Draft Initial Study/Mitigated Negative Declaration

University of California Santa Cruz

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2

(Tiered from 2005 LRDP EIR)

Prepared By:

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April 2019

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UNIVERSITY OF CALIFORNIA **April 2019**

Santa Cruz Campus

1 PROJECT INFORMATION

Project title:

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2

Project location:

Existing bike path extending from Coolidge Drive to Meyer Drive through the central portion of the lower campus meadows, University of California Santa Cruz main campus, Santa Cruz, CA

Lead agency's name and address:

The Regents of the University of California
1111 Franklin Street
Oakland, CA 94607

Contact person:

Alisa Klaus, Senior Environmental Planner, (831) 459-3732

Project sponsor's name and address:

Physical Planning, Development and Operations/Physical and Environmental Planning Services
University of California Santa Cruz
1156 High Street, Barn G
Santa Cruz, CA 95064

Location of administrative record:

See Project sponsor, above.

Identification of previous documents relied upon for tiering purposes:

University of California Santa Cruz 2005 Long Range Development Plan Environmental Impact Report. Available online at: http://lrdp.ucsc.edu/final-eir.shtml

2 INTRODUCTION

2.1 INITIAL STUDY

Pursuant to Section 15063 of the California Environmental Quality Act (CEQA) Guidelines (Title 14, California Code of Regulations, Sections 15000 et seq.), an Initial Study is a preliminary environmental analysis that is used by the lead agency as a basis for determining whether an Environmental Impact Report, a Mitigated Negative Declaration, or a Negative Declaration is required for a project. The CEQA Guidelines require that an Initial Study contain a project description; a description of environmental setting; an identification of environmental effects by checklist or other similar form; an explanation of environmental

effects; a discussion of mitigation for significant environmental effects; an evaluation of the project's consistency with existing, applicable land use controls; and the names of persons who prepared the study.

The purpose of this Initial Study is to evaluate the potential environmental impacts of the proposed project to determine what level of additional environmental review, if any, is appropriate. As shown in the Determination form in Section 5 of this document and based on the analysis contained in this Initial Study, which is tiered from the University of California Santa Cruz (UC Santa Cruz) 2005 Long Range Development Plan Environmental Impact Report (LRDP EIR), it has been determined that the proposed project would not result in any potentially significant impacts that either were not previously identified and analyzed in the 2005 LRDP EIR, or that cannot be mitigated to less-than-significant levels through mitigation included in the project.

The analysis contained in this Initial Study concludes that the proposed project would result in the following categories of impacts, depending on the environmental issue involved: no impact; less-than-significant impact; or a less-than-significant impact with the implementation of mitigation measures. Therefore, preparation of a Mitigated Negative Declaration is appropriate. The proposed Mitigated Negative Declaration is presented in Appendix A.

2.2 TIERING PROCESS

The CEQA concept of "tiering" refers to the evaluation of general environmental matters in a broad program-level EIR, with subsequent focused environmental documents for individual projects that implement the program. This environmental document incorporates by reference the discussions in the 2005 LRDP EIR (the Program EIR) and concentrates on project-specific issues. CEQA and the CEQA Guidelines encourage the use of tiered environmental documents to reduce delays and excessive paperwork in the environmental review process. This is accomplished in tiered documents by eliminating repetitive analyses of issues that were adequately addressed in the Program EIR and by incorporating those analyses by reference.

Section 15168(d) of the State CEQA Guidelines provides for simplifying the preparation of environmental documents on individual parts of the program by incorporating by reference analyses and discussions that apply to the program as a whole. Where an EIR has been prepared or certified for a program or plan, the environmental review for a later activity consistent with the program or plan should be limited to effects that were not analyzed as significant in the prior EIR or that are susceptible to substantial reduction or avoidance (CEQA Guidelines Section 15152[d]).

This Initial Study is tiered from the UC Santa Cruz 2005 LRDP EIR (UC Santa Cruz 2006b) in accordance with Sections 15152 and 15168 of the CEQA Guidelines and Public Resources Code Section 21094. The 2005 LRDP EIR is a Program EIR that was prepared pursuant to Section 15168 of the CEQA Guidelines. The LRDP is a general land use plan that guides physical development on the campus to accommodate expanded and new program initiatives. The LRDP EIR analyzes full implementation of uses and physical development proposed under the LRDP, and it identifies measures to mitigate the significant adverse program-level and cumulative impacts associated with the anticipated development.

By tiering from the LRDP EIR, this Tiered Initial Study will rely on the LRDP EIR for the following: a discussion of general background and setting information for environmental topic areas; overall growth-related issues; issues that were evaluated in sufficient detail in the LRDP EIR for which there is no significant new information or change in circumstances that would require further analysis; and assessment of cumulative impacts.

This Initial Study will evaluate the potential environmental impacts of the proposed project with respect to the LRDP EIR to determine what level of additional environmental review, if any, is appropriate. As shown

in the Determination in Section 5 of this document, and based on the analysis contained in this Initial Study, it has been determined that the proposed project would not have potentially significant effects on the environment that cannot be reduced through project-level mitigation to a less-than-significant level, or that were not previously adequately addressed in the LRDP EIR. Therefore, a Mitigated Negative Declaration will be prepared.

The LRDP EIR identifies measures to mitigate the potential environmental effects of proposed development. The project analyzed in this Initial Study incorporates applicable LRDP EIR mitigation measures.

2.3 PUBLIC AND AGENCY REVIEW

This Draft Initial Study will be circulated for public and agency review from April 5, 2019 to May 6, 2019. Copies of this document are available for review at the following locations:

UC Santa Cruz Physical Planning and Environmental Planning Services, Barn G, UC Santa Cruz

Downtown Branch of the Santa Cruz Public Library in downtown Santa Cruz

The UC Santa Cruz web site, at https://ppc.ucsc.edu/planning/EnvDoc.html

Comments on this Draft Initial Study must be received by 5:00 PM on Monday, May 6, 2019 and should be sent to:

PPDO
University of California Santa Cruz
1156 High Street
Santa Cruz, CA 95064
Attn: Alisa Klaus, Senior Environmental Planner

Comments also may be submitted by email, by 5:00 PM on Monday, May 6, 2019, to: EIRcomment@ucsc.edu. Please include "Great Meadow Bike Path" in the email subject line.

2.4 PROJECT APPROVALS

As a public agency principally responsible for approving or carrying out the proposed project, the University of California is the Lead Agency under CEQA and is responsible for certifying the adequacy of the environmental document and approving the proposed project. Following the close of the public and agency comment period on this draft Initial Study on May 6, 2019, the University will prepare responses to all written comments that raise CEQA-related environmental issues regarding the project. The responses will be published in the Final Initial Study/Mitigated Negative Declaration (IS/MND). The Final IS/MND and approval of design of the Great Meadow Bike Path Improvement Project Phase 2 will be considered by University decision makers and adopted if it is determined to be in compliance with CEQA. Upon adoption of the IS/MND, the University will consider approval of design for the project. The Campus anticipates that the project will be considered for approval in May 2019.

2.5 ORGANIZATION OF THE INITIAL STUDY

This Initial Study is organized into the following sections:

Section 1 - Project Information: provides summary background information about the proposed project, including project location, lead agency, and contact information.

Section 2 - Introduction: summarizes the scope of the document, the project's review and approval processes, and the document's organization.

Section 3 - Project Description: presents a description of the proposed project, including the need for the projects the projects' objectives, and the elements included in the projects.

Section 4 - Environmental Factors Potentially Affected: addresses whether this Initial Study identifies any environmental factors that involve a significant or potentially significant impact that cannot be reduced to a less-than-significant level.

Section 5 - Determination: indicates whether impacts associated with the proposed project are significant and what, if any, additional environmental documentation is required.

Section 6 - Evaluation of Environmental Impacts: contains the Environmental Checklist form for each resource area. The checklist is used to assist in evaluating the potential environmental impacts of the proposed projects. This section also presents a background summary for each resource area, the standards of significance, and an explanation of all checklist answers.

Section 7 - Fish and Game Determination: indicates whether the proposed project has a potential to impact wildlife or habitat and therefore will require payment of a Fish and Game filing fee.

Section 8 – References

Section 9 - Agencies and Persons Consulted

Section 10 - Report Preparers

Appendix A – Proposed Mitigated Negative Declaration

Appendix B – 2005 LRDP Mitigation Measures Incorporated in the Project

Appendix C – Proposed Mitigation Monitoring Program

Appendix D – Biological Resources Reports

Appendix E – Cultural Resources Assessment

Appendix F – Noise and Vibration Report

3 PROJECT DESCRIPTION

3.1 PROJECT LOCATION

The University of California Santa Cruz (UC Santa Cruz) is located on the coast of Monterey Bay in Santa Cruz County, approximately 70 miles south of San Francisco, 30 miles southeast of San Jose, and 30 miles north of Monterey (Figure 3-1). Approximately 53 percent of the main campus, including most of the area that is currently developed, is located within the city limits of Santa Cruz; the remainder is in unincorporated Santa Cruz County. Approximately 250 acres of undeveloped campus land on the western side of Empire Grade are within the Coastal Zone. The Project site is within the city limits.

Public open space borders the campus on two sides: Pogonip City Park and Henry Cowell Redwoods State Park on the east and Wilder Ranch State Park on the west. The southern border of the campus is adjacent to the City's upper west side residential neighborhoods. The rural residential Cave Gulch neighborhood is located adjacent to a portion of the campus's northwestern boundary. To the north, the campus is bounded by private land and small-scale rural development. High Street, Bay Street, Western Drive, and Empire Grade are the primary access routes to the main campus.

The project site is located along the existing bike path alignment within the Great Meadow in the south-central portion of the campus. The Great Meadow Bike Path is a Class I bike path (i.e., exclusively for bicyclists and pedestrians, fully separated from vehicle and heavy transit traffic) extending from Coolidge Drive to Meyer Drive. The bike path was built in 1974 and serves as a primary bicycle access route from the main campus entrance to central campus facilities as well as undeveloped recreational areas of the upper campus. The path is approximately 1 mile long and travels at moderate to steep gradients through rolling hills and open grassy terrain for much of its length, with a grade of up more than 10 percent. Downhill cyclists may choose to reach speeds up to 40 miles per hour (mph). Approximately 1,000 cyclists, both commuters and recreational riders and UC Santa Cruz affiliates and non-affiliates, use the bike path each day.

The bike path includes bidirectional portions and unidirectional (i.e., uphill and downhill) portions resulting in four distinct segments: the two-way path, the uphill path, the downhill path, and the Meyer Drive intersection. The path travels north from Coolidge Drive south of the intersection with Ranch View Road as an approximately 8-foot-wide, two-way path, where it splits into two one-way portions near Village Road (uphill and downhill), before merging into a two-way path near the eastern terminus of Meyer Drive (i.e., Meyer Drive intersection). The uphill path is approximately 8 feet wide and the downhill path is approximately 6 feet wide. The path provides access to numerous areas used for recreational purposes, such as fire roads and recreational trails in the upper campus, as well as providing access to academic, administrative, student life, and housing facilities. Figure 3-2 shows the existing bike path alignment on the UC Santa Cruz campus.

3.2 PROJECT OVERVIEW

This Initial Study analyzes the environmental effects of the Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2. The project consists of reconstructing and widening the existing Great Meadow Bike Path to meet current California Department of Transportation (Caltrans) standards to the extent feasible within the current alignment.[1] This would include reconstruction and repaving of the path, widening and paving of shoulders, correcting existing drainage issues adjacent to the path, and designating specific portions of the path for shared pedestrian and bicycle use.

[1] Improvements would focus on meeting Caltrans standards for width and striping, but meeting Caltrans standards for other variables (e.g., grade, speed, stopping sight distance, etc.) would require extensive realignment of the path, which is not proposed.

3.3 PROJECT BACKGROUND, NEED, AND OBJECTIVES

The first phase of bike path improvements, constructed in 2016 in conjunction with the new Resource Recovery Facility north of the Center for Agroecology and Sustainable Food Systems (CASFS) farm, addressed safety issues near the intersection of the path with Village Road. This Project would address safety and maintenance issues along the remaining approximately 1-mile length of the bike path. The objectives of the project are to:

1. Preserve and enhance the Class I path to facilitate reduced single-occupancy vehicle trips to campus and support recreational use of the path;

2. Improve campus access to alternative modes of transportation;

3. Bring the path up to current Caltrans standards for width and striping to the extent feasible;

4. Reconstruct failing pavement;

5. Widen the path to allow for safer bike travel and fewer conflicts with oncoming bikes, pedestrians, and animals; and

6. Provide a pedestrian route through the Great Meadow from the Village to the central campus.

The existing bike path is over 40 years old, and is in need of reconstruction to address pavement deterioration and potential safety issues. Bike-related accidents that have occurred on the path have mostly consisted of solo bike accidents caused by cyclists losing control, bike-bike accidents due to conflicts caused by speeds and narrowness of the bike path, and other accidents by cyclists averting conflicts with pedestrians or animals.

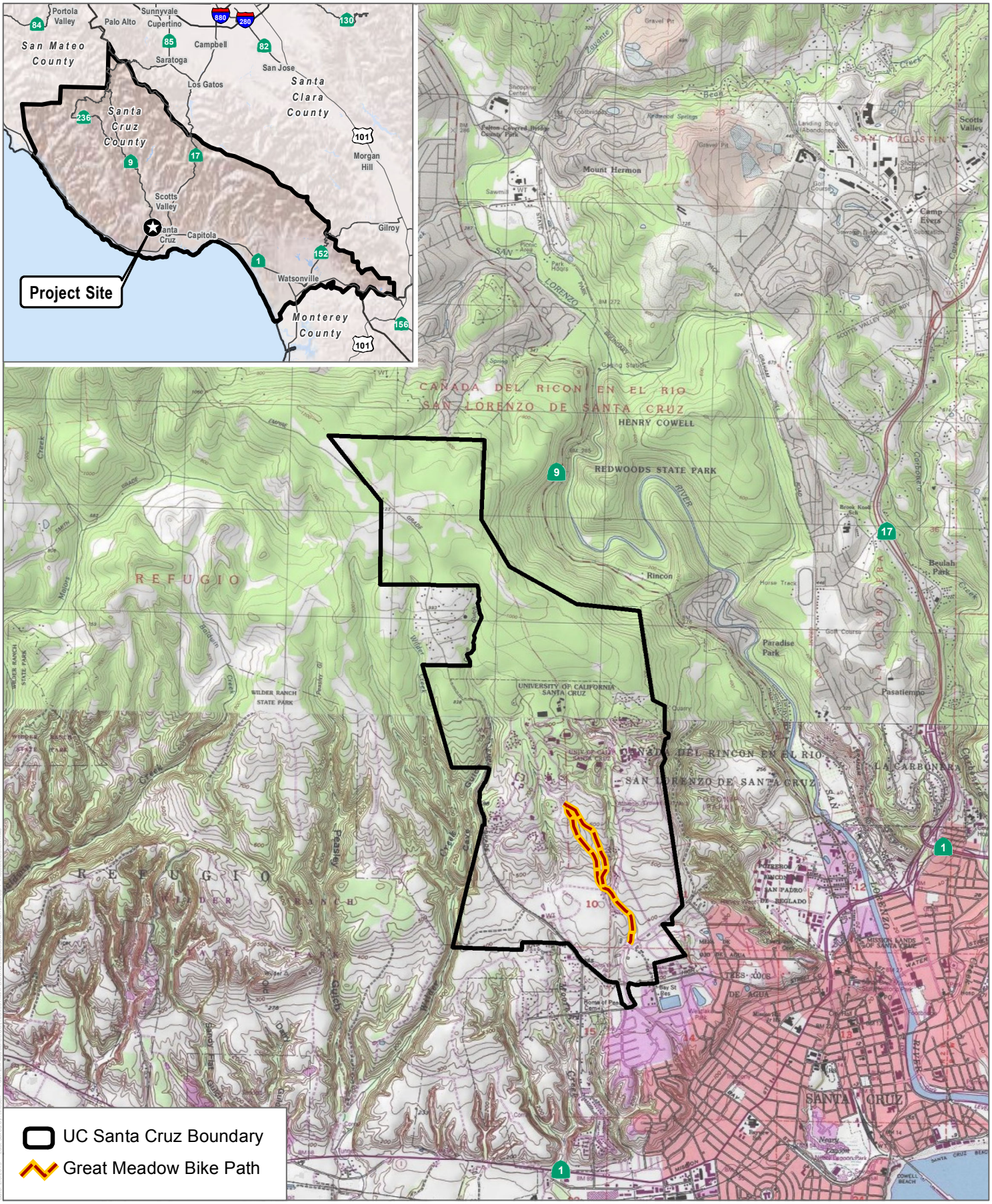
The Project's bike path improvements would reduce accident rates. Having a wider, improved path with the addition of wider, paved shoulders would allow for greater clear recovery room to prevent many of these accidents, and would improve sight lines in some areas of the two-way path to minimize bike-bike conflicts. Designating the single-lane, uphill path as a multi-use path and the Farm Road for pedestrian use instead of the two-way bike path in the lower portion of the route would allow pedestrian use in this area, minimizing some bike-pedestrian conflicts.

3.4 CONSISTENCY WITH THE 2005 LRDP

The Project would not result in an increase in student enrollment or campus population, or add new building space. The existing bike path is on land designated Campus Support (CS), Protected Landscape (PL), and Site Research and Support (SRS). The CS land use accommodates both public functions and operations-oriented functions. Lands designated as PL are, to the extent feasible, intended to be retained in an undeveloped state and buildings are not allowed in the open expanse of the Great Meadow; any development within PL is not to impinge on its overall character. The SRS land use designation permits the development of new buildings associated with existing and future approved research programs, principally in the fields of Social Sciences, Physical and Biological Sciences, Student Services, and Public Services. Given that the project does not propose new buildings and would consist of improvements to the existing primary Class I bike facility on the campus, the project would be consistent with these designations.

3.5 DETAILED PROJECT DESCRIPTION

The Great Meadow Bike Path would be fully reconstructed, including widening, repaving, and slope adjustments. Figure 3-3 shows the project site. In addition to the widening described below, base rock shoulders varying from 1 to 2 feet in width would be added on both sides of the paved section.



SOURCE: USGS 7.5 minute series Santa Cruz and Felton quadrangles

DUDEK

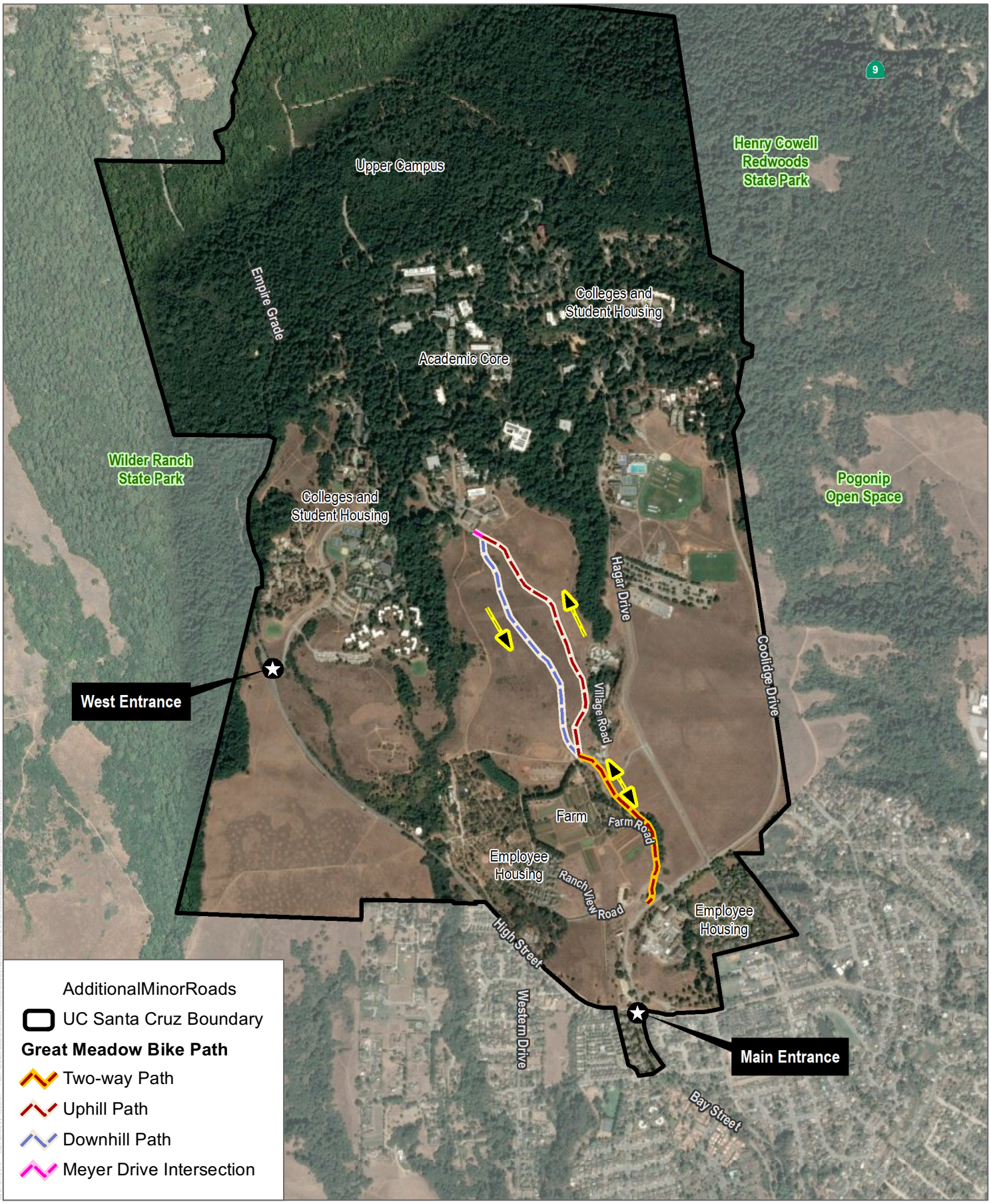
0 2,000 4,000 Feet

FIGURE 3-1

Project Location

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2

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SOURCE: Bing 2019

DUDEK

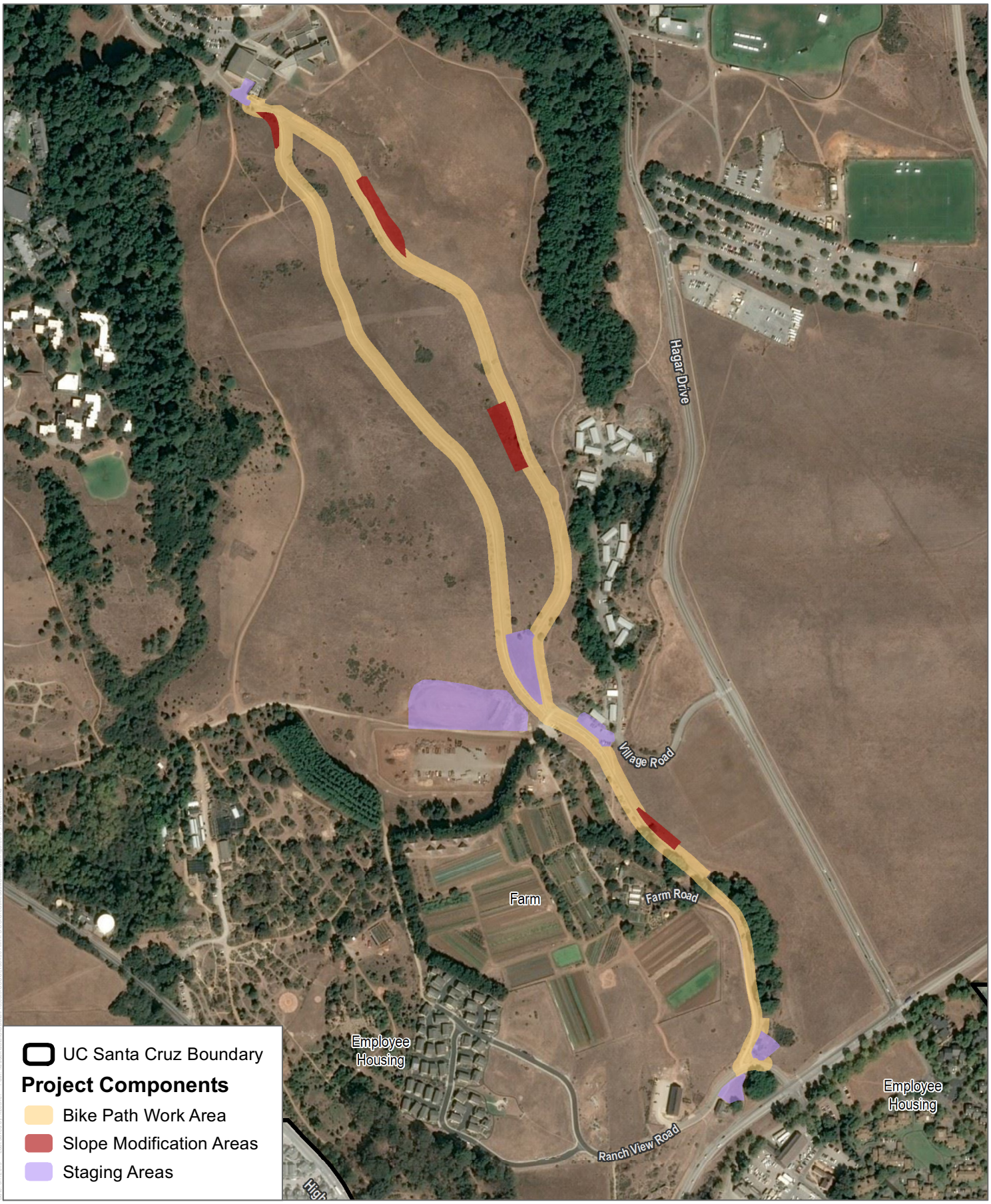
0 750 1,500 Feet

FIGURE 3-2

Project Vicinity

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2

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SOURCE: Bing 2019

DUDEK

0 275 550 Feet

FIGURE 3-3

Project Site

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2

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The two-way path would be widened to meet current Caltrans standards of 12 feet wide: approximately 10 feet wide with 1-foot paved shoulders on either side. The two-way path would be designated for bikes only and pedestrians would be directed to use the adjacent Farm Road south of Village Road. The uphill path would be designated as a multi-use trail to accommodate uphill bike traffic as well as two-way pedestrian traffic and would be widened to approximately 12 feet. The downhill path would be widened to approximately 10 feet with a striped 6-foot bike lane and 2-foot shoulders. Near the Meyer Drive intersection, the alignment would also be modified to increase safety and accommodate the addition of pedestrian access from the uphill path.

