

Biotic Resources Group

Biotic Assessments ♦ Resource Management ♦ Permitting

APN 101-041-09

1200 GRANITE CREEK ROAD, SANTA CRUZ

Oak Woodland and Riparian Corridor Restoration Plan

Updated, August 6, 2024



Prepared By

Biotic Resources Group
Kathleen Lyons, Plant Ecologist

1.0 BASIS FOR RESTORATION

1.1 Summary of Project and Restoration Requirements

APN 101-041-09 is an approximately 7.8-acre parcel located at 1200 Granite Creek Road in the unincorporated area of Santa Cruz County (**Figure 1**). The property is located outside of the County’s rural and urban service lines and outside the coastal zone. The project area supports a mosaic of mixed evergreen forest, oak woodland, grassland/scrub, as well as recently created bare areas. Also present is an unnamed ephemeral drainage that traverses the parcel; this drainage empties into nearby Granite Creek. The County GIS shows mapping of biotic resources within the westernmost edge of the property. As depicted on **Figure 2**, these are aquatic resources associated with Granite Creek.

In 2022, prior to the landowner receiving a development permit from the County, grading and tree/vegetation removal occurred. The County issued a “red-tag”, indicating that grading and tree removal was a violation of County Code as oak woodland, a sensitive habitat, was affected. In addition, the County indicated that the riparian corridor along the ephemeral drainage was affected. The County requested that the disturbed areas be stabilized and treated for erosion control. The County also requested the landowner prepare a plan to restore oak woodland and the riparian corridor to resolve the violation.

An Erosion Control and Grading Mitigation Plan was prepared for disturbed areas in fall 2022 (*Boyd Residence Erosion Control/Grading Mitigation Plan*, Ramsey Civil Engineering, Inc, dated 10/6/22) and the site stabilization measures and erosion control measures were installed in October/November 2022. An updated Erosion Control and Grading Mitigation Plan was prepared in on May 9, 2023. An Oak Woodland and Riparian Corridor Restoration Plan was prepared in July 2023 (BRG, 2023) based on grading mitigation identified in this most current plan (*Boyd Residence Erosion Control/Grading Mitigation Plan*, Ramsey Civil Engineering, Inc, dated 5/9/23). This plan identified the restoration of the pre-disturbed woodland and the ephemeral drainage.

Since submittal of the Oak Woodland and Riparian Corridor Restoration Plan to the County in July 2023, the applicant has prepared plans for residential development on the parcel (*Improvement Plans for Boyd Residence*, Ramsey Civil Engineering, Inc, dated 2/27/24). The County requested the applicant update the Oak Woodland and Riparian Corridor Restoration Plan to incorporate the residential development.

This updated Oak Woodland and Riparian Corridor Restoration Plan (Plan), as presented herein, identifies restoration of the pre-disturbed woodland and the ephemeral drainage; however, it excludes the areas designated for residential development. The Plan includes outlines restoration of oak woodland affected by the previous disturbance as well as restoration of additional areas to compensate for impacts from the residential development, as allowed under County Code. According to County Code, development activities shall conform to permitted uses and impacts to sensitive habitat be avoided. If development occurs within any sensitive habitat area the County requires projects mitigate significant environmental impacts and restoration of any area which is degraded sensitive habitat or has caused or is causing the degradation, with restoration commensurate with the scale of the development. The landowner is responsible for implementing this Plan.

1.2 Impacts to Oak Woodland

Disturbance, Circa 2022. On the subject parcel, approximately 1.09 acres of oak woodland were altered by unauthorized grading and vegetation removal in/around 2022. An unknown number of trees were removed from forested areas; however, recently cut tree stumps and a large pile of cut

and split wood provide field evidence of substantial tree and/or limb removal. Most of the disturbed area was devoid of vegetation and/or was subject to restorative grading and erosion control seeding in fall 2022.

Proposed Residential Development. The proposed residential development will affect areas previously identified as supporting oak woodland, as well as undisturbed oak woodland. Grading for the driveway, storage structure, house and ADU will affect approximately 16,200 square feet (0.37 acre) of previous oak woodland. The new septic leach line/leach field will affect approximately 2,400 square feet (0.05 acre) of existing oak woodland. Total impact to oak woodland is approximately 0.42 acre. Six trees will be removed.

1.3 Impacts to Riparian Corridor

On the subject parcel, an ephemeral drainage traverses the parcel. The County of Santa Cruz's Riparian Ordinance defines a riparian corridor along ephemeral streams outside the urban/rural services line as the lands within the stream channel, including the stream and the area encompassing the streams main rainy season (bankfull) flowline. If riparian woodland exists, the riparian area surrounding the corridor extends outward to encompass the riparian vegetation. On the subject parcel, the ephemeral drainage is approximately 200 linear feet, with an average width between the bankfull flow lines of 1.5 feet. The stream crosses an existing dirt road, which has been recently rocked for erosion control. The stream channel was devoid of vegetation when observed in November 2022 and June 2023 and there was field evidence of winter flow to the bankfull line (approximately 6 inches above the channel bed). No adjacent riparian vegetation was observed along the drainage; adjacent upland vegetation is oak woodland and mixed evergreen forest. These adjacent upland slopes were seeded for erosion control in fall 2022.

1.4 County of Santa Cruz Resolution of Violation

To resolve the alleged violation the County of Santa Cruz requested the restoration of the previously-disturbed oak woodland and the riparian corridor. To meet this County requirement, an Oak Woodland and Riparian Corridor Restoration Plan was prepared in July 2023 (BRG, 2023) based on grading mitigation identified in this most current plan (*Boyd Residence Erosion Control/Grading Mitigation Plan*, Ramsey Civil Engineering, Inc, dated 5/9/23). This plan identified the restoration of the pre-disturbed woodland and the ephemeral drainage.

The applicant prepared plans for residential development on the parcel (*Improvement Plans for Boyd Residence*, Ramsey Civil Engineering, Inc, dated 2/27/24) and the County requested the applicant update the Oak Woodland and Riparian Corridor Restoration Plan to incorporate the residential development. This updated Plan provides restoration of the previously disturbed areas located outside the residential development area, provides restoration of additional areas to compensate for impacts to the oak woodland from the proposed residential development, and provides restoration/rehabilitation plantings along the ephemeral stream.

1.5 Summary of Restoration

Oak Woodland. The Plan provides approximately 1.0 acre of oak woodland restoration. Woodland restoration will occur on slopes where vegetation was previously removed, areas temporarily disturbed by residential construction, and open areas that are suitable for oak woodland restoration. The restoration areas are located adjacent to undisturbed oak woodland, mixed evergreen forest, and grassland/scrub. All oak restoration will occur a

minimum of 30-feet outward from structures. The Plan identifies three types of oak woodland restoration:

1. Active Restoration Outside 100-foot Management Area (approximately 0.2 acre). This restoration will occur in areas that are devoid of most vegetation and active planting is required for woodland recovery. In these areas container stock plants will be installed and natural regeneration encouraged. There will be no restriction on tree/shrub density or cover. The container stock plantings will receive three years of supplemental irrigation, after which the installed plants will rely on natural soil moisture for sustenance. Invasive, non-native plant species will be removed/controlled from these areas.
2. Active Restoration Within 100-foot Management Area (approximately 0.2 acre). This restoration will occur in areas that are devoid of most vegetation and active planting is required for woodland recovery. In these areas container stock plants will be installed and natural regeneration encouraged; however, tree/shrub plantings will be spaced to avoid fuel laddering and volunteer plants will be controlled to minimize fuel laddering. The container stock plantings will receive three years of supplemental irrigation, after which the installed plants will rely on natural soil moisture for sustenance. Invasive, non-native plant species will be removed/controlled from these areas.
3. Passive Restoration Areas (approximately 0.6 acre). Passive restoration will occur in areas where plant recovery is already occurring and/or woodland features are expected to naturally recover within a 5-year timeframe. For restored areas within the 100-foot fuel management area, tree and shrubs are allowed to be thinned/controlled to minimize fuel laddering. All passively restored areas will be subject to maintenance and monitoring, including the removal/control of invasive, non-native plant species.

The Plan specifies maintenance and monitoring of the restored oak woodland areas for a minimum of 5 years after project initiation (or longer until success criteria are met).

