii*	giant horsetail
Ferns	Polypodiaceae	*Polypodium calirhiza*	nested polypody
Ferns	Polypodiaceae	*Polypodium glycyrrhiza*	licorice fern
Ferns	Pteridaceae	*Pellaea andromedifolia*	coffee fern
Ferns	Pteridaceae	*Pellaea mucronata var. mucronata*	bird's-foot fern
Ferns	Pteridaceae	*Pentagramma triangularis*	goldback fern

Table A-1: Plant species observed during the survey. Exotic vascular plant species shown in bold font.

Section	Family	Scientific Name	Common Name
Gymnosperms	Cupressaceae	*Sequoia sempervirens*	coast redwood
Gymnosperms	Pinaceae	*Pinus ponderosa* var. *pacifica*	Bentham's pine
Gymnosperms	Pinaceae	*Pseudotsuga menziesii var. menziesii*	Douglas-fir
Magnoliids	Lauraceae	*Umbellularia californica*	California bay
Eudicots	Adoxaceae	Sambucus nigra ssp. caerulea	blue elderberry
Eudicots	Aizoaceae	***Carpobrotus edulis***	Hottentot fig
Eudicots	Anacardiaceae	*Toxicodendron diversilobum*	western poison oak
Eudicots	Apiaceae	***Anthriscus caucalis***	bur-chervil
Eudicots	Apiaceae	***Conium maculatum***	poison hemlock
Eudicots	Apiaceae	*Osmorhiza berteroi*	sweet cicely
Eudicots	Apiaceae	*Sanicula crassicaulis var. crassicaulis*	Pacific sanicle, gambleweed
Eudicots	Apiaceae	***Torilis arvensis***	high sock-destroyer
Eudicots	Apiaceae	***Torilis nodosa***	short sock-destroyer
Eudicots	Apocynaceae	***Vinca major***	greater periwinkle
Eudicots	Araliaceae	***Hedera helix***	English ivy
Eudicots	Asteraceae	*Adenocaulon bicolor*	trail plant
Eudicots	Asteraceae	*Anisocarpus madioides*	woodland tarweed
Eudicots	Asteraceae	*Artemisia douglasiana*	mugwort
Eudicots	Asteraceae	*Baccharis pilularis ssp. consanguinea*	coyote brush
Eudicots	Asteraceae	***Carduus pycnocephalus ssp. pycnocephalus***	Italian thistle
Eudicots	Asteraceae	***Cirsium vulgare***	bull thistle
Eudicots	Asteraceae	*Corethrogyne filaginifolia*	common sand aster
Eudicots	Asteraceae	*Ericameria ericoides*	mock heather, California goldenbush
Eudicots	Asteraceae	*Heterotheca grandiflora*	telegraph weed
Eudicots	Asteraceae	*Heterotheca sessiliflora ssp. bolanderi*	Bolander's golden aster
Eudicots	Asteraceae	*Hieracium albiflorum*	white hawkweed
Eudicots	Asteraceae	***Hypochaeris glabra***	smooth cat's-ear
Eudicots	Asteraceae	***Hypochaeris radicata***	rough cat's-ear
Eudicots	Asteraceae	***Lactuca serriola***	prickly lettuce
Eudicots	Asteraceae	***Lactuca virosa***	wild lettuce
Eudicots	Asteraceae	*Layia platyglossa*	tidy-tips
Eudicots	Asteraceae	*Madia sativa*	coast tarweed
Eudicots	Asteraceae	*Matricaria discoidea*	pineapple weed
Eudicots	Asteraceae	***Pseudognaphalium luteoalbum***	weedy cudweed
Eudicots	Asteraceae	***Senecio sylvaticus***	woodland ragwort
Eudicots	Asteraceae	***Senecio vulgaris***	common groundsel

Table A-1: Plant species observed during the survey. Exotic vascular plant species shown in bold font.

Section	Family	Scientific Name	Common Name
Eudicots	Asteraceae	*Solidago velutina ssp. californica*	California goldenrod
Eudicots	Asteraceae	***Sonchus asperssp. asper***	prickly sow thistle
Eudicots	Asteraceae	***Taraxacum officinale***	common dandelion
Eudicots	Betulaceae	*Corylus cornuta ssp. californica*	California hazelnut
Eudicots	Boraginaceae	*Adelinia grande*	Pacific hound's- tongue
Eudicots	Boraginaceae	*Johnstonella micromeres*	minute-flowered cryptantha
Eudicots	Boraginaceae	***Myosotis latifolia***	broadleaved forget-me-not
Eudicots	Boraginaceae	*Plagiobothrys chorisianus var. hickmanii*	Hickman's popcornflower
Eudicots	Brassicaceae	***Brassica nigra***	black mustard
Eudicots	Brassicaceae	*Cardamine oligosperma*	popweed
Eudicots	Brassicaceae	***Lobularia maritima***	sweet alyssum
Eudicots	Brassicaceae	*Nasturtium officinale*	watercress
Eudicots	Brassicaceae	***Raphanus sativus***	radish
Eudicots	Brassicaceae	***Sisymbrium orientale***	oriental hedge mustard
Eudicots	Caprifoliaceae	*Lonicera hispidula*	hairy honeysuckle
Eudicots	Caprifoliaceae	*Symphoricarpos albus laevigatus*	snowberry
Eudicots	Caryophyllaceae	*Cardionema ramosissimum*	sand mat
Eudicots	Caryophyllaceae	*Cerastium arvense ssp. strictum*	field mouse-ear chickweed
Eudicots	Caryophyllaceae	***Silene gallica***	windmill pink
Eudicots	Caryophyllaceae	***Spergula arvensis***	stickwort, starwort
Eudicots	Caryophyllaceae	***Stellaria media***	common chickweed
Eudicots	Convolvulaceae	*Calystegia purpurata ssp. purpurata*	western morning-glory
Eudicots	Cornaceae	*Cornus sericea ssp. occidentalis*	western dogwood
Eudicots	Cornaceae	*Cornus sericea ssp. sericea*	American dogwood
Eudicots	Cucurbitaceae	*Marah fabacea*	California man-root
Eudicots	Ericaceae	*Arbutus menziesii*	Pacific madrone, madroño
Eudicots	Ericaceae	*Arctostaphylos crustacea ssp. crinita*	crinite manzanita
Eudicots	Ericaceae	*Arctostaphylos silvicola*	Bonny Doon manzanita
Eudicots	Euphorbiaceae	***Euphorbia oblongata***	oblong spurge
Eudicots	Euphorbiaceae	***Euphorbia peplus***	petty spurge
Eudicots	Fabaceae	***Acacia dealbata***	silver wattle
Eudicots	Fabaceae	***Acacia melanoxylon***	blackwood acacia
Eudicots	Fabaceae	*Acmispon glaber var. glaber*	deerweed
Eudicots	Fabaceae	***Cytisus scoparius***	Scotch broom
Eudicots	Fabaceae	***Genista monspessulana***	French broom
Eudicots	Fabaceae	***Lathyrus latifolius***	perennial sweet pea
Eudicots	Fabaceae	*Lathyrus vestitus var. vestitus*	Pacific pea

Table A-1: Plant species observed during the survey. Exotic vascular plant species shown in bold font.

Section	Family	Scientific Name	Common Name
Eudicots	Fabaceae	***Lotus corniculatus***	bird's-foot trefoil
Eudicots	Fabaceae	*Lupinus affinis*	fleshy lupine
Eudicots	Fabaceae	*Lupinus albifrons var. albifrons*	silver bush lupine
Eudicots	Fabaceae	*Lupinus arboreus*	yellow bush lupine
Eudicots	Fabaceae	*Lupinus bicolor*	miniature lupine
Eudicots	Fabaceae	*Lupinus nanus*	sky lupine
Eudicots	Fabaceae	***Medicago polymorpha***	California burclover
Eudicots	Fabaceae	***Trifolium angustifolium***	narrow-leaved clover
Eudicots	Fabaceae	***Trifolium campestre***	hop clover
Eudicots	Fabaceae	***Trifolium hirtum***	rose clover
Eudicots	Fabaceae	***Trifolium repens***	white clover
Eudicots	Fabaceae	***Trifolium subterraneum***	subterranean clover
Eudicots	Fabaceae	***Vicia sativa ssp. sativa***	spring vetch
Eudicots	Fagaceae	*Notholithocarpus densiflorus var. densiflorus*	tan oak
Eudicots	Fagaceae	*Quercus agrifolia var. agrifolia*	coast live oak, encina
Eudicots	Geraniaceae	***Erodium botrys***	long-beaked filaree
Eudicots	Geraniaceae	***Geranium dissectum***	common cranesbill
Eudicots	Geraniaceae	***Geranium molle***	soft cranesbill
Eudicots	Geraniaceae	***Geranium purpureum***	little robin
Eudicots	Hydrophyllaceae	*Nemophila parviflora var. parviflora*	small-flowered nemophila
Eudicots	Hypericaceae	***Hypericum calycinum***	Aaron's beard
Eudicots	Lamiaceae	*Clinopodium douglasii*	yerba buena
Eudicots	Lamiaceae	***Lamium amplexicaule***	henbit
Eudicots	Lamiaceae	*Stachys bullata*	California hedge nettle
Eudicots	Malvaceae	***Malva parviflora***	cheeseweed, little mallow
Eudicots	Montiaceae	*Claytonia parviflora ssp. parviflora*	small-flowered claytonia
Eudicots	Montiaceae	*Claytonia perfoliata ssp. perfoliata*	miner's lettuce
Eudicots	Myrsinaceae	**Lysimachia arvensis**	scarlet pimpernel
Eudicots	Namaceae	*Eriodictyon californicum*	California yerba santa
Eudicots	Onagraceae	*Camissonia contorta*	Contorted primrose
Eudicots	Onagraceae	*Clarkia sp.*	Clarkia
Eudicots	Onagraceae	*Epilobium ciliatum ssp. ciliatum*	willow herb
Eudicots	Oxalidaceae	***Oxalis incarnata***	crimson wood-sorrel
Eudicots	Oxalidaceae	*Oxalis oregana*	redwood sorrel
Eudicots	Oxalidaceae	***Oxalis pes-caprae***	Bermuda buttercup
Eudicots	Papaveraceae	*Dendromecon rigida*	bush poppy
Eudicots	Papaveraceae	*Eschscholzia californica*	California poppy

Table A-1: Plant species observed during the survey. Exotic vascular plant species shown in bold font.