Drainage issues that currently result in erosion adjacent to the paved pathways would also be corrected as part of the project by modifying grades and cross slopes to prevent water from channelizing immediately adjacent to the pathway. Additionally, the project would be designed to direct stormwater via sheetflow to adjacent vegetated areas and to minimize concentration of stormwater runoff. The base rock shoulders would facilitate this drainage objective. V-ditches or swales may be used to transport water to vegetated areas where sheetflow of runoff would be difficult to achieve. Sewer manholes in the two-way portions of the path would need to be raised to the new asphalt finished grade by adding new concrete rings to the top of the manhole cone; adjustments would be approximately 1 to 6 inches.

Two methods for reconstructing the bike path are being considered for the project: (1) full-depth reclamation (FDR), where the existing asphalt and base materials would be pulverized, mixed with cement and water, and compacted to produce a base for a new asphalt surface; and (2) asphalt overlays, which would involve grinding the top approximately 1-inch layer of the path and adding base materials to the sides to provide a new surface for paving. Asphalt overlays would be used for the two-way path near the base of the campus. The method to be used for the uphill and downhill paths has not yet been determined.

In general, the worst-case area of disturbance for the project is assumed to be approximately 30 feet in either direction from the edge of the existing path to accommodate widening and/or adjustment of slopes at certain locations. In some areas requiring more extensive slope modifications to correct drainage and erosion issues, the disturbance may extend out to 50 feet from the edge of the path, as shown on Figure 3-3. The total area of disturbance is approximately 16.60 acres. However, all or most trees within the worst-case area of disturbance would be avoided with the project, although some shrub removal and tree trimming would be required. Additionally, the Powder House, which is a historic structure in the Cowell Lime Works Historic District located near the bottom of the two-way path, would be avoided with the project.

The Project would remove approximately 60,000 square feet of existing asphalt bicycle path pavement and construct approximately 93,000 square feet of new bicycle path pavement, thereby creating approximately 33,000 square feet of net new impervious surface. Areas disturbed by construction of the project would be reseeded with native grasses. No temporary or permanent irrigation would be required.

3.6 POPULATION

The Project would not accommodate additional campus population.

3.7 CONSTRUCTION SCHEDULE AND STAGING

Construction would be scheduled for the summer months to minimize disruptions during the academic year. Construction is anticipated to begin in mid-June 2020 and would last for approximately 3 months until mid-September 2020. Construction of the project would require temporary closure of the bike path. Detour signs would be installed during construction to direct cyclists to alternate bike routes between the central and lower campus, which are available on existing campus roads and paths.

Approximately 650 cubic yards of asphalt would be demolished during construction. The Project would involve grading of up to 30,000 square feet per day. Construction would not involve the import or export of cut and fill; all excavated material would be reused on site and, if needed, fill would be provided from an on-site source.

As shown on Figure 3-3, six potential construction staging areas have been identified for the project at various locations along the bike path. These construction staging areas could include unpaved areas off of Ranch View Road near Coolidge Drive, an unpaved area near the intersection of Ranch View Road and Farm Road, an unpaved area north of the intersection of Village Road and the bike path, Parking Lot #168 near the Village, a loading dock behind the Recital Hall, and Parking Lot #126 near the Recital Hall. Primary vehicle access to the project area would be off Hagar Drive from Village Road. Secondary access would be from Ranch View Road for the bottom of the bike path and off Meyer Drive for the top of the bike path.

Construction hours could occur from 6:00 AM to 7:00 PM, Monday through Saturday, though generally would be expected to occur from 7:00 AM to 4:00 PM, Monday through Friday. Any construction activity occurring before 7:00 AM would require prior written University approval.

The Project would be expected to be operational in September 2020.

4 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

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

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

Based on the analysis presented in this Initial Study, it has been determined that for all resource areas, the proposed project would not result in any significant impacts that cannot be mitigated to a less-than-significant level. Please see the analyses below and refer to the Mitigated Negative Declaration (Appendix A to the Initial Study).

5 DETERMINATION

On the basis of this initial evaluation:

☐	I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
☑	I find that although the proposed project could have a significant effect on the environment, the project impacts were adequately addressed in an earlier document or there will not be a significant effect in this case because revisions in the project have been made that will avoid or reduce any potential significant effects to a less than significant level. A MITIGATED NEGATIVE DECLARATION will be prepared.
☐	I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

SCLatham _____ 4/3/2019

Sarah C. Latham — Date

Vice Chancellor - Business and Administrative Services

6 EVALUATION OF ENVIRONMENTAL IMPACTS

Introduction

The following Environmental Checklist form is based on Appendix G of the CEQA Guidelines. The Environmental Checklist identifies potential project effects as corresponding to the following categories of impacts:

Potentially Significant Impact: There is substantial evidence that the effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

Project Impact Adequately Addressed in LRDP EIR: The potential impacts of the proposed project were adequately addressed in the LRDP EIR and mitigation measures identified in the LRDP EIR will mitigate any impacts of the proposed project to the extent feasible. All applicable LRDP EIR mitigation measures are incorporated into the project as proposed. The impact analysis in this document summarizes and cross references the relevant analysis in the LRDP EIR.

Less than Significant with Project-Level Mitigation Incorporated: The incorporation of project-specific mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." All project-level mitigation measures must be described, including a brief explanation of how the measures reduce the effect to a less than significant level.

Less-than-Significant Impact: An effect for which no significant impacts, only less than significant impacts, would result. The effects may or may not have been discussed in the LRDP Program EIR. The project impact is less than significant without the incorporation of LRDP or Project-level mitigation.

No Impact: The project would not create an impact in the category or the category does not apply. "No Impact" answers need to be adequately supported by the information sources cited, which show that the impact does not apply to projects like the one involved (*e.g.*, the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (*e.g.*, the project will not expose sensitive receptors to pollutants, based on a project specific screening analysis).

6.1 AESTHETICS

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

Aesthetics issues and programmatic mitigation measures applicable to LRDP development are described in Volume I, Section 4.1, of the 2005 LRDP EIR (UC Santa Cruz 2006b). The following, previously adopted LRDP EIR mitigations for potential aesthetic impacts are applicable to and included in the proposed project (the full text of the mitigation measures is included in Appendix B):

- LRDP EIR Mitigation AES-3B (Limit natural vegetation removal and cluster development at meadow edges)
- LRDP EIR Mitigation AES-5C (Preserve healthy and mature trees around new projects)

a) The 2005 LRDP EIR (Vol. 1, pp. 4.1-4 to 4.1-5) identifies both long-range and short-range scenic vistas from vantage points on and off campus. From the central campus, vantage points along the southern forest edge generally offer unbroken and sweeping views towards Monterey Bay. Prominent campus vantage points are the Cowell College plaza, Baskin Visual Arts Center, University House, the knoll at Porter College, and the field at Oakes College. Sweeping views across the meadows down to the bay are available from these points and from other points within the Great Meadow. The Great Meadow Bike Path offers panoramic views of the Monterey Bay from its upper elevations. Points along Glenn Coolidge Drive offer panoramic views of the city and the bay, and of Pogonip City Park in the foreground. Similarly, points along Heller Drive and Empire Grade offer panoramic views of the bay. Important vantage points from the lower campus looking across open space areas towards the central campus include points along Empire Grade, Glenn Coolidge Drive, and Hagar Drive. From these vantage points, sweeping views are available across the meadows up to the forest edge. Short-range views on campus are influenced by topography, vegetation type and height, density of vegetation, and density of buildings. Examples of locations that provide short-range scenic views and vistas include small meadows surrounded by forests or buildings, and relatively

open meadowland vegetated with oaks and madrones. Short-range views through forested areas of ravines and pathways are available in some areas as well.

For the purposes of analyzing impacts to scenic vistas, the 2005 LRDP EIR (Vol. 1, pp. 4.1-10 to 4.1-12) identifies the following views as important scenic vistas: views of the Monterey Bay as viewed from Cowell College plaza, Baskin Visual Arts Center, University House, the knoll at Porter College, Stevenson College knoll, and the field at Oakes College; and views across the campus and wooded backdrop as viewed from locations along Empire Grade between Western Drive and the campus west entrance, Glenn Coolidge Drive between Hagar Drive and Cowell College, and Hagar Drive between Glenn Coolidge Drive and the East Remote parking lot.

Based on LRDP EIR Figure 4.1-7, the upper portion of the project site crosses through campus lands identified as having high and medium visibility from off-campus viewpoints. However, as the proposed project would not include new buildings or above grade structures, views from off-campus would not be affected by the proposed project. While portions of the existing bike path are visible from Hagar Drive and Glen Coolidge Drive, the proposed project would not substantially alter the views from these locations. As the project would involve widening of and improvements to the existing path, ocean views from the path or across the Great Meadow from Baskin Visual Arts Center (an identified important scenic vista) would not be substantially affected. The impact to scenic vistas would be less than significant.

b) There are no officially designated state scenic highways in Santa Cruz County[2] (Caltrans 2011). The County General Plan, however, designates Empire Grade as a scenic road. The City of Santa Cruz General Plan 1994-2005, which is cited in the LRDP EIR, describes the foothills of the Santa Cruz Mountains, including the UC Santa Cruz campus, as a scenic resource and identifies the portions of Hagar Drive and Glenn Coolidge Drive through the lower campus meadows as scenic drives. The City's 2030 General Plan Update does not mention Hagar Drive or Coolidge Drive, but includes Action CD1.3.1, which encourages UC Santa Cruz development to blend with the natural landscape and maintain natural ridgelines as seen from the City (City of Santa Cruz 2012).

The 2005 LRDP EIR (Vol. 1, pp. 4.1-15 to 4.1-16) defines scenic resources to include Cowell Ranch Historic District buildings and structures, rock exposures in the main entrance area, and all of the meadows on the lower campus, including Great Meadow, East Meadow, and the meadow west of Empire Grade.

The 2005 LRDP EIR (Vol. 1, pp. 4.1-15 to 4.1-16) determined that development along the upper edges of the Great Meadow in the Academic Core area near the Academic Resources Center, and the Meyer Drive extension, also in the upper portion of the Great Meadow, could substantially damage scenic resources on campus around the meadows, which would be a potentially significant impact. The 2005 LRDP EIR determined that this impact would be limited to the upper portion of the Great Meadow, because the remainder of the Great Meadow and most of the other lower campus meadows would be designated Protected Landscape, Campus Resource Land, or Campus Natural Reserve, and therefore would remain open grasslands. The potentially significant impact would be reduced to a less-than-significant level with implementation of LRDP EIR Mitigations AES-3A through AES-3C. LRDP EIR Mitigation AES-3A requires that visual simulations be prepared for development projects proposed around the lower campus meadows that have the potential to affect scenic resources. However, this measure is not applicable to the proposed project, as it would not result in any vertical development or tree removal that would affect scenic resources and therefore no visual simulations are required. LRDP EIR Mitigation AES-3B requires that, for development in meadow areas, the Campus shall limit the removal of natural vegetation, and cluster

[2] Highway 1 segment from the Santa Cruz County line north up to Half Moon Bay is a designated state scenic highway.

development at meadow edges to the extent feasible. LRDP EIR Mitigation AES-3C identifies design standards for the new Meyer Drive and therefore this measure is not applicable to the proposed Project.

The Project site is not visible from any scenic highways or scenic roads, including Empire Grade and therefore would not impact such scenic resources. As indicated above, the LRDP EIR identified all of the meadows, including the Great Meadow, as being scenic resources. The existing bike path is part of the existing character and setting of the Great Meadow. The Project would be limited to widening of and improvements to the existing bike path through the Great Meadow and some adjacent slope modifications to correct erosion issues, and would not likely affect the meadow character or setting. LRDP EIR Mitigations AES-3B and AES-5C are applicable to and incorporated into the project. Consistent with LRDP EIR Mitigations AES-3B and AES-5C, removal of natural vegetation would be minimized with the project, and mature trees would not be removed. The impact to scenic resources would be less than significant.

c) The existing visual character of the project site is created by its location in the open, expansive Great Meadow, with grassland vegetation and trees, and limited development. Near the path's intersection with Village Road, agricultural structures and equipment, and unpaved area used for staging of materials and equipment, and an unpaved parking area associated with the Farm are visible. As the path nears Coolidge Drive, more campus development and roadways come into view.

The Project would not significantly affect the visual character or quality of the site, as the physical changes would be limited to widening and modifications to the existing path, slope modifications immediately adjacent to the path, and new striping and signage. The Project would require some removal of vegetation to accommodate the widened path. All disturbed areas would be revegetated with native grassland vegetation and shrubs following completion of construction, and the visual character of the project site would be similar to its existing character. The Powder House, part of the Cowell Lime Works Historic District, is located approximately 5 feet east of the bike path in the lower two-way portion of the path. Widening of the bike path with Project implementation would bring the path closer to the Powder House; however, it would not damage or block views of the Powder House or significantly affect the visual character of the lower two-way portion of the path. As indicated above, LRDP EIR Mitigations AES-3B and AES-5C are applicable to and incorporated into the project. Consistent with LRDP EIR Mitigations AES-3B and AES-5C, removal of natural vegetation would be minimized with the project, and mature trees would not be removed. The impact on visual character would be less than significant.

d) As use of the bike path is not permitted after dark and the existing bike path is not lit, with the exception of flashing beacon lights that are triggered by cyclists approaching the intersection with Farm Road. The Project may add illuminated signage at the intersections and top and bottom of the bike path to indicate that the pathway is closed at night. These signs would be lighted to the minimum level required for nighttime readability and would not create a substantial new source of light or glare. Therefore, impacts related to light and glare would be less than significant.

Summary

All aesthetic impacts of the project would be less than significant. 2005 LRDP EIR Mitigations AES-3B and AES-5C are applicable to and incorporated into the project. No new significant aesthetic impacts not otherwise addressed in the 2005 LRDP EIR would occur as a result of the project. No project-level mitigation is required.

6.2 AGRICULTURAL AND FORESTRY RESOURCES

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

Agricultural Resources materials background relevant to LRDP development is presented in Volume I, Section 4.2, of the 2005 LRDP EIR (UC Santa Cruz 2006b).

a, e) Based on the Important Farmland map produced by the California Department of Conservation, Division of Land Resource Protection under the Farmland and Mapping Monitoring Program (FMMP), the proposed project site is not designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. The CASFS farm contains 16 acres of land in the lower campus that are designated Unique Farmland in the FMMP. Unique Farmland is land with lesser quality soils used for the production of cash crops. On the campus, this land is used for agriculture and for research, training, and teaching concerning organic production methods. There are no lands within 1-mile radius of the campus that are designated Important Farmland; most of the land adjoining the campus is within state or city parks and unlikely to be developed for other uses, and there are no ongoing agricultural or timber operations on any of the lands that adjoin the campus. The project would not convert any of the CASFS Unique Farmland to non-agricultural use. No impact would occur.

b) As a State entity, land owned by the University is not eligible for Williamson Act agreements, nor are they subject to local zoning controls. Therefore, projects on campus lands have no potential conflict with existing zoning for agricultural use or a Williamson Act contract. Therefore, no impact would occur.

c, d) The project site is not forest land as defined in Public Resources Code Section 12220(g), is not zoned Timberland Production, and is not considered timberland as defined in Public Resources Code 4526. Section 4.4 of the LRDP EIR, Biological Resources, contains Figure 4.4-1 Vegetation Communities and Sensitive Habitats. Forest land does exist on the UC Santa Cruz campus north of the project site and would not be affected by the proposed project. The project would not remove any trees. No impact to timberland or forestland or conversion of forestland would occur.

Summary

The project would have no impact on agricultural or forestry resources. No project-level mitigation is required.

6.3 AIR QUALITY

AIR QUALITY Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in the LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☑	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	☐	☑	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☑	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☐	☐	☑

Air quality issues and programmatic mitigation measures applicable to LRDP development are described in Volume I, Section 4.3, of the 2005 LRDP EIR (UC Santa Cruz 2006b). The following, previously adopted LRDP EIR mitigations for potential air quality impacts are applicable to and included in the proposed project (the full text of the mitigation measures is included in Appendix B):

- LRDP EIR Mitigation AIR-1 (Construction dust control measures)
- LRDP EIR Mitigation AIR-6 (Measures to minimize construction emissions)

6.3.1 Background

The state and federal Clean Air Acts mandate the control and reduction of certain air pollutants. Under these Acts, the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) have established ambient air quality standards for certain "criteria" pollutants. Ambient air pollutant concentrations are affected by the rates and distributions of corresponding air pollutant emissions, as well as by the climactic and topographic influences discussed above. The primary determinant of concentrations

of non-reactive pollutants (such as CO and PM_{10}) is proximity to major sources. Ambient CO levels in particular usually closely follow the spatial and temporal distributions of vehicular traffic. A discussion of primary criteria pollutants is provided below.

Ozone. Ozone is a colorless gas with a pungent odor. Most ozone in the atmosphere is formed as a result of the interaction of ultraviolet light, reactive organic gases (ROG), and oxides of nitrogen (NO_X). ROG (the organic compound fraction relevant to ozone formation, and sufficiently equivalent for the purposes of this analysis to volatile organic compounds, or VOC[3]) is composed of non-methane hydrocarbons (with some specific exclusions), and NO_X is made of different chemical combinations of nitrogen and oxygen, mainly NO and NO_2. A highly reactive molecule, ozone readily combines with many different components of the atmosphere. Consequently, high levels of ozone tend to exist only while high ROG and NO_X levels are present to sustain the ozone formation process. Once the precursors have been depleted, ozone levels rapidly decline. Because these reactions occur on a regional rather than local scale, ozone is considered a regional pollutant.

Carbon Monoxide. Carbon monoxide (CO) is an odorless, colorless, gas. CO causes a number of health problems including fatigue, headache, confusion, and dizziness. The incomplete combustion of petroleum fuels in on-road vehicles and at power plants is a major cause of CO. CO is also produced during the winter from wood stoves and fireplaces. CO tends to dissipate rapidly into the atmosphere; consequently, violations of the state CO standard are generally associated with major roadway intersections during peak hour traffic conditions.

Localized carbon monoxide "hotspots" can occur at intersections with heavy peak hour traffic. Specifically, hotspots can be created at intersections where traffic levels are sufficiently high such that the local CO concentration exceeds the national Ambient Air Quality Standards (NAAQS) of 35.0 parts per million (ppm) or the state AAQS of 20.0 ppm.

Nitrogen Dioxide. Nitrogen dioxide (NO_2) is a by-product of fuel combustion, with the primary source being motor vehicles and industrial boilers and furnaces. The principal form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts rapidly to form NO_2, creating the mixture of NO and NO_2 commonly called NO_X. Nitrogen dioxide is an acute irritant. A relationship between NO_2 and chronic pulmonary fibrosis may exist, and an increase in bronchitis in young children at concentrations below 0.3 parts per million (ppm) may occur. Nitrogen dioxide absorbs blue light and causes a reddish brown cast to the atmosphere and reduced visibility. It can also contribute to the formation of PM_{10} and acid rain.

Particulate Matter. Suspended particulate matter (airborne dust) consists of particles small enough to remain suspended in the air for long periods. Fine particulate matter includes particles small enough to be inhaled, pass through the respiratory system, and lodge in the lungs, with resultant health effects. Particulate matter can include materials such as sulfates and nitrates, which are particularly damaging to the lungs. Health effects studies resulted in revision of the Total Suspended Particulate (TSP) standard in 1987 to focus on particulates that are small enough to be considered "inhalable," i.e. 10 microns or less in size (PM_{10}). In July of 1997, a further revision of the federal standard added criteria for $PM_{2.5}$, reflecting recent studies that suggested that particulates less than 2.5 microns in diameter are of particular concern.

The CARB and the EPA establish ambient air quality standards for major pollutants at thresholds intended to protect public health. Federal and state standards have been established for ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead, and fine particulates (PM_{10} and $PM_{2.5}$). Table 6.3-1

[3] ROG is equivalent to volatile organic compounds (VOC) per MBUAPCD Rule 101, 2.32

summarizes the California Ambient Air Quality Standards (CAAQS) and the NAAQS for each of these pollutants.

Standards have been set at levels intended to be protective of public health. California standards are more restrictive than federal standards for each of these pollutants except for lead and the eight-hour average for CO. Depending on whether the standards are met or exceeded, the local air basin is classified as in "attainment" or "non-attainment." Some areas are unclassified, which means no monitoring data are available. Unclassified areas are considered to be in attainment.

Table 6.3-1
Current Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standards	California Standard
Ozone	1-Hour	---	0.09 ppm
	8-Hour	0.075 µg/m^3	0.070 µg/m^3
PM_{10}	24-Hour	150 µg/m^3	50 µg/m^3
	Annual	---	20 µg/m^3
$PM_{2.5}$	24-Hour	35 µg/m^3	---
	Annual	12 µg/m^3	12 µg/m^3
Carbon Monoxide	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35.0 ppm	20.0 ppm
Nitrogen Dioxide	Annual	0.053 ppm	0.030 ppm
	1-Hour	0.100 ppm	0.18 ppm
Sulfur Dioxide	24-Hour	---	0.04 ppm
	3-Hour	0.5 ppm (secondary)	---
	1-Hour	0.075 ppm (primary)	0.25 ppm
Lead	30-Day Average	---	1.5 µg/m^3
	3-Month Average	0.15 µg/m^3	---

ppm = parts per million µg/m^3 = micrograms per cubic meter
Source: California Air Resources Board, http://www.arb.ca.gov/research/aaqs/aaqs2.pdf, last updated May 4, 2016.

Current Ambient Air Quality. Table 6.3-2 summarizes the state and federal attainment status for criteria pollutants in the North Central Coast Air Basin (NCCAB). As shown in Table 6.3-2, although the NCCAB is in attainment or unclassifiable of all federal NAAQS, it is designated as non-attainment with respect to the more stringent state PM_{10} standard and the state's eight-hour ozone standard. Given that the NCCAB is designated as non-attainment for state standards for ozone and PM_{10}, these are the primary pollutants of concern for the NCCAB.