Riparian Corridor. The Plan provides approximately 0.02 acre of ephemeral riparian corridor restoration/rehabilitation. Riparian corridor restoration/rehabilitation will occur in an approximately 2-foot wide swath along each side of the ephemeral stream. The riparian restoration areas are located adjacent to oak woodland and mixed evergreen forested slopes. The restoration will consist of the installation of container stock plantings at/near the bankfull flow line. The container stock plantings will receive three years of supplemental irrigation, after which the installed plants will rely on natural soil moisture for sustenance. The restored riparian corridor area will be subject to maintenance and monitoring, including the removal/control of invasive, non-native plant species. The Plan specifies maintenance and monitoring of the restored riparian corridor area for a minimum of 5 years after project initiation (or longer until success criteria are met).

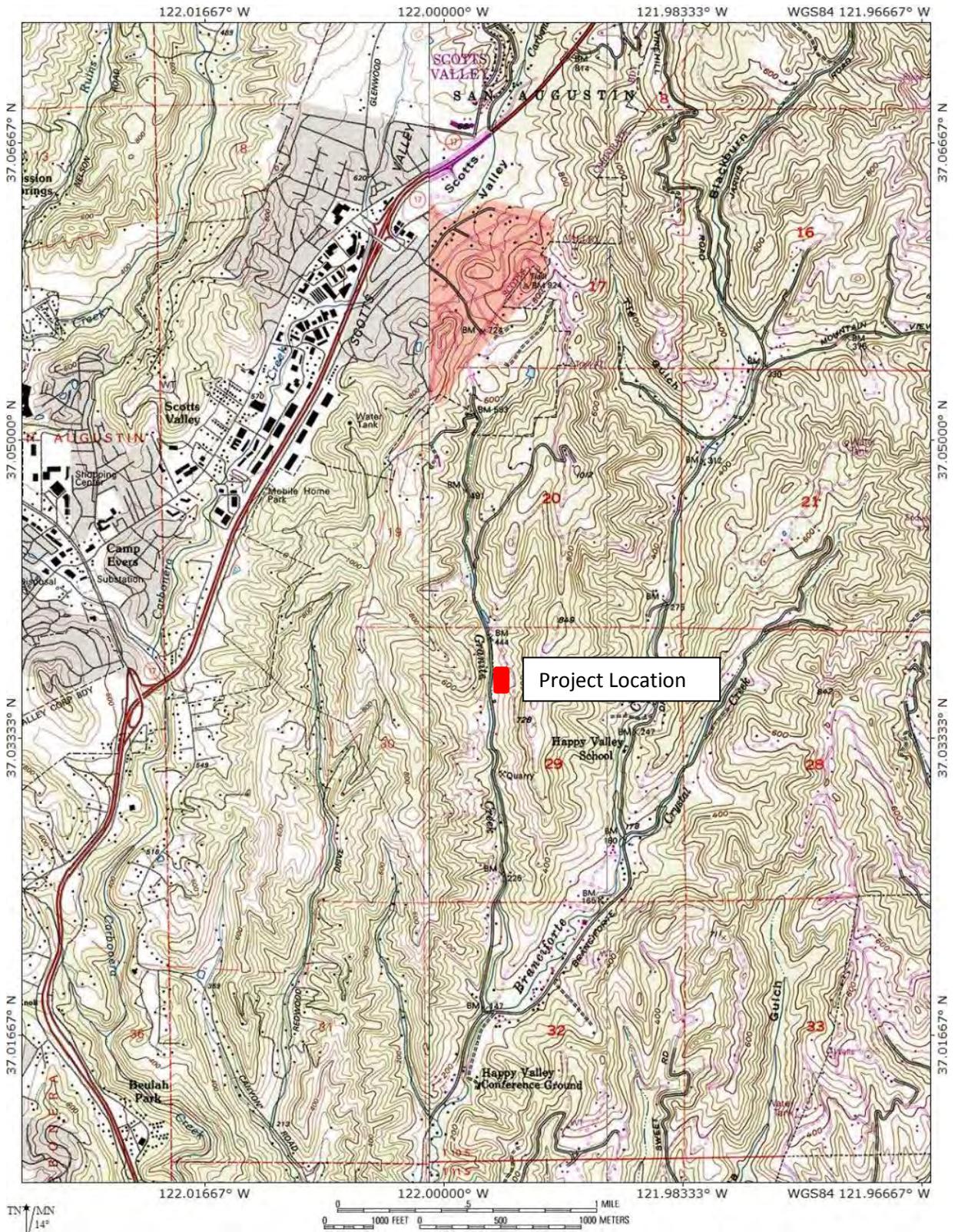
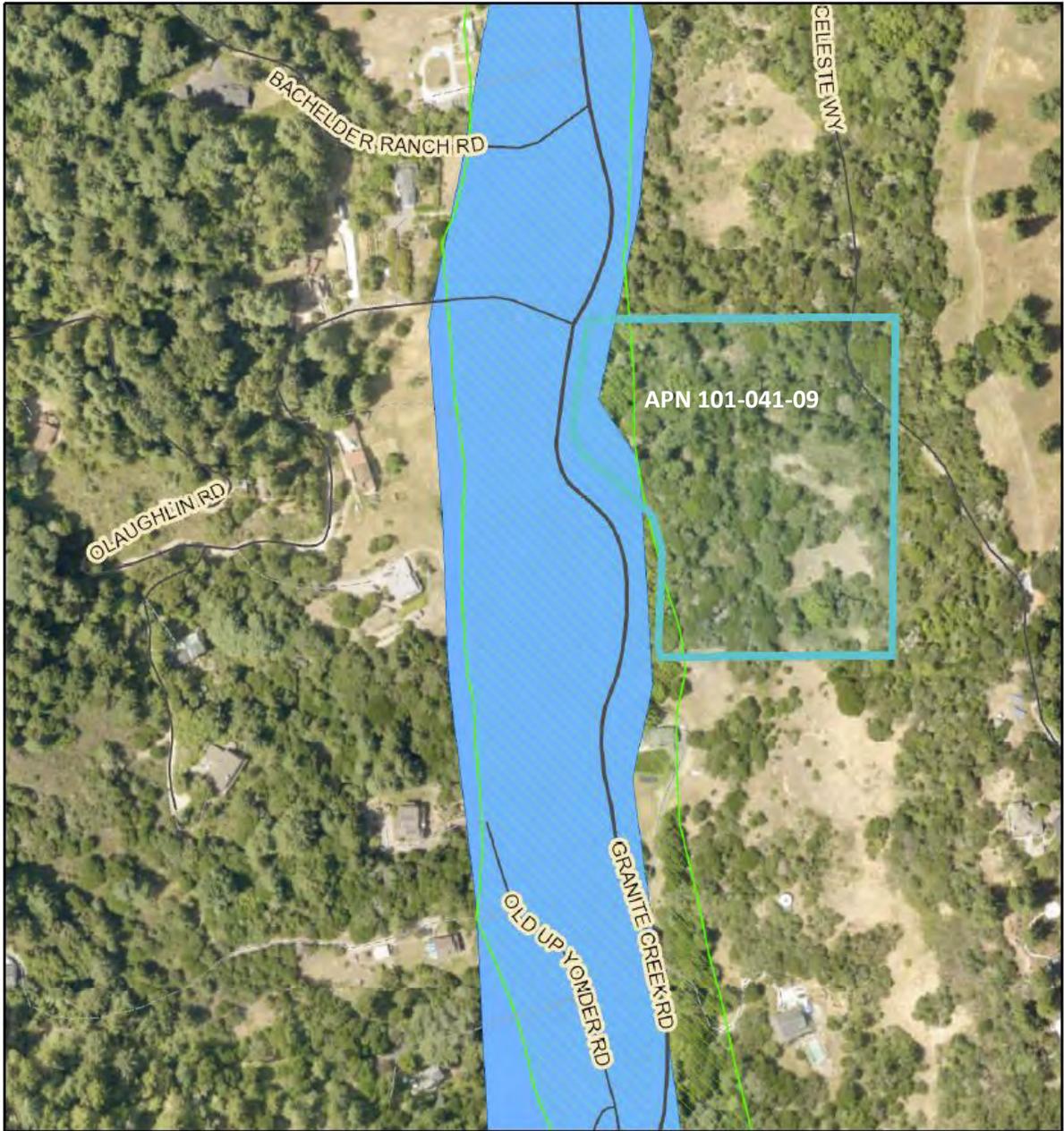


Figure 1. Project Location on USGS Laurel Quadrangle Topographic Map



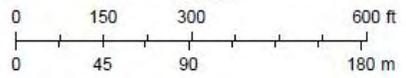
May 15, 2023

1:3,240

Biotic Resources

 Biotic Resources

 Terrestrial
 Aquatic



Santa Cruz County Biotic Data

 Undetermined
 Plant
 Animal

County of Santa Cruz

Figure 2. County of Santa Cruz GIS Map, showing Parcel and Location of County-Mapped Biotic Resources

2.0 OAK WOODLAND RESTORATION AREA

The area subject to oak woodland restoration are those locations that supported oak woodland prior to the land disturbance in 2022 as well as open areas that are suitable for oak woodland establishment. As a pre-disturbance vegetation type map was not available, aerial photos were used to generate a pre-disturbance condition map. Using the limits of disturbance, as portrayed on the Erosion Control and Grading Mitigation Plan (*Boyd Residence Erosion Control/Grading Mitigation Plan*, Ramsey Civil Engineering, Inc, dated 10/6/22), oak woodland areas were determined. The Plan identifies restoration activities in areas mapped as supporting oak woodland prior to the 2022 disturbance (excluding areas of the residential development), as well as additional areas to provide compensation for removal of existing/pre-existing oak woodland for the residential development.