Section	Family	Scientific Name	Common Name
Eudicots	Papaveraceae	***Fumaria parviflora***	small-flowered fumitory
Eudicots	Phrymaceae	*Diplacus aurantiacus*	sticky monkeyflower
Eudicots	Plantaginaceae	***Plantago coronopus***	cut-leaf plantain
Eudicots	Plantaginaceae	*Plantago erecta*	California plantain
Eudicots	Plantaginaceae	***Plantago lanceolata***	English plantain
Eudicots	Polemoniaceae	*Collomia heterophylla*	varied-leaved collomia
Eudicots	Polemoniaceae	*Navarretia hamata ssp. parviloba*	small-lobed navarretia
Eudicots	Polygonaceae	*Chorizanthe pungens* var. *hartwegiana*	Ben Lomond spineflower
Eudicots	Polygonaceae	***Rumex acetosella***	sheep sorrel
Eudicots	Polygonaceae	***Rumex crispus***	curly dock
Eudicots	Polygonaceae	*Rumex salicifolius*	willow-leaved dock
Eudicots	Ranunculaceae	*Ranunculus californicus var. californicus*	California buttercup
Eudicots	Rhamnaceae	*Ceanothus cuneatus var. ramulosus*	coast ceanothus
Eudicots	Rosaceae	*Adenostoma fasciculatum var. fasciculatum*	chamise
Eudicots	Rosaceae	*Fragaria vesca*	wood strawberry
Eudicots	Rosaceae	*Holodiscus discolor var. discolor*	oceanspray
Eudicots	Rosaceae	*Horkelia cuneata var. cuneata*	Kellogg's horkelia
Eudicots	Rosaceae	***Rubus armeniacus***	Himalayan blackberry
Eudicots	Rosaceae	*Rubus ursinus*	California blackberry
Eudicots	Rubiaceae	*Galium aparine*	goose grass
Eudicots	Rubiaceae	*Galium californicum & Arn. ssp. californicum*	California bedstraw
Eudicots	Salicaceae	*Populus trichocarpa*	black cottonwood
Eudicots	Rosaceae	*Rosa sp.*	rose
Eudicots	Salicaceae	*Salix laevigata Bebb*	red willow
Eudicots	Salicaceae	*Salix lasiandra var. lasiandra*	Pacific willow
Eudicots	Salicaceae	*Salix lasiolepis*	arroyo willow
Eudicots	Sapindaceae	*Acer macrophyllum*	big-leaf maple
Eudicots	Sapindaceae	*Acer negundo*	box elder
Eudicots	Sapindaceae	*Aesculus californica*	California buckeye
Eudicots	Scrophulariaceae	*Scrophularia californica*	California figwort
Eudicots	Solanaceae	*Solanum americanum*	small-flowered nightshade
Eudicots	Urticaceae	***Urtica urens***	dwarf nettle
Monocots	Agavaceae	*Chlorogalum pomeridianum var. pomeridianum*	soap plant
Monocots	Araceae	**Zantedeschia aethiopica**	calla lily
Monocots	Commelinaceae	***Tradescantia fluminensis***	small-leaf spiderwort
Monocots	Cyperaceae	*Carex globosa Boott*	round-fruited sedge
Monocots	Cyperaceae	*Carex harfordii*	Harford's sedge

Table A-1: Plant species observed during the survey. Exotic vascular plant species shown in bold font.

Section	Family	Scientific Name	Common Name
Monocots	Cyperaceae	*Carex obnupta*	slough sedge
Monocots	Cyperaceae	*Cyperus eragrostis*	umbrella sedge
Monocots	Iridaceae	*Iris douglasiana*	Douglas's iris
Monocots	Iridaceae	*Sisyrinchium bellum*	western blue-eyed grass
Monocots	Juncaceae	*Juncus effusus ssp. pacificus*	Pacific rush
Monocots	Juncaceae	*Juncus patens*	common rush, spreading rush
Monocots	Juncaceae	*Juncus phaeocephalus var. paniculatus*	brown-headed rush
Monocots	Liliaceae	*Prosartes hookeri*	Hooker's fairy bells
Monocots	Melanthiaceae	*Trillium ovatum ssp. ovatum*	western trillium
Monocots	Poaceae	***Aira caryophyllea***	silver hair grass
Monocots	Poaceae	***Avena barbata***	slender wild oat
Monocots	Poaceae	***Briza maxima***	rattlesnake grass
Monocots	Poaceae	***Briza minor***	small quaking grass
Monocots	Poaceae	***Bromus catharticus var. catharticus***	rescue grass
Monocots	Poaceae	***Bromus diandrus***	ripgut brome
Monocots	Poaceae	***Bromus hordeaceus***	soft chess
Monocots	Poaceae	*Bromus sitchensis var. carinatus*	California brome
Monocots	Poaceae	*Calamagrostis rubescens*	pine reed grass
Monocots	Poaceae	***Cynosurus echinatus***	bristly dogtail grass
Monocots	Poaceae	*Danthonia californica*	California oat grass
Monocots	Poaceae	***Ehrharta erecta***	panic veldt grass
Monocots	Poaceae	*Elymus glaucus ssp. glaucus*	blue wild-rye
Monocots	Poaceae	*Festuca californica*	California fescue
Monocots	Poaceae	***Festuca myuros***	rattail fescue
Monocots	Poaceae	***Festuca perennis***	Italian rye grass
Monocots	Poaceae	*Festuca rubra*	red fescue
Monocots	Poaceae	***Holcus lanatus***	velvet grass
Monocots	Poaceae	***Hordeum murinum ssp. leporinum***	farmer's foxtail, hare barley
Monocots	Poaceae	*Melica imperfecta*	small-flowered melic
Monocots	Poaceae	*Stipa pulchra*	purple needle grass
Monocots	Ruscaceae	*Maianthemum racemosum*	false Solomon's seal
Monocots	Ruscaceae	*Maianthemum stellatum*	slim Solomon's seal
Monocots	Typhaceae	*Typha* sp.	cattail

Appendix B: Individual Rare Plant Patch Data

This appendix provides the data collected for the patches (one or more) of rare plants, which are mapped in Figures 2-1 through 2-5 and summarized in Table 3.

Table B-1: Individual patch data for rare plants mapped as part of the survey

Patch	Geometry Type	Species	Patch Area (Square Feet)	Number of Plants			
				Seedlings	Juveniles	Adults	Total
1	Points	*Arctostaphylos silvicola*	1	0	1	0	1
2	Points	*Chorizanthe pungens* var. *hartwegiana*	3	0	0	150	150
3	Points	*Chorizanthe pungens* var. *hartwegiana*	0.02	0	0	3	3
4	Point	*Chorizanthe pungens* var. *hartwegiana*	0.01	0	0	1	1
5	Point	*Arctostaphylos silvicola*	4	0	1	0	1
6	Point	*Chorizanthe pungens* var. *hartwegiana*	2.5	0	0	67	67
7	Point	*Arctostaphylos silvicola*	0.88	2	3	0	5
8	Point	*Chorizanthe pungens* var. *hartwegiana*	1.25	0	0	6	6
9	Point	*Arctostaphylos silvicola*	3	0	1	0	1
10	Point	*Arctostaphylos silvicola*	12	0	0	1	1
11	Point	*Arctostaphylos silvicola*	0.21	0	1	0	1
12	Point	*Chorizanthe pungens* var. *hartwegiana*	2	0	0	53	53
13	Polygon	*Arctostaphylos silvicola*	164	0	0	3	3
14	Polygon	*Arctostaphylos silvicola*	395	0	1	4	5
15	Polygon	*Arctostaphylos silvicola*	8	0	0	1	1
16	Polygon	*Arctostaphylos silvicola*	257	0	0	4	4
17	Polygon	*Arctostaphylos silvicola*	87	0	0	1	1
18	Polygon	*Arctostaphylos silvicola*	1,907	0	0	11	11
19	Polygon	*Arctostaphylos silvicola*	2,073	0	0	15	15
20	Polygon	*Arctostaphylos silvicola*	74	0	0	3	3
21	Polygon	*Arctostaphylos silvicola*	290	0	0	4	4
22	Polygon	*Arctostaphylos silvicola*	481	0	0	4	4
23	Polygon	*Arctostaphylos silvicola*	331	0	0	6	6
24	Polygon	*Arctostaphylos silvicola*	941	0	0	4	4
25	Polygon	*Arctostaphylos silvicola*	64	0	0	2	2
26	Polygon	*Arctostaphylos silvicola*	558	0	0	5	5
27	Polygon	*Arctostaphylos silvicola*	363	0	0	2	2
28	Polygon	*Arctostaphylos silvicola*	85	0	0	1	1
29	Polygon	*Arctostaphylos silvicola*	946	0	1	7	8
30	Polygon	*Arctostaphylos silvicola*	980	0	0	6	6
31	Polygon	*Arctostaphylos silvicola*	68	0	0	2	2