Table 6.3-2
Attainment Status of the North Central Coast Air Basin

Pollutant	State Standard	Federal Standard
Ozone (O_3)	**Non-attainment**[1]	Attainment/Unclassified[2]
Inhalable Particulates (PM_{10})	**Non-attainment**	Attainment
Fine Particulates ($PM_{2.5}$)	Attainment	Attainment/Unclassified[3]
Carbon Monoxide (CO)	Unclassified (Santa Cruz County)	Attainment/Unclassified
Nitrogen Oxides (NO_X)	Attainment	Attainment/Unclassified[4]
Sulfur Oxides (SO_X)	Attainment	Attainment[5]
Lead	Attainment	Attainment/Unclassified[6]

[1] Effective July 26, 2007, the ARB designated the NCCAB a non-attainment area for the state ozone standard, which was revised in 2006 to include an 8-hour standard of 0.070 ppm.
[2] On March 12, 2008, USEPA adopted a new 8-hour ozone standard of 0.075 ppm, while temporarily retaining the existing 8-hour standard of 0.08 ppm.
[3] In 2006, the Federal 24-hour standard for $PM_{2.5}$ was revised from 65 to 35 $\mu g/m^3$. Although final designations have yet to be made, it is expected that the NCCAB will remain designated unclassified/attainment.
[4] In 2011, EPA indicated it plans to designate the entire state as attainment/unclassified for the 2010 NO2 standard. Final designations have yet to be made by EPA.
[5] In June 2011, the ARB recommended to EPA that the entire state be designated as attainment for the 2010 primary SO_2 standard. Final designations have yet to be made by EPA.
[6] On October 15, 2008 EPA substantially strengthened the national ambient air quality standard for lead by lowering the level of the primary standard from 1.5 $\mu g/m^3$ to 0.15 $\mu g/m^3$. Final designations were made by EPA in November 2011.
Note: Non-attainment pollutants are highlighted in **Bold**.

6.3.2 Regulatory Setting

The project site is within the NCCAB, which is under the jurisdiction of the Monterey Bay Air Resources District (MBARD).[4] The local air quality management agency (MBARD) is required to monitor air pollutant levels to ensure that applicable air quality standards are met and, if they are not met, to develop strategies to meet the standards. Depending on whether or not the standards are met or exceeded, the air basin is classified as being in "attainment" or "nonattainment." As shown above in Table 6.3-2, the NCCAB is in nonattainment for the CAAQS for ozone and PM_{10} (MBUAPCD 2013). Because the NCCAB currently exceeds state ambient air quality standards it is required to implement strategies that would reduce the pollutant levels to recognized acceptable standards. This non-attainment status is a result of several factors, primarily the naturally adverse meteorological conditions that limit the dispersion and diffusion of pollutants; the limited capacity of the local airshed to eliminate pollutants from the air; and the number, type, and density of emission sources within the NCCAB.

In 1991, the MBARD adopted the Air Quality Management Plan (AQMP) for the Monterey Bay Region in response to the California Clean Air Act of 1988, which established specific planning requirements to meet the ozone standards. The California Clean Air Act requires that AQMPs be updated every three years. The MBARD has updated the AQMP seven times. The most recent update, the *2012-2015 Air Quality Management Plan*, was adopted in 2017. The AQMP identifies a continued trend of declining O_3 emissions in the NCCAB primarily related to lower vehicle miles traveled (VMT), showing that the region is continuing to make progress toward meeting the state O_3 standard during the three-year period reviewed (MBARD 2017).

[4] The MBARD was previously called the Monterey Bay Unified Air Pollution Control District (MBUAPCD). In this report, the agency is referred to as MBARD; however, references to agency publications or guidance that predate the official name change use MBUAPCD.

The MBARD has established the following significance thresholds for project operations within the NCCAB:

- 137 pounds per day of reactive organic compounds (ROC; also known as ROG or VOC)
- 137 pounds per day of NO_x
- 550 pounds per day of CO
- 150 pounds per day of SO_x
- 82 pounds per day of PM_{10}

The MBARD has also adopted the following thresholds for temporary construction-related pollutant emissions:

- 82 pounds per day of $PM_{2.5}$

The MBARD also considers indirect sources that would significantly affect levels of service at intersections or road sections to be potentially significant for carbon monoxide production.

6.3.3 Impact Analysis

a) According to the *MBUAPCD CEQA Air Quality Guidelines* (MBUAPCD 2008), a project that is consistent with the AQMP is considered to be accommodated in the AQMP and therefore would not have a significant impact on regional air quality. The AQMP for the MBARD is based on population and housing forecasts prepared by the Association of Monterey Bay Area Governments (AMBAG) (MBARD 2017). The proposed project would not result in an increase in population or housing, or result in a growth in employment that could trigger direct or indirect population increase. Therefore, the project would not conflict with the AQMP. Impacts would be less than significant.

b, c) An evaluation of both short-term and long-term air pollutant emissions is provided in the paragraphs below.

Construction Impacts

Emissions from construction activities would be temporary and short-term in duration. Construction would generally consist of demolition of existing asphalt, site preparation, grading, trenching, and paving. Construction of the project would occur over approximately three months, from June 2020 to September 2020. According to the *MBUAPCD CEQA Air Quality Guidelines*, construction projects using typical construction equipment, as would be the case for the proposed project, are accommodated in the emission inventories of state- and federally required air plans and would not have a significant impact on the attainment and maintenance of ozone standards (MBUAPCD 2008). Regardless, LRDP EIR Mitigation AIR-6, which would minimize construction emissions, is applicable to and incorporated into the proposed project and would further reduce the impact.

Project construction could result in generation of dust and PM_{10} emissions as a result of site grading. According to the *MBUAPCD CEQA Air Quality Guidelines*, construction activity on 8.1 acres per day with minimal earthmoving or 2.2 acres per day with grading and excavation are assumed to be below the PM_{10} significance threshold of 82 pounds per day. As the proposed project would involve grading of up to 30,000 square feet (0.7 acres) per day, the project would result in less-than-significant PM_{10} emissions during construction. As the project would be below the significance threshold, it would not expose sensitive receptors to substantial pollutant concentrations and the impact would be less than significant.

LRDP EIR Mitigation AIR-1, which requires specific contract requirements designed to minimize construction fugitive dust, is applicable to and incorporated into the proposed project. These require that the contractor implement dust control measures recommended by the *MBUAPCD CEQA Air Quality Guidelines* to reduce PM_{10} generated by utility trenching or by demolition. This previously adopted LRDP mitigation would further reduce the less than significant impact of the project with respect to construction emissions of PM_{10}. Additionally, compliance with MBARD's regulations is specifically required by the Campus' contract documents.

Operational Impacts

The proposed project would not result in any operational emissions, as operations associated with the completed path would include use by bicycles and pedestrians on campus similar to the use of the existing path. The proposed project would have no operational impact associated with air quality.

d) The proposed project would not result in the generation of odors during operation, as operations associated with the completed path would include use by bicycles and pedestrians on campus similar to the use of the existing path. There would be no impact.

Summary

The project would have a less-than-significant impact on air quality, which would be further minimized by LRDP EIR Mitigations AIR-1 and AIR-6. No project-level mitigation is required.

6.4 BIOLOGICAL RESOURCES

BIOLOGICAL RESOURCES Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in the LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☑	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☑	☐	☐	☐
c) Have a substantial adverse effect on state- or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☐	☑
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with	☐	☐	☐	☑	☐

BIOLOGICAL RESOURCES Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in the LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?					
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☐	☑
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☐	☑

Biological resources issues and programmatic mitigation measures applicable to LRDP development are described in Volume I, Section 4.4, of the 2005 LRDP EIR (UC Santa Cruz 2006). The following, previously adopted LRDP EIR mitigations for potential impacts to biological resources are applicable to and included in the proposed project (the full text of the mitigation measures is included in Appendix B):

- LRDP EIR Mitigation BIO-6 (Avoid spread of noxious weeds, sudden oak death, or pitch canker)
- LRDP EIR Mitigation BIO-9 (Avoid and protect California red-legged frogs)
- LRDP EIR Mitigation BIO-11 (Avoid and/or monitor nesting special-status birds)
- LRDP EIR Mitigations BIO-12A and BIO-12B (Avoid, survey, and/or monitor burrowing owls)
- LRDP EIR Mitigation BIO-14 (Avoid and/or survey for San Francisco dusky-footed woodrats)

6.4.1 Study Methods and Background

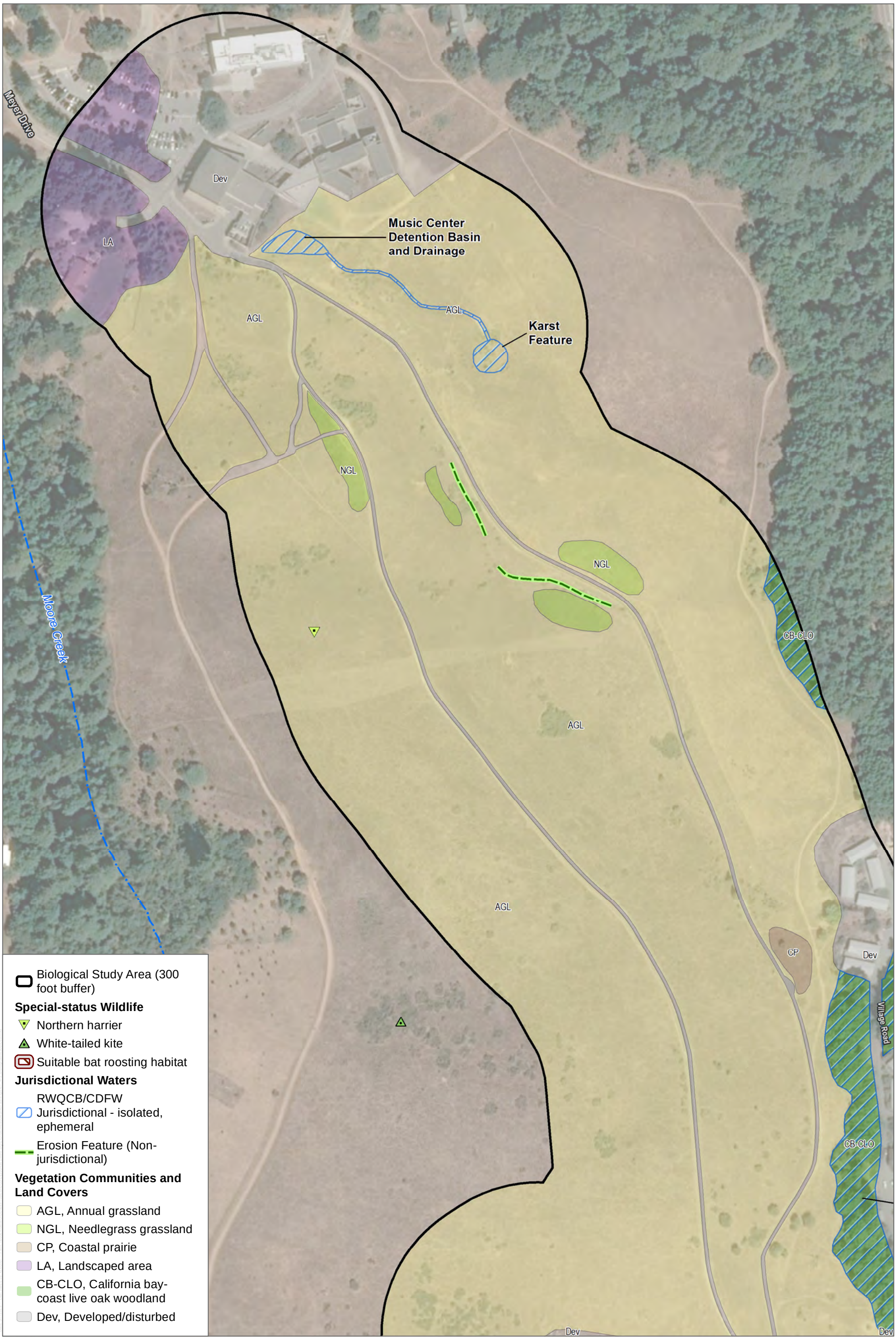
The following analysis relies on a biological resources assessment conducted by Dudek in February 2019. This assessment included a review of the latest available relevant literature, published research, and maps on soils, hydrology, general biological baselines, and special-status species distributions to determine those resources that have the potential to occur within the proposed 16.60-acre area of potential impact and surrounding 300-foot buffer. This area equates to 124.42 acres, which constitutes the biological study area (Figure 6.4-1, Biological Resources). Dudek searched the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB) (CDFW 2019a–d), the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants (CNPS 2019), and the U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Conservation (IPaC) occurrence data (USFWS 2019a) to identify special-status biological resources that are known to occur in the region. The CNDDB and CNPS databases were searched based on the U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps for Santa Cruz, where the project site is located, as well as the surrounding four USGS 7.5-minute quadrangle maps (i.e., Davenport, Felton, Laurel, and Soquel). Potential and/or historic drainages and aquatic features were investigated based on a review of USGS topographic maps (1:24,000 scale), aerial photographs, the National Wetland Inventory database (USFWS 2019b), and the Natural Resource Conservation Service Web Soil Survey (USDA 2019). Dudek conducted a thorough review and confirmed

the findings of the LRDP EIR. In addition, Dudek confirmed the results of the focused botanical survey conducted for the proposed project in spring 2018, which identified the locations of vegetation communities (including native grass stands) and special-status plant species (Biotic Resources Group 2018).

For the purposes of this analysis, special-status species include those that are (1) listed, proposed for listing, or candidates for listing under the federal Endangered Species Act as threatened or endangered; (2) listed or candidates for listing under the California Endangered Species Act as threatened or endangered; (3) a state fully protected species; (4) a CDFW Species of Special Concern; or (5) a species listed on the CNPS Inventory of Rare and Endangered Plants with a California Rare Plant Rank of 1B or 2B. Sensitive vegetation communities are those communities identified as high priority for inventory in CDFW's List of Vegetation Alliances and Associations (or Natural Communities List; CDFG 2010), which is based on A Manual of California Vegetation, Second Edition (Sawyer et. al. 2009), by a state rarity ranking of S1, S2, or S3.

Following the literature review, Dudek biologists Ryan Henry and Michelle Leis conducted a reconnaissance-level survey of the biological study area on February 12, 2019, to identify existing biological resources. Dudek confirmed the extent of vegetation communities and land covers previously mapped by Biotic Resources Group (2018) and compiled a general inventory of plant and wildlife species detected by sight, calls, tracks, scat, or other sign. Dudek also made determinations concerning the potential for special-status species to occur within the biological study area.

Additionally, Dudek conducted an investigation of the extent and distribution of waters of the U.S./waters of the State that would be subject to regulation by the U.S. Army Corps of Engineers (Corps), Regional Water Quality Control Board (RWQCB) and/or CDFW. The investigation of potentially jurisdictional aquatic resources (i.e., waters of the U.S./state) used the definitions and methods described in the Corps Wetlands Delineation Manual (Environmental Laboratory 1987). Potential non-wetland waters of the U.S. were identified based on the limits of an ordinary high water mark (OHWM). Potential jurisdictional features were also examined for evidence of saturation, permanence of surface water, hydrophytic vegetation, and nexus to a traditional navigable or relatively permanent water of the U.S. In areas where potential Corps jurisdictional wetlands were suspected, the extent and/or dominance of hydrophytic vegetation was noted. Areas regulated by the RWQCB are generally coincident with the Corps, but include features isolated from navigable waters of the U.S. that have evidence of surface water inundation. The extent of potential CDFW jurisdiction was identified to the top-of-bank of the stream/channels or to the limit of adjacent riparian vegetation, if present.



SOURCE: Bing 2019

DUDEK

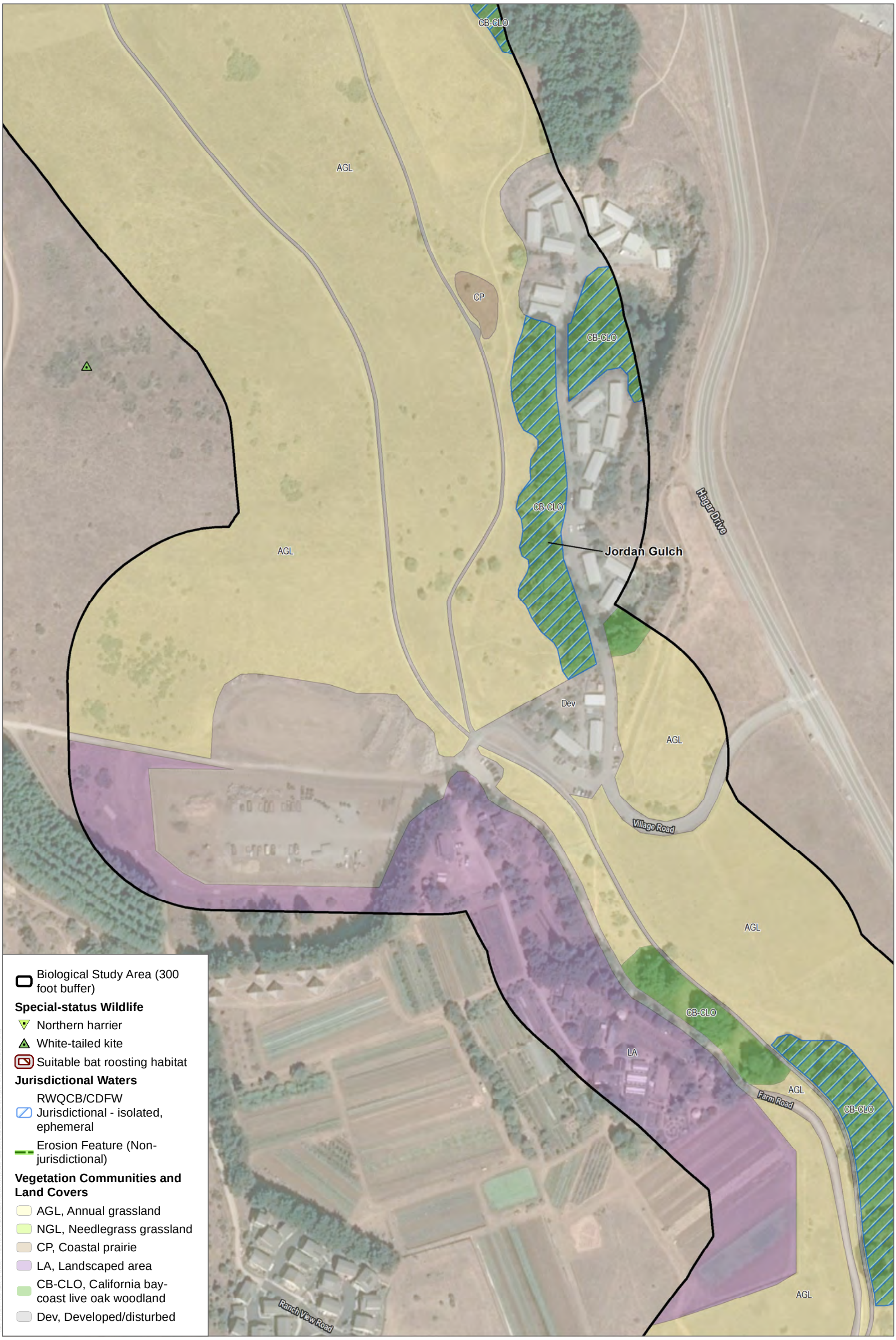
0 100 200 Feet

FIGURE **6**.4-1A

Biological Resources

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2

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SOURCE: Bing 2019

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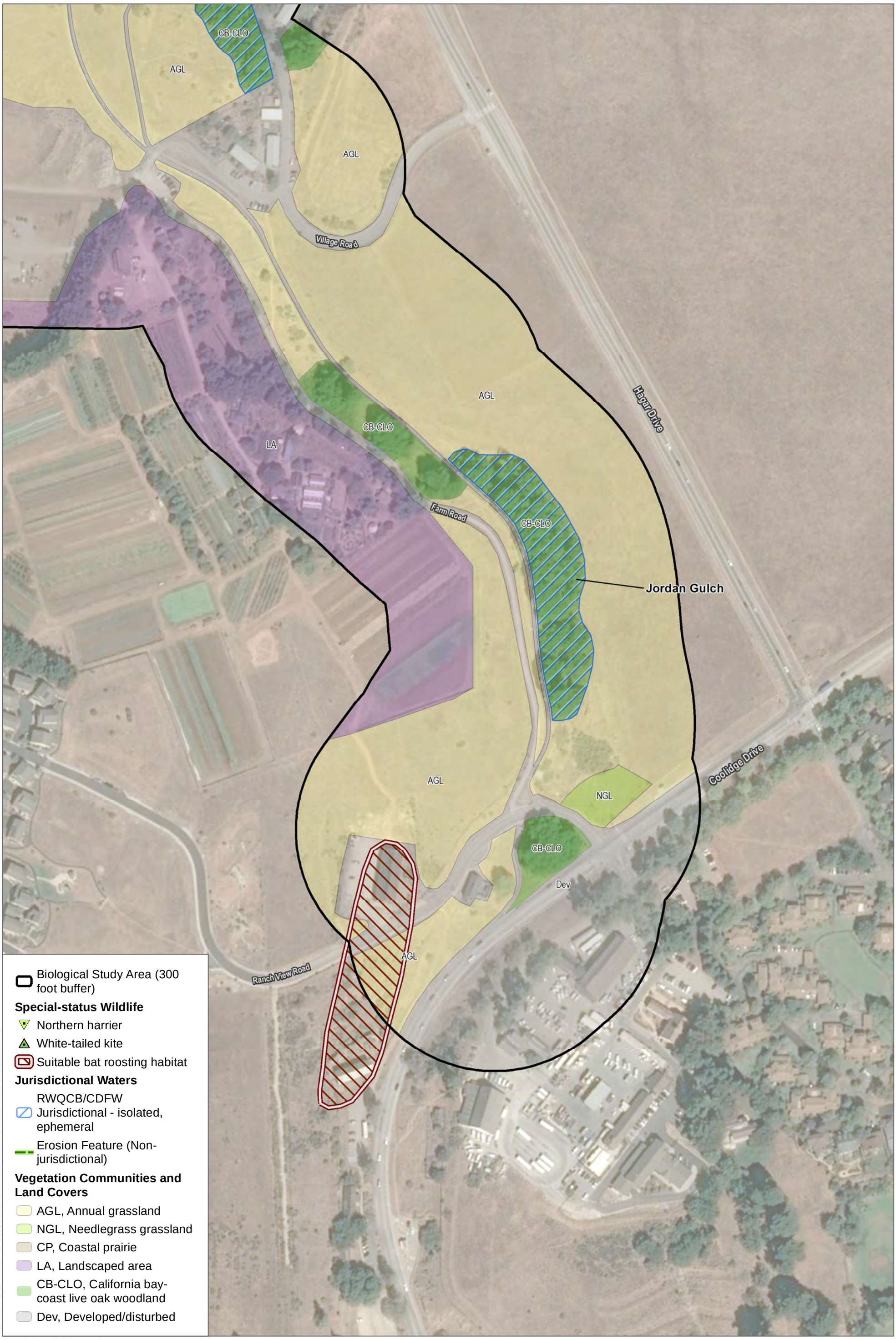
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FIGURE 6.4-1B

Biological Resources

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2

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SOURCE: Bing 2019

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FIGURE 6.4-1C

Biological Resources

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2

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Vegetation Communities and Plants

The biological study area supports the following vegetation communities and land covers: annual grassland, coastal prairie, needlegrass grassland, California bay-coast live oak woodland association, developed/disturbed, and landscaped area. Annual grassland is the dominant vegetation community, which intergrades with the needlegrass grassland and coastal prairie vegetation communities, within the biological study area. Figure 6.4-1 illustrates the distribution and Table 6.4-1 summarizes the extent of vegetation communities and land covers within the biological study area. Descriptions of these vegetation communities and land covers are summarized from Biotic Resources Group (2018) below.

Table 6.4-1
Vegetation Communities and Land Covers within the Biological Study Area

Vegetation Community or Land Cover	Project Site (acres)	300-foot Buffer (acres)	Biological Study Area (acres)
Forest and Woodland Alliances and Stands			
California bay-coast live oak woodland association	0.47	5.47	5.95
Herbaceous Alliances and Stands			
Annual grassland	10.99	67.15	78.13
Coastal prairie*	0.09	0.12	0.21
Needlegrass grassland*	0.29	1.01	1.30
Non-Natural Land Covers/Unvegetated Communities			
Developed/disturbed mapping unit	4.76	21.52	26.28
Landscaped area	-	12.55	12.55
Total*	**16.60**	**107.82**	**124.42**

*Sensitive vegetation community (CDFG 2010)
**Acreages may not total due to rounding

The annual grassland includes wild oat (*Avena fatua*), farmer's foxtail (*Hordeum leporinum*), and ripgut brome (*Bromus diandrus*) as co-dominants. Other species of grass occur at varying densities and include California oatgrass (*Danthonia californica*), European hairgrass (*Airia caryophyllea*), fescues (*Festuca* sp.), purple needlegrass (*Stipa pulchra*), and quaking grass (*Briza minor*). Several species of non-native forbs also characterize the annual grassland, including English plantain (*Plantago lanceolata*), geranium (*Geranium molle*), Italian thistle (*Carduus pycnocephalus*), Mediterranean clover (*Trifolium angustifolium*), sidewalk horseweed (*Conyza bonariensis*), scarlet pimpernel (*Anagallis arvensis*), and storksbill (*Erodium botrys*). Scattered shrubs also occur at low cover within this community, including cotoneaster (*Cotoneaster* sp.), coyote brush (*Baccharis pilularis*), and French broom (*Genista monspessulana*). This community occurs throughout the biological study area.