2.1 Distribution of Oak Woodland Prior to Disturbance

To determine to extent of oak woodland on the property prior to disturbance, existing mapped data and aerial photos were reviewed. The Santa Cruz County GIS for APN 101-041-09 was also reviewed. The County's GIS does not depict the presence of any sensitive habitat on the property; however, fishery resources are noted for Granite Creek. The pre-disturbance extent of oak woodland was investigated through aerial photo review/interpretation and field observations. Aerial images from Google Earth (2007, 2014, 2016, 2017, 2021), Santa Cruz GIS (2020), and site observations were used to ascertain the pre-disturbance distribution of vegetation types. Based on aerial photo imaging, coupled with field observations. four vegetation types were distinguished in the disturbed area: oak woodland, mixed evergreen forest, redwood grove, and grass/scrub. **Figure 3** shows the approximate distribution of vegetation types prior to the land disturbance. The location of existing trees from a survey map prepared by Ramsey Engineering are also depicted on **Figure 3**. **Figure 4** shows aerial images from 2007 to 2020 that depict the mosaic of vegetation types on the property; these images were used in developing **Figure 3**.

2.2 Oak Woodland Restoration Areas

As shown in green on **Figure 3**, several areas supported oak woodland prior to the 2022 disturbance. The level of disturbance varied onsite, from minor to major. Minor disturbance areas were subject to understory cutting and tree limbing, yet the oak overstory and natural ground surface is intact. Major disturbance areas were subject to ground clearing disturbances, such as grading, as well as tree removal and, in some areas a thick application of wood chip mulch. The residential development will also impact oak woodland. The oak woodland impact map is shown on **Figure 5**.

Active Restoration Areas. In areas of major disturbances (i.e., areas where trees were removed and/o the ground surface altered by grading), active restoration actions will occur. These restoration actions include installation of native trees and shrubs, encouraging natural plant colonization and recovery, and controlling invasive non-native plant species. Areas subject to active restoration are depicted on **Figure 6**.

Passive Restoration Areas. In areas of minor disturbances (i.e., areas where oak trees were retained, yet understory vegetation was cut and tree limbs removed, and the proposed septic leach line/leach field), passive restoration actions will occur. These restoration actions include monitoring natural plant colonization and recovery and controlling invasive non-native plant species. Natural recovery has already occurred in some areas, as evidenced by the re-growth of herbaceous plants and stump -sprouting of cut shrubs and trees. Areas subject to passive restoration are depicted on **Figure 6**.

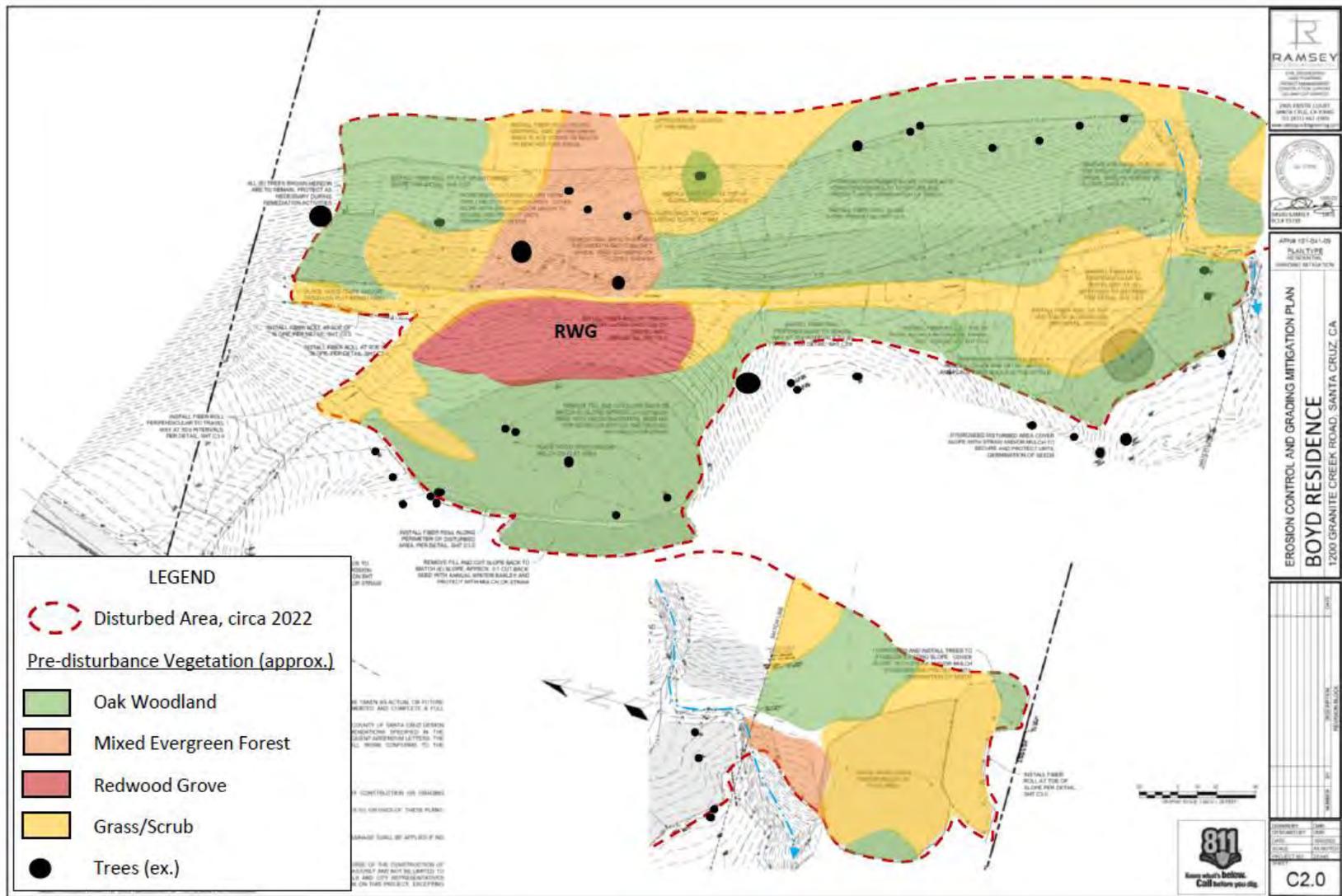


Figure 3. Distribution of Pre-disturbance Vegetation Types

2003



2007



2016



2020



Figure 4. Aerial Photo Review
(showing mosaic of vegetation types on property)