Table B-1: Individual patch data for rare plants mapped as part of the survey

Patch	Geometry Type	Species	Patch Area (Square Feet)	Number of Plants			
				Seedlings	Juveniles	Adults	Total
32	Polygon	*Arctostaphylos silvicola*	4	0	0	1	1
33	Polygon	*Arctostaphylos silvicola*	536	0	0	7	7
34	Polygon	*Chorizanthe pungens* var. *hartwegiana*	146	0	0	470	470
35	Polygon	*Chorizanthe pungens* var. *hartwegiana*	34	0	0	76	76
36	Polygon	*Arctostaphylos silvicola*	5.7	0	0	1	1
37	Polygon	*Arctostaphylos silvicola*	2,132	0	0	9	9
38	Polygon	*Arctostaphylos silvicola*	122	0	0	1	1
39	Polygon	*Chorizanthe pungens* var. *hartwegiana*	84	0	0	446	446
40	Polygon	*Chorizanthe pungens* var. *hartwegiana*	22	0	0	48	48
41	Polygon	*Arctostaphylos silvicola*	64	0	1	0	1
42	Polygon	*Arctostaphylos silvicola*	403	0	0	8	8

Appendix D
Plant Compendium

Vascular Species

Eudicots

ADOXACEAE—Muskroot Family
- Sambucus nigra—blue elderberry
- Sambucus racemosa—red elderberry

ANACARDIACEAE—Sumac Or Cashew Family
- Toxicodendron diversilobum—poison oak

APIACEAE—Carrot Family
- Conium maculatum—poison hemlock*
- Heracleum maximum—common cowparsnip
- Sanicula crassicaulis—Pacific blacksnakeroot

APOCYNACEAE—Dogbane Family
- Vinca major—bigleaf periwinkle*

ARALIACEAE—Ginseng Family
- Hedera helix—English ivy*

ARISTOLOCHIACEAE—Pipevine Family
- Asarum caudatum—British Columbia wildginger

ASTERACEAE—Sunflower Family
- Adenocaulon bicolor—American trailplant
- Artemisia californica—California sagebrush
- Artemisia douglasiana—Douglas' sagewort
- Artemisia ludoviciana—white sagebrush
- Baccharis pilularis—coyote brush
- Centaurea solstitialis—yellow star-thistle*
- Cirsium vulgare—bull thistle*
- Ericameria ericoides—mock heather
- Erigeron bonariensis—asthmaweed*
- Eriophyllum confertiflorum—golden-yarrow
- Helminthotheca echioides—bristly oxtongue*

BETULACEAE—Birch Family
- Alnus rhombifolia—white alder
- Alnus rubra—red alder
- Corylus cornuta—beaked hazelnut

BORAGINACEAE—Borage Family
- Eriodictyon californicum—California yerba santa
- Myosotis latifolia—broadleaf forget-me-not*
- Phacelia californica—California phacelia

BRASSICACEAE—Mustard Family
- Hirschfeldia incana—shortpod mustard*

CAPRIFOLIACEAE—Honeysuckle Family
- Lonicera hispidula—pink honeysuckle
- Symphoricarpos albus—common snowberry

CONVOLVULACEAE—Morning-glory Family
- Calystegia purpurata—Pacific false bindweed
- Convolvulus arvensis—field bindweed*

CORNACEAE—Dogwood Family
- Cornus sericea ssp. sericea—redosier dogwood

CUCURBITACEAE—Gourd Family
- Cucumis anguria—West Indian gherkin*
- Marah fabacea—California man-root

ERICACEAE—Heath Family
- Arbutus menziesii—madrone
- Arctostaphylos columbiana—hairy manzanita
- Arctostaphylos pungens—pointleaf manzanita
- Arctostaphylos silvicola—Bonny Doon manzanita
- Arctostaphylos tomentosa—woolly leaf manzanita
- Vaccinium ovatum—California huckleberry

FABACEAE—Legume Family
- Acacia dealbata—silver wattle*
- Acacia melanoxylon—blackwood*
- Acmispon glaber—deer weed
- Cytisus scoparius—broom*
- Genista monspessulana—French broom*
- Lupinus albifrons—silver bush lupine
- Robinia pseudoacacia—black locust*
- Vicia sativa—garden vetch*

FAGACEAE—Oak Family
- Notholithocarpus densiflorus—tanoak
- Quercus agrifolia—coast live oak
- Quercus lobata—valley oak
- Quercus parvula var. shrevei—Shreve oak

GARRYACEAE—Silk Tassel Family
- Garrya elliptica—coastal silk tassel

GROSSULARIACEAE—Gooseberry Family
- Ribes divaricatum var. pubiflorum—straggly gooseberry
- Ribes menziesii var. menziesii—canyon gooseberry

LAMIACEAE—Mint Family
- Salvia mellifera—black sage
- Stachys ajugoides—bugle hedgenettle

LAURACEAE—Laurel Family
- Umbellularia californica—California bay

MYRTACEAE—Myrtle Family
- Eucalyptus globulus—Tasmanian bluegum*

OXALIDACEAE—Oxalis Family
- Oxalis oregana—redwood-sorrel

PAPAVERACEAE—Poppy Family

Eschscholzia californica—California poppy
PHRYMACEAE—Lopseed Family
Diplacus aurantiacus—bush monkeyflower
PLANTAGINACEAE—Plantain Family
Plantago lanceolata—narrowleaf plantain*
PLATANACEAE—Plane Tree, Sycamore Family
Platanus racemosa—California sycamore
POLYGONACEAE—Buckwheat Family
Eriogonum fasciculatum—California buckwheat
Eriogonum nudum—naked buckwheat
Rumex acetosella—common sheep sorrel*
Rumex crispus—curly dock*
RANUNCULACEAE—Buttercup Family
Clematis vitalba—evergreen clematis*
RHAMNACEAE—Buckthorn Family
Ceanothus cuneatus—wedge leaf ceanothus, buck brush
Ceanothus incanus—coast whitethorn
Frangula californica—California coffee berry
ROSACEAE—Rose Family
Adenostoma fasciculatum—chamise
Cercocarpus betuloides—birch leaf mountain mahogany
Cotoneaster pannosus—silverleaf cotoneaster*
Heteromeles arbutifolia—toyon
Holodiscus discolor—ocean spray brush
Pyracantha coccinea—scarlet firethorn*
Rosa gymnocarpa—dwarf rose
Rubus armeniacus—Himalayan blackberry*
Rubus parviflorus—thimbleberry
Rubus ursinus—California blackberry
SALICACEAE—Willow Family
Populus fremontii—Fremont cottonwood
Populus trichocarpa—black cottonwood
Salix lasiandra var. lasiandra—Shining willow
Salix lasiolepis—arroyo willow
SAPINDACEAE—Soapberry Family
Acer macrophyllum—bigleaf maple
Acer negundo—box-elder
Aesculus californica—California buckeye
VERBENACEAE—Vervain Family
Verbena lasiostachys—western vervain
VIOLACEAE—Violet Family
Viola sempervirens—evergreen violet

Ferns and Fern Allies

BLECHNACEAE—Deer Fern Family
- Woodwardia fimbriata—giant chainfern

DENNSTAEDTIACEAE—Bracken Family
- Pteridium aquilinum var. pubescens—hairy brackenfern

DRYOPTERIDACEAE—Wood Fern Family
- Dryopteris arguta—coastal woodfern
- Polystichum californicum—California swordfern
- Polystichum munitum—western swordfern

EQUISETACEAE—Horsetail Family
- Equisetum hyemale ssp. affine—scouringrush horsetail

POLYPODIACEAE—Polypody Family
- Polypodium californicum—California polypody

PTERIDACEAE—Brake Family
- Adiantum jordanii—California maidenhair
- Pellaea andromedifolia—coffee cliffbrake
- Pellaea mucronata—birdfoot cliffbrake
- Pentagramma triangularis—goldback fern

WOODSIACEAE—Cliff Fern Family
- Athyrium filix-femina var. cyclosorum—subarctic ladyfern

Gymnosperms and Gnetophytes

CUPRESSACEAE—Cypress Family
- Hesperocyparis macrocarpa—Monterey cypress
- Sequoia sempervirens—redwood

PINACEAE—Pine Family
- Pinus attenuata—knobcone pine
- Pinus ponderosa var. pacifica—Pacific ponderosa pine
- Pinus radiata—Monterey pine
- Pseudotsuga menziesii—Douglas fir

Monocots

CYPERACEAE—Sedge Family
- Cyperus eragrostis—tall flatsedge

IRIDACEAE—Iris Family
- Iris douglasiana—Douglas iris

MELANTHIACEAE—False Hellebore Family
- Trillium chloropetalum—giant wakerobin

ORCHIDACEAE—Orchid Family
- Epipactis helleborine—broadleaf helleborine*

POACEAE—Grass Family
- Briza maxima—big quakinggrass*
- Melica imperfecta—smallflower melicgrass