The coastal prairie vegetation community includes California oatgrass as the dominant species. Similar to the annual grassland, several other grasses and forbs occur at varying densities including Mediterranean clover, narrow-leaved vetch (*Vicia sativa* ssp. *nigra*), rattlesnake grass (*Briza maxima*), and sun cups (*Taraxia ovata*). Coastal prairie is considered a sensitive vegetation community (CDFG 2010).

The needlegrass grassland vegetation community includes purple needlegrass as the dominant species. Also similar to the annual grassland, several other grasses and forbs occur at varying densities and includes additional native species such as bracken fern (*Pteridium aquilinum*), California aster (*Corethrogyne filaginifolia*), and sun cups. This community occurs in discrete patches within the most northern and

southern portions of the biological study area. Needlegrass grassland is considered a sensitive vegetation community (CDFG 2010).

The California bay-coast live oak woodland association (mixed evergreen forest) includes California bay (*Umbellularia californica*) and coast live oak (*Quercus agrifolia*) as co-dominants in the tree layer. Other species that comprise the understory include coyote brush and various grasses, typically found within the annual grassland community.

The developed/disturbed mapping unit refers to areas that support commercial, industrial, and/or institutional structures. Typically, these areas are paved with impermeable surfaces that cannot support vegetation or habitat for species; however, non-native ornamental landscaping may occur within the mapping unit. This mapping unit also includes areas that lack vegetation such as paved roads or unimproved areas that still retain a pervious surface. The latter areas may be dominated by a sparse cover of non-native forb species commonly associated with the annual grassland.

The landscaped area mapping unit, as identified in the LRDP EIR (UC Santa Cruz 2006), includes areas occupied by introduced plantings of exotic, and sometimes native, species as landscaping that are actively maintained.

A complete list of plants detected within the biological study area is included in Appendix D-1 of this document.

Wildlife

Several wildlife species were observed or detected during the reconnaissance-level survey of the biological study area, including 17 bird species, six mammal species, and one reptile species. Bird species detected within the biological study area were Anna's hummingbird (*Calypte anna*), common raven (*Corvus corax*), great egret (*Ardea alba*), northern harrier (*Circus hudsonius*), and white-crowned sparrow (*Zonotrichia leucophrys*). No active bird nests were detected within the biological study area. Mammal species detected included Botta’s pocket gopher (*Thomomys bottae*), brush rabbit (*Sylvilagus bachmani*), coyote (*Canis latrans*), domestic dog (*Canis lupus familiaris*), and mule deer (*Odocoileus hemionus*). The reptile species detected was western fence lizard (*Sceloporus occidentalis*). A complete list of wildlife detected within the biological study area is included in Appendix D-2 of this document.

Jurisdictional Waters

One retention basin (Music Center Retention Basin) and associated outlet drainage (ephemeral), one natural ephemeral drainage (Jordan Gulch), and one swale-like feature along the existing bike path were investigated as potential jurisdictional resources within the biological study area. Other features that occur within the vicinity but outside of the biological study area include Moore Creek, which is located to the west. The identification of potential jurisdictional features within the biological study area was complicated by the geologic setting (karst formations), ongoing sediment and erosion control management practices, and campus development that have altered the natural vegetation, soils, and hydrology of the biological study area.

The Music Center Detention Basin occurs within the northernmost portion of the biological study area just south of the Music Center and Recital Hall next to the bike path. This stormwater control feature occurs at the outfall of three concrete culverts that discharge localized stormwater runoff from the campus (Figure 6.4-1). The shallow, earthern, oval-shaped basin is approximately 60 feet in width and 180 feet in length. A v-shaped, flow-control structure occurs at the down-gradient (eastern) portion of the basin, which allows low-flows to pass through the structure. The flow path down-gradient of the basin has been re-aligned and stabilized with a series of in-line, ungrouted drop structures that have been created from small rock rip-rap. This drainage feature measures approximately 6 feet in width. The physical structure of the drainage feature terminates at a depressional area (karst). The detention basin is frequently maintained and supports a mix

of native and non-native plant species, including English plantain, farmer's foxtail, fescues, ripgut brome, rush (*Juncus* sp.), storksbill, quaking grass, and western blue-eyed grass. No clear dominance of hydrophytic vegetation was observed in the detention basin or drainage feature. The detention basin and outlet drainage feature are physically isolated from any other surface drainage features and the above-ground portion terminates at a karst feature located to the southeast. The feature does not support an OHWM and as a result would not be considered a regulated aquatic resource by the Corps. However, the RWQCB and CDFW jurisdictional extents encompass the basin and downstream channel structure (top of bank) for a total of 0.30 acres.

Portions of Jordan Gulch occur along the easternmost portion of the biological study area. This natural drainage feature is characterized by a California bay-coast live oak woodland vegetation community that has been physically and hydrologically modified as a result of student housing development. Jordan Gulch is a major fracture zone and most flow is captured by sinkholes and swallow holes along the course of the channel. Flow is ephemeral, occurring only during major storms (UC Santa Cruz 2006). The fragmented drainage was investigated due to its topographic setting and riparian-like geomorphology. The portion of Jordan Gulch within the biological study area lacks a clearly defined OHWM or connectivity to other receiving waters downstream and as a result was determined to be an isolated water of the state. The RWQCB and CDFW jurisdictional extents encompass the outer limits (drip-line) of the California bay-coast live oak woodland for a total of 4.57 acres.

The other feature investigated was a swale located in the northern portion of the biological study area. The discontinuous swale appears to be an erosional feature that parallels the west side of the uphill bike path for approximately 640 linear feet. Vegetation associated with the swale was typical of the surrounding annual grassland and limited to upland species. The feature was investigated due to its topographic setting; however, due to a lack of a clearly defined OHWM, continuous bed and bank, connectivity to other receiving waters, and associated indicators of normal flow (e.g., sediment flow, shelving, and water marks), the feature was determined to be a non-jurisdictional feature.

6.4.2 Impact Analysis

a) This biological resources assessment found that the project site generally lacks suitable habitat for most special-status plant species known from the UC Santa Cruz campus and surrounding region due to a combination of unsuitable habitat conditions and the high level of human activity in the area. However, several special-status wildlife species have at least a moderate potential to occur within the biological study area.

Special-Status Plants

The project site does not occur within USFWS-designated critical habitat for any federally-listed plant species. No plant species listed or proposed for listing as rare, threatened, or endangered by the CDFW or USFWS were detected within the biological study area during the focused rare plant surveys conducted from March through June 2018 (Biotic Resources Group 2018) and general biological survey conducted by Dudek in February 2019. Additionally, no plant species considered sensitive by CNPS were detected. The 2018 focused surveys were conducted during the peak bloom period for special-status plant species to ensure detection of potential occurring species.

Dudek performed a review of the literature, existing documentation, and geographic information systems (GIS) data to evaluate the potential for special-status plant species to occur within the project site and biological study area. Each special-status plant species was evaluated and given a rating based on its potential to occur (i.e., not expected, low, medium, or high) taking into consideration the relative location of the biological study area to known occurrences, vegetation communities, soils, and elevation. Based on the results of the literature review and database searches, 45 special-status plant species were identified as occurring within the region. According to the LRDP Final EIR (UC Santa Cruz 2006), four special-status

species have been documented on the UC Santa Cruz campus: marsh microseris (*Microseris paludosa*), Point Reyes horkelia (*Horkelia marinensis*), San Francisco popcorn flower (*Plagiobothrys diffusus*), and Anderson's [Santa Cruz] manzanita (*Arctostaphylos andersonii*). One additional species is known from the nearby Pogonip Open Space: robust spineflower (*Chorizanthe robusta robusta*). However, none of these species are expected to occur within the biological study area based on the absence of suitable soils, current disturbance levels, lack of suitable vegetation communities (habitats) present, the location of biological study area being outside species elevation ranges, proximity to previous known locations based on the CNDDB and CNPS records, and the results of the recent focused rare plant surveys (Biotic Resources Group 2018). The complete results of this potential to occur evaluation for special-status plants are included as Appendix D-3 of this document.

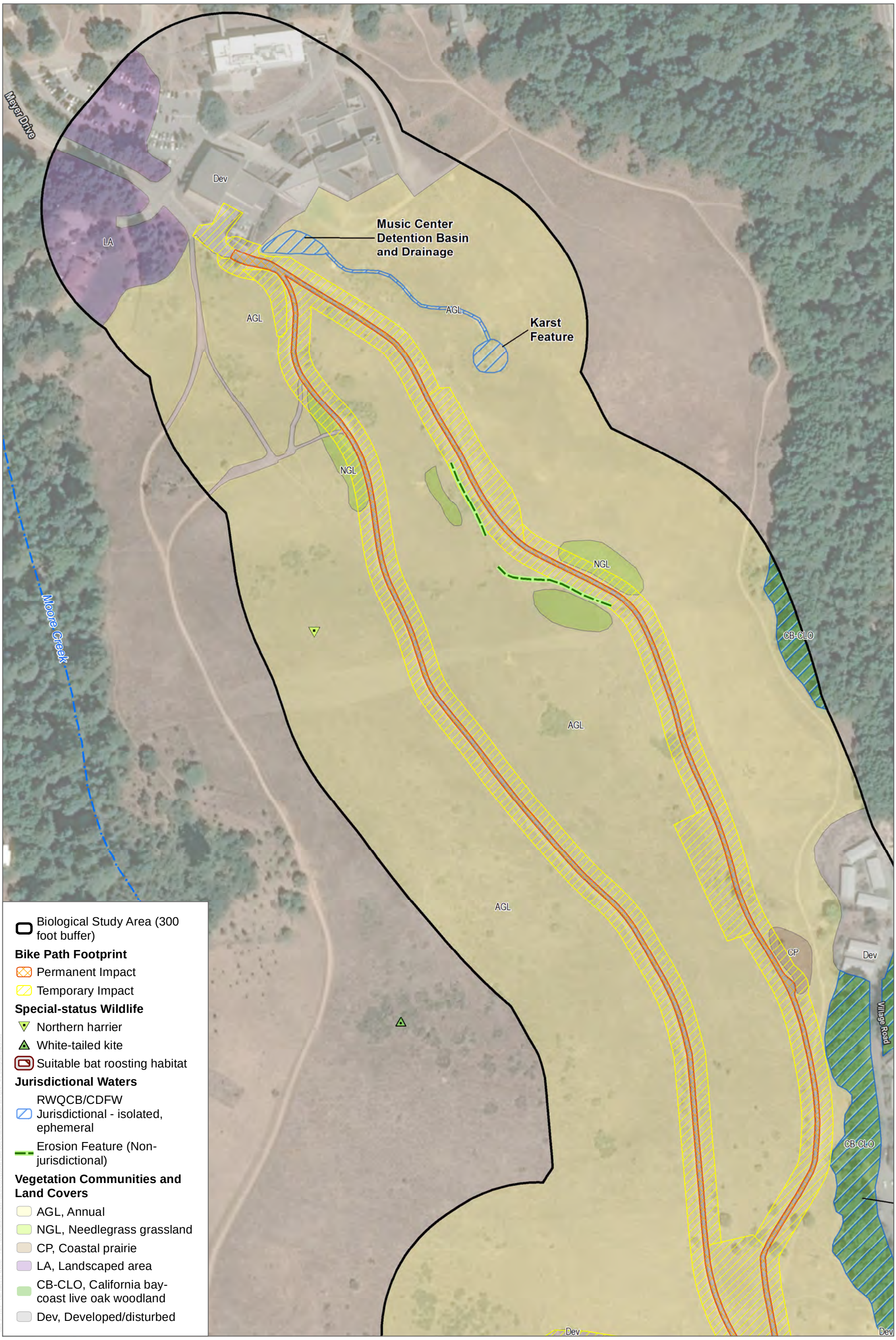
As a result, there would be no direct or indirect impacts to special-status plant species.

Special-Status Wildlife

The project site does not occur within USFWS-designated critical habitat for any federally-listed wildlife species. No wildlife species listed or proposed for listing as rare, threatened, or endangered by the CDFW or USFWS were detected within the biological study area during the reconnaissance-level survey conducted by Dudek in February 2019. One non-listed, special-status wildlife species was detected near the center of the biological study area: northern harrier (*Circus cyaneus*; CDFW Species of Special Concern). Additionally, one wildlife species considered Fully Protected by the CDFW was incidentally detected just outside and to the west of the biological study area: white-tailed kite (*Elanus leucurus*). Figure 6.4-2 illustrates the location of these species in relation to the proposed project footprint.

Dudek performed a review of literature, existing documentation, and GIS data to evaluate the potential for special-status wildlife species to occur within the biological study area. Each special-status wildlife species was evaluated and given a rating based on its potential to occur (i.e., not expected, low, moderate, or high) taking into consideration the relative location to known occurrences, vegetation communities, and elevation. Based on the results of the literature review and database searches, 33 special-status wildlife species were identified as occurring within the region. Of these, 12 wildlife species have a moderate or high potential to occur within the biological study area based on the vegetation communities (habitat) present, elevation ranges, and previous known locations documented within the CNDDB, USFWS occurrence data, and LRDP EIR. These special-status species consist of one federally-threatened species, California red-legged frog (*Rana draytonii*), and eleven species that are CDFW Species of Special Concern including the American badger (*Taxidea taxus*), San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), western burrowing owl (*Athene cunicularia*), three species of bats (western mastiff bat [*Eumops perotis californicus*], pallid bat [*Antrozous pallidus*], and Townsend's big-eared bat [*Corynorhinus townsendii*]), two species of nesting passerines (Bryant's savannah sparrow [*Passerculus sandwichensis alaudinus*] and grasshopper sparrow [*Ammodramus savannarum*]), and three raptors/falcons (golden eagle [*Aquila chrysaetos*; Fully Protected], white-tailed kite, and northern harrier). Potential impacts to these species are discussed below in greater detail.

The remaining special-status wildlife species identified during the literature review and database searches are expected or have a low potential to occur within the biological study area. The complete results of this potential to occur evaluation for special-status wildlife are included as Appendix D-4 of this document.



SOURCE: Bing 2019

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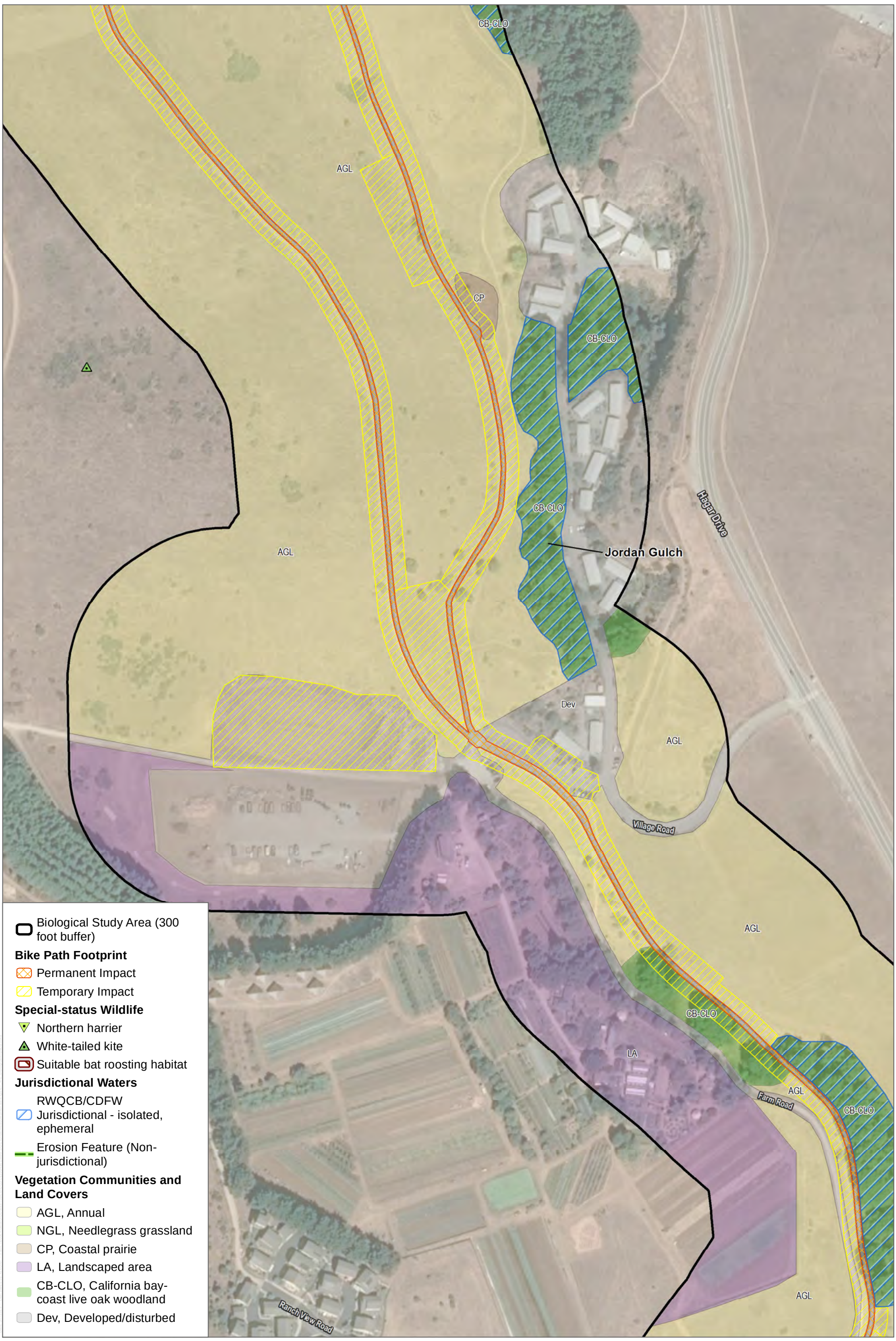
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FIGURE 6.4-2A

Impacts to Biological Resources

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2

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SOURCE: Bing 2019

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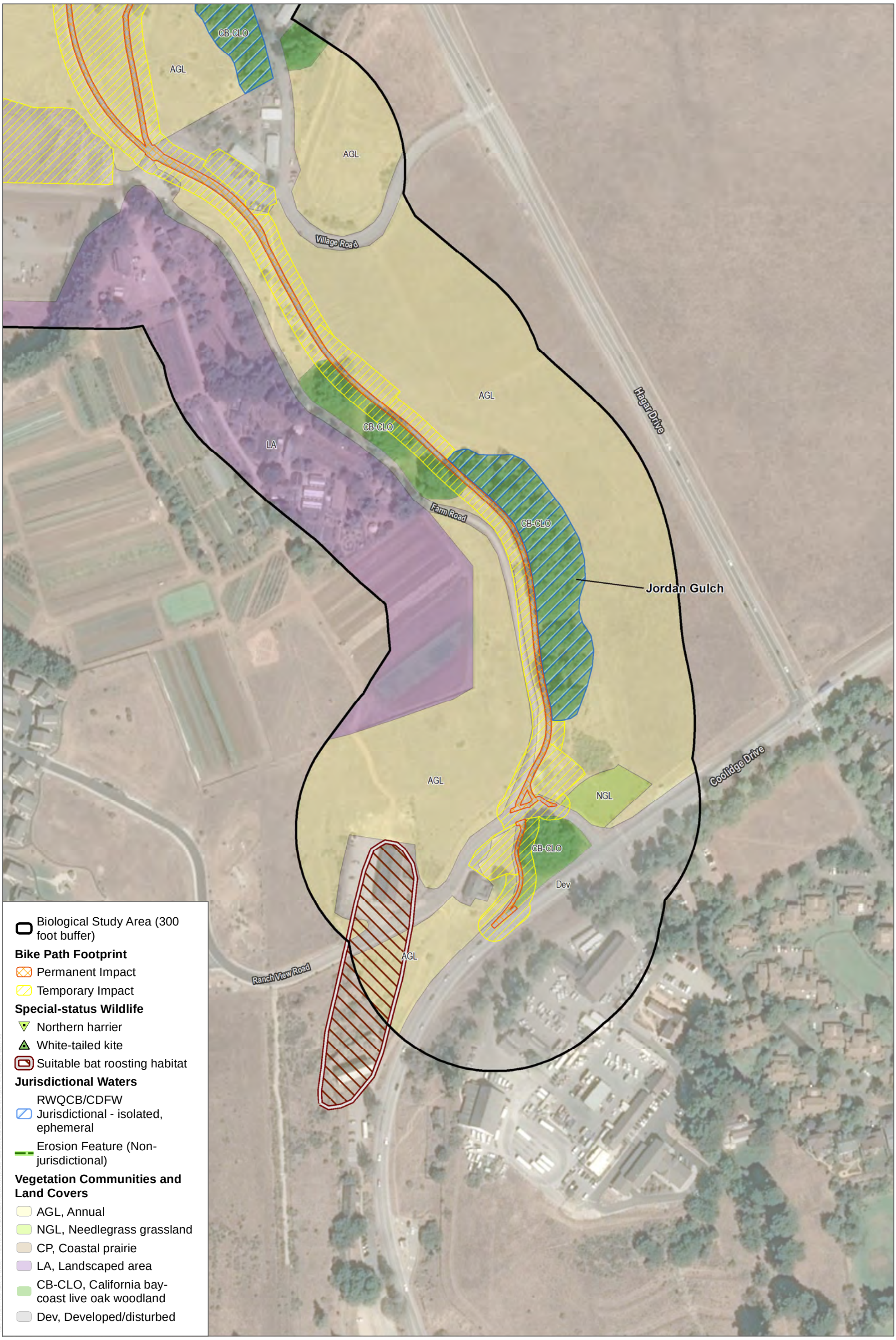
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FIGURE 6.4-2B

Impacts to Biological Resources

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2

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SOURCE: Bing 2019

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FIGURE 6.4-2C

Impacts to Biological Resources

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2

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American badger. The American badger is designated as a Species of Special Concern by the CDFW. The species was historically detected in 1983 approximately four miles northwest of Santa Cruz, in 2004 approximately 0.3 miles to the east of the project site, and more recently in Wilder Ranch State Park near the Campus (CDFW 2019a). Additionally, in 2013, and in late 2018, Campus Natural Reserve staff observed shallow digs that appeared to be evidence of a badger foraging in the Great Meadow, but no dens have been observed on the campus in recent years (Klaus pers. comm. 2019). Therefore, the grasslands within the biological study area provide suitable habitat for this species. Although general surveys did not result in the detection of this species, American badgers could occupy the project site prior to initiation of construction activities and implementation of the project could result in direct and/or indirect impacts to the species. Direct impacts could include harming individuals during initial grading activities. Indirect impacts could include noise, dust, pollution, and entrapment during construction activities. Implementation of Great Meadow Bike Path Mitigation BIO-1 would ensure that project construction does not disturb badgers, and impacts would be reduced to less than significant.

> **Great Meadow Bike Path Mitigation BIO-1:** Prior to project construction, a qualified biologist shall inspect the project work area and adjacent areas within 100 feet for American badger dens. If an active badger den is found within the project footprint, the Campus shall contact the California Department of Fish and Wildlife regarding the latest acceptable methods for den exclusion/excavation.

California Red-Legged Frog. The California red-legged frog is listed as threatened under the federal Endangered Species Act and as a Species of Special Concern by CDFW. The California red-legged frog is known to breed in the Arboretum pond located approximately 0.2 mile from the biological study area, and have been found in the East Fork of Moore Creek located approximately 0.15 mile from the biological study area (Ecosystems West 2000, Jones & Stokes 2002, and UC Santa Cruz 2006). Red-legged frogs may also occur in marginal upland habitats adjacent to Moore Creek during juvenile dispersal or adult aestivation. Although no suitable aquatic habitat is present in the biological study area, the grasslands within the biological study area provide suitable upland movement habitat for this species. California red-legged frogs could potentially occur on the project site, especially during the rainy season, while dispersing from breeding sites or moving between breeding and non-breeding aquatic habitats. During periods of wet weather, red-legged frogs may make overland excursions through upland habitat.

Although California red-legged frogs have not been documented on campus within developed areas or outside of the Moore Creek riparian corridor, the species could occupy the project site prior to initiation of construction activities. Implementation of LRDP EIR Mitigation BIO-9, which is applicable to and incorporated into the proposed project, would avoid impacts to this species. This measure requires construction activities to occur between May 1 and October 15, and a pre-construction survey by a qualified biologist be conducted within 24 hours of ground-disturbing activities. If the species is detected, then the Campus shall coordinate with the appropriate agencies to develop appropriate avoidance measures before commencing project activities. Therefore, no impacts to this species would result with the proposed project.