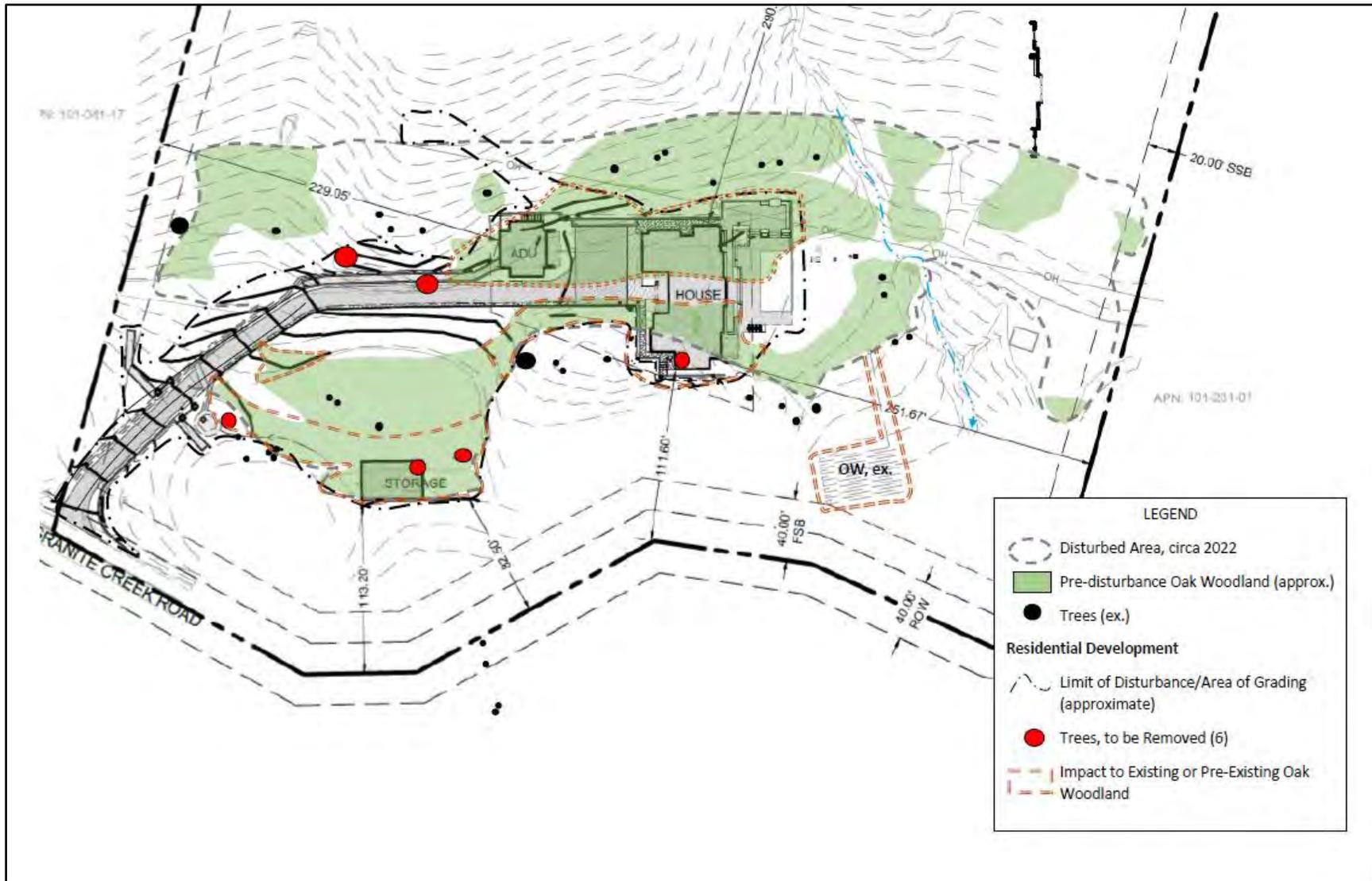


Figure 5. Oak Woodland Impact Map

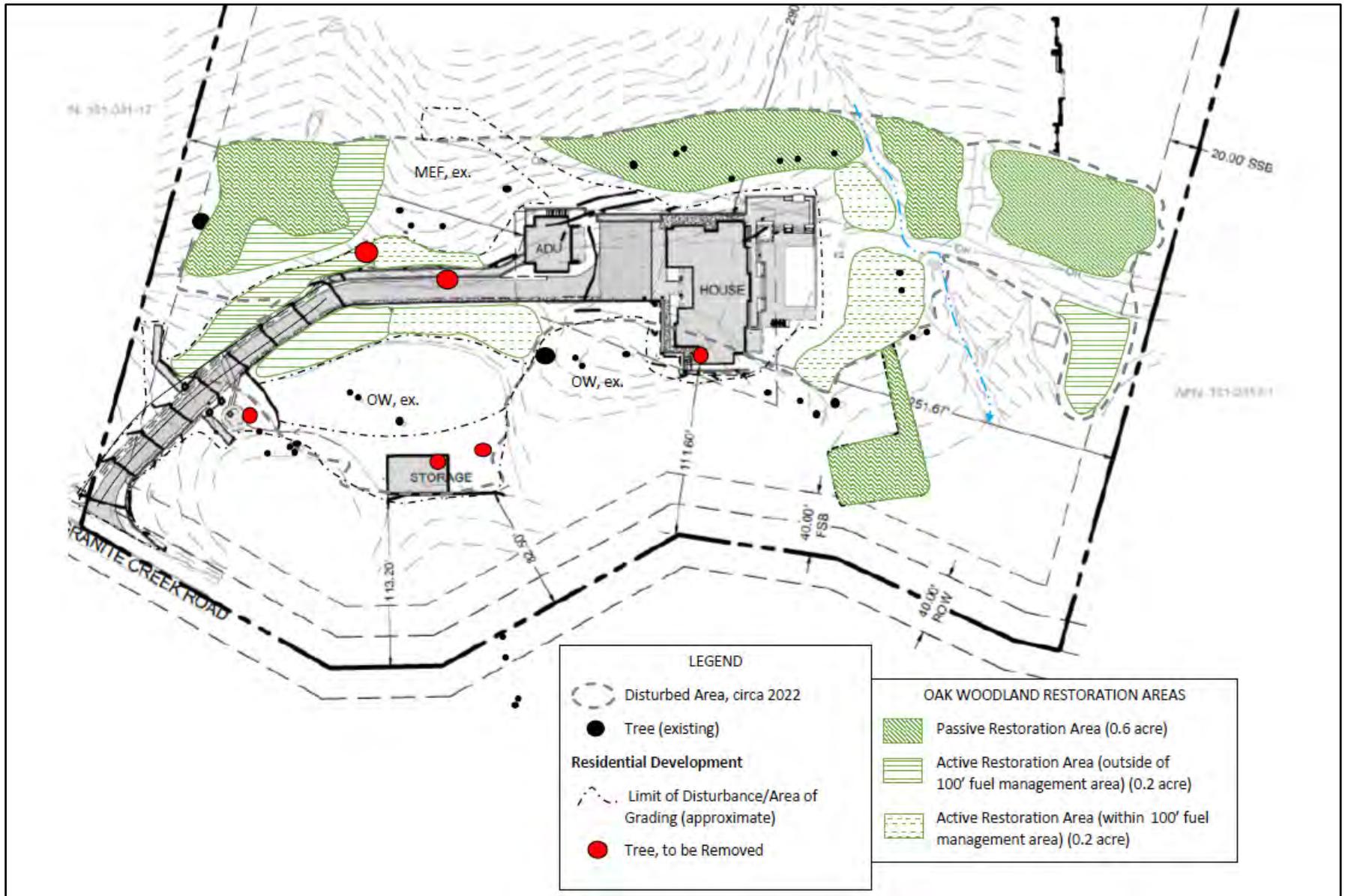


Figure 6. Oak Woodland Restoration Areas



Figure 7. Major disturbance area: oak woodland area graded and hydroseeded for erosion control
On Left: November 2022; On Right: June 2023



Figure 8. Minor disturbance area: oak woodland with modified understory, November 2022



Figure 9. Minor disturbance area: natural recovery of oak woodland understory, November 2022

2.4 Habitat Value of Oak Woodland

The oak woodland intermixes with mixed evergreen forest, as well as areas supporting grasses and shrubs. A review of pre-disturbance aerial images shows a dense tree canopy on most of the parcel, yet there are grassy openings and areas of scrub. An old road traverses the property, which is thought to have been the old alignment of Granite Creek Road (Boyd, pers. comm, 2022). Field observations in fall 2022, found a mosaic of tree and shrub species within intact woodland/forest as well re-sprouting plants in the previously-disturbed areas. Tree cover is co-dominated by coast live oak (*Quercus agrifolia*) and interior live oak (*Q. wislizenii*), with lesser amounts of Douglas fir (*Pseudotsuga menziesii*), coast redwood (*Sequoia sempervirens*), madrone (*Arbutus menziesii*), buckeye (*Aesculus californica*), and California bay (*Umbellularia californica*). Non-native tree species are also present, such as acacia (*Acacia sp.*). Understory vegetation was sparse in the previously-disturbed areas; however, sprouts of some shrubs were evident, including California blackberry (*Rubus ursinus*), sticky monkey flower (*Diplacus aurantiacus*), coast redwood, madrone, hairy honeysuckle (*Lonicera hispidula*), and California polypody (*Polypodium californicum*). Invasive, non-native understory plants were also observed, including French broom (*Genista monspessulana*), crofton weed (*Ageratina adenophora*), and bull thistle (*Cirsium vulgare*).