* signifies introduced (non-native) species

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Appendix E

Wildlife Compendium

Vertebrates

Amphibians

HYLIDAE—TREEFROGS
Pseudacris sierra—Sierran treefrog

Birds

TYRANNIDAE—TYRANT FLYCATCHERS
Sayornis nigricans—black phoebe
TROCHILIDAE—HUMMINGBIRDS
Calypte anna—Anna's hummingbird
REGULIDAE—KINGLETS
Regulus calendula—ruby-crowned kinglet
ODONTOPHORIDAE—NEW WORLD QUAIL
Callipepla californica—California quail
COLUMBIDAE—PIGEONS & DOVES
Zenaida macroura—mourning dove
TURDIDAE—THRUSHES
Catharus guttatus—hermit thrush
Turdus migratorius—American robin
PARULIDAE—WOOD-WARBLERS
Setophaga coronata—yellow-rumped warbler
TROGLODYTIDAE—WRENS
Thryomanes bewickii—Bewick's wren
ACCIPITRIDAE—HAWKS, KITES, EAGLES, & ALLIES
Accipiter striatus—sharp-shinned hawk
Buteo jamaicensis—red-tailed hawk
Buteo lineatus—red-shouldered hawk
AEGITHALIDAE—LONG-TAILED TITS & BUSHTITS
Psaltriparus minimus—bushtit
ANATIDAE—DUCKS, GEESE, & SWANS
Aix sponsa—wood duck
Bucephala clangula—common goldeneye
Lophodytes cucullatus—hooded merganser
CORVIDAE—CROWS & JAYS
Aphelocoma californica—California scrub-jay
Corvus brachyrhynchos—American crow
Corvus corax—common raven
Cyanocitta stelleri—Steller's jay
PARIDAE—CHICKADEES & TITMICE
Poecile rufescens—chestnut-backed chickadee
PICIDAE—WOODPECKERS & ALLIES

Dryocopus pileatus—pileated woodpecker
Melanerpes formicivorus—acorn woodpecker
Dryobates nuttallii—Nuttall's woodpecker
Dryobates pubescens—downy woodpecker

PASSERELLIDAE—NEW WORLD SPARROWS

Junco hyemalis—dark-eyed junco
Melozone crissalis—California towhee
Pipilo maculatus—spotted towhee
Zonotrichia atricapilla—golden-crowned sparrow

CATHARTIDAE—NEW WORLD VULTURES

Cathartes aura—turkey vulture

Mammals

CANIDAE—WOLVES & FOXES

Canis latrans—coyote
Canis lupus familiaris—domestic dog*

EQUIDAE—HORSES & BURROS

Equus caballus—domestic horse*

CERVIDAE—DEERS

Odocoileus hemionus—mule deer

SCIURIDAE—SQUIRRELS

Sciurus griseus—western gray squirrel

CRICETIDAE—RATS, MICE, & VOLES

Neotoma fuscipes—dusky-footed woodrat

* signifies introduced (non-native) species

Appendix F

Special-Status Plant Species Potentially Occurring within the Biological Study Area