San Francisco dusky-footed woodrat. The San Francisco dusky-footed woodrat is designated as a Species of Special Concern by CDFW. The species has not historically been detected on campus. However, woodrat nests have been found within the north campus and adjacent to lower Moore Creek during 2002 surveys (Ecosystems West 2002, Jones & Stokes 2004). The California bay-coast live oak woodland (mixed evergreen forest) community within the biological study area provides marginally suitable habitat for this species. Although the species has not been documented on campus nor during general surveys, individuals may occupy the project site prior to initiation of construction activities. Implementation of LRDP EIR Mitigation BIO-14 (pre-construction surveys), which is applicable and incorporated into the proposed project, would avoid potentially significant impacts to dusky-footed woodrat. This measure requires a pre-

construction survey prior to ground-disturbing activities, establishment of an avoidance buffer if the species is discovered, construction monitoring to avoid inadvertent impacts, and relocation if needed. Therefore, the impact to this species would be less than significant.

Western Burrowing Owl. The western burrowing owl is designated as a Species of Special Concern by the CDFW and Bird of Conservation Concern by the USFWS. This species is known to overwinter within the lower UC Santa Cruz campus and has been observed at several locations on campus during the 1970s and in 2001 (UC Santa Cruz 2006) and has been seen in most years in the East Meadow, including the winter of 2018-19 (Jones pers. comm. 2019). However, the species has not nested on the UC Santa Cruz campus since 1987. Potential overwintering habitat is present within the grassland areas of the biological study area. Although the species has not been documented recently on campus nor during general surveys, they may occupy the project site prior to initiation of construction activities. Implementation of LRDP EIR Mitigations BIO-12A (pre-construction surveys) and BIO-12B (avoidance measures), which are applicable and incorporated into the proposed project would avoid potentially significant impacts to western burrowing owl. This measure requires a pre-construction survey following the current CDFW survey guidelines before ground-disturbing activities begin; if owls are found, defined non-disturbance buffer zones during the breeding and non-breeding seasons must be established or if nest sites cannot be avoided, one-way doors will be established on owl burrows to passively relocate individuals. Therefore, the impact to this species would be less than significant.

Roosting Bats. There are several species of special-status bats that have potential to forage or roost within the biological study area, including western mastiff bat, pallid bat, and Townsend's big-eared bat. These species are designated as Species of Special Concern by the CDFW and typically roost within artificial structures. Highly suitable bat roosting habitat was identified within the southernmost portion of the biological study area. This area corresponds with the historic Hay Barn and Cookhouse buildings. However, historic pedestrian and acoustic surveys have not indicated current use of these areas (UC Santa Cruz 2006). Moreover, the Cookhouse was substantially renovated in 2006-2007 and the Hay Barn was completely reconstructed in 2014 (Klaus pers. comm. 2019), so it is unlikely that either retains the features suitable for bat roosting that were noted in the 2005 LRDP EIR. Furthermore, these areas would be avoided during construction of the bike path. Other areas identified within the LRDP as providing moderately suitable bat roosting habitat within the vicinity of the project include the redwood forests within the Moore Creek corridor adjacent to Oakes College and College Eight located 0.2 mile to the west, and Jordan Gulch corridor located 0.1 mile to the east of the biological study area (UC Santa Cruz 2006). The grasslands within the biological study area provide limited foraging opportunities for bats. Bats generally prey on insects that are locally abundant near water bodies. Although habitats adjacent to ponds and riparian areas may provide ecotone areas for foraging, the biological study area does not support this type of close proximity between high and moderately suitable roosting habitat and nearby water bodies.

The LRDP EIR Mitigation BIO-13, which is applicable to and incorporated into the proposed project, requires field surveys (and avoidance or relocation of roosting bats) if tree removal or grading activities would occur within project sites that contain suitable roosting habitat. However, the proposed project would not occur within or in close proximity to any suitable foraging or roosting bat habitat. Therefore, no impacts to this species would result with the proposed project.

Nesting Birds. Several special-status passerines are known from the lower portions of the Campus. Most of these species are not expected to nest in the biological study area due to a lack of nesting sites and the high level of human activity in the area. However, potential nesting habitat is present on site for two grassland species: Bryant’s savannah sparrow and grasshopper sparrow. Additionally, there are several species of special-status raptors known to occur in the vicinity of the biological study area, including golden eagle, northern harrier, and white-tailed kite. None of these species are expected to nest on the project site itself due to a lack of nesting sites, micro-habitat and the high level of human activity in the area. However,

the biological study area provides suitable foraging habitat for these species. One northern harrier was observed foraging over the grassland habitat within the biological study area during the 2019 reconnaissance-level survey. Additionally, two white-tailed kites were incidentally detected approximately 0.12 mile west of the project site (and outside the biological study area) during the February 2019 survey. Implementation of LRDP Mitigation BIO-11 (pre-construction surveys and nest avoidance), which is applicable and incorporated into the proposed project, would avoid potentially significant impacts to active raptor nests. This measure requires a pre-construction survey during the nesting/breeding season (typically February 1 through August 31), establishment of non-disturbance buffer zones, and postponement of clearing and construction within buffer zones until juveniles have fledged and there is no evidence of a second nesting attempt. Implementation of this measure would also benefit and protect special-status passerine species. Therefore, the impact to nesting birds would be less than significant.

In summary, implementation of the LRDP EIR mitigation measures identified above and included in the proposed project would ensure that potential direct and indirect impacts to the special-status plant and wildlife species would be less than significant.

b) Two sensitive natural vegetation communities were identified within the biological study area during the 2018 focused rare plant survey: coastal prairie and needlegrass grassland. One small area of coastal prairie (0.21 acres) and four patches of needlegrass grassland (1.30 acres) occur in close proximity to the existing bike path. These areas currently experience periodic mowing during routine maintenance activities and have been previously disturbed during construction of the original bike path, as well as installation of the Village Road, underground utilities, and stormwater drainage facilities. The proposed project has been designed to avoid permanent impacts to these communities. However, approximately 0.09 acres of coastal prairie and 0.29 acres of needlegrass grassland could be temporarily impacted during construction of the new bike path. LRDP EIR Mitigations BIO-2A and 2B require avoidance of these habitats, restoration of the coastal prairie and needlegrass grassland at a 3:1 ratio if the vegetation community cannot be avoided, and implementation of a management and monitoring plan to achieve the stated success criteria. However, these mitigation measures do not apply to the proposed project as it would not result in permanent impacts to these communities. Implementation of Great Meadow Bike Path Mitigation BIO-2 would ensure that coastal prairie and needlegrass grassland areas temporarily impacted during construction are appropriately restored.

> **Great Meadow Bike Path Mitigation BIO-2*:*** Prior to construction of the proposed project the Campus shall prepare a coastal prairie and needlegrass grassland habitat mitigation and monitoring plan to define the type of restoration, species lists, success criteria, photo documentation and reporting that will be conducted for habitat areas that will be temporarily disturbed during project construction. The habitat mitigation and monitoring plan may include a one-time topsoil salvage prior to construction in the defined areas of coastal prairie and needlegrass grassland that will be subject to disturbance for later use in reseeding soils with native grasses. The habitat mitigation and monitoring plan shall be implemented per the specifications in the plan at the conclusion of project construction. Restoration areas shall be monitored for 3 years to meet defined success criteria.

Additionally, consistent with LRDP EIR Mitigation BIO-6, which is included in all campus construction contracts that involve ground disturbance, the proposed project would implement measures during construction to avoid the spread of noxious weeds. Therefore, the impact to sensitive habitats would be reduced to less than significant.

c) One stormwater detention basin (Music Center Detention Basin) and associated outlet drainage, and portions of Jordan Gulch occur within the biological study area. These features were identified as waters of the State (non-wetland waters) as defined and regulated by Section 401 of the federal Clean Water Act, California Porter-Cologne Water Quality Control Act, and Section 1602 of the California Fish and Game

Code and total approximately 4.87 acres within the biological study area. No jurisdictional waters or wetlands regulated by the Corps occur within the biological study area. The proposed project was designed to avoid all permanent and temporary impacts to state jurisdictional waters. As a result, implementation of the proposed bike path improvements would avoid jurisdictional waters and wetlands. Therefore, no impacts to jurisdictional waters or wetlands are anticipated with implementation of the proposed project.

d) The 2005 LRDP EIR (Vol. 1, pp. 4.4-61 to 4.4-62) identified several wildlife corridors on the campus, including the grasslands of the lower campus, which provides a link between Pogonip City Park to the east and Wilder Ranch State Park to the west. However, the existing Farm and Arboretum fences form barriers to wildlife movement on the south and east. Although the construction of the proposed project may cause some minor temporary impacts on local wildlife movement, the proposed bike path improvements would occur along the edges of the lower campus grasslands and would not disrupt the main expanse of the Great Meadow wildlife corridor. The proposed project would not create a new permanent barrier to wildlife movement, and the conditions for wildlife movement across the bike path would remain the same as currently exist after project construction. Therefore, less-than-significant impacts to wildlife movement would be anticipated with implementation of proposed project.

e) The proposed project is consistent with the policies of the 2005 LRDP EIR with respect to biological resources. No other biological resource policies or ordinances are applicable. As a result, no impact would occur to any local policies or ordinances protecting biological resources.

f) The proposed project site is not within an area covered by any adopted Habitat Conservation Plan or other approved habitat conservation plan. As a result, the proposed project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Summary

The proposed project would result in a less-than-significant impact to American badger with the implementation of Great Meadow Bike Path Mitigation BIO-1 and to coastal prairie and needlegrass grassland with implementation of Great Meadow Bike Path Mitigation BIO-2. All other impacts would be less-than significant with the implementation of LRDP EIR Mitigations BIO-6, BIO-9, BIO-11, BIO-12A, BIO-12B, and BIO-14, which are incorporated into the proposed project.

6.5 CULTURAL RESOURCES

CULTURAL RESOURCES Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	☐	☐	☑	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☑	☐	☐	☐
c) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☑	☐	☐	☐

Cultural resources issues and programmatic mitigation measures applicable to LRDP development are described in Volume I, Section 4.5, of the 2005 LRDP EIR (UC Santa Cruz 2006). The following, previously adopted LRDP EIR mitigations for potential impacts to cultural resources are applicable to and included in the project (the full text of the mitigation measures is included in Appendix B):

- LRDP EIR Mitigation CULT-1A (Archaeological records review of project site)
- LRDP EIR Mitigation CULT-1B (Training for construction crews on how to recognize archaeological sites and artifacts)
- LRDP EIR Mitigation CULT-1C (Archaeological survey during project planning and design)
- LRDP EIR Mitigation CULT-1D (Measures to be taken if cultural resource is identified)
- LRDP EIR Mitigation CULT-1E (Avoiding or reducing ground disturbance within site boundaries)
- LRDP EIR Mitigation CULT-1F (Monitoring and data recovery plan)
- LRDP EIR Mitigation CULT-1G (Measures to be taken if an archaeological resource is discovered during construction)
- LRDP EIR Mitigation CULT-2B (Requirement to determine the potential for a project to result in impacts to historical resources)
- LRDP EIR Mitigation CULT-2D (Avoidance of direct and indirect impacts to historic buildings or structures)
- LRDP EIR Mitigation CULT-4A (Implement LRDP EIR Mitigations CULT-1A through CULT-1H to minimize potential to disturb human remains)
- LRDP EIR Mitigation CULT-4B (Native American monitoring for any excavation within a known Native American archaeological site)

- LRDP EIR Mitigation CULT-4C (Measures to be taken in the event of a discovery on campus of human bone, suspected human bone, or a burial)

- LRDP EIR Mitigation CULT-4D (Measures to be taken if human remains cannot be left in place)

This section is based on a cultural resources assessment prepared for the proposed project (see Appendix E). The cultural resources assessment included a records search at the Northwest Information Center (NWIC) of the California Historical Resources Information System (CHRIS) at Sonoma State University and Native American Heritage Commission (NAHC) Sacred Lands File search for the proposed project site and 0.5-mile buffer around the project site (project area), and an intensive pedestrian survey of the project area.

a, b, c) Consistent with LRDP EIR Mitigations CULT-1A and CULT-1C, which are applicable to and incorporated into the proposed project, the cultural resources assessment determines the project's potential to result in cultural resource impacts within the project area and includes a review of confidential resource records.

The project area extends into the boundaries of six previously recorded historic-age cultural resources relating to the lime industry, which played an important role in the growth of both Santa Cruz County and the State of California from the mid-19th century to the turn of the 20th century. Two of the recorded resources are historic districts. One of the districts, P-44-000200, the 32-acre Cowell Lime Works Historic District (District), is listed in the National Register of Historic Places (NRHP) as of 2007. Within the boundary of the District, the Powder House, a historic building and contributing element of the District, lies within the project area. Additionally, small portions of two previously recorded resources lie within the District. One is a historic-age archaeological deposit related to the Blacksmith Shop (P-44-000958), and the other is the approximate boundary of "two barns" (P-44-001027), presumably contributing elements to the District known as the Hay Barn and the Blacksmith Shop recorded in 1976 by the Office of Historic Preservation. Additional sites located outside the District but within the project area include P-44-000184 (CA-SCR-182H), a complex of features related to the quarrying and production of lime mortar that show the southern half of the existing bike path as lying within a historic rail and road alignment, and P-44-000276, an agricultural field which may have been used historically by the Santa Cruz Mission.

The second district, P-44-000855, the 12,000-acre Cowell Home Ranch District, which includes the elements of the Cowell Lime Works Historic District along with features related to the lime industry as far as the town of Felton, was nominated but subsequently determined ineligible for the NRHP and, therefore, is not considered a historic resource in this analysis.

Twenty-one additional cultural resources are recorded within a 0.5-mile radius of the project area. These include three prehistoric sites, six historic sites, six historic buildings, one historic structure, one historic district and four historic elements of a district. The Project would not affect these resources as no disturbance would occur beyond the project area. The historic resources that cross portions of the project area are discussed further below, consistent with LRDP EIR Mitigation CULT-2B. See Appendix E for further details on these resources.

<u>P-44-000184 (CA-SCR-182H)</u>

This resource was originally recorded by J. Pryor in 1978 as a narrow railway bed with 4″ × 4″ railroad ties and associated steel rail sections. The site record was updated by E. Reese and M. Elliott in 2005 to include the Upper Quarry, Lower Quarry, Jordan Gulch Main Stem Pocket Quarry, and associated access road segments, tailings, a railroad bridge foundation, a possible channel diversion berm and a fence line. The

railway alignment, which Reese and Elliott date to 1860, connects the Jordan and Davis lime kilns (CA-SCR-198H) to the Lower Quarry, the Jordan Gulch Main Stem, and the Upper Quarry.

The existing bike path follows the alignment of a historic road and railway that was used to transport material from the quarries in Jordan Gulch to the limekilns in the southern portion of the campus. The bike path follows the historic road/rail alignment from its intersection with Lower Quarry Road to the southern terminus. Although very little of the former rail alignment is evident, additional subsurface features may be present. The historic road and railway site is likely eligible for the NRHP, however, it is unlikely that the portion of the site with the existing bike path is a contributing feature to the site's eligibility. Consequently, minor adjustments to the bike path associated with the proposed project would not likely affect the eligibility of the site as a whole. The implementation of LRDP EIR Mitigations CULT-1B, CULT-1D, CULT-1E, CULT-1F, CULT-1G, and CULT-2B, which are applicable and incorporated into the proposed project, as well as Great Meadow Bike Path Mitigation CULT-1, would avoid potentially significant impacts to this resource.

> **Great Meadow Bike Path Mitigation CULT-1:** The Campus shall require archaeological monitoring for all earth-disturbing construction activities within the archaeologically sensitive area extending from the convergence of the uphill/downhill segments of the bike path to a single two-way track at the northern intersection of Ranch Hill Road to the southern terminus of the bike path just north of Glenn Coolidge Drive. Monitoring would include earth-disturbing activities within staging areas as well as the bike path construction.

These measures require avoiding or reducing ground disturbance within resource site boundaries, training of construction crews on how to recognize buried archaeological or historic sites, measures to be taken if a subsurface cultural resource is identified, implementation of data recovery plans where required, and archaeological monitoring during earth-disturbing construction activities within sensitive areas. Therefore, the impact to the historic road and railway would be less than significant.

<u>P-44-000200 (Cowell Lime Works Historic District)</u>

This historic district, listed on the NRHP in 2007, is significant at the local level under Criterion A for its contribution to the industry of lime production in Santa Cruz County between 1853 and 1920. This district contains a collection of buildings and features related to limestone quarrying, and the processing of lime mortar, which played an important role within the building industry at a time of rapid growth in California after the gold rush. The Cowell Lime Works Historic District lists 15 contributing resources: the Granary, the Paymaster's House, the Horse Barn, the Cookhouse and associated Pig Feeder, two Workers' Cabins, Joined Pot Kilns, a Continuous Kiln, the Cooperage, the Tramway Trestle, the Hay Barn, the Blacksmith Shop, the Powder House, the Entry Gate and Landscaping at the Ranch House, and the Ranch House.

The southernmost 500 feet of the existing bike path passes through the Cowell Lime Works Historic District. Furthermore, the current eastern edge of the bike path asphalt is just over 5 feet from the Powder House, a contributing feature of the Cowell Lime Works Historic District. The Powder House is a small stone building measuring 13.5 feet by 15.3 feet with a corrugated metal roof. The building was originally constructed with lime mortar, but has been repaired in some areas with Portland cement. The building has the potential to be damaged from vibrations made by heavy equipment. The implementation of LRDP EIR Mitigations CULT-1B, CULT-1D, CULT-1E, CULT-1F, CULT-1G, and CULT-2B (described above), which are applicable and incorporated into the proposed project, would reduce but not avoid the potential for significant impacts to this resource. Implementation of Great Meadow Bike Path Mitigation CULT-1 described above and Great Meadow Bike Path CULT-2 would ensure that project construction would not damage the Powder House and the impacts would be reduced to less than significant. Potential vibration impacts on the Powder House are further discussed in Section 6.13.

Great Meadow Bike Path Mitigation CULT-2: Within the Cowell Lime Works Historic District (P-44-000200), protective fencing should be placed around any historic buildings or structures within the project area at a distance of no more than 2 feet from the existing structure. Specifically, fencing should be placed around the Powder House, a contributing feature of the District located approximately 5 feet from the eastern edge of the existing bike path in the southern portion of the project. Fencing should be placed prior to any construction activity and staging should be avoided in this area. Limit construction that creates vibration impacts around historic buildings including the Powder House. This may include using only rubber-tired vehicles within the vicinity of the Powder House. Minimize grading and other ground disturbance within the District in order to retain its integrity as a historic resource.

P-44-000276 (CA-SCR-277H)

This resource is an agricultural field measuring 875 feet by 2,125 feet possibly associated with Mission Santa Cruz. The feature is described as "distinctive plow marks on an aerial photograph" and is likely not eligible for listing on the NRHP. A small portion of this resource crosses into the project area. The implementation of LRDP EIR Mitigations CULT-1B, CULT-1D, CULT-1E, CULT-1F, CULT-1G, and CULT-2B, which are applicable and incorporated into the proposed project, as well as Great Meadow Bike Path Mitigation CULT-1, would avoid potentially significant impacts to this resource. These measures require avoiding or reducing ground disturbance within resource site boundaries, training of construction crews on how to recognize buried archaeological or historic sites, measures to be taken if a subsurface cultural resource is identified, implementation of data recovery plans where required, and archaeological monitoring during construction within sensitive areas. Therefore, the impact to the agricultural field would be less than significant.

P-44-000958

This resource is an historic archaeological deposit measuring 67 feet (N-S) by 56 feet (E-W) and at least 5.5 feet deep, but under at least two feet of fill of native soils. This deposit is located directly north of the Blacksmith Shop, a contributing feature of the NRHP-listed Cowell Lime Works Historical District, and contains artifacts related to work conducted at the Blacksmith Shop such as metal files, hardware, horse and mule shoes, machinery parts and some domestic artifacts. A portion of this deposit lies within the project area identified as a staging area. The implementation of LRDP EIR Mitigations CULT-1B, CULT-1D, CULT-1E, CULT-1F, CULT-1G, and CULT-2B, which are applicable and incorporated into the proposed project, as well as Great Meadow Bike Path Mitigation CULT-1, would avoid potentially significant impacts to this resource. These measures require avoiding or reducing ground disturbance within resource site boundaries, training of construction crews on how to recognize buried archaeological or historic sites, measures to be taken if a subsurface cultural resource is identified, implementation of data recovery plans where required, and archaeological monitoring during earth-disturbing construction within sensitive areas. Therefore, the impact to the historic archaeological deposit would be less than significant.

P-44-001027

This is a 1976 OHP recording of "two barns" of vernacular redwood board and batten style made with long gabled roofs. These are likely the Hay Barn and Blacksmith Shop buildings, both contributing elements to the NRHP-listed Cowell Lime Historic District built c.1860. A portion of this deposit lies within the project area. The implementation of LRDP EIR Mitigations CULT-1B, CULT-1D, CULT-1E, CULT-1F, CULT-1G, and CULT-2B, which are applicable and incorporated into the proposed project, as well as Great Meadow Bike Path Mitigation CULT-1, would avoid potentially significant impacts to this resource. These measures require avoiding or reducing ground disturbance within resource site boundaries, training of construction crews on how to recognize buried archaeological or historic sites, measures to be taken if a subsurface

cultural resource is identified, implementation of data recovery plans where required, and archaeological monitoring during earth-disturbing construction within sensitive areas. Therefore, the impact to the two barns would be less than significant.

Other Potential Archaeological Sites

No new archaeological sites were discovered during the pedestrian survey of the site. However, the possibility for the discovery of unrecorded sites during project construction exists, and the ground disturbing activities both within and adjacent to the Cowell Lime Works Historic District, other locations in the vicinity of historic lime industry activity, and other areas of archaeological sensitivity, may impact unknown buried cultural deposits. Implementation of previously adopted LRDP EIR Mitigations CULT-1A through CULT-1H, which are applicable to and included in the project, as well as Great Meadow Bike Path Mitigation CULT-1, would ensure that potential impacts to such resources would be less than significant. These mitigations provide for contractor training, construction monitoring by a qualified archaeologist, data recovery, and other measures to avoid or mitigate for impacts to cultural resources discovered during construction. In addition, excavation and grading would have the potential to unearth previously unknown human remains. The implementation of LRDP EIR Mitigations CULT-4A through CULT-4D, which are applicable to and incorporated into the proposed project, would ensure that impact related to the discovery of human remains would be less than significant.

Summary

The proposed project would incorporate previously adopted LRDP EIR Mitigations CULT-1A, CULT-1B, CULT-1C, CULT-1D, CULT-1E, CULT-1F, CULT-1G; CULT-2B, CULT-2D, and CULT-4C, which would ensure that most cultural resource impacts would be less than significant. Additionally, with the implementation of Great Meadow Bike Path Mitigation CULT-1 and Great Meadow Bike Path Mitigation CULT-2, the impacts of the project on known and unknown cultural resources in the project area would be reduced to less than significant.

6.6 ENERGY

ENERGY Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☐	☑	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☐	☑

The 2005 LRDP EIR was certified before the CEQA Guidelines were updated to include a separate section regarding energy in December 2018. However, energy was analyzed in Section 6.2 of the 2005 LRDP EIR (UC Santa Cruz 2006b). No mitigation measures were identified in the 2005 LRDP EIR related to energy. As the project site contains an existing path used by bicyclists and pedestrians, there is no existing energy consumption on the site.

a) Construction of the project would require consumption of nonrenewable energy resources, primarily in the form of fossil fuels (including fuel oil, natural gas, and gasoline) for automobiles and construction equipment, and other resources including, but not limited to, gravel, asphalt, and water. Construction would include energy used by construction equipment and other activities at the project site (e.g., excavation, paving), in addition to the energy used to manufacture the equipment, materials, and supplies and transport them to the project site. It is expected that nonrenewable energy resources would be used efficiently during construction activities given the financial implications of inefficient use of such resources. The Project would not result in an increase in enrollment or employment at UC Santa Cruz; thus, no increase in vehicle miles traveled and, hence, petroleum use, would occur with Project operation. Operation of the project would support alternative, human-powered modes of transportation on the campus. Therefore, the project's consumption of energy resources would be less than significant, and it would not represent unnecessary, inefficient, or wasteful use of energy resources.

b) As a bicycle and pedestrian project, the project would not conflict with or obstruct a state or local plan for renewable energy, and no impact would occur.