The value of the disturbed oak woodland to wildlife is moderated due to the tree removal, tree limbing, sparse tree cover, and lack of native understory plants. Common wildlife species are expected to utilize the area, particularly those that can tolerate open areas and human activities associated with the vegetation removal, such as western fence lizard (*Sceloporus occidentalis*), acorn woodpecker (*Melanerpes formicivorus*), scrub jay (*Aphelocoma californica*), chestnut-backed chickadee (*Poecile rufescens*), and western gray squirrel (*Sciurus griseus*).

2.5 Habitat Connectivity Value

The present use of the property is open space and residential storage. A shed holding heavy equipment is present and there is a large pile of cut wood. A dirt/gravel road traverses the property, providing vehicular access through the site. A residential development will include a new driveway, house, and accessory dwelling unit (ADU).

The existing oak woodland, mixed evergreen forest and grassland/scrub areas support a mixture of native plant species and provide habitat connectivity to adjacent undeveloped parcels. All species are considered common to the region and no special status species have been observed, or have been recorded, from the project area. A review of the County's GIS and the California Natural Diversity Data Base found records of several species within close proximity to the parcel; however, none are expected to occur within the oak woodland.

3.0 RIPARIAN CORRIDOR RESTORATION AREA

The area subject to riparian corridor restoration is located along both sides of the ephemeral stream upstream and downstream of the existing road crossing. The plantings will occur at or near the bankfull location. The Plan identifies riparian corridor restoration along approximately 200 linear feet of channel for a planting area of approximately 0.2 acre. These actions will rehabilitate the ephemeral streams' riparian corridor and increase its riparian resource values. The riparian corridor restoration area is shown on **Figure 10**. The character of the areas to be rehabilitated is depicted in **Figure 11** and **Figure 12**.

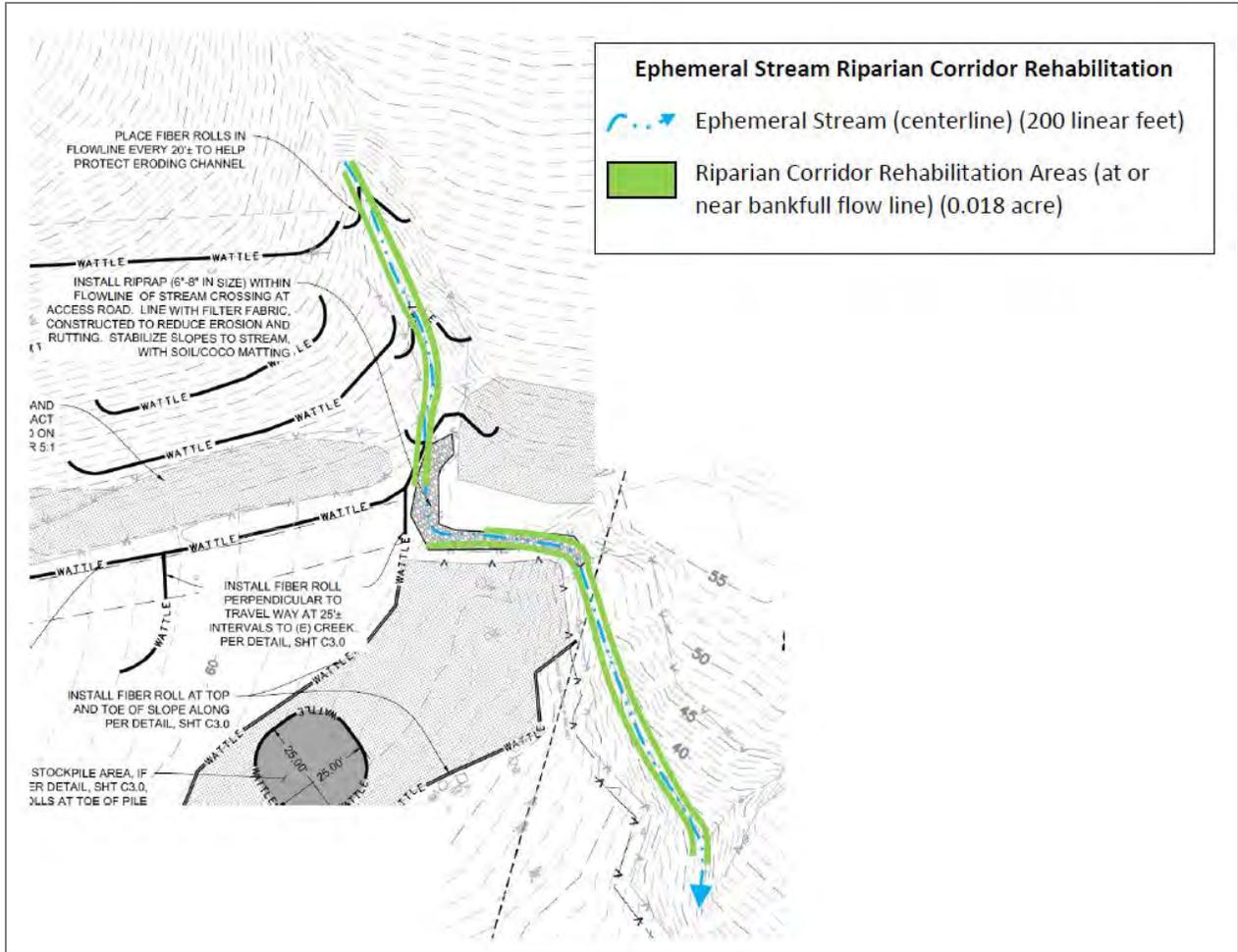


Figure 10. Ephemeral stream riparian corridor rehabilitation area



Figure 11. Character of ephemeral stream upstream of existing road crossing, June 2023



Figure 12. Character of ephemeral stream downstream of existing road crossing, June 2023

4.0 RESTORATION ACTIVITIES

4.1 Restoration Goals

- 1) Restore native oak woodland vegetation within areas previously supporting the resource (excluding residential development area) and other suitable areas to provide the following woodland functions: cover and forage for native wildlife and native oak woodland plant cover. Restore oak woodland through both passive and active restoration activities.
- 2) Rehabilitate the ephemeral stream riparian corridor to provide the following riparian functions: cover along the stream channel for native wildlife and native riparian plant cover. Restore riparian corridor through active restoration activities.
- 3) For active restoration, install locally-native vegetation that can persist in winter-wet and summer-dry site conditions. Provide supplemental irrigation in Years 1-3, or longer if there is an unseasonable drought or other unforeseen circumstance that requires a longer irrigation period.
 - (a) Utilize plant propagules collected from on-site, from the Granite Creek watershed, and/or Santa Cruz County in the revegetation efforts. Obtain container stock plants from native plant nurseries that employ Best Management Practices (BMP's) that control or eliminate the diseases caused by *Phytophthora ramorum*, as outlined by the California Oak Mortality Task Force.
 - (b) Maintain a minimum of 80% survival of installed plants (by species) in Years 1-5. Install replacement plants as needed to meet yearly survival rates. If substantial replanting is necessary, the maintenance and monitoring period may need to be extended so that each plant is maintained and monitored for 5 years.
- 4) For passive oak woodland restoration areas, conduct a baseline documentation of woody plant cover in Year 1. Measure woody plant cover each year and achieve a trend of increasing woody plant cover in Year 2-5. If woody cover does not increase each year, implement remedial measures, such as plant installation.
- 5) Within passive and active restoration areas, control cover of target invasive weeds (e.g., crofton weed, thistles, French broom, and others) to less than 5% in Years 1-5.
- 6) Maintain and monitor the restoration areas annually for a minimum of 5 years; extend maintenance and monitoring beyond Year 5 if Year 5 performance standards and success

criteria are not met. Submit annual reports to Santa Cruz County Community Development and Infrastructure Department by December 31 of each monitoring year, and to other agencies at the dates specified in permits.

4.2 Active Restoration Area Actions

The location of areas subject to active oak woodland restoration are shown on **Figure 6**. The active oak woodland restoration areas encompass 0.4 acre. The location of areas subject to active ephemeral stream riparian corridor rehabilitation restoration are shown on **Figure 10**. The active riparian corridor restoration area encompasses 0.02 acre.