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Agrostis blasdalei	Blasdale's bent grass	None/None/1B.2	Coastal bluff scrub, Coastal dunes, Coastal prairie/perennial rhizomatous herb/May–July/0–490	Not expected to occur. Suitable coastal bluff habitat for this species is absent from the BSA.
Amsinckia lunaris	bent-flowered fiddleneck	None/None/1B.2	Coastal bluff scrub, Cismontane woodland, Valley and foothill grassland/annual herb/Mar–June/10–1,640	Low potential to occur. Marginally suitable grassland habitat is present within the BSA, but most has been eliminated by intensive human use. The closest CNDDB occurrence was documented approximately 2.3 miles southwest of the BSA in 1990 (CDFW 2021; No. 1).
Arctostaphylos andersonii	Anderson's manzanita	None/None/1B.2	Broadleafed upland forest, Chaparral, North Coast coniferous forest; openings, edges/perennial evergreen shrub/Nov–May/197–2,490	Moderate potential to occur. The BSA supports marginally suitable habitat for this species and the CNDDB lists 127 occurrences throughout the Santa Cruz Mountains (CDFW 2021).
Arctostaphylos glutinosa	Schreiber's manzanita	None/None/1B.2	Closed-cone coniferous forest, Chaparral; diatomaceous shale/perennial evergreen shrub/(Nov)Mar–Apr/558–2,245	Not expected to occur. The BSA is outside the known distribution of this species.
Arctostaphylos ohloneana	Ohlone manzanita	None/None/1B.1	Closed-cone coniferous forest, Coastal scrub; siliceous shale/evergreen shrub/Feb–Mar/1,475–1,735	Not expected to occur. The BSA is outside of the species' known elevation range.
Arctostaphylos pajaroensis	Pajaro manzanita	None/None/1B.1	Chaparral (sandy)/perennial evergreen shrub/Dec–Mar/98–2,490	Not expected to occur. The BSA is outside the known distribution of this species.
Arctostaphylos regismontana	Kings Mountain manzanita	None/None/1B.2	Broadleafed upland forest, Chaparral, North Coast coniferous forest; granitic or sandstone/perennial evergreen shrub/Dec–Apr/1,000–2,395	Not expected to occur. The BSA is outside of the species' known elevation range.
Eriogonum nudum var. decurrens	Ben Lomond buckwheat	None/None/1B.1	Chaparral, Cismontane woodland, Lower montane coniferous forest (maritime ponderosa pine sandhills); sandy/perennial herb/June–Oct/164–2,620	Observed. This species was observed in the Newell Creek Road and Graham Hill Road North sections of the BSA. Suitable sandhills are present within the Glen Arbor Road, Quail Hollow Road, and Mount Hermon Road sections of the BSA. The closest CNDDB occurrence was documented within the 0.1 mile south of the BSA in 2017 (CDFW 2021; No. 1).
Arenaria paludicola	marsh sandwort	FE/SE/1B.1	Marshes and swamps (freshwater or brackish); sandy, openings/perennial stoloniferous herb/May–Aug/10–560	Low potential to occur. The BSA supports suitable habitat for this species in Wilder Ranch State Park located approximately 3.9 miles southwest of the study area, where this species was introduced back into native habitat in 2013 (CDFW 2021).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Calyptridium parryi var. hesseae	Santa Cruz Mountains pussypaws	None/None/1B.1	Chaparral, Cismontane woodland; sandy or gravelly, openings/annual herb/May–Aug/1,000–5,015	Low potential to occur. Although the BSA is outside of the species' known elevation range, there is marginally suitable habitat within the BSA and the nearest CNDDB occurrence was documented within 0.5 mile south of the BSA (CDFW 2021; No. 13).
Campanula californica	swamp harebell	None/None/1B.2	Bogs and fens, Closed-cone coniferous forest, Coastal prairie, Meadows and seeps, Marshes and swamps (freshwater), North Coast coniferous forest; mesic/perennial rhizomatous herb/June–Oct/3–1,325	Low potential to occur. The BSA supports suitable habitat for this species. However, only one historic occurrence of this species was documented within the region. This species was documented in a bog near Camp Evers in 1944. This occurrence has since been extirpated (CDFW 2020; No. 1).
Carex comosa	bristly sedge	None/None/2B.1	Coastal prairie, Marshes and swamps (lake margins), Valley and foothill grassland/perennial rhizomatous herb/May–Sep/0–2,050	Low potential to occur. The BSA supports suitable habitat for this species. However, only two historic occurrences of this species were documented within the region. This species was documented within the Bonny Doon Ecological Preserve in 2007 approximately 3.3 miles east of the BSA and in the Forest of Nisene Marks State Park in 1994 approximately 7.9 miles west of the BSA (CDFW 2020; No. 32 and 2).
Carex saliniformis	deceiving sedge	None/None/1B.2	Coastal prairie, Coastal scrub, Meadows and seeps, Marshes and swamps (coastal salt); mesic/perennial rhizomatous herb/June(July)/10–755	Moderate potential to occur. The BSA supports suitable habitat for this species, although modern and historical CNDDB occurrences are scarce.
Centromadia parryi ssp. congdonii	Congdon's tarplant	None/None/1B.1	Valley and foothill grassland (alkaline)/annual herb/May–Oct(Nov)/0–755	Not expected to occur. The BSA is outside the known distribution of this species.
Chorizanthe pungens var. hartwegiana	Ben Lomond spineflower	FE/None/1B.1	Lower montane coniferous forest (maritime ponderosa pine sandhills)/annual herb/Apr–July/295–2,000	Observed. This species was observed in the Graham Hill Road North section of the BSA. Suitable forest habitat and sandhill soils are present within all portions of the BSA, except for the Graham Hill Road South section. The closest CNDDB occurrence was documented approximately 20 feet southwest of the BSA in 1988 (CDFW 2020; No. 3).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Chorizanthe pungens var. pungens	Monterey spineflower	FT/None/1B.2	Chaparral (maritime), Cismontane woodland, Coastal dunes, Coastal scrub, Valley and foothill grassland; sandy/annual herb/Apr–June(July–Aug)/10–1,475	Not expected to occur. Although there are a couple CNDDB occurrences for this species within Santa Cruz County, they are from 2006 and located in the most southern portion of the County. The BSA is outside the known distribution of this species.
Chorizanthe robusta var. hartwegii	Scotts Valley spineflower	FE/None/1B.1	Meadows and seeps (sandy), Valley and foothill grassland (mudstone and Purisima outcrops)/annual herb/Apr–July/755–805	Not expected to occur. Although there are a couple CNDDB occurrences for this species within Santa Cruz County, the species is endemic to grasslands within the Scotts Valley region southeast of the BSA.
Horkelia cuneata var. sericea	Kellogg's horkelia	None/None/1B.1	Closed-cone coniferous forest, Chaparral (maritime), Coastal dunes, Coastal scrub; sandy or gravelly, openings/perennial herb/Apr–Sep/33–655	Moderate potential to occur. The BSA supports suitable habitat for this species, although only historic CNDDB occurrences occur within the region (CDFW 2021).
Cirsium fontinale var. campylon	Mt. Hamilton thistle	None/None/1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland; serpentinite seeps/perennial herb/(Feb)Apr–Oct/328–2,915	Not expected to occur. There are no occurrences of this species within Santa Cruz County.
Collinsia multicolor	San Francisco collinsia	None/None/1B.2	Closed-cone coniferous forest, Coastal scrub; sometimes serpentinite/annual herb/(Feb)Mar–May/98–902	Not expected to occur. The biological study is outside the known distribution of this species.
Horkelia marinensis	Point Reyes horkelia	None/None/1B.2	Coastal dunes, Coastal prairie, Coastal scrub; sandy/perennial herb/May–Sep/16–2,475	Moderate potential to occur. The BSA supports suitable habitat for this species. The CNDDB lists two occurrences in the vicinity of UCSC (CDFW 2021).
Dudleya abramsii ssp. setchellii	Santa Clara Valley dudleya	FE/None/1B.1	Cismontane woodland, Valley and foothill grassland; serpentinite, rocky/perennial herb/Apr–Oct/197–1,755	Not expected to occur. There are no occurrences of this species within Santa Cruz County.
Arctostaphylos silvicola	Bonny Doon manzanita	None/None/1B.2	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest; inland marine sands/perennial evergreen shrub/Jan–Mar/394–1,965	Observed. Suitable forest and shrub habitat is present within the BSA. The species was observed along the right-of-way during the 2021 habitat assessment. The closest CNDDB occurrence was documented within chaparral/sandhill habitat approximately 0.06 mile southwest of the BSA in 2014 (CDFW 2020; No. 1).
Chorizanthe robusta var. robusta	robust spineflower	FE/None/1B.1	Chaparral (maritime), Cismontane woodland (openings), Coastal dunes, Coastal scrub; sandy or gravelly/annual herb/Apr–Sep/10–985	Moderate potential to occur. The BSA supports suitable habitat for this species and the CNDDB lists 8 occurrences within the region (CDFW 2021).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Plagiobothrys chorisianus var. chorisianus	Choris' popcornflower	None/None/1B.2	Chaparral, Coastal prairie, Coastal scrub; mesic/annual herb/Mar–June/10–525	High potential to occur. The BSA supports suitable habitat for this species, and the CNDDB lists five occurrences, modern and historic, within wetlands from Boulder Creek to Scotts Valley (CDFW 2021).
Fritillaria liliacea	fragrant fritillary	None/None/1B.2	Cismontane woodland, Coastal prairie, Coastal scrub, Valley and foothill grassland; Often serpentinite/perennial bulbiferous herb/Feb–Apr/10–1,345	Not expected to occur. There are no occurrences of this species within Santa Cruz County.
Grimmia torenii	Toren's grimmia	None/None/1B.3	Chaparral, Cismontane woodland, Lower montane coniferous forest; Openings, rocky, boulder and rock walls, carbonate, volcanic/moss/N.A./1,065–3,805	Not expected to occur. The BSA is outside of the species' known elevation range.
Grimmia vaginulata	vaginulate grimmia	None/None/1B.1	Chaparral (openings); Rocky, boulder and rock walls, carbonate/moss/N.A./2,245–2,245	Not expected to occur. The BSA is outside of the species' known elevation range.
Hesperevax sparsiflora var. brevifolia	short-leaved evax	None/None/1B.2	Coastal bluff scrub (sandy), Coastal dunes, Coastal prairie/annual herb/Mar–June/0–705	Low potential to occur. Although The BSA supports suitable habitat for this species, the only occurrence lists by the CNDDB is historic and lacks locational information (CDFW 2020; No. 1).
Hesperocyparis abramsiana var. abramsiana	Santa Cruz cypress	FT/SE/1B.2	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest; sandstone or granitic/perennial evergreen tree/N.A./919–2,620	Not expected to occur. The BSA is outside of the species' known elevation range.
Hesperocyparis abramsiana var. butanoensis	Butano Ridge cypress	FT/SE/1B.2	Closed-cone coniferous forest, Chaparral, Lower montane coniferous forest; Sandstone/perennial evergreen tree/Oct/1,310–1,605	Not expected to occur. The BSA is outside of the species' known elevation range.
Hoita strobilina	Loma Prieta hoita	None/None/1B.1	Chaparral, Cismontane woodland, Riparian woodland; usually serpentinite, mesic/perennial herb/May–July(Aug–Oct)/98–2,820	Not expected to occur. There are no occurrences of this species within Santa Cruz County.
Fissidens pauperculus	minute pocket moss	None/None/1B.2	North Coast coniferous forest (damp coastal soil)/moss/N.A./33–3,355	High potential to occur. The BSA supports suitable habitat for this species and the CNDDB lists two occurrences within Santa Cruz County (CDFW 2021). The closest CNDDB occurrence was documented approximately 1.3 miles east of the BSA near the Felton Diversion in 2001 (CDFW 2021; No.11).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Erysimum teretifolium	Santa Cruz wallflower	FE/SE/1B.1	Chaparral, Lower montane coniferous forest; inland marine sands/perennial herb/Mar–July/394–2,000	Moderate potential to occur. This species was documented south of the Mt. Hernon Road exit along La Madrona Road in 1995 (CDFW 2020, No. 29) and suitable coniferous forest habitat is present within the study area. The remainder of the BSA is below the elevational range of the species.
Dacryophyllum falcifolium	tear drop moss	None/None/1B.3	North Coast coniferous forest; carbonate/moss/N.A./164–900	Moderate potential to occur. The BSA supports marginally suitable habitat for this species. The closest CNDDB occurrence was documented approximately 1.1 mile east of the BSA near Felton Diversion in 2013 (CDFW 2020; No. 7).
Lasthenia californica ssp. macrantha	perennial goldfields	None/None/1B.2	Coastal bluff scrub, Coastal dunes, Coastal scrub/perennial herb/Jan–Nov/16–1,705	Not expected to occur. Suitable coastal habitat for this species is absent from the study area.The historic distribution of this species is limited to Seacliff State Park (CDFW 2021).
Lessingia micradenia var. glabrata	smooth lessingia	None/None/1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland; serpentinite, often roadsides/annual herb/(Apr–June)July–Nov/394–1,375	Not expected to occur. There are no occurrences of this species within Santa Cruz County.
Malacothamnus arcuatus	arcuate bush-mallow	None/None/1B.2	Chaparral, Cismontane woodland/perennial evergreen shrub/Apr–Sep/49–1,160	Low potential to occur. The BSA supports suitable habitat for this species. However, CNDDB occurrences are limited to the northern and easternmost limits of Santa Cruz County (CDFW 2021).
Microseris paludosa	marsh microseris	None/None/1B.2	Closed-cone coniferous forest, Cismontane woodland, Coastal scrub, Valley and foothill grassland/perennial herb/Apr–June(July)/16–1,160	Not expected to occur. The BSA supports marginally suitable habitat for this species. However, the three CNDDB occurrences within Santa Cruz County are historic and/or lack specific locational information (CDFW 2021). These occurrences are assumed extirpated.
Monardella sinuata ssp. nigrescens	northern curly-leaved monardella	None/None/1B.2	Chaparral (SCR Co.), Coastal dunes, Coastal scrub, Lower montane coniferous forest (SCR Co., ponderosa pine sandhills); Sandy./annual herb/(Apr)May–July(Aug–Sep)/0–985	High potential to occur. Marginally suitable to suitable scrub, woodland, grassland, and/or Ponderosa pine sandhill habitat is present within the BSA. The closest CNDDB occurrence was documented immediately to the northeast of the BSA in 1993 (CDFW 2021; No. 11).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Plagiobothrys diffusus	San Francisco popcornflower	None/SE/1B.1	Coastal prairie, Valley and foothill grassland/annual herb/Mar–June/197–1,180	High potential to occur. The BSA supports suitable habitat for this species, and the CNDDB lists 19 occurrences, modern and historic, within the vicinity of Santa Cruz (CDFW 2021).
Orthotrichum kellmanii	Kellman's bristle moss	None/None/1B.2	Chaparral, Cismontane woodland; sandstone, carbonate/moss/Jan–Feb/1,125–2,245	Not expected to occur. The BSA is outside of the species' known elevation range.
Pedicularis dudleyi	Dudley's lousewort	None/SR/1B.2	Chaparral (maritime), Cismontane woodland, North Coast coniferous forest, Valley and foothill grassland/perennial herb/Apr–June/197–2,950	Low potential to occur. The BSA supports suitable habitat for this species. However, the two CNDDB occurrences documented within Santa Cruz County are over 100 years old (CDFW 2021).
Penstemon rattanii var. kleei	Santa Cruz Mountains beardtongue	None/None/1B.2	Chaparral, Lower montane coniferous forest, North Coast coniferous forest/perennial herb/May–June/1,310–3,605	Not expected to occur. The BSA is outside of the species' known elevation range.
Pentachaeta bellidiflora	white-rayed pentachaeta	FE/SE/1B.1	Cismontane woodland, Valley and foothill grassland (often serpentinite)/annual herb/Mar–May/115–2,030	Not expected to occur. The BSA supports suitable habitat for this species. However, the last CNDDB occurrence was from 1955 and the species is presumed extirpated (CDFW 2021; Neubauer 2013).
Pinus radiata	Monterey pine	None/None/1B.1	Closed-cone coniferous forest, Cismontane woodland/perennial evergreen tree/N.A./82–605	Not expected to occur. The current range of this species is limited to three stands, the northernmost of which is located east of point Año Nuevo, outside of The BSA.
Piperia candida	white-flowered rein orchid	None/None/1B.2	Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest; sometimes serpentinite/perennial herb/(Mar)May–Sep/98–4,295	Low potential to occur. The BSA supports marginally suitable habitat for this species. However, the only CNDDB occurrence within the region is located approximately 3.5 miles southeast of the BSA from 1966 (CDFW 2021; No. 2).
Holocarpha macradenia	Santa Cruz tarplant	FT/SE/1B.1	Coastal prairie, Coastal scrub, Valley and foothill grassland; often clay, sandy/annual herb/June–Oct/33–720	High potential to occur. The BSA supports suitable habitat for this species, and the CNDDB lists 14 occurrences documented in the vicinity of Santa Cruz and Aptos (CDFW 2021).
Monolopia gracilens	woodland woolythreads	None/None/1B.2	Broadleafed upland forest (openings), Chaparral (openings), Cismontane woodland, North Coast coniferous forest (openings), Valley and foothill grassland; Serpentine/annual herb/(Feb)Mar–July/328–3,935	High potential to occur. The BSA supports suitable habitat for this species and the CNDDB lists 31 occurrences throughout Santa Cruz County (CDFW 2021).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Plagiobothrys glaber	hairless popcornflower	None/None/1A	Meadows and seeps (alkaline), Marshes and swamps (coastal salt)/annual herb/Mar–May/49–590	Not expected to occur. There are no occurrences of this species within Santa Cruz County.
Polygonum hickmanii	Scotts Valley polygonum	FE/SE/1B.1	Valley and foothill grassland (mudstone and sandstone)/annual herb/May–Aug/689–820	Not expected to occur. Although there are a couple CNDDB occurrences for this species within Santa Cruz County, the species is endemic to grasslands within the Scotts Valley region southeast of the BSA.
Sanicula saxatilis	rock sanicle	None/SR/1B.2	Broadleafed upland forest, Chaparral, Valley and foothill grassland; rocky, scree, talus/perennial herb/Apr–May/2,030–3,850	Not expected to occur. The BSA is outside of the species' known elevation range.
Senecio aphanactis	chaparral ragwort	None/None/2B.2	Chaparral, Cismontane woodland, Coastal scrub; sometimes alkaline/annual herb/Jan–Apr(May)/49–2,620	Not expected to occur. The BSA is outside the known distribution of this species.
Silene verecunda ssp. verecunda	San Francisco campion	None/None/1B.2	Coastal bluff scrub, Chaparral, Coastal prairie, Coastal scrub, Valley and foothill grassland; sandy/perennial herb/(Feb)Mar–June(Aug)/98–2,115	Low potential to occur. The BSA supports marginally suitable habitat for this species, although only historic CNDDB occurrences from 1983 occur within the region approximately 9.5 miles east of the BSA (CDFW 2021).
Stebbinsoseris decipiens	Santa Cruz microseris	None/None/1B.2	Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Coastal prairie, Coastal scrub, Valley and foothill grassland; open areas, sometimes serpentinite/annual herb/Apr–May/33–1,640	Not expected to occur. The BSA is outside the known distribution of this species.
Streptanthus albidus ssp. albidus	Metcalf Canyon jewelflower	FE/None/1B.1	Valley and foothill grassland (serpentinite)/annual herb/Apr–July/148–2,620	Not expected to occur. There are no occurrences of this species within Santa Cruz County.
Streptanthus albidus ssp. peramoenus	most beautiful jewelflower	None/None/1B.2	Chaparral, Cismontane woodland, Valley and foothill grassland; serpentinite/annual herb/(Mar)Apr–Sep(Oct)/312–3,280	Not expected to occur. There are no occurrences of this species within Santa Cruz County.
Trifolium buckwestiorum	Santa Cruz clover	None/None/1B.1	Broadleafed upland forest, Cismontane woodland, Coastal prairie; gravelly, margins/annual herb/Apr–Oct/344–2,000	Low potential to occur. The BSA supports marginally suitable habitat for this species. The CNDDB lists several occurrences from the vicinity of Boulder Creek down to Santa Cruz (CDFW 2021).