Summary

The Project would not result in any significant impacts related to energy and no project-level mitigation is required.

6.7 GEOLOGY, SOILS, & SEISMICITY

GEOLOGY, SOILS, & SEISMICITY Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:					
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☐	☑
ii) Strong seismic ground shaking?	☐	☐	☐	☑	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☑	☐
(iv) Landslides?	☐	☐	☐	☑	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☑	☐

GEOLOGY, SOILS, & SEISMICITY Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☑	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☐	☑	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☐	☑
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☑	☐	☐	☐

Geology, soils, and seismicity background and issues, and programmatic mitigation measures applicable to LRDP development, are described in Volume I, Section 4.6, of the 2005 LRDP EIR (UC Santa Cruz 2006b). Paleontological resources are discussed in Section 4.5 of the LRDP EIR. The following, previously adopted LRDP EIR mitigations for potential impacts to geological resources are applicable to and included in the project (the full text of the mitigation measures is included in Appendix B):

- LRDP EIR Mitigation CULT-5A (Evaluation of whether a project site is underlain by a formation that is known to be sensitive for paleontological resources)
- LRDP EIR Mitigation CULT-5C (Measures to be taken in the event of a discovery of a paleontological resource on campus)
- LRDP EIR Mitigation CULT-5D (Measures to be taken in the event that a proposed project would result in impacts to a unique paleontological resource)

a,i) The UC Santa Cruz campus and the surrounding area are not located within an Alquist-Priolo Earthquake Fault Zone and no active faults are mapped on the campus; therefore, the potential for ground rupture is low (Nolan, Zinn, and Associates 2005). No impact would occur.

a,ii-iv) The proposed project site, like much of central California, could experience significant seismic shaking due to the numerous active faults in the region. However, Section 4.6 of the LRDP EIR, Geology and Soils, notes that based on the nature of the subsurface soils on the UC Santa Cruz campus and the depth to groundwater, the potential for liquefaction and liquefaction-induced lateral spreading are low (Nolan, Zinn, and Associates 2005). The potential hazards from landslides on campus are limited to areas where steep slopes are overlain by substantial thicknesses of colluvium and soil, generally only along the larger stream drainages and in the old marble quarries. The proposed project does not involve construction on steep slopes which would be subject to landslides and would not develop any new structures or other

facilities whose failure related to seismic shaking could result in substantial adverse effects. The project would result in less-than-significant impacts related to seismic ground shaking, seismic-related ground failure, liquefaction, and landslides.

b) Section 4.6 of the LRDP EIR, Geology and Soils, mapped the soils found through the University Campus. According to Figure 4.6-6, Soils on UC Santa Cruz Campus, the soils on the project site are Los Osos loam and Elkhorn Sandy loam. These soils range from slight to moderate erosion potential. Los Osos loam is found on wide ridges on hills and mountains, is composed of material weathered from sandstone or shale, and generally has low permeability and moderate erosion potential.

UC Santa Cruz has developed a set of construction-phase soil erosion control standards based substantially on Chapter 16.22 of the Santa Cruz County Code (Erosion Control Ordinance). These standards are included in the Campus Standards Handbook and incorporated by reference into the specifications for campus development projects. In addition, because the project would disturb more than 1 acre, a Storm Water Pollution Protection Plan (SWPPP) would be required in compliance with the General Permit for Discharges of Storm Water Associated with Construction Activity under the National Pollution Discharge Elimination System (NPDES).

Project construction would result in short-term disturbance that could lead to increased erosion. However, adherence to the applicable campus standards related to construction-phase soil erosion control and NPDES requirements would minimize construction-phase erosion. Once operational, the project would result in improved erosion control along the path due to the correction of existing drainage issues that currently lead to erosion and channeling adjacent to the path. Therefore, the project's impacts on erosion would be less than significant.

c, d) Much of the central and lower UC Santa Cruz campus is underlain by marble bedrock. Over many thousands of years, the dissolution of the marble by ground water has created an extensive system of solution cavities in the area. The solution cavities consist of highly irregular, interconnected caverns and channels. Where they intersect the ground surface, they form pits, called sinkholes or dolines, which may gradually fill by infiltration of fine-grained sediments from the surface or by collapse of the adjacent rock walls or roof into the cavity. The 2005 update of the Campus Geology map defined four karst hazard zones, based on the known or suspected presence of doline features. Areas underlain by doline fill have been designated as Hazard Level 4, indicating a high potential for hazards due to karst conditions. At the ground surface, solution cavities may manifest in two ways. Collapse dolines, which are created by failure of the cavity roof, are typically steep-sided, while solution dolines are created by surface and near surface soils eroding and washing into and through a cavity system, leaving a broad closed depression with moderate to gently sloped sites. The surface expression of many of the dolines on the campus has been almost completely obliterated by erosion and deposition. Subsurface manifestations of the solution cavity system may include zones of very loose or soft soils at depth, loose marble rubble, or highly weathered marble bedrock with open voids or cavities, loosely filled with residual soil.

The majority of the project site lies within Hazard Levels 3 and 4. The terrain is sensitive to erosional processes, water intrusion, and has the potential to shrink and swell as a result of moisture changes. The expansive soil can cause heaving and cracking of concrete slabs, pavements, and structures founded on shallow foundations if they are inadequately designed for these conditions.

The 2005 LRDP EIR (Vol. 1, pp. 4.6-17 to 4.6-18) concluded that although construction in karst terrain is potentially hazardous because many karst features are not visible at the surface and settling or collapse can occur beneath a structure constructed on karst, campus construction practices have been successful in preventing settlement or collapse of structures. The geotechnical report prepared for the project found that the site is underlain by expansive doline fill and marble bedrock and provided specific recommendations to

avoid a doline fill subsidence event (Butano Geotechnical 2018). These recommendations include: treating the expansive soils with lime and/or cement to mitigate shrinking and swelling, removing the expansive soil and replacing it with non-expansive imported engineered fill to the depth of moisture influence, or stabilizing the moisture content by minimizing the access of water through surface and subsurface drainage. Adherence to these recommendations in the geotechnical report would ensure that the project incorporates appropriate soil treatment. Therefore, the impact would be less than significant.

e) The proposed project would not use septic tanks or alternative wastewater disposal systems. Use of the project would not generate any wastewater. No impact would occur.

f) Paleontological resources are described in Section 4.5 of the 2005 LRDP EIR. There are three potentially fossil-bearing formations on the main campus: the Santa Margarita sandstones, doline fill deposits in areas underlain by marble, and Quaternary marine or non-marine terrace deposits. According to the geologic map of the campus, the project site is underlain by marble bedrock, with some areas consisting of doline fill overlaying the marble (UC Santa Cruz 2006b, Butano Geotechnical 2018). No fossil finds have been documented in doline fill deposits in the region, nor have any fossil finds been made on campus, despite extensive development in areas underlain by doline fill; thus, the potential to encounter fossils in doline fill on the campus appears to be low (UC Santa Cruz 2006b). There are no known unique paleontological resources or geologic features on the project site. Incorporation of LRDP EIR Mitigations CULT-5A, CULT-5C, and CULT-5D into the proposed project would ensure that, in the event of a discovery of a paleontological resource on the project site, work within 50 feet of the find shall halt until a qualified paleontologist has examined and assessed the find and, if the resource is determined to be a unique paleontological resource, the resource is recovered. LRDP EIR Mitigation CULT-5D is a component of the project requiring the Campus to adequately document, analyze, and curate any finds at an appropriate institution. Therefore, the impact would be less than significant.

Summary

The project would incorporate LRDP EIR Mitigations CULT-5A, CULT-5C, and CULT-5D; therefore all impacts of the proposed project related to geology and soils would be less than significant. No project-level mitigation is required.

6.8 GREENHOUSE GAS EMISSIONS

GREENHOUSE GAS EMISSIONS Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☐	☑	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☑	☐

The 2005 LRDP EIR was certified before the passage of Assembly Bill 32 (Global Warming Solutions Act of 2006) and therefore did not analyze greenhouse gas emissions (GHGs) or climate change. There are no previously adopted mitigation measures for climate change impacts that are applicable to the proposed

project. Operation of construction equipment and vehicle trips associated with project construction would result in emissions of GHGs.

6.8.1 Background

The accumulation of greenhouse gases (GHGs) in the atmosphere regulates the earth's temperature. Without the natural heat trapping effect of GHGs, Earth's surface would be about 34°C cooler (CalEPA 2006). However, emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations. Carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) are the GHGs that are emitted in the greatest quantities from human activities. Emissions of CO_2 are largely by-products of fossil fuel combustion. CH_4 results from fossil fuel combustion as well as off-gassing associated with agricultural practices and landfills. N_2O is produced by microbial processes in soil and water, including those reactions that occur in fertilizers that contain nitrogen, fossil fuel combustion, and other chemical processes.

Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. According to the California Environmental Protection Agency's (CalEPA) 2010 Climate Action Team Biennial Report, potential impacts of climate change in California may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (CalEPA 2010). While these potential impacts identify the possible effects of climate change at a global and potentially statewide level, in general scientific modeling tools are currently unable to predict what impacts would occur locally with a similar degree of accuracy.

6.8.2 Regulatory Setting

In response to an increase in human-made GHG concentrations over the past 150 years, California has implemented Assembly Bill (AB) 32, the "California Global Warming Solutions Act of 2006." AB 32 codifies the Statewide goal of reducing GHG emissions to 1990 levels by 2020 (essentially a 15 percent reduction below 2005 emission levels), and requires the California Air Resources Board (ARB) to prepare a Scoping Plan that outlines the main State strategies for reducing GHGs to meet the 2020 deadline. In addition, AB 32 requires ARB to adopt regulations to require reporting and verification of statewide GHG emissions.

After completing a comprehensive review and update process, ARB approved a 1990 statewide GHG level and 2020 limit of 427 million metric tons (MMT) carbon dioxide equivalent (CO_2e). The Scoping Plan was approved by ARB on December 11, 2008, and includes measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. The Scoping Plan includes a range of GHG reduction actions that may include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms.

In May 2014, ARB approved the first update to the AB 32 Scoping Plan. The 2013 Scoping Plan update defines ARB's climate change priorities for the next five years and sets the groundwork to reach post-2020 goals set forth in EO S-3-05. The update highlights California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluates how to align the State's longer-term GHG reduction strategies with other State policy priorities, such as for water, waste, natural resources, clean energy and transportation, and land use (ARB 2014).

In 2016, the Legislature passed Senate Bill (SB) 32, which codifies a 2030 GHG emissions reduction target of 40 percent below 1990 levels. With SB 32, the Legislature passed companion legislation AB 197, which

provides additional direction for developing the Scoping Plan. ARB is moving forward with a second update to the Scoping Plan to reflect the 2030 target set by Executive Order B-30-15 and codified by SB 32 (ARB 2018).

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is an environmental issue that requires analysis in California Environmental Quality Act (CEQA) documents. In March 2010, the California Resources Agency (Resources Agency) adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts.

The University of California Policy on Sustainable Practices (issued 7/1/2004 and updated 8/10/2018) requires that each campus develop a long-term strategy for voluntarily meeting the State of California's goal for reducing GHG emissions to 1990 levels by 2020, pursuant to the California Global Warming Solutions Act of 2006. As an intermediate target, each campus must pursue the goal of reducing GHG emissions to 2000 levels by 2014. Additionally, UC President Janet Napolitano issued a directive in November 2015 for each campus to achieve carbon neutrality for Scope 1 (i.e., direct emissions) and Scope 2 (i.e., emissions from all energy used at the electricity-generating power plant, but excluding transmission and distribution loss) by 2025. Napolitano outlined four focus areas for achieving this aggressive goal: increasing the renewable portfolio standards for purchased electricity beyond the state requirements, investing in campus energy efficiency and renewables projects, system wide procurement of natural gas and biogas, and management of environmental attributes. The Climate and Energy Strategy (CES) is UC Santa Cruz's equivalent of a CAP as required under the UC Sustainable Practices Policy. The UC Santa Cruz Climate and Energy Strategy (CES) was prepared in 2016, as the result of an 18-month process led by campus staff in partnership with a team of consultants to develop a detailed plan for achieving UC Santa Cruz's two climate and energy goals:

1. Achieve carbon neutrality by 2025 for Scope 1 and 2 emissions

2. Mitigate the impacts of the Cap-and-Trade regulation

A series of desktop and on-site energy audits were performed of 50 of the campus' most energy-intensive buildings, along with an evaluation of the campus' potential for development of solar photovoltaic and solar thermal projects. From this review, several hundred energy efficiency measures and nearly a dozen renewable energy projects were developed, providing detailed cost information on metrics such as energy and utility savings, labor and materials costs. The findings of the CES analysis show that carbon neutrality at UC Santa Cruz could be achieved with a positive net-present-value due to the projected savings from on-site renewable energy and energy efficiency projects being greater than the additional costs of purchasing biogas, offsets and compliance instruments to achieve carbon neutrality, as defined by the initiative, and addressing regulatory requirements.

Similar to the CAPs for the all UC campuses, the CES provides recommendations, with a series of possible paths to meeting the UC Sustainable Practices Policy requirements, but does not create performance requirements with which every project must comply. However, most relevant to campus building projects is the recommendation that UC Santa Cruz adopt a policy of net zero emissions for new buildings (Scope 1 and 2, so includes purchased electricity and on-site combustion). This would be accomplished by developing all electric buildings with on-site renewable power generation; all purchased electricity would come from renewable sources; RECs would be provided for electricity purchased from non-renewable sources; offsets would be established for on-site combustion sources.

The CES has not been adopted or used to develop an updated climate action plan for the campus, but many of the strategies identified in the CES have been incorporated into the UC Santa Cruz Campus Sustainability Plan (UC Santa Cruz 2017a) includes goals within four categories: Learning and Culture, Climate and Energy, Materials Management and Food Systems, and Natural Environment and Infrastructure. Each category includes related goals, strategies, and actions. Within the Natural Environment and Infrastructure category, Goal 3, Strategy 3.2 directs the Campus to develop an outreach strategy to promote sustainable transportation culture and prioritize human-powered on-campus travel at UC Santa Cruz.

6.8.3 Impact Analysis

a) The significance of GHG emissions may be evaluated based on locally adopted quantitative thresholds, or consistency with a regional GHG reduction plan (such as a Climate Action Strategy). The MBARD has not adopted GHG emissions thresholds to date. According to a 2013 informational report from Mike Gilroy, Deputy Air Pollution Control Officer to the District Board of Directors, MBARD recommended a threshold of 10,000 metric tons (MT) CO_2e per year for stationary source projects and a threshold of 2,000 MT CO_2e per year for land-use projects, or compliance with an adopted GHG Reduction Plan/Climate Action Plan. MBARD is currently evaluating a percentage-based threshold option (MBUAPCD 2013b).

The Bike Path would not include any operational emissions, as it would not generate any vehicle trips nor would it develop any structures or other features that would require energy, with the possible exception of minimally lighted signage, which may be solar powered. Therefore, the project would not result in any long-term (annual) emissions of GHGs. All emissions associated with the project would be associated with temporary construction activity. This includes grading, trenching, and paving, as well as vehicle trips during site preparation and during grading activities. As a bicycle infrastructure and safety project, the project would be consistent with the UC Santa Cruz Campus Sustainability Plan. Thus, Project-related GHG emissions would be less than significant.

b) As discussed previously, AB 32 codifies the Statewide goal of reducing GHG emissions to 1990 levels by 2020 (essentially a 15 percent reduction below 2005 emission levels). CalEPA's Climate Action Team (CAT) published the 2006 CAT Report, which includes GHG emissions reduction strategies intended for projects emitting less than 10,000 tons CO_2E/year (CalEPA 2006). In addition, the California Attorney General's Office has developed Global Warming Measures (2010) and the State Office of Planning and Research's (OPR) 2008 technical advisory CEQA and Climate Change document includes GHG reduction measures intended to reduce GHG emissions in order to achieve statewide emissions reduction goals (ARB 2014). These measures aim to curb GHG emissions through suggestions pertaining to land use, transportation, renewable energy, and energy efficiency. Several of these actions are already required by California regulations, and the project would be required to comply with applicable regulations:

- AB 1493 (Pavley) requires the state to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of climate change emissions emitted by passenger vehicles and light duty trucks.

- In 2004, the California Air Resources Board (ARB) adopted a measure to limit diesel-fueled commercial motor vehicle idling.

- The Integrated Waste Management Act of 1989, (AB 939, Sher, Chapter 1095, Statutes of 1989) established a 50% waste diversion mandate for California

- Assembly Bill 341 (Chesbro, Chapter 476, Statutes of 2011) established a mandate to achieve even more significant waste reductions by 2020, setting a goal of 75 percent of the solid waste generated to be source reduced, recycled, or composted by 2020.

The Association of Monterey Bay Area Governments (AMBAG) adopted the 2040 Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) in June 2018. The 2040 MTP/SCS sets forth emissions targets, goals, policies, and strategies to meet regional emission reduction targets set by CARB. The 2040 MTP/SCS contains a number of improvements to the region's multimodal transportation system and emphasizes alternative transportation projects that reduce GHG emissions.

The City of Santa Cruz's *General Plan 2030* includes goals, policies, and actions on climate change, including reducing communitywide GHG emissions 30 percent by 2020, reducing 80 percent by 2050 (compared to 1990 levels), and for all new buildings to be emissions neutral by 2030. The City of Santa Cruz adopted a Climate Action Plan in 2012 (City of Santa Cruz 2012). Although the University, as a state entity, is not subject to local regulation, local standards are a subject of importance to the University in evaluating impacts. It is University policy to seek consistency with local plans and policies where feasible.

The University of California Regents created a Sustainable Practices Policy in June 2004, which was most recently updated in August 2018. This policy requires that each campus will complete a biennial update of its action plan for reducing emissions to 2000 levels by 2014, 1990 levels by 2020, and becoming climate neutral as soon as possible. The Policy centers around nine areas of sustainable practices, one of which is transportation. The UC Santa Cruz Campus Sustainability Plan includes strategies to prioritize human-powered on-campus travel. The proposed project would provide a more effective route through the UC Santa Cruz campus and could serve to reduce GHG emissions by encouraging and diverting commuter trips towards the use of non-motorized transportation methods. Thus, the project would implement strategies pertaining to human-powered on-campus travel. Furthermore, the project is intended to increase safety on the Great Meadow Bike Path, which is consistent with strategies related to human-powered modes of travel.

Because the project would not result in a net increase in vehicle trips, nor would either require a substantial amount of energy, both of which are contributors to GHG emissions and are most frequently addressed in plans, policies, and regulations, including those described above, the project would not conflict with any California regulations intended to reduce GHG emissions. Therefore, the projects would not conflict with any applicable plan, policy or regulation intended to reduce GHG emissions, and the impact would be less than significant.

Summary

All GHG impacts of the proposed projects would be less than significant. No mitigation is required.

6.9 HAZARDS AND HAZARDOUS MATERIALS

HAZARDS & HAZARDOUS MATERIALS

Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☑	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions	☐	☐	☐	☑	☐

HAZARDS & HAZARDOUS MATERIALS

Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
involving the release of hazardous materials into the environment?					
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☐	☑
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☐	☑
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☐	☑
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☑	☐	☐	☐
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☑	☐

Hazards and hazardous materials issues and programmatic mitigation measures applicable to LRDP development are described in Volume I, Section 4.7, of the 2005 LRDP EIR (UC Santa Cruz 2006b). The following, previously adopted LRDP EIR mitigations for potential impacts related to hazards and hazardous materials are applicable to and included in the project (the full text of the mitigation measures is included in Appendix B):

- LRDP EIR Mitigation HAZ-9A (Construction traffic control and roadway closure notification requirements for contractors)

a, b, c) Construction of the proposed project could involve use of hazardous chemicals, such as petroleum products and their derivatives (e.g., gasoline, diesel fuels, oils, lubricants, and hydraulic fluids) and solvents associated with the use of heavy construction equipment. UC Santa Cruz Environmental Health & Safety oversees compliance of all state and federal laws regulating the generation, storage, transport, and disposal of hazardous wastes. Operation of the project would not involve the use of hazardous materials. The Campus's standard construction contract provisions include specific requirements for hazardous materials spill prevention, reporting, and response. These requirements would minimize the potential for hazards to

the public or to the environment as a result of a release of hazardous materials and the impact would be less than significant.

d) There are no sites on campus that are listed as hazardous materials sites pursuant to Government Code Section 65962.5. As noted in Section 4.7 of the LRDP EIR, Hazards, the past uses of the campus, including the proposed project site, are well known and are not likely to have resulted in soil or groundwater contamination. No impact would occur.

e) There are no public airports or private airstrips in the vicinity of the UC Santa Cruz campus. No impact would occur with respect to air traffic hazards.

f) Construction of the proposed project would necessitate temporary closure of the bike path but would not interfere with the Campus's Emergency Operations Plan (EOP). The project would implement LRDP EIR Mitigation HAZ-9A, which requires that: (1) Construction must be conducted in a manner that minimizes the obstruction to traffic; (2) Contractors are required to provide advance notification of proposed road closures to the Campus community and to emergency services providers; (3) Alternate access routes must be clearly designated; (4) Adequate access to fire hydrants and for the passage of emergency vehicles must be maintained, and campus police and fire departments and dispatchers must be notified of proposed road closures and alternative travel routes for emergency vehicles; (5) Handicapped-accessible and emergency exit routes from occupied buildings must be maintained at all times. The proposed project would comply with these and all other relevant Campus Standards. The project would not impair implementation or physically interfere with the EOP during operation. The project would not alter existing vehicle circulation through the campus, and would provide improved bicycle and pedestrian connections through the campus. The project's potential to interfere with to emergency operations would be less than significant.

g) Although there is some risk of wildfire in undeveloped areas of the central and lower campus, including the project site, Campus fire management procedures have been successful in preventing and controlling fires on campus in the past decade. The proposed project would not interfere with Campus fire management or otherwise exacerbate the existing hazard, as the project would entail widening of and improvements to the existing bike path. Therefore, the project's potential to result in increased risk of wildfire would be less than significant.

Summary

Because LRDP EIR Mitigation HAZ-9A would be implemented during construction of the project, all impacts of the project related to hazards and hazardous materials would be less than significant. No additional project-level mitigation is required.

6.10 HYDROLOGY & WATER QUALITY

HYDROLOGY & WATER QUALITY Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☑	☐	☐	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project	☐	☐	☐	☑	☐

HYDROLOGY & WATER QUALITY Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
may impede sustainable groundwater management of the basin?					
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:					
(i) Result in substantial erosion or siltation on- or off-site?	☐	☑	☐	☐	☐
(ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site?	☐	☑	☐	☐	☐
(iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☑	☐	☐	☐
(iv) Impede or redirect flood flows?	☐	☐	☐	☑	☐
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☐	☑
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	☐	☑

Hydrology and water quality background for the campus, and issues and programmatic mitigation measures applicable to LRDP development, are described in Volume II, Section 4.8, of the 2005 LRDP EIR (UC Santa Cruz 2006b). The following previously adopted LRDP EIR mitigations for potential impacts to hydrologic resources and water quality are applicable to and included in the project (the full text of the mitigation measures is included in Appendix B):

- LRDP EIR Mitigation HYD-2B (Erosion and sediment control measures for hillside grading)
- LRDP EIR Mitigation HYD-3D (Stormwater runoff volume control requirements for new capital projects)

The southern two-thirds of the campus, including the project site, consists of marble and schist bedrock overlain by deposits of residual soils and colluvium. Karst topography has developed as a result of the dissolution of marble. Although this portion of the campus is cut by several steep-walled north-south

flowing streams, an integrated drainage system is not present because of sporadic stream capture by sinkholes and swallow holes. As a result, very little stormwater is conveyed by surface streams to channels downstream of the campus. Instead, stormwater is captured by the karst aquifer, stored, and transmitted via solution channels and caves, and discharged in springs at lower elevations to the east, south, and west of the campus.

As outlined in Section 4.8 of the LRDP, Hydrology and Water Quality, three watersheds drain approximately 1,100 acres in the central portion of the 2,020 acre campus. The project site falls within the Jordan Gulch watershed, which encompasses the central portion of the central and lower campus. All runoff in this watershed infiltrates to the subsurface by way of several large sinkholes and smaller swallow holes along the course the drainage channel and none leaves the campus as surface flow. Jordan Gulch terminates at a sinkhole near Coolidge Drive.

a) During construction, ground disturbance and grading would have the potential to result in water quality impacts. The project would involve grading and excavation for the new bike path. The project would involve grading of up to 30,000 square feet per day. Additionally, the project would be designed to direct stormwater via sheetflow to adjacent vegetated areas and to minimize concentration of stormwater runoff. The base rock shoulders would facilitate this drainage objective. V-ditches or swales may be used to transport water to vegetated areas where sheetflow of runoff would be difficult to achieve. Regulated projects under UC Santa Cruz's Post-Construction Stormwater Management Requirements (PCRs) do not include sidewalk and bicycle path or lane projects and trails and pathways, where no other impervious surfaces are replaced or created, and built to direct stormwater runoff to adjacent vegetated areas; therefore the project is exempt from the PCRs.