Site Preparation. Prior to planting all inorganic materials shall be removed from the restoration area(s), if present. Pre-planting weed control shall also be done, which shall include removal of non-native trees (i.e., acacia), shrubs (i.e., French broom), and weedy forbs (i.e., thistles, crofton weed). Some restoration areas currently support a layer of wood chips or straw. This mulch will need to be removed from each plant-installation site; however, it can be re-used as mulch within planting basins. Where natural plant recovery of trees and shrubs is observed wood chip mulch will be removed from a minimum 3-foot area around the plant.

Planting List. The active oak woodland restoration areas will be accomplished by the installation of container stock plants, with plantings installed 6-15 feet on -center. **Table 1** lists the plant species to be installed, propagule size, and spacing. **Table 1** also lists the hydroseeded erosion control seed mix that was applied to some areas in November 2022. **Table 2** lists the plant species to be installed within the ephemeral stream riparian corridor. The tree and shrub plantings will have root and foliage protectors to reduce browse damage. Each planting will also have a mulched planting basin. A temporary, above-ground drip irrigation system or hand watering will be used to provide supplemental irrigation to the container stock plantings in Years 1-3.

Table 1. Plant Species for Active Oak Woodland Restoration Areas (0.4 acre)

Common Name and Botanical Name		Number of Plants	Size	Spacing (feet)
Trees				
Coast Live Oak	<i>Quercus agrifolia</i>	47	1 gallon	15
Interior Live Oak	<i>Quercus wislizenii</i>	22	1 gallon	15
CA Buckeye	<i>Aesculus californica</i>	22	1-gallon	15
Total Trees		91		
Understory Trees and Shrubs				
Hazelnut	<i>Corylus cornuta</i>	75	1 gallon	10
Blue elderberry	<i>Sambucus nigra</i>	35	1-gallon	10
Coffee Berry	<i>Frangula californica</i>	25	1 gallon	6
California Rose	<i>Rosa californica</i>	100	1 gallon	6
Coyote Brush	<i>Baccharis pilularis</i>	100	1 gallon	6
Toyon	<i>Heteromeles arbutifolia</i>	100	1 gallon	6
California Blackberry	<i>Rubus ursinus</i>	25	1 gallon	6
Total Understory Trees and Shrubs		460		
TOTAL		551		

Table 2. Plant Species for Active Ephemeral Stream Riparian Corridor Rehabilitation Area

Common Name and Botanical Name		Number of Plants	Size	Spacing (feet)
Creek Dogwood	<i>Cornus sericea</i>	13	1 gallon	15
Spreading Rush	<i>Juncus patens</i>	20	4" pot or 1-gallon	6
California Rose	<i>Rosa californica</i>	20	1 gallon	6
TOTAL		53		

Plant Installation. Container stock plants will be obtained from native plant nurseries. The nurseries will employ measures to control *Phytophthora*, as per current guidelines. At planting locations, holes will be hand-dug or created with a power auger. Planting holes will be a minimum 16 inches deep and wide to accommodate a 1-gallon size gopher basket and the 1-gallon container stock plantings. If larger container stock plants are obtained, larger gopher baskets and planting holes will be created. The gopher cages and container stock plantings will be installed and deep-irrigated.

A 3-inch high watering basin, approximately 2-feet in diameter will be constructed around each plant and a 3-inch layer of organic mulch will be placed in the basin. Mulch shall not be placed against the stem of the plant as that may cause bark suffocation or crown rot. An above-ground browse protection (deer cage) will be installed around all plants. Above ground cages will be made of 14- or 16-gauge welded wire (or equivalent), to form a 2-foot diameter circle and secured with two rebar stakes (or equivalent). Plants shall be deep-watered after installation. **Figure 13** depicts a typical container stock planting detail.

4.3 Passive Oak Woodland Restoration Area Actions

The location of areas subject to passive oak woodland restoration are shown on **Figure 6**. The active restoration areas encompass approximately 0.6 acre. Actions within these areas will be limited to removal and control of invasive, non-native plant species. Recovering native trees, shrubs, and groundcovers will be allowed to natural regenerate; native vegetation will not be thinned, pruned or otherwise cut within the passive restoration areas. Measures to remove and control invasive, non-native plant species is described in Section 4.0 Maintenance.

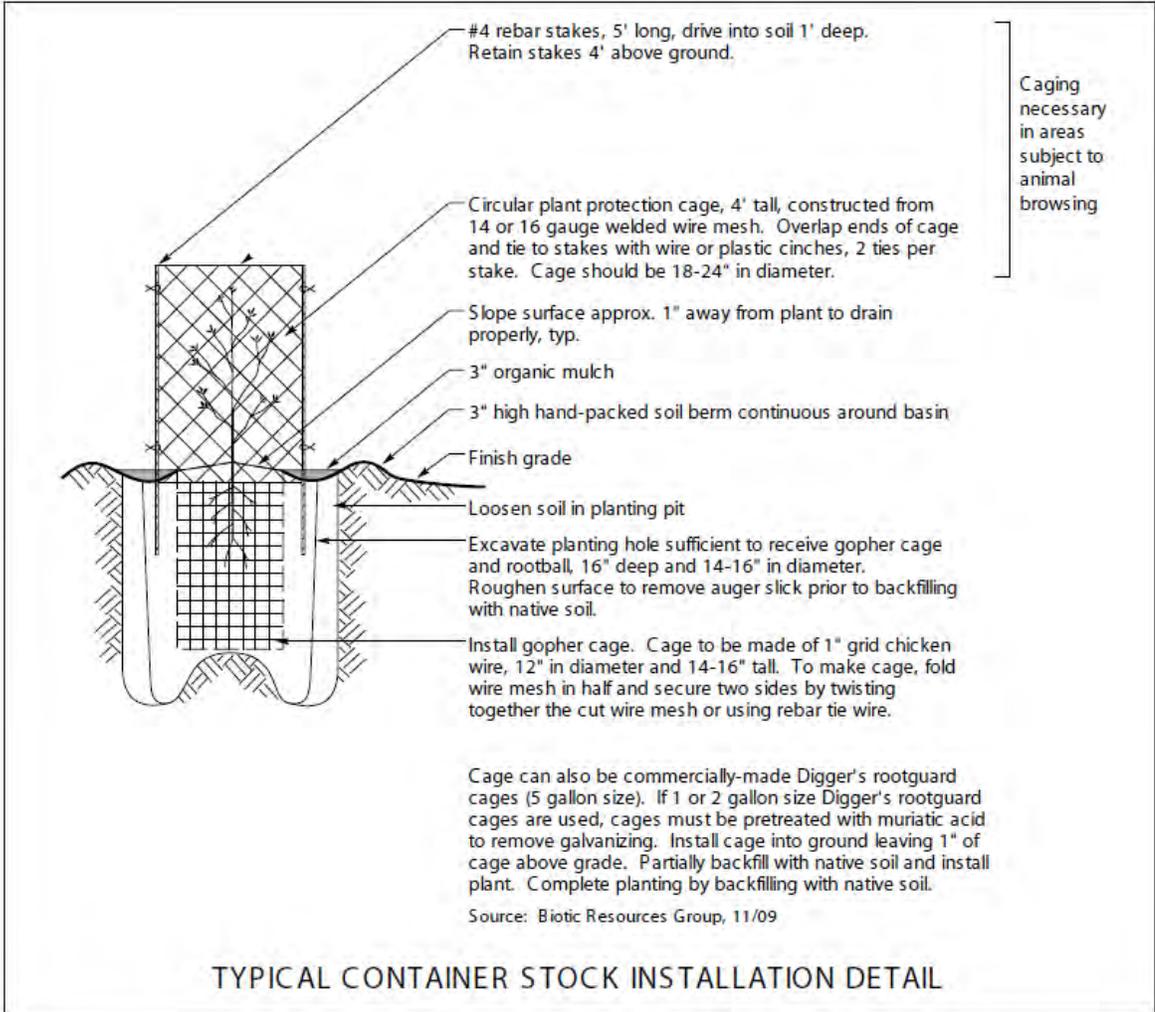


Figure 13. Typical Container Stock Detail

5.0 RESTORATION AREA MAINTENANCE

The goal for the restoration is to re-establish oak woodland and an ephemeral stream riparian corridor that will provide suitable and sustainable habitat for wildlife that will require limited maintenance in the long term. During the establishment period (Years 1-5) proper maintenance is especially important. When the habitat has established, maintenance efforts should be reduced; however, the restoration areas will be maintained in perpetuity. A specific establishment period maintenance program will be implemented for the first five years following initiation of passive and active restoration, as outlined in this document.