Scientific Name	Common Name	Status Federal/State/ CRPR	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (feet amsl)	Potential to Occur
Trifolium polyodon	Pacific Grove clover	None/SR/1B.1	Closed-cone coniferous forest, Coastal prairie, Meadows and seeps, Valley and foothill grassland; mesic, sometimes granitic/annual herb/Apr–June(July)/16–1,390	Low potential to occur. The BSA supports marginally suitable habitat for this species. The CNDDB lists two modern occurrences of this species within wet meadows. One occurrence from 2017 approximately 1.5 miles east of the BSA and one occurrence from 2018 approximately 2.2 miles southwest of the BSA (CDFW 2021; No. 21 and 22).

Notes: BSA = Biological Study Area; CNDDB = California Natural Diversity Database.

Status Legend
Federal
FE: Federally listed as endangered
FT: Federally listed as threatened
FC: Federal candidate for listing as threatened or endangered
State
SE: State listed as endangered
ST: State listed as threatened
SR: State listed as rare
CRPR (California Rare Plant Rank)
CRPR 1A: Plants presumed extinct in California and either rare or extinct elsewhere
CRPR List 1B: Plants rare, threatened, or endangered in California and elsewhere
CRPR List 2A: Plants rare, threatened, or endangered in California but common elsewhere
CRPR List 2B: Plants rare, threatened, or endangered in California but more common elsewhere
Threat Rank
.1 Seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat)
.2 Fairly endangered in California (20% to 80% of occurrences threatened/moderate degree and immediacy of threat)
.3 Not very endangered in California (less than 20% of occurrences threatened/low degree and immediacy of threat or no current threats known).

References

CDFW (California Department of Fish and Wildlife). 2020. RareFind 5, Version 5.2.14. California Natural Diversity Database. Sacramento, California: CDFW, Biogeographic Data Branch. Accessed February 2020. https://map.dfg.ca.gov/rarefind/view/RareFind.aspx.

USDA (U.S. Department of Agriculture). 2020. Web Soil Survey: Santa Cruz County Area. USDA, Natural Resources Conservation Service, Web Soil Survey Staff. Accessed February 2020. http://websoilsurvey.nrcs.usda.gov/.

Appendix G

Special-Status Wildlife Species Potentially Occurring within the Biological Study Area