As required for all construction contracts that would disturb more than 1 acre of soil, project construction contract documents would require the project contractor to prepare and implement a SWPPP to comply with the State Water Resources Control Board general permit for construction activities. The SWPPP identifies potential sources of pollution and describes runoff controls that will be implemented both during construction and after construction is complete to avoid impacts to water quality. Although construction would occur outside the rainy season specified in LRDP EIR Mitigation HYD-2B (October 1 through May 31), the contractor would be required to implement erosion and sediment control measures for hillside grading prior to any predicted storm events. Because the project would be subject to these requirements, the potential short-term construction water quality impacts of the project would be less than significant.

The Project would create approximately 33,000 square feet of net new impervious surface area. The project would not add any new sources of water pollutants and therefore would not result in long-term operational impacts on water quality. Stormwater runoff on the project site would be directed to adjacent vegetated areas to infiltrate to the subsurface soils on site; therefore, the project would not result in stormwater discharges to Waters of the U.S. or any other surface water body, and NPDES waste discharge requirements would not apply. Given the foregoing, the project would not result in violation of water quality standards or waste discharge requirements and the impact would be less than significant.

b) The Project would not require a source of water during operation and, therefore, would not entail the extraction of groundwater. Runoff from the project site infiltrates into the ground and contributes to recharge of the karst aquifer underlying the campus. The aquifer feeds a series of seeps and springs surrounding the lower portion of the campus, and is considered a potential supplemental, non-potable water supply for the campus. A portion of Jordan Gulch, adjacent to the project site to the east, is identified by the County as a groundwater recharge area (Santa Cruz County 2019). The Project would create approximately 33,000 square feet of net new impervious surface area. However, project improvements would not overlap with the mapped recharge area. Moreover, stormwater runoff from the project site would

infiltrate on site or in adjacent meadow areas; therefore, the project would not result in a reduction in recharge to the karst aquifer. The project's impact on groundwater supplies would be less than significant.

e) There is no water quality control plan or groundwater management plan that is applicable to the project site. No conflicts with water quality control plans and sustainable groundwater management plans would occur.

c, i-iii) The project would reconstruct and widen the existing bike path, which would create approximately 33,000 square feet of net new impervious surface area. The project would also correct the existing drainage problems that result in erosion adjacent to the paved pathways. The project would modify grades and cross slopes along the bike path to prevent water from channelizing immediately adjacent to the pathway. Project design would direct stormwater via sheetflow, V-ditches, or swales to adjacent vegetated areas and to minimize concentration of stormwater runoff. LRDP EIR Mitigation HYD-3D is applicable to and incorporated into the proposed project. This mitigation requires that every development project include design measures to maximize infiltration and dissipation of runoff near its source. Adherence to LRDP EIR Mitigation HYD-3D would ensure that impacts related to drainage and runoff would be less than significant.

c-iv, d) The proposed project has no potential to result in impacts with respect to flood flows, 100-year flood hazard areas, dam or levee failure, or inundation by seiche, tsunami, or mudflow. The project site is not within a 100-year flood hazard area and is outside the inundation hazard area that could be affected by a failure of levees or dams, including Newell Creek Dam. The main campus is not in an area subject to inundation by seiche, tsunami, or mudflow. The project would not result in impacts related to any of these hazards.

Summary

LRDP EIR Mitigations HYD-2B and HYD-3D are applicable to and incorporated into the project. Accordingly, the project would result in less-than-significant impacts related to hydrology and water quality. No project-level mitigation is required.

6.11 LAND USE & PLANNING

LAND USE & PLANNING Would the project…	Potentially Significant Impact	Project Impact Adequately Analyzed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☐	☑
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☐	☑
c) Result in development of land uses that are substantially incompatible with existing adjacent land uses or with planned uses?	☐	☐	☐	☐	☑

Land use background and issues relevant to LRDP development are described in Volume II, Section 4.9, of the 2005 LRDP EIR (UC Santa Cruz 2006b). There are no LRDP EIR mitigation measures that are applicable to this impact category.

a) The project would be confined to the immediate area of the existing bike path and intersection. The reconstruction and widening of the existing Great Meadow Bike Path would facilitate safer bike and pedestrian travel. The Project would not divide an established community and no impact would occur.

b) The applicable land use plan for the campus is UC Santa Cruz's 2005 Long Range Development Plan (2005 LRDP). As noted in Section 3.4, the land uses of the project site are Campus Support (CS), Protected Landscape (PL) and Site Research and Support (SRS). The 2005 LRDP designates approximately 505 acres as PL, including most of the meadows south of the developed campus core, and corridors along Moore Creek and Jordan Gulch, which are preserved to support wildlife movement and to protect special plant species. Development within the PL designation may not impinge on the protected landscape's overall character. Only limited development such as pedestrian and bicycle paths, utilities, and service roads, and agricultural research that maintains the visual quality of the lower meadows is allowed in these areas. The LRDP designates 154 acres for SRS, including the land currently used by CASFS and the UC Santa Cruz Arboretum in the south campus. As a reconstruction of the current bike path, the project would be consistent with the CS, PL and SRS designations. No impact due to a land use conflict would occur.

c) The Bike Path Project would not change existing land uses and no impact would occur.

Summary

The proposed Bike Path Project would not result in significant impacts related to land use. No project-level mitigation is required.

6.12 MINERAL RESOURCES

MINERAL RESOURCES Would the project…	Potentially Significant Impact	Project Impact Adequately Analyzed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☐	☑
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☐	☑

a, b) The entire UC Santa Cruz campus is located within a Zone 3 Mineral Resource Zone, an area where mineral resources are known to exist, but where insufficient information is available to determine the value of those resources. According to the Division of Mines and Geology, development within Zone 3 areas is not considered a significant impact. The project site is not within an area designated as a mineral resource on city or county planning maps. Therefore, the proposed project would not result in the loss of availability of mineral resources and no impact would occur.

6.13 NOISE

NOISE Would the project result in…	Potentially Significant Impact	Project Impact Adequately Analyzed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☑	☐	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☑	☐

Noise issues and programmatic mitigation measures applicable to LRDP development are described in Volume II, Section 4.10, of the 2005 LRDP EIR (UC Santa Cruz 2006). The following, previously adopted LRDP EIR mitigations for potential noise impacts are applicable to and included in the project (the full text of the mitigation measures is included in Appendix B):

- LRDP EIR Mitigation NOIS-1 (Construction noise mitigation requirements)

6.13.1 Background

Noise

Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz).

Sound pressure level is measured on a logarithmic scale with the 0 dB level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA, and a sound that is 10 dBA less than the ambient sound level has no effect on ambient noise. Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged as twice as loud. In general, a 3 dBA change in community noise levels is noticeable, while 1-2 dB changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40-50 dBA, while arterial streets are in the 50-60+ dBA range. Normal conversational levels are in the 60-65 dBA range, and ambient noise levels greater than 65 dBA can interrupt conversations.

Noise levels typically attenuate at a rate of 6 dBA per doubling of distance from point sources (such as industrial machinery). Noise from lightly traveled roads typically attenuates at a rate of about 4.5 dBA per doubling of distance. Noise from heavily traveled roads typically attenuates at about 3 dBA per doubling of distance. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed (approximately 30 years old or older) generally provides a reduction of exterior-to-interior noise levels of

about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units and office buildings is generally 30 dBA or more (FTA 2006).

In addition to the actual instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (Leq). The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, Leq is summed over a one-hour period. Lmax is the highest RMS (root mean squared) sound pressure level within the measurement period, and Lmin is the lowest RMS sound pressure level within the measurement period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using Day-Night Average Level (Ldn), which is the 24-hour average noise level with a 10-dBA penalty for noise occurring during nighttime (10 p.m. to 7 a.m.) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5 dBA penalty for noise occurring from 7 p.m. to 10 p.m. and a 10 dBA penalty for noise occurring from 10 p.m. to 7 a.m. Noise levels described by Ldn and CNEL usually do not differ by more than 1 dB.

Vibration

Groundborne vibration is small, rapidly oscillating motion transmitted through the ground. The strength of groundborne vibration attenuates fairly rapidly over distance. Some soil types transmit vibration quite efficiently, while other types (primarily sandy soils) do not. Several basic measurement units are commonly used to describe the intensity of ground vibration. The descriptors used by the Federal Transit Administration (FTA) are peak particle velocity (PPV), in units of inches per second (ips), and vibration velocity decibel (VdB).

Sensitive Receptors

Consistent with the 2005 LRDP EIR, noise-sensitive receptors generally include residences, schools, hospitals, and parks, where people are normally expected to sleep or where low ambient sound levels are expected to help provide clear communication or enhance conditions for study and contemplation. The nearest noise-sensitive receptors to the project site are described as follows:

- Employee Housing – This is an on-campus area off of Hagar Drive south of Coolidge Drive, populated with housing units that are as close as approximately 500 feet from the southern end of the project site.

- The Village – This is an on-campus area on Village Road between Hagar Drive and the eastern bike path leg, populated with office and multi-unit residential structures that are as close as 50 feet from the project site.

- The Music Center – The Music Center is located at the southern end of Meyer Drive and is a complex of academic buildings where certain levels of quiet are expected within for music performance and study. The northern end of the project site is approximately 50 feet from the southern façade of the Center's main building.

Typically, noise-sensitive receptors are also vibration-sensitive receptors since they are often residences or places of learning where occupants may perceive and become annoyed with groundborne vibration.

Additionally, older structures—regardless of occupancy—can also be vibration sensitive and worthy of vibration velocity impact assessment.

In addition to the noise-sensitive receptors described above, which are also vibration-sensitive receptors, the Powder House is also a vibration-sensitive receptor. The existing bike path passes within approximately 5 feet of the Powder House, which is a small, lime-mortar structure that was built in the 1860s and is a part of the NRHP-listed Cowell Lime Works Historic District. As such, this structure would be considered susceptible to vibration-related damage at a level of sensitivity associated with "historic" buildings.

6.13.2 Analysis Methodology

This analysis is based on a noise and vibration assessment prepared for the project (see Appendix E).

As a bicycle/pedestrian improvement project, the project would not directly increase or otherwise alter automotive traffic on nearby UC Santa Cruz campus and City roadways. The project would neither install nor operate new or refurbished stationary noise-producing equipment, such as heating, ventilation, and air-conditioning (HVAC) systems. Hence, the project would have no noise and vibration impacts with respect to transportation noise and stationary noise sources. Project operation would entail use of the improved bike path by bicyclists and pedestrians, similar to existing conditions; therefore, the project would not have operational noise impacts. As such, the impact analysis below focuses on construction-period noise and vibration.

Consistent with the analysis in the 2005 LRDP EIR, a substantial temporary increase in ambient noise levels (associated with construction activities) was evaluated based on whether it would exceed the following standards at noise-sensitive receptors:

- 80 dBA Leq (8h)[5] daytime
- 80 dBA Leq (8h) evening
- 70 dBA Leq (8h) nighttime

6.13.3 Impact Analysis

a) The proposed project would improve and widen the existing Great Meadow Bike Path and would not change the existing land use of the site. As described above, project operation would entail use of the improved bike path by bicyclists and pedestrians, similar to existing conditions; therefore, the project would not have operational noise impacts.

The LRDP EIR concluded that construction at some locations on campus, even with the incorporation of LRDP EIR Mitigation NOIS-1 to minimize construction noise impacts, could result in noise levels in exceedance of the construction threshold of 80 dBA, which would be a significant and unavoidable impact.

Existing Ambient Noise Levels

The baseline sound level survey presented in the noise section of the 2005 LRDP EIR includes a collection of thirteen short-term (ST) sound pressure level (SPL) measurements taken at representative positions across the UC Santa Cruz campus. The closest of these ST positions to the project site are summarized as follows:

[5] $L_{eq(8h)}$ is an average measurement over an eight-hour period.

- ST-6, East Field (less than 0.4 miles northeast of the bike path), 49 dBA L_{eq} measured from 11:10 to 11:25 a.m., with noted sound sources including "distant fans at recreation center, pool activity, tennis, joggers, distant aircraft;" and

- ST-10, near intersection of High Street and Cardiff Terrace (approximately 0.3 miles southeast of the bike path), 66 dBA L_{eq} measured from 3:10 to 3:25 p.m., with sources including "traffic, distant aircraft, birds."

The ST-6 survey position is closest to the northern end of the project site, where the bike bath terminates at the Music Center and is distant from busy City roadways. Survey position ST-10, on the other hand, is at the southern end of the UC Santa Cruz campus near the employee residences off of Hagar Drive and thus closer to these traffic noise sources.

The baseline ambient noise survey of the LRDP EIR also included four long-term SPL measurement positions. Plots of hourly L_{eq} values at LT-2 and LT-3 that are nearest to the housing units off of Hagar Drive southeast of the project site show a trend of generally steady daytime (7:00 a.m. to 10:00 p.m.) sound levels dipping to levels that are 5 to 15 dBA less at night (10:00 p.m. to 7:00 a.m.). The measured SPL at LT-1, positioned between family student housing and College Eight northwest of the project site, exhibits the same pattern, with daytime levels ranging from 55 to 60 dBA hourly L_{eq} that drop to as low as 42 dBA at 4:00 a.m.

Impact Assessment

The 2005 LRDP EIR identified a significant and unavoidable impact with regard to exposure of sensitive receptors to construction noise. As required by LRDP EIR Mitigation NOIS-1, which is applicable to and incorporated into the project, the Campus must implement a construction noise mitigation plan for all construction projects on the campus. The noise mitigation plan must include the requirement that all construction equipment be equipped with feasible noise reduction devices, and also must require noticing of loud construction activities and place certain constraints on the scheduling of such activities.

Noise generated by project-attributed construction activities would vary with the type and quantity of equipment operating at any given time, equipment duty cycle, and the duration of construction activities. Noise exposure at a studied noise-sensitive receptor would depend on its proximity to project construction processes and the effects of any intervening natural terrain or man-made geographic features that linearly occlude direct sound paths between the noise-producing activities and the studied noise-sensitive receptor. To predict the aggregate noise exposure at a noise-sensitive receptor over an eight-hour period, consistent with the LRDP EIR standard, this analysis makes the following construction activity assumptions:

- Conservatively, all anticipated equipment would be concurrently operating equidistant from the studied NSR nearest to the Project boundary; and

- Construction periods may endure for up to thirteen (13) hours per day (6:00 a.m. to 7:00 p.m.) in proximity to the Music Center and employee housing off of Hagar Drive; but only between 7:30 a.m. and 7:00 p.m. when project construction activity is within 100 feet of the Village, which adheres to LRDP EIR Mitigation NOIS-1.

Both construction approaches (i.e., FDR and asphalt overlays) would involve the same set of equipment and vehicles, such as pickup trucks, paving equipment, water trucks, etc. It is assumed the asphalt overlay technique would incorporate a scarifier (or comparable source of equipment noise) to grind away the top surface of the bike path. Tables 6.13-1 and 6.13-2 show predicted hourly L_{eq} at 50 feet and 130 feet, respectively, for each piece of anticipated construction equipment assumed to be associated with FDR;

Tables 6.13-3 and 6.13-4 present a similar table for asphalt overlays. The first of these two distances depicts the worst-case scenario for each of these two project construction methods, placing all equipment as close as 50 feet from the receptor (i.e., the Music Center). In practice, it is unlikely that all equipment would be so clustered and in proximity to this receptor. The 130-foot distance attempts to describe a scenario where construction equipment may be arranged along the Bike Path, at this same distance to the nearest Village residential building. The "total" predicted L_{eq} is the logarithmic sum of sound from all of the listed equipment for the approach under study.

Table 6.13-1
Predicted Project Construction Equipment Sound Pressure Levels (SPL) for Full-Depth Reclamation (FDR) at 50 feet

Equipment Type	Quantity	Acoustical Usage Factor (AUF %)	Reference L_{max} at 50 feet (dBA)	Source-to-Receptor Distance (feet)	Allowable Operation Time (hours)	Predicted 8-hour L_{eq} (dBA)[1]
Dump Truck	1	40	76	50	8	72
Backhoe	1	40	78	50	8	74
Dump Truck (water truck)	1	40	76	50	8	72
Dump Truck (tackifier truck)	1	40	76	50	8	72
Roller (sheepsfoot compaction)	1	20	80	50	8	73
Roller (smooth drum compaction)	1	20	80	50	8	73
Front End Loader	1	40	79	50	8	75
Pickup Truck	1	40	75	50	8	71
Paver	1	50	77	50	8	74
Drum Mixer	1	50	80	50	8	77
					Total for FDR Approach:	**84**

Sources: FHWA 2006, Dudek 2019
Note:

1. Although construction activities may occur more than eight hours per day, the predicted 8-hour L_{eq} construction noise levels would be representative for any consecutive eight hours within the actual per-day construction duration. For example, if construction began at 7:30 a.m., its time-varying noise level would need to comply with 80 dBA L_{eq} when evaluated between 7:30 a.m. and 3:30 p.m. As the day progresses, construction activity noise would need to comply with the same 8-hour L_{eq} standard through the final 11:00 a.m. to 7:00 p.m. evaluation period. Since the construction noise analysis conservatively assumes that each listed equipment type is operating at its same expected intensity hour by hour (as suggested by the AUF values), there is no 8-hour period that would be considered louder than another and thus the predicted L_{eq8h} values could apply to any consecutive 8-hour period.

Table 6.13-2
Predicted Project Construction Equipment Sound Pressure Levels (SPL) for Full-Depth Reclamation (FDR) at 130 feet

Equipment Type	Quantity	Acoustical Usage Factor (AUF %)	Reference L_{max} at 50 feet (dBA)	Source-to-Receptor Distance (feet)	Allowable Operation Time (hours)	Predicted 8-hour L_{eq} (dBA)[1]
Dump Truck	1	40	76	130	8	64
Backhoe	1	40	78	130	8	66
Dump Truck (water truck)	1	40	76	130	8	64
Dump Truck (tackifier truck)	1	40	76	130	8	64
Roller (sheepsfoot compaction)	1	20	80	130	8	65
Roller (smooth drum compaction)	1	20	80	130	8	65
Front End Loader	1	40	79	130	8	67
Pickup Truck	1	40	75	130	8	63
Paver	1	50	77	130	8	66
Drum Mixer	1	50	80	130	8	69
					Total for FDR Approach:	**75**

Sources: FHWA 2006, Dudek 2019
Note:

1. Although construction activities may occur more than eight hours per day, the predicted 8-hour L_{eq} construction noise levels would be representative for any consecutive eight hours within the actual per-day construction duration. For example, if construction began at 7:30 a.m., its time-varying noise level would need to comply with 80 dBA L_{eq} when evaluated between 7:30 a.m. and 3:30 p.m. As the day progresses, construction activity noise would need to comply with the same 8-hour L_{eq} standard through the final 11:00 a.m. to 7:00 p.m. evaluation period. Since the construction noise analysis conservatively assumes that each listed equipment type is operating at its same expected intensity hour by hour (as suggested by the AUF values), there is no 8-hour period that would be considered louder than another and thus the predicted L_{eq8h} values could apply to any consecutive 8-hour period.

Table 6.13-3
Predicted Project Construction Equipment Sound Pressure Levels (SPL) for Asphalt Overlays at 50 feet

Equipment Type	Quantity	Acoustical Usage Factor (AUF %)	Reference L_{max} at 50 feet (dBA)	Source-to-Receptor Distance (feet)	Allowable Operation Time (hours)	Predicted 8-hour L_{eq} (dBA)[1]
Dump Truck	1	40	76	50	8	72
Backhoe	1	40	78	50	8	74
Dump Truck (water truck)	1	40	76	50	8	72
Dump Truck (tackifier truck)	1	40	76	50	8	72
Roller (sheepsfoot compaction)	1	20	80	50	8	73
Roller (smooth drum compaction)	1	20	80	50	8	73
Pavement Scarifier	1	20	90	50	8	83
Front End Loader	1	40	79	50	8	75
Pickup Truck	1	40	75	50	8	71
Paver	1	50	77	50	8	74
Total for Asphalt Overlays Approach:						**86**

Sources: FHWA 2006, Dudek 2019
Note:

1. Although construction activities may occur more than eight hours per day, the predicted 8-hour L_{eq} construction noise levels would be representative for any consecutive eight hours within the actual per-day construction duration. For example, if construction began at 7:30 a.m., its time-varying noise level would need to comply with 80 dBA L_{eq} when evaluated between 7:30 a.m. and 3:30 p.m. As the day progresses, construction activity noise would need to comply with the same 8-hour L_{eq} standard through the final 11:00 a.m. to 7:00 p.m. evaluation period. Since the construction noise analysis conservatively assumes that each listed equipment type is operating at its same expected intensity hour by hour (as suggested by the AUF values), there is no 8-hour period that would be considered louder than another and thus the predicted L_{eq8h} values could apply to any consecutive 8-hour period.

Table 6.13-4
Predicted Project Construction Equipment Sound Pressure Levels (SPL) for Asphalt Overlays at 130 feet

Equipment Type	Quantity	Acoustical Usage Factor (AUF %)	Reference L_{max} at 50 feet (dBA)	Source-to-Receptor Distance (feet)	Allowable Operation Time (hours)	Predicted 8-hour L_{eq} (dBA)[1]
Dump Truck	1	40	76	130	8	64
Backhoe	1	40	78	130	8	66
Dump Truck (water truck)	1	40	76	130	8	64
Dump Truck (tackifier truck)	1	40	76	130	8	64
Roller (sheepsfoot compaction)	1	20	80	130	8	65
Roller (smooth drum compaction)	1	20	80	130	8	65
Pavement Scarifier	1	20	90	130	8	75
Front End Loader	1	40	79	130	8	67
Pickup Truck	1	40	75	130	8	63
Paver	1	50	77	130	8	66
Total for Asphalt Overlays Approach:						**77**

Sources: FHWA 2006, Dudek 2019
Note:
1. Although construction activities may occur more than eight hours per day, the predicted 8-hour L_{eq} construction noise levels would be representative for any consecutive eight hours within the actual per-day construction duration. For example, if construction began at 7:30 a.m., its time-varying noise level would need to comply with 80 dBA L_{eq} when evaluated between 7:30 a.m. and 3:30 p.m. As the day progresses, construction activity noise would need to comply with the same 8-hour L_{eq} standard through the final 11:00 a.m. to 7:00 p.m. evaluation period. Since the construction noise analysis conservatively assumes that each listed equipment type is operating at its same expected intensity hour by hour (as suggested by the AUF values), there is no 8-hour period that would be considered louder than another and thus the predicted L_{eq8h} values could apply to any consecutive 8-hour period.

As shown in Tables 6.13-1 through 6.13-4, operation of the construction equipment for either construction approach for a full 8 hours as close as 50 feet to the closest noise-sensitive receptor (i.e., the Music Center), would result in exceedance of the applicable LRDP EIR threshold of 80 dBA and thus create a significant impact that would require mitigation. At 130 feet, however, which represents the closest noise-sensitive receptor for the Village, combined predicted construction noise levels for the two approaches would be less than the 80 dBA L_{eq8h} threshold and would, therefore, be less than significant.

In order to lower predicted L_{eq8h} values for operation of construction equipment near the Music Center, and thus yield overall construction activity noise levels that comply with the LRDP EIR NOIS-1 standard, the following mitigation measure Great Meadow Bike Path Mitigation NOIS-1 should be implemented.

Great Meadow Bike Path-Mitigation-NOIS-1: UC Santa Cruz and/or the construction contractor(s) shall incorporate the following administrative controls when equipment operation is expected within 50 to 100 feet of the Music Center:

- Limit equipment operation to no more than three (3) hours within any consecutive eight-hour daytime period (except for the pavement scarifier, which should be limited to 1 hour of operation per eight-hour period); or

- Erect a temporary sound barrier (e.g., plywood planks, acoustical blankets, etc.) so that its height, extent, and solidity occludes line of sight between the operating equipment and the Music Center; or

- If construction equipment operation cannot be limited with either option above, UC Santa Cruz and its construction contractor(s) shall coordinate with the Music Center and limit project construction hours and activities to avoid concurrence with scheduled concerts and performances.