Maintenance efforts during Years 1-5 will consist primarily of invasive plant/weed removal, site upkeep, and temporary irrigation of installed plants. Some plant replacement may be necessary during the first five years. Plant replacement will be required at any time if plants die or are in significant decline (low vigor rating) due to injury from animals, drought stress, or other events. When plants are well established, maintenance efforts will consist of weed control and continued removal/control of invasive, non-native plant species. After Year 5, maintenance will likely be reduced to the periodic control/removal of invasive non-native plants and removal of above-ground browse protection cages.

5.1 Maintenance Actions

The landowner is responsible for the following tasks during the 5-year establishment period:

- 1) Conduct quarterly inspections of the restoration areas to document and implement maintenance needs.
- 2) Provide temporary irrigation for all plantings in Year 1-3. Provide supplemental irrigation to each plant May through October, or at other times if an unseasonable drought occurs during Years 1-3. Provide supplemental irrigation beyond Year 3 if plants become drought-stressed and plant survival is compromised.
- 3) In Years 1-3, remove weeds from the container stock planting basins at a minimum of once a month March to October. In Years 1-3, replenish organic mulch within each planting basin to retain 3-inch cover.
- 4) In Years 1-5, remove/control invasive, non-native plant species (as identified by Cal-IPC) that may establish within the compensation areas, including acacia (*Acacia sp.*), Italian thistle (*Carduus pycnocephalus*), bull thistle (*Cirsium vulgare*), French broom (*Genista monspessulana*), crofton weed (*Ageratina adenophora*), and any others detected during monitoring. Hand removal shall be utilized to remove and control the occurrence of these species. Individuals of invasive plant species shall be removed, with all flower/seed heads bagged and removed from the site.
- 5) After Year 5, the landowner shall preserve and manage the restoration areas in perpetuity, as per the Mitigation Plan goals. Each year, maintenance actions shall include removal of inorganic debris/trash and removal of invasive, non-native plant species.

5.2 Container Stock Maintenance

Weed Control and Mulching within Watering Basins. The watering basins around each container stock planting will be periodically weeded to remove unwanted plants. The basins will be routinely inspected and all weeds removed. The basins will be repaired expeditiously so irrigation water is directed to plant roots and does not run off. Organic mulch will be replenished within each basin to suppress weeds and to retain soil moisture.

Irrigation System Installation, Inspection and Maintenance. The plantings will be irrigated with either an above-ground drip system or hand watered. Watering should provide a slow, gentle soaking of the plants root zone. If a drip system is used, above-ground lateral lines and drip emitters will service each plant. The landowner will periodically inspect and repair the irrigation system to ensure it is in an operable condition at all times. Supplemental irrigation will be required in Years 1-3 and may cease after Year 3 if the following conditions are met: 1) the plant composition meets the criteria of the performance standards; and 2) the plants are deemed to be established and no longer in need of irrigation. When the irrigation system (if used) is no longer needed, the materials will be removed.

Plant Replacement/Replanting. Supplemental planting may be needed due to unforeseen events or factors, such as soil compaction, damage, or poor nursery stock. Supplemental planting needs will be assessed during the annual monitoring. The need for supplemental planting will be determined by monitoring field performance and comparing it to the performance standards. The number of replacement plants, the species, and the propagule/container size, will be determined by the monitor and stated in the annual monitoring report. Substitute species may be used if the original species consistently performs poorly and suitable alternative species perform well. However, substitute species should be consistent with the goals and objectives and be compatible with the criteria for success. The landowner will be responsible for contracting with a native plant nursery for the production of the required plants.

5.3 Pruning, Herbivore Protection, Insect Pest Control and Debris Removal

Pruning will not be required. Much more irregular and random plant growth is desirable in natural habitats than is typical for residential landscaping. Pruning will not be required for grooming plants. Most especially, pruning to clean the understory shrubs and low branches of trees will not be conducted.

If pruning is necessary, pruning will be limited to the barest minimum required to accomplish the following goals:

Promote healthy initial plant growth. Extremely unbalanced plant growth will be pruned only during the first five years after planting, and just enough to promote initial strong growth of trees and shrubs.

Repair storm damage or remove hazard. Storm damage, such as broken branches or fallen trees, will be cleaned up if they are deemed to compromise channel stability or capacity.

Above-ground browse protection cages will need maintenance if they are knocked over by animals or are otherwise damaged. Above-ground cages will be removed once plants reach the top of the cage, the plant is not expected to be severely impacted by animal browse, and it is determined no additional plant protection is needed.

Insect infestations, with the exception of California oakworm, will not be treated unless more than 5 to 10 percent of the trees or shrubs show significant damage. Insects are a primary food source for native birds, and once the habitats are functioning, the birds themselves will keep insects in balance. If this level of tolerance is exceeded and insects must be controlled, the landowner will develop an Integrated Pest Management (IPM), which will be implemented and the use of biological controls will be maximized. The California oakworm (*Phryganidia californica*) is one of many species of caterpillars that feeds on oaks. It is the most important oak-feeding caterpillar throughout its range, which extends along the coast and through the coastal mountains of California. Damage is most common on coast live oak. Trees under stress from drought or other factors may decline if defoliated; however, healthy

trees can tolerate oakworm damage. Because defoliating outbreaks usually last only 1 or 2 years, oakworms rarely cause repeated defoliations that can severely harm or kill otherwise healthy trees. Good cultural care of oaks is an essential component of integrated pest management and will enable trees to tolerate moderate levels of defoliation without harm. It is important to prevent physical injury to trunks and roots and avoid soil changes such as compaction or changes in the grade. As oakworm populations vary unpredictably year to year from very high to undetectably low, healthy oaks generally tolerate extensive loss of leaves (defoliation) without serious harm, so treatment to control oakworms usually is not recommended (Source: University of California IPM).

All non-organic debris will be removed and properly disposed of off-site during the entire 5-year establishment period. All organic debris such as leaves, dead branches, plants, and snags will be left in the restoration area to increase wildlife habitat and add organic matter to the soil.

5.4 Invasive, Non-native Plant Removal

The Plan identifies removal and control of plant species considered to be of significant management concern within the restoration area. In general, *noxious weeds* and *invasive plants* are adapted to establish on previously disturbed conditions, such as loose soils exposed by grading or on sites that have experienced a substantial habitat change from previous land uses. Invasive, non-native plants can be annual/biennial species, such as Italian thistle, that grow quickly and produce large amounts of seed, as well as perennial plants, such as French broom.

The removal of invasive, non-native plant species control should be timed to coincide with specific weather and plant growth conditions. Most invasive weed infestations can be effectively controlled when treatments are implemented prior to plant flowering, which reduces seed formation. Some biennial and perennial species are best treated after flowering, when plant nutrients are being expended and treatment actions can stress the plant, reduce its vigor, and inhibit its ability to reproduce. Other species may be best treated when they are focusing on drawing nutrients into the roots or stems for storage (i.e., English ivy, Himalaya blackberry).

The following species of concern have been observed on site: acacia, bull thistle, Italian thistle, French broom, and crofton weed. Others may be detected during monitoring and control efforts will need to be implemented, as needed.

- **Bull thistle** is usually a biennial, from Eurasia and **Italian thistle** (*Carduus pycnocephalus*) is usually an annual, both native to the Mediterranean area. Bull thistle mostly flowers in late spring through the summer of the second year, with seed viability ranging from 3 to 5 years. Italian thistle usually flowers from mid-April through May and seed viability ranges from 4-8 years. Italian thistle produces 2 types of seed; one seed type usually falls near the plant and the other seed type is carried by the wind. Both species of thistle may continue to produce flowers until soil moisture becomes too low. Both of these thistles reproduce only by seed. Bull thistle represents a greatest threat in areas with soil moisture continuing later into the summer and the plant can re-sprout from cut roots, if conditions are right. Bull thistle may continue to produce some flower heads well into the fall under good conditions. Italian thistle prefers ground with reduced late spring moisture. **Control:** Hand removal Hand pull – maximize root removal, surface cut of weeds (prior to flowering); shovel cut to sever root (prior to flowering).