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Amphibians				
Ambystoma californiense	California tiger salamander	FT/ST, WL	Annual grassland, valley–foothill hardwood, and valley–foothill riparian habitats; vernal pools, other ephemeral pools, and (uncommonly) along stream courses and man-made pools if predatory fishes are absent	Not expected to occur. The BSA is outside the known distribution of this species.
Ambystoma macrodactylum croceum	Santa Cruz long-toed salamander	FE/FP, SE	Dense riparian vegetation, thick coastal scrub, and oak woodland	Not expected to occur. Although dense riparian vegetation and oak woodland is present, the BSA is located outside the known range of this species, which is restricted to southern Santa Cruz county (south of Aptos Creek) and northern Monterey county (CDFW 2021c). There are no CNDDB occurrences of this species within 5 miles of the BSA (CDFW 2021c).
Aneides flavipunctatus niger	Santa Cruz black salamander	None/SSC	Restricted to mesic forests in the fog belt of the outer Coast Range of San Mateo, Santa Cruz, and Santa Clara counties. Mixed deciduous and coniferous woodlands and coastal grasslands. Occurs in moist streamside microhabitats and is found under rocks, talus, and damp woody debris.	High potential to occur. The BSA supports suitable moist streamside habitats within deciduous and coniferous woodlands as required for this species. This species has historically been documented on numerous occasions near the BSA (CDFW 2021c).
Dicamptodon ensatus	California giant salamander	None/SSC	Known from wet coastal forests and chaparral near streams and seeps from Mendocino Co. south to Monterey Co. and east to Napa Co. Aquatic larvae found in cold, clear streams, occasionally in lakes and ponds. Adults known from wet forests under rocks and logs near streams and lakes.	High potential to occur. The BSA supports suitable wet coastal forest and chaparral habitat near cold streams as required for this species. This species has historically been documented on numerous occasions near the BSA (CDFW 2021c).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Rana boylii	foothill yellow-legged frog	None/SSC, SE	Rocky streams and rivers with open banks in forest, chaparral, and woodland	Low potential to occur. The BSA supports some suitable rocky stream habitat within forests and woodlands, however the majority of the streamside banks are densely vegetated with little to no openings in the canopy for basking, and minimal pools for breeding. A sub-adult individual was observed in 2018 in a small seep area at the base of Newell Creek Dam, approximately 0.23 miles northwest of the Newell Creek Road segment by Dudek herpetologist C. Seltenrich (Occ. No. 2440, CDFW 2021c). However, this observation was assumed to be of an individual who had dispersed downstream from Newell Creek and was temporarily utilizing the seep as refugia habitat (Dudek 2018). All other occurrences in the BSA vicinity are from 1931 (CDFW 2021c).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Rana draytonii	California red-legged frog	FT/SSC	Lowland streams, wetlands, riparian woodlands, livestock ponds; dense, shrubby or emergent vegetation associated with deep, still or slow-moving water; uses adjacent uplands	Low potential to occur. The BSA supports some suitable lowland streams and riparian woodlands with few areas containing still or slow-moving water suitable for breeding. Most aquatic features are narrow, steep, roadside drainages, ditches and tributaries that contain little to no ponding water or emergent vegetation. Some features, such as the northern reach of Newell Creek and the reach of Eagle Creek that crosses underneath Pipeline Trail, may provide foraging habitat, but are not expected to support breeding due to the presence of predatory fish and lack of calm, clear, pooled water. There are several CNDDB occurrences within 1 to 4 miles of the BSA (CDFW 2021c).
Reptiles				
Actinemys marmorata	western pond turtle	None/SSC	Slow-moving permanent or intermittent streams, ponds, small lakes, and reservoirs with emergent basking sites; adjacent uplands used for nesting and during winter.	Moderate potential to occur. Suitable perennial stream habitat is present within the BSA but the majority of the drainages are fairly incised with steep, narrow banks that limit accessibility to adjacent uplands. Larger streams within the BSA (such as San Lorenzo River and Zayante Creek), provide suitable foraging and basking habitat for this species, and western pond turtle has been documented historically within these areas (CDFW 2021c).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Thamnophis sirtalis tetrataenia	San Francisco garter snake	FE/FP, SE	Wide range of habitats including grasslands or wetlands adjacent to ponds, marshes, and sloughs	Not expected to occur. The BSA supports marginal slow-moving aquatic habitat, however the majority of the aquatic features lack emergent vegetation for cover. Many of the drainages within the BSA are too steep and narrow to support this species, and the larger features likely support unsuitable stream velocities during high flows. Additionally, the BSA is located outside of the known range for this species, which is typically limited to wetland areas on the San Francisco Peninsula and coasts of Santa Cruz County (USFWS 2017). The closest CNDDB occurrences are in the Ano Nuevo or Franklin Point USGS quadrangles, more than 10 miles west of the BSA (CDFW 2021c).
Birds				
Agelaius tricolor (nesting colony)	tricolored blackbird	BCC/SSC, ST	Nests near freshwater, emergent wetland with cattails or tules, but also in Himalayan blackberry; forages in grasslands, woodland, and agriculture	Not expected to nest or forage. The BSA does not support freshwater, emergent wetland habitat as required for nesting for this species, and foraging habitat is marginal. The majority of the grassland areas are disturbed and adjacent to urban/residential development, limiting the likelihood that tricolored blackbird would use these areas for foraging. The nearest CNDDB occurrence is approximately 2.5 miles south of the BSA (CDFW 2021c).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Aquila chrysaetos (nesting & wintering)	golden eagle	BCC/FP, WL	Nests and winters in hilly, open/semi-open areas, including shrublands, grasslands, pastures, riparian areas, mountainous canyon land, open desert rimrock terrain; nests in large trees and on cliffs in open areas and forages in open habitats	Not expected to nest or forage. The majority of the BSA consists of dense redwood and coniferous forest, with only small grassland openings that are highly disturbed and immediately adjacent to urban/residential development, limiting the likelihood that golden eagle would nest or forage within these areas. There are no CNDDB occurrences of this species within 5 miles of the BSA (CDFW 2021c).
Athene cunicularia (burrow sites & some wintering sites)	burrowing owl	BCC/SSC	Nests and forages in grassland, open scrub, and agriculture, particularly with ground squirrel burrows	Not expected to nest or forage. The BSA supports limited open grassland or agriculture habitat as required for this species. Existing grassland habitat within the BSA is heavily disturbed (i.e., previously used as Christmas tree farms or for horseback riding), and immediately surrounded by urban/residential development. The nearest CNDDB occurrence is 1.35 miles southwest of the BSA at U.C. Santa Cruz, where burrowing owls are known to winter (CDFW 2021c).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Brachyramphus marmoratus (nesting)	marbled murrelet	FT/SE	Nests in old-growth coastal forests, forages in subtidal and pelagic habitats	Low potential to occur. The BSA is within the nesting range of this species in Santa Cruz County and supports coniferous forest; an individual was also detected flying overhead in 2018 by Dudek biologists at Newell Creek Dam, approximately 0.2 miles northwest of the Newell Creek Road segment (Dudek 2018). However, the known nesting areas for this species are located in the Pescadero Creek, Butano Creek, Little Butano Creek, Gazos Creek, Cascade Creek, Waddell Creek, and Scott Creek watersheds northwest of the BSA. The nearest CNDDB occurrence of this species is approximately 2 miles west of the BSA in the Fall Creek sub-watershed within Henry Cowell Redwoods State Park (CDFW 2021c); this area represents the only occupied murrelet habitat in the San Lorenzo River watershed (Halbert and Singer 2017). Critical habitat for this species overlaps with the southern extent of the BSA.
Charadrius alexandrinus nivosus (nesting)	western snowy plover	FT, BCC/SSC	On coasts nests on sandy marine and estuarine shores; in the interior nests on sandy, barren or sparsely vegetated flats near saline or alkaline lakes, reservoirs, and ponds	Not expected to occur. The BSA does not support suitable nesting or foraging habitat for this species, which is only known to nest along the immediate coast and on former salt ponds in South San Francisco Bay in this region* (CDFW 2021c).
Contopus cooperi (nesting)	olive-sided flycatcher	BCC/SSC	Nests in mixed-conifer, montane hardwood–conifer, Douglas-fir, redwood, red fir, and lodgepole pine habitats; usually close to water	High potential to nest and forage. The BSA supports suitable nesting and foraging habitat for this species. There are several eBird occurrences during the nesting season near the BSA (eBird 2021).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Coturnicops noveboracensis	yellow rail	BCC/SSC	Nesting requires wet marsh/sedge meadows or coastal marshes with wet soil and shallow, standing water	Not expected to occur. The BSA does not support suitable nesting or foraging habitat for this species.
Cypseloides niger (nesting)	black swift	BCC/SSC	Nests in moist crevices, caves, and cliffs behind or adjacent to waterfalls in deep canyons; forages over a wide range of habitats	Not expected to nest, low potential to forage. Suitable cliff or deep canyon habitat for nesting is not present within the BSA, although this species might forage within and adjacent to the BSA from time to time. This species is known to nest along the coastal cliffs and caves of Santa Cruz, over 5 miles southeast of the BSA (CDFW 2021c).
Elanus leucurus (nesting)	white-tailed kite	None/FP	Nests in woodland, riparian, and individual trees near open lands; forages opportunistically in grassland, meadows, scrubs, agriculture, emergent wetland, savanna, and disturbed lands	High potential to nest and low potential to forage. The BSA supports suitable woodland and riparian habitat required for nesting for this species. However, open grassland and meadow habitats for foraging are sparse and generally surrounded by residential development. The nearest CNDDB occurrence is approximately 1.5 miles west of the BSA (CDFW 2021c).
Empidonax traillii extimus (nesting)	southwestern willow flycatcher	FE/SE	Nests in dense riparian habitats along streams, reservoirs, or wetlands; uses variety of riparian and shrubland habitats during migration	Not expected to nest or forage. Although dense riparian vegetation is present along some of the streams within the BSA, most streamside habitat consists of redwood or coniferous forest that is not used by this subspecies. Additionally, the BSA is outside the typical range of this species, and there are no CNDDB occurrences west of the Sierra Nevada Mountains, or north of the Santa Ynez River (CDFW 2021c).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Falco peregrinus anatum (nesting)	American peregrine falcon	FDL, BCC/FP, SDL	Nests on cliffs, buildings, and bridges; forages in wetlands, riparian, meadows, croplands, especially where waterfowl are present	Not expected to nest or forage. The BSA does not support suitable cliff-nesting habitat for this species, which is only known to nest along the immediate coast within the region* (CDFW 2021c).
Geothlypis trichas sinuosa	saltmarsh common yellowthroat	BCC/SSC	Nests and forages in emergent wetlands including woody swamp, brackish marsh, and freshwater marsh	Not expected to nest or forage. The BSA does not support suitable nesting or foraging habitat for this species. There are no CNDDB occurrences within 5 miles of the BSA (CDFW 2021c).
Laterallus jamaicensis coturniculus	California black rail	BCC/FP, ST	Tidal marshes, shallow freshwater margins, wet meadows, and flooded grassy vegetation; suitable habitats are often supplied by canal leakage in Sierra Nevada foothill populations	Not expected to nest or forage. The BSA does not support suitable nesting or foraging habitat for this species.
Progne subis (nesting)	purple martin	None/SSC	Nests and forages in woodland habitats including riparian, coniferous, and valley foothill and montane woodlands; in the Sacramento region often nests in weep holes under elevated freeways	Low potential to nest and forage. Although the BSA provides suitable woodland and coniferous habitat for this species, few suitable tree cavities were observed during biological surveys, and this species is more typically associated with the Sacramento region. There are no CNDDB occurrences of this species within 5 miles of the BSA (CDFW 2021c).
Riparia riparia (nesting)	bank swallow	None/ST	Nests in riparian, lacustrine, and coastal areas with vertical banks, bluffs, and cliffs with sandy soils; open country and water during migration	Not expected to nest or forage. The BSA does not support suitable nesting cliff habitat for this species, and open country and water habitat for foraging is limited. The nearest CNDDB occurrence is approximately 2 miles south of the BSA, however the occurrence is historic (1891-1954) and the exact location is unknown (CDFW 2021c).
Sternula antillarum browni (nesting colony)	California least tern	FE/FP, SE	Forages in shallow estuaries and lagoons; nests on sandy beaches or exposed tidal flats	Not expected to nest or forage. The BSA does not support suitable nesting or foraging habitat for this species.

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Vireo bellii pusillus (nesting)	least Bell's vireo	FE/SE	Nests and forages in low, dense riparian thickets along water or along dry parts of intermittent streams; forages in riparian and adjacent shrubland late in nesting season	Not expected to nest or forage. Although some areas of the BSA support marginal riparian habitat for this species, most streamside habitat consists of redwood or coniferous forest that is not used by this species. There are no CNDDB occurrences within 5 miles of the BSA (CDFW 2021c).
Fishes				
Eucyclogobius newberryi	tidewater goby	FE/None	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County, to the mouth of the Smith River	Not expected to occur. Suitable brackish water habitat for this species is absent from the BSA.
Oncorhynchus kisutch pop. 4	coho salmon - central California coast ESU	FE/SE	Streams and small freshwater tributaries during first half of life cycle and estuarine and marine waters of the Pacific Ocean during the second half of life cycle. Spawns in small streams with stable gravel substrates.	Low potential to occur. The BSA supports suitable habitat for this species in the San Lorenzo River and its tributaries (including Newell Creek) and a few individuals were observed in Bean Creek and Zayante Creek in 2005, but overall few coho have been observed in the watershed in recent years (City, in preparation). The upper reach of Newell Creek is considered inaccessible to coho due to a natural bedrock sheld approximately 0.7 mile downstream of Newell Creek Dam that acts as a movement barrier (HES 2017; City, in preparation).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Oncorhynchus mykiss irideus pop. 8	steelhead - central California coast DPS	FT/None	Coastal basins from Redwood Creek south to the Gualala River, inclusive; does not include summer-run steelhead	Moderate potential to occur. This species has historically occurred within the San Lorenzo River and tributaries that overlap the BSA, and is known to occur in Newell Creek (CDFW 2021c). However, there are several barriers to passage from the lower San Lorenzo River to the segments that cross or overlap the BSA (e.g., bedrock shelf 0.7 mile downstream of Newell Creek Dam, shallow riffles in vicinity of Tait Diversion and Henry Cowell State Park, Felton Diversion Dam) (HES 2014; City, in prep.)and high flow events would be needed for this species to travel upstream.
Thaleichthys pacificus	eulachon	FT/None	Found in Klamath River, Mad River, and Redwood Creek and in small numbers in Smith River and Humboldt Bay tributaries	Not expected to occur. The BSA is outside the known distribution of this species.
Mammals				
Antrozous pallidus	pallid bat	None/SSC	Grasslands, shrublands, woodlands, forests; most common in open, dry habitats with rocky outcrops for roosting, but also roosts in man-made structures and trees	Moderate potential to roost and forage. The BSA contains suitable woodland and forest habitat with dense stands of trees for foraging and roosting, however rocky outcrops, the preferred roosting substrate for this species, are absent from the BSA. The nearest CNDDB occurrence is approximately 3 miles northwest of the BSA.

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Corynorhinus townsendii	Townsend's big-eared bat	None/SSC	Mesic habitats characterized by coniferous and deciduous forests and riparian habitat, but also xeric areas; roosts in limestone caves and lava tubes, man-made structures, and tunnels	Moderate potential to roost and forage. The BSA supports suitable coniferous forest and riparian habitat for this species, however preferred roosting substrate (limestone caves and lava tubes) are absent from the BSA. However, several buildings and bridges over stream crossings within the BSA may provide suitable roosting substrate for this species. The nearest CNDDB occurrence is approximately 3.5 miles southeast of the BSA (CDFW 2021c).
Lasiurus blossevillii	western red bat	None/SSC	Forest, woodland, riparian, and orchards, including fig, apricot, peach, pear, almond, walnut, and orange; roosts in tree canopy	Moderate potential to roost and forage. The study area supports suitable forest and woodland habitat for this species. There are no CNDDB occurrences in the vicinity but bats are poorly represented in the CNDDB.
Dipodomys venustus venustus	Santa Cruz kangaroo rat	None/Special Animals	Shrub communities on sandy soils in the Santa Cruz Mountains, including silverleaf manzanita chaparral.	High potential to occur. The Graham Hill Road North alignment bisects one of the two CNDDB occurrences atop Mount Hermon. Suitable silverleaf manzanita chaparral habitat is also present adjacent to the Newell Creek Road and Glen Arbor Road Proposed Project alignments.
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat	None/SSC	Forest habitats with a moderate canopy and moderate to dense understory	High potential to occur. Numerous woodrat middens were observed within the BSA during biological surveys, and suitable forest habitat for this species occurs throughout the BSA. However, it is not possible to discern N. fuscipes and N. fuscipes annectens species phenotypically, although the BSA does fall within the historic range of N. fuscipes annectens. The nearest CNDDB occurrence is approximately 4.75 miles southwest of the BSA (CDFW 2021c).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Taxidea taxus	American badger	None/SSC	Dry, open, treeless areas; grasslands, coastal scrub, agriculture, and pastures, especially with friable soils	Not expected to occur. The BSA supports limited open grassland or agriculture habitat as required for this species. Existing grassland habitat within the BSA is heavily disturbed (i.e., previously used as Christmas tree farms or for horseback riding), and immediately surrounded by urban/residential development. The nearest CNDDB occurrence is approximately 1.3 miles southwest of the BSA (CDFW 2021c).
Invertebrates				
Bombus crotchii	Crotch bumble bee	None/PSE	Open grassland and scrub communities supporting suitable floral resources.	Low potential to occur. The BSA supports limited open grassland with suitable floral resources; potentially suitable scrub communities are prevalent, however. There are no documented CNDDB occurrences of this species within 5 miles of the BSA (CDFW 2021c).
Bombus occidentalis	western bumble bee	None/PSE	Once common and widespread, species has declined precipitously from central California to southern British Columbia, perhaps from disease	Low potential to occur. The BSA supports limited open grassland with suitable floral resources; potentially suitable scrub communities are prevalent, however. The nearest CNDDB occurrence is a 1998 specimen collection approximately 0.65 mile southwest of the Pipeline Road section (CDFW 2021c; No. 309).
Cicindela ohlone	Ohlone tiger beetle	FE/None	Remnant native grasslands with California oatgrass (Danthonia californica) and purple needlegrass (Stipa pulchra) in Santa Cruz County	Not expected to occur. The BSA does not support suitable native grassland habitat. The nearest CNDDB occurrence is approximately 0.6 miles southwest of the Graham Hill Road section, where adults were observed from 2000 to 2004 (CDFW 2021c; No. 1).

Scientific Name	Common Name	Status (Federal/State)	Primary Habitat Associations	Potential to Occur
Polyphylla barbata	Mount Hermon (=barbate) June beetle	FE/None	Known only from sand hills in vicinity of Mount Hermon, Santa Cruz County	High potential to occur. Known to occur in BSA along Graham Hill Road section (CDFW 2021c). This species is likely to occur in portions of the BSA with Zayante sand soil (including transition soils) as well as adjacent sandy loam soils, including developed and paved areas.
Euphilotes enoptes smithi	Smith's blue butterfly	FE/None	Sand dunes, scrub, chaparral, grassland, and their ecotones	Not expected to occur. The BSA does not support suitable habitat for this species.
Trimerotropis infantilis	Zayante band-winged grasshopper	FE/None	Isolated sandstone deposits in the Santa Cruz Mountains (the Zayante Sand Hills ecosystem)	Moderate potential to occur. Open areas of silverleaf manzanita chaparral within the Newell Creek Road and Graham Hill Road North sections of the BSA are moderately suitable. Within the Project area at these locations, there is limited habitat in road turnouts on Zayante soils adjacent to suitable habitat; these areas feature loose sand soil and open canopies as well as sparse herbaceous vegetation suitable for the species. Remaining sections of the BSA provide low-quality habitat or are unsuitable (i.e., Glen Arbor Road section).

Notes: BSA = Biological Study Area; CNDDB = California Natural Diversity Database; USGS = U.S. Geological Survey; ESU = Evolutionarily Significant Unit, DPS = Distinct Population Segment.
Status Legend
Federal
BCC: Bird of Conservation Concern
FC: Candidate for federal listing as threatened or endangered
FDL: Federally delisted; monitored for 5 years
FE: Federally listed endangered
FT: Federally listed as threatened
State
PSE: Proposed state listing as endangered
SDL: State delisted
SSC: Species of Special Concern
FP: California Department of Fish and Wildlife Protected and Fully Protected Species
SE: State listed as endangered
ST: State listed as threatened

References

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