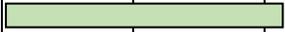
- **French broom** (*Genista monspessulana*) is a non-native, leguminous, perennial shrub with an average life span of 12-15 years. It is native to the Mediterranean region of Europe. French broom is evergreen and may reach a height of 10+ feet. French broom usually flowers in spring and early summer. A mature plant can produce thousands of seed pods per year. Each pod contains 5-8 seeds. The seed pods are dehiscent, bursting open in the summer, expelling seeds for a distance of up to 6 feet. French broom seed remains viable in and on the soil for decades. French broom seeds and flowers are toxic to humans and many domestic and native wildlife species. French broom is a highly invasive shrub that spreads rapidly. The prodigious quantities and long-term viability of the seeds often result in a rapid expansion of the infestation. In addition, French broom will re-sprout from cut stumps unless it is cut below the root crown. Over a period of 3-6 years French broom can create a dense, monocultured stand. **Control:** Hand removal. Hand pull young plants in winter -early spring when soil is moist– maximize root removal.
- **Crofton weed** (*Ageratina adenophora*) is a perennial subshrub that can reach 6 feet in height. It has triangular leaves and nearly flat-topped clusters of white flower heads. This plant has escaped cultivation as an ornamental and is especially invasive in mild coastal areas. Crofton weed is toxic to horses. It reproduces from seed. **Control:** Hand removal, being careful to remove the crown and its short rootstock. Hand pull is best in winter-early spring when the soil is moist.

5.5 Maintenance Schedule

Maintenance activities will be selected and timed to maximize their effectiveness, such as weeding prior to flowering and seed set. Maintenance activities will occur only in areas designated for those activities.

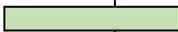
Active Restoration Areas. Within the active restoration areas, during the five-year establishment period, the landowner will check and, if necessary, tend to each container stock plant at least once a month. Irrigation emitters will also be checked at least once every other week during periods of irrigation system operation. If necessary, animal protection devices, such as browse screen, will be adjusted, weeds removed, or mulch adjusted. Soil around the plant will be examined to ensure that adequate moisture is available and the emitter or irrigation system will be adjusted, if necessary. All plants will receive water at the rate that promotes proper plant health and growth. If appropriate, each irrigation circuit or valve zone will be checked during each irrigation session for proper operation. A typical maintenance schedule for the active restoration areas is presented in **Table 3**.

Table 3. Maintenance Schedule for Active Restoration Areas, Years 1-5

Task	Winter	Spring	Summer	Fall
Yearly, conduct field inspections to monitor plant growth and progress of flowering stalks on invasive weed species. Monitor project area for changes in distribution of existing invasive weeds.				
Hand pull French broom plants and crofton weed when soil is moist (Dec - Feb). Remove other invasive plants in Mar – Apr, and prior to flowering and seed set.				
Monthly, check planting basins and remove weeds, repair browse protection cages, if needed (Years 1-3)				
Yearly, in early spring check irrigation system and program system for spring and summer irrigation (Years 1-3)				
In spring and summer, every two weeks check irrigation system to ensure each plant is receiving adequate water; repair leaks or other problems with irrigation system; or implement hand watering (Years 1-3)				

Passive Restoration Areas. Within the passive restoration areas, during the five-year establishment period, the landowner will monitor natural plant recruitment and encourage woody plant recovery. A typical maintenance schedule is presented in **Table 4**.

Table 4. Maintenance Schedule for Passive Restoration Areas, Years 1-5

Task	Winter	Spring	Summer	Fall
Yearly, conduct field inspections to monitor plant growth and progress of flowering stalks on invasive weed species. Monitor project area for changes in distribution of existing invasive weeds.				
Hand pull French broom and crofton weed plants when soil is moist (Dec - Feb). Remove other invasive plants in Mar – Apr, and prior to flowering and seed set.				
Yearly, document woody plant cover and compare to previous year data				
Implement remedial measures if woody plant growth is not increasing each year				

6.0 MONITORING AND REPORTING

6.1 Monitoring Methods

Plant Survival - Active Restoration Areas. Within the active restoration areas, detailed monitoring will be conducted to document individual plant survival, plant height, and health/vigor. Plant survival will be determined by a count of all species. Natural plant recruitment will also be noted. Plants shall have a moderate to high plant health and vigor rating and show growth as evidenced in a trend in increasing height. **Table 5** presents the health and vigor rating scale.

As part of the health and vigor monitoring, field evidence of *Phytophthora ramorum* (water mold responsible for Sudden Oak Death [SOD]), infecting planting stock will be noted. If the pathogen is found within the restoration areas, the landowner will take precautions to prevent spreading the pathogen within the site and to other areas. Precautions will include cleaning and disinfecting pruning or other work tools after use and sanitizing tools before pruning healthy trees or working in pathogen-free areas. Workers will clean vehicles of mud, dirt, leaves, organic material, and woody debris before leaving the site.

The monitoring will include an evaluation on whether any remedial actions are needed, such as additional planting, irrigation, or other actions needed for the site to meet its success criteria. The monitoring survey will include a visual estimate of cover by invasive, non-native plant species. The development of the plantings and site conditions will also be recorded at a minimum of three permanent photo points.

Table 5. Plant Health and Vigor Rating Scale

Code	Rating	Health Characteristics	Vigor Characteristics ¹
0	Dead	No healthy foliage	None
1	Low	0-25% healthy foliage	Stem dieback observed; no new growth evident
2	Moderate	>25-75% healthy foliage	Vigorous new growth observed only at terminal bud
3	High	>75% healthy foliage	Vigorous new growth observed throughout plant

¹ vigor assessment will include assessment for *Phytophthora ramorum*

Woody Plant Cover - Passive Oak woodland Restoration Areas. Within the passive oak woodland restoration areas, a baseline documentation of woody plant cover will be conducted in Year 1. A series of permanent line transects (a minimum of one per restoration area) will be established wherein woody plant cover data (absolute and relative cover) shall be collected. In summer of Years 2-5, the transects will be re-run and the data analyzed. There shall be a documented trend of increasing woody plant cover in Year 2-5, compared to the baseline data. If woody cover does not increase each year, the landowner will implement remedial measures, such as plant installation, or other measures. The progress of recovery in the passive restoration areas will also be recorded at a minimum of three permanent photo points.

Invasive Plant Cover. Within all of the restoration areas, the cover of invasive, non-native plant species shall be recorded each year. Cover will be documented along the woody plant transects within the passive restoration areas, as well as visual estimated in the restoration areas. If invasive, non-native plant cover exceeds the thresholds listed in **Table 6**, the landowner will implement remedial measures, such as additional control sessions, or other

measures.

6.2 Success Criteria

The success criteria for the restoration are outlined below in **Table 6**. When these criteria are fulfilled, the oak woodland restoration will be determined to be progressing toward the habitat type and values that constitute the long-term goals of this project. The final success criteria will be monitored for compliance at the end of the 5-year monitoring period. Final success criteria will be documented by monitoring by a qualified botanist, ecologist or revegetation specialist.

Table 6. Performance Standards for Years 1-4 and Final Success Criteria for Year 5

	Year 1	Year 2	Year 3	Year 4	Year 5
OAK WOODLAND					
Active Oak Woodland Restoration Areas					
Plant Survival (%) ¹	80%	80%	80%	80%	80%
Invasive Plant Species Plant Cover (%)	<5%	<5%	<5%	<5%	<5%
Number of Trees	72	72	72	72	72
Number of Understory Trees and Shrubs	368	368	368	368	368
¹ – plant survival numbers rounded up if value is ≥ 0.5 ; rounded down if value is < 0.5 .					
Passive Oak woodland Restoration Areas					
Woody Plant Cover (%) ¹	Baseline	Increase from Baseline	Increase from Year 2	Increase from Year 3	Increase from Year 4
Invasive Plant Species Plant Cover (%)	<5%	<5%	<5%	<5%	<5%
RIPARIAN CORRIDOR					
Active Ephemeral Stream Riparian Corridor Restoration Areas					
Plant Survival (%) ¹	80%	80%	80%	80%	80%
Invasive Plant Species Plant Cover (%)	<5%	<5%	<5%	<5%	<5%
Number of Trees (Dogwood)	10	10	10	10	10
Number of Understory Trees and Shrubs	32	32	32	32	32
¹ – plant survival numbers rounded up if value is ≥ 0.5 ; rounded down if value is < 0.5 .					

6.3 Reporting

Annual reports shall be submitted to the County of Santa Cruz Department of Community Development and Infrastructure by December 31 of each monitoring year (Years 1-5) or longer if success criteria have not been met. When the required monitoring period is complete and the landowner believes that the final performance standards have been met, the landowner will notify the County when submitting the proposed final report (Year 5). Final performance standards will be considered met a minimum of two years after all irrigation has ceased. Maintenance actions, such as control and/or removal of invasive non-native plant species will occur beyond the five-year monitoring period as part of the landowner's responsibility to preserve and maintain the restoration areas in perpetuity.