With the options presented in the Great Meadow Bike Path Mitigation NOIS-1 implemented on site, the acoustical contribution from the pavement scarifier would be sufficiently reduced and yield an overall predicted L_{eq8h} value that would comply with the LRDP EIR standard, or construction conflicts with Music Center events would be avoided, and the impact would be reduced to a less-than-significant level.

b) According to the LRDP EIR, construction of future projects on the UC Santa Cruz campus would not expose sensitive receptors to excessive groundborne vibration or groundborne noise due to the expected lack of on-campus construction activities or processes involving high levels of vibration, such as blasting or pile-driving. However, given the proximity of vibration-sensitive receptors to project construction activities (i.e., residences and the Music Center located within approximately 50 feet and a historic structure located within approximately 5 feet of the bike path), the following predictive analysis was conducted to ascertain where and when construction activities associated with the proposed project might result in excessive groundborne vibrations at these sensitive receptors.

Typical background vibration levels in residential areas are no greater than 50 VdB (FTA 2006); and the vibration velocity level at which most residential building occupants will detect and become annoyed with is approximately 94 VdB, or 0.2 ips RMS PPV (FTA 2006). The Music Center, due to its concert hall and recording studio spaces that are highly sensitive to vibration and the potential for groundborne noise generation caused by induced vibration of building structures and surfaces, should have a more stringent disturbance threshold of 65 VdB (0.0007 ips PPV), compatible with FTA guidance (FTA 2006). For historic buildings, Caltrans recommends a maximum PPV threshold for vibration due to “continuous/frequent” sources that ranges from 0.25 to 0.08 ips depending on fragility of the building of concern (Caltrans 2013). Available literature indicates there is a range of vibration velocity thresholds to potentially adopt and apply that incorporate three “key factors” as follows (Johnson and Hannen 2015): building type and condition, vibration source type, and “importance factor” that considers the cultural or economic value of the structure. A review of this literature points to 0.12 ips PPV for continuous vibration sources and 0.3 ips PPV for single-event vibrations as apparent appropriate vibration velocity thresholds to apply to the Powder House, as further described in Appendix F. Because the anticipated construction activity for the proposed project involves equipment and processes that are generally not single events or “transient”, which one might use to define vibration producers such as controlled detonation or pile-driving impacts, this analysis assumes that the 0.12 ips PPV criterion should be used to assess potential vibration impact to the Powder House..

Table 6.13-5 presents predicted vibration velocity levels at the indicated sensitive receptors for four categories of anticipated construction equipment: vibratory roller, jackhammer, front-end loader (or a large bulldozer and similarly powered heavy construction equipment), and a small bulldozer. Based on FTA reference data (FTA 2006), the vibratory roller would be expected to have the highest levels of vibration from among the equipment listed in Tables 6.13-1 through 6.13-4. The front-end loader vibration level (0.089 ips PPV), from FTA data, is conservatively assumed to be representative of other equipment on site. Use of a jackhammer (or other man-portable impact-type vibratory equipment) would represent an alternative to using engine-driven equipment having higher vibratory levels and is, therefore, also shown in Table 6.13-5. A "small bulldozer" is also shown in Table 6.13-5 as it represents smaller, less vibratory construction equipment that UC Santa Cruz or its contractors may elect to use in lieu of heavier and/or more powerful equipment on site.

As shown in Table 6.13-5, vibration levels would exceed thresholds for the Music Center and the Powder House, depending on the equipment used and distance to the receptor, but not for the residences in the Village. Table 6.13-5 shows that usage of a roller at the indicated distances from the nearest residential structures at the Village would be less than the 0.2 ips PPV or 94 VdB standards for building damage risk and human annoyance, respectively. But, at an anticipated distance of only 5 feet, construction equipment shown in Table 6.13-5 would create far more vibration than would be considered appropriate for a fragile historic structure. Usage of a jackhammer at no less than 5 feet away from the Powder House façade, however, would be compliant with 0.12 ips PPV, the suggested vibration velocity criterion, as would operation of a loaded truck, or front-end loader at a distance of 10 feet, as shown in Table 6.13-5. Table 6.13-5 also shows that small construction equipment (e.g., "small bulldozer") could operate at the indicated distances to the four receptors and comply with the vibration criteria. Construction equipment would also need to be kept further away from the Music Center, as indicated by the minimum distances (italicized and in gray) between construction equipment and the nearest façade.

Passenger car and sports utility vehicle (SUV) traffic on the unpaved road adjoining the Bike Path in the vicinity of the Powder House is not expected to cause vibration damage risk to the historic structure. FHWA research (Heywood et al. 2002) indicates that at vehicle speeds in the range of 25-30 miles per hour, measured ground vibration at a distance of 5 feet from roadway traffic was less than 0.003 ips PPV.

Table 6.13-3
Project Construction Activity Vibration at Indicated Receptor Distances

Vibration-Sensitive Receptor[1]	Distance to Vibration Source (feet)	Peak Particle Velocity (PPV, ips)	Vibration Velocity (RMS VdB)
Predicted Vibration Velocity from a Roller (reference PPV = 0.21 ips at 25 feet)			
The Village	130	0.03	79
Music Center	50	0.097	88*
Music Center	*200*	*0.007*	*65**
Employee Housing (off of Hagar Drive)	500	0.008	66
Powder House	5	0.57	103**
Powder House	*22*	*0.12*	*89***
Predicted Vibration Velocity from a Jackhammer (reference PPV = 0.035 ips at 25 feet)			
The Village	130	0.006	63
Music Center	50	0.005	62*
Employee Housing (off of Hagar Drive)	500	0.001	50
Powder House	5	0.09	87**
Predicted Vibration Velocity from a Small Bulldozer (reference PPV = 0.003 ips at 25 feet)			
The Village	130	0.0005	42
Music Center	50	0.0004	41*
Employee Housing (off of Hagar Drive)	500	0.0001	29
Powder House	5	0.006	63**
Predicted Vibration Velocity from a Front-End Loader (reference PPV = up to 0.089 ips at 25 feet)			
The Village	130	0.014	71
Music Center	50	0.012	70*
Music Center	*85*	*0.007*	*65**
Employee Housing (off of Hagar Drive)	500	0.003	58
Powder House	5	0.22	95**
Powder House	*10*	*0.12*	*89***

Sources: FTA 2006, Dudek 2018
*assumes the Music Center facilities have piles or spread-footing foundations that provide a 10 VdB coupling loss.
**consistent with site observations from structural engineer that the Powder House sits on a "foundation below grade" (MME 2019), which FTA suggests for a "1-2 Story Masonry" structure provides a 7 VdB coupling loss (FTA 2006).
Notes:
1. Italicized values show what conditions (i.e., larger distances between the vibration source and the sensitive receptor) would be required in order to yield vibration velocity levels that are compliant with the FTA-based standards to avoid impacts.

To help ensure these construction-attributed groundborne vibration velocity exposures at noise-sensitive receptors are kept below the previously discussed criteria, the following mitigation measure Great Meadow Bike Path-Mitigation-NOIS-2 should be implemented. Additionally, as a good construction practice and based on the expectation of it being used as an travel route across the proposed project site, the unpaved Farm Road parallel to the bike path should be properly maintained to avoid and/or minimize potholes, washboarding, and other surface roughness effects that cause bumps, drops, or other phenomena that create or amplify ground-borne vibration from vehicle and equipment traffic.

Great Meadow Bike Path Mitigation NOIS-2a: UC Santa Cruz and/or the construction contractor(s) shall ensure that usage of the following construction equipment adheres to the following limits on proximity to the indicated noise-sensitive receptor:

- For vibratory rollers, operating distance to the noise-sensitive receptor must not be less than:
    - The Music Center – 200 feet; and
    - The Powder House – 22 feet.
- For other conventional heavy construction equipment shown on Tables 6.13-1 through 6.13-4, operating distance to the noise-sensitive receptor must not be less than:
    - The Music Center – 85 feet; and,
    - The Powder House – 10 feet.

Great Meadow Bike Path Mitigation NOIS-2b: If UC Santa Cruz and/or the construction contractor(s) cannot avoid the use of the equipment listed in Great Meadow Bike Path Mitigation NOIS-2a in close proximity to the Music Center based on the above distances, UC Santa Cruz shall coordinate with the Music Center and limit project construction hours and activities to avoid concurrence with scheduled concerts and performances.

Great Meadow Bike Path Mitigation NOIS-2c: If UC Santa Cruz and/or the construction contractor(s) cannot avoid the use of the equipment listed in Great Meadow Bike Path Mitigation NOIS-2a in close proximity to the Powder House based on the above distances, or if soil conditions in the vicinity are known or are suspected to be a Class IV soil type (or otherwise transmit ground vibration more readily than that of Class III soil type (as assumed for the calculated distances of Great Meadow Bike Path Mitigation NOIS-2a), the following shall be implemented:

- A pre-construction condition survey shall be prepared by a qualified independent structural engineer.
- During construction, the contractor(s) shall install and maintain at least one continuously operational automated vibration monitor at the Powder House. The monitor(s) must be capable of being programmed with at least two predetermined vibratory velocity levels, such as a first-level alert equivalent to a 0.1 inches per second (in/sec) PPV to warn of continuous vibration approaching the 0.12 ips standard, and a second-level 0.25 ips PPV alert for potential transient vibration events. The monitoring system must produce real-time specific alerts (e.g., via text message and/or email to on-site personnel) when vibration velocities exceed the predetermined levels. In the event of a first-level alert, feasible steps to reduce vibratory levels shall be undertaken, including but not limited to

halting/staggering concurrent activities and using lower-vibratory techniques. In the event of an exceedance of the second-level alert, work in the vicinity shall be suspended and the building visually inspected for potential damage. Results of the inspection must be logged.

- With methods and materials suggested at the discretion of the independent structural engineer, the stone header over the door of the Powder House should be stabilized and/or braced during construction activities in the vicinity.

Implementation of Great Meadow Bike Path Mitigation NOIS-2 would reduce vibration-related impacts to a less-than-significant level.

Summary

The project would have a less-than-significant impact on exposure of sensitive receptors to noise and vibration during construction with implementation of Great Meadow Bike Path Mitigation NOIS-1 and Great Meadow Bike Path Mitigation NOIS-2. LRDP EIR Mitigation NOIS-1 is also incorporated into the project.

6.14 POPULATION & HOUSING

POPULATION & HOUSING Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☐	☑
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☐	☑
c) Create a demand for housing that cannot be accommodated by local jurisdictions?	☐	☐	☐	☐	☑

More detail on population and housing issues related to development under the campus' 2005 LRDP are described in Volume II, Section 4.11 of the 2005 LRDP EIR (UC Santa Cruz 2006b).

a, c) The project would not directly or indirectly induce population growth. The project would not construct residential dwellings, businesses, or infrastructure that would induce population growth or create demand for housing. No impact would occur.

b) The project site is the Great Meadow Bike Path on the UC Santa Cruz campus. No housing is present on the project site and the project would not displace existing housing or people. No impact would occur.

Summary

The proposed project would not result in significant impacts related to population and housing. No project-level mitigation is required.

6.15 PUBLIC SERVICES

PUBLIC SERVICES Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:					
i) Fire protection?	☐	☐	☐	☐	☑
ii) Police protection?	☐	☐	☐	☐	☑
iii) Schools?	☐	☐	☐	☐	☑
iv) Parks?	☐	☐	☐	☐	☑
v) Other public facilities?	☐	☐	☐	☐	☑

Public services issues relevant to development under the campus' 2005 LRDP, of which the proposed project is an element, are described in Volume II, Section 4.12 of the 2005 LRDP EIR (UC Santa Cruz 2006b).

a, i-iv) As discussed in Section 6.14, the proposed project would not accommodate or result in an increase in campus population. The project would not generate an increase in demand for services and would not result in the need for construction of new or expanded facilities. Therefore, the project would have no impact on public services.

Summary

The proposed project would not have significant impacts related to public services. No project-level mitigation is required.

6.16 RECREATION

RECREATION Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☐	☑
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☐	☑

Recreation issues relevant to development under the campus' 2005 LRDP are described in Volume II, Section 4.12, of the 2005 LRDP EIR (UC Santa Cruz 2006b), from which the analysis presented below is tiered.

a) The proposed project would reconstruct, widen, and improve the existing recreational and commuter Great Meadow Bike Path. As discussed in Section 6.14, the proposed project would not result in an increase in campus population. As such, implementation of the project would not result in increased use of off-campus parks or recreational facilities, or generate the need for new or expanded recreational facilities. Therefore, no impact would occur to parks and recreational facilities.

b) The Great Meadow Bike Path has substantial recreational use as well as use by campus commuters. Improvements to the bike path are necessary to mitigate existing safety hazards caused by pavement deterioration, accidents cause by the narrowness of the path, and conflicts between bicyclists and pedestrians. The potential environmental impacts of the project are analyzed in other sections of this Initial Study and no impact would occur beyond those which are disclosed in this Initial Study.

Summary

The proposed project would not create any significant impacts associated with recreational facilities. No project-level mitigation is required.

6.17 TRAFFIC, CIRCULATION AND PARKING

TRAFFIC, CIRCULATION, & PARKING Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	☐	☐	☐	☑	☐
b) Conflict or be inconsistent with CEQA Guidelines Section 15064.3 subdivision (b)?	☐	☐	☐	☑	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☐	☑
d) Result in inadequate emergency access?	☐	☐	☐	☑	☐

Traffic and transportation issues relevant to development under the campus' 2005 LRDP are described in Volume II, Section 4.13, of the 2005 LRDP EIR (UC Santa Cruz 2006b). That section also provides detail on program-level mitigation measures. There are no previously adopted LRDP EIR mitigations for potential impacts to transportation and circulation which are applicable to the proposed project.

a, b) The proposed project would not result in new vehicle trips or demand for public transit. The project would provide improvements to an existing Class I bike/pedestrian path on campus. As such, the project would not conflict with an applicable plan, ordinance, or policy addressing the circulation system. The project would not increase enrollment on campus or otherwise increase vehicle miles traveled (VMT). As a bicycle/pedestrian improvement project, the project could serve to reduce VMT. Therefore, impacts would be less than significant.

c) The proposed project would reconstruct and widen the existing bike path to current Caltrans standards to the extent feasible. Improvements would focus on meeting Caltrans standards for width and striping, but meeting Caltrans standards for other variables (e.g., grade, speed, stopping sight distance, etc.) would require extensive realignment of the path, which is not proposed. Compared with existing conditions of the bike path, the project would allow for safer bike travel and reduce conflict with oncoming bikes and pedestrians. Thus, the project would reduce hazards due to geometric design features and there would be no impact.

d) The project would require temporary closure of the bike path, but road closures would not be anticipated during project construction. As discussed in Section 6.9, above, and consistent with LRDP EIR Mitigation HAZ-9A, which is included in the proposed project, if road closures were required, Campus Standards require that contractors provide notification two weeks in advance of any road closure, clearly designate alternate routes, and keep fire hydrants accessible at all times. These provisions, which would be a requirement of construction contract specifications, would ensure that construction would not interfere with emergency access. The impact of the proposed project on emergency access would be less than significant.

Summary

The project would not have significant impacts on traffic, circulation, and parking. Incorporation of LRDP EIR Mitigation HAZ-9a would ensure that adequate emergency access would be maintained during project and the impact would be less than significant. No project-level mitigation is required.

6.18 TRIBAL CULTURAL RESOURCES

TRIBAL CULTURAL RESOURCES Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:					
(i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?	☐	☐	☐	☑	☐
(ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	☐	☐	☐	☑	☐

Assembly Bill (AB) 52 requires that California lead agencies consult with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of a proposed project, if so requested by the tribe. No Native American tribe has contacted the Campus and requested consultation related to the project area specifically pursuant to AB 52. Appendix E provides details on consultation with tribal contacts recommended by the NAHC, conducted during the preparation of the cultural resources assessment prepared for the project.

AB 52 also specifies that a project with an effect that may cause a substantial adverse change in the significant of a tribal cultural resource is a project that may have a significant effect on the environment under CEQA. The 2005 LRDP EIR was certified before the passage of Assembly Bill 52 and therefore did not analyze tribal cultural resources. Nevertheless, the following previously adopted LRDP EIR mitigations for potential impacts to cultural resources are applicable to and included in the project (the full text of the mitigation measures is included in Appendix B):

- LRDP EIR Mitigation CULT-1A (Archaeological records review of project site)

- LRDP EIR Mitigation CULT-1B (Training for construction crews on how to recognize archaeological sites and artifacts)
- LRDP EIR Mitigation CULT-1C (Archaeological survey during project planning and design)
- LRDP EIR Mitigation CULT-1D (Measures to be taken if cultural resource is identified)
- LRDP EIR Mitigation CULT-1E (Avoiding or reducing ground disturbance within site boundaries)
- LRDP EIR Mitigation CULT-1F (Monitoring and data recovery plan)
- LRDP EIR Mitigation CULT-1G (Measures to be taken if an archaeological resource is discovered during construction)
- LRDP EIR Mitigation CULT-4A (Implement LRDP EIR Mitigations CULT-1A through CULT-1H to minimize potential to disturb human remains)
- LRDP EIR Mitigation CULT-4B (Native American monitoring for any excavation within a known Native American archaeological site)
- LRDP EIR Mitigation CULT-4C (Measures to be taken in the event of a discovery on campus of human bone, suspected human bone, or a burial)
- LRDP EIR Mitigation CULT-4D (Measures to be taken if human remains cannot be left in place)

This section is based on a cultural resources assessment prepared for the project (see Appendix E). The cultural resources assessment included a records search at the Northwest Information Center (NWIC) of the California Historical Resources Information System (CHRIS) at Sonoma State University and Native American Heritage Commission (NAHC) Sacred Lands File search for the project site and 0.5-mile buffer around the project site (project area), and an intensive pedestrian survey of the project area.

a) As described in Appendix E, Dudek sent a request to the Native American Heritage Commission (NAHC) on February 11, 2019 to check the project area against their Sacred Lands File (SLF). A reply from the NAHC on February 13, 2019 indicated positive results within the SLF and provided the number of a representative of the Costanoan Ohlone Rumsen-Mutsun Tribe to contact. NAHC also provided Dudek with a list of Native American tribal group representatives who may have information about cultural resources in the area. Dudek contacted all representatives provided by the NAHC including the Costanoan Ohlone Rumsen-Mutsun Tribe. Patrick Orozco of the Costanoan Ohlone Rumsen-Mutsun Tribe responded with knowledge of archaeological sites in the area and a recommendation for Native American monitoring during construction. However, no Native American archeological sites or tribal cultural resources have been identified in the project area. Therefore, no impacts on Native American archeological sites or tribal cultural resources would occur with the proposed project.

LRDP EIR Mitigation CULT-4B, which is applicable to and incorporated into the proposed project, requires Native American monitoring for any excavation occurring within a known Native American archaeological site. While there are no known Native American archaeological sites in the project area, implementation of LRDP EIR Mitigation CULT-4B would address impacts to a Native American archaeological site if such a site was discovered during construction in the project area. In addition, LRDP EIR Mitigations CULT-1A through CULT-1G, CULT-4A, CULT-4C, and CULT-4D, would also serve to minimize potential impacts to archaeological sites. (See Section 6.5 for additional information about Cultural Resources.)

Summary

No impacts on Native American archeological sites or tribal cultural resources would occur with the proposed project. No project-level mitigation would be required.

6.19 UTILITIES & SERVICE SYSTEMS

UTILITIES & SERVICE SYSTEMS Would the project…	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less than Significant with Project-Level Mitigation Incorporated	Less than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, telecommunications, chilled water, or steam facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☑	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?	☐	☐	☐	☑	☐
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the providers existing commitments?	☐	☐	☐	☑	☐
d) Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	☐	☑
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☐	☑

Utility issues and programmatic mitigation measures relevant to development under the campus' 2005 LRDP are described in Volume II, Section 4.14, of the 2005 LRDP EIR (UC Santa Cruz 2006), from which the analysis presented below is tiered:

a) The proposed project would increase impervious surface area on the project site from approximately 60,000 square feet to approximately 93,000 square feet, resulting in a net increase of 33,000 square feet of impervious surface. While this additional impervious surface could result in an increase in stormwater runoff flows, the design of the proposed improvements would direct stormwater runoff to adjacent vegetated areas, as described in Section 6.10, and would not require construction of new stormwater drainage facilities. Therefore, the proposed project would not result in the need for new stormwater drainage facilities. Impacts would be less than significant.

b) Some water would be used during project construction; however, the operation of the project would not result in a demand for long-term water supply. Therefore, the impacts of the project related to water supply would be less than significant.

c) Construction and operation of the proposed project would not generate wastewater requiring wastewater treatment. Therefore, the project would not exceed wastewater treatment requirements. There would be no impact.

d, e) The proposed project would generate solid waste during construction. However, all soil excavated during construction would be used on site and would not be exported off site. Operation of the project would not generate solid waste. Therefore, the project would not cause a landfill to exceed its permitted capacity or violate any regulations related to solid waste and no impact would occur.

Summary

The proposed project would have a less-than-significant impact related to utilities and service systems. No project-level mitigation would be required.

6.20 WILDFIRE

WILDFIRE

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

The 2005 LRDP EIR was certified before the CEQA Guidelines were updated to include a separate section regarding wildfire in December 2018. However, wildfire hazards were analyzed in Section 4.7 of the 2005 LRDP EIR (UC Santa Cruz 2006b). None of the previously adopted LRDP EIR mitigations for potential impacts related to wildfire are applicable to the project, as the project would not include new buildings or structures.

The California Department of Forestry and Fire Protection (CAL FIRE) maps areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors, pursuant to Public Resources Code 4201-4204 and Government Code 51175-51189. These areas are referred to as Fire Hazard Severity Zones (FHSZs) and are identified for areas where the state has financial responsibility for wildland fire protection (i.e., state responsibility areas, or SRAs), and areas where local governments have financial responsibility for wildland fire protection (i.e., local responsibility areas, or LRAs). The Project site is located within a LRA and is not located near a SRA or a very high FHSZ (CAL FIRE 2012).

a-d) The Project site is located within an LRA within an unzoned FHSZ (CAL FIRE 2012). As the project site is not located in or near SRAs or lands classified as very high FHSZs, no impact would occur related to wildfire hazards, including emergency response/evacuation, pollutants and uncontrolled wildfire spread, associated infrastructure, or post-fire effects. Furthermore, the project would not construct new structures requiring fire protection or increase the population or use of an area subject to wildland fire hazards.

Summary

The Project would not result in any impacts related to wildfire. No project-level mitigation would be required.

6.21 MANDATORY FINDINGS OF SIGNIFICANCE

MANDATORY FINDINGS OF SIGNIFICANCE

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

a) As discussed in Section 6.4, above, project impacts on biological resources would be reduced to a less-than-significant level with implementation of LRDP EIR Mitigations BIO-6, BIO-9, BIO-11, BIO-12-A, BIO-12B, and BIO-14, and Great Meadow Bike Path Mitigation BIO-1. As discussed in Section 6.5 above, implementation of LRDP EIR Mitigations CULT-1A through CULT-1G, CULT-2B and CULT-2D, and

CULT-4A through CULT-4D, as well as Great Meadow Bike Path Mitigation CULT-1 would reduce potential impacts on cultural resources to a less-than-significant level.

b) All cumulative impacts analyzed in the 2005 LRDP EIR that are relevant to the proposed project were determined to be less than significant with the incorporated of LRDP EIR mitigations. The project's impacts would be limited to the construction period, as operation would entail use of the improved bike/pedestrian path similar to existing conditions. As the project would not result in an increase in enrollment or employment, it would not contribute to cumulative impacts on housing demand, traffic congestion, and water supply. Therefore, the project's contribution to significant cumulative impacts would not be cumulatively considerable.

c) Implementation of the project would not result in any impacts that are significant and unavoidable or cumulatively considerable, including those related to hazardous materials, emergency response, transportation hazards, or noise. The implementation of LRDP EIR Mitigation HAZ-9a would ensure that construction-related traffic disruptions would be minimized. The project would not exacerbate existing wildfire hazards. Therefore, the project would not result in impacts that would cause substantial adverse effects on human beings, either directly or indirectly.

7 FISH & GAME DETERMINATION

Based on the information presented in this Initial Study, the project does have a potential to adversely affect wildlife or the habitat upon which wildlife depend. Therefore, a filing fee will be paid.

____ Certificate of Fee Exemption

__X__ Pay Fee

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Appendix A

Proposed Mitigated Negative Declaration

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PROPOSED MITIGATED NEGATIVE DECLARATION

Lead Agency:	University of California
Project Proponent:	University of California Santa Cruz
Project Location:	The proposed Great Meadow Bike Path Project site is located along the existing bike path alignment within the Great Meadow in the south-central portion of the campus.
Project Description:	This Initial Study analyzes the environmental effects of the Great Meadow Bike Path Preservation and Safety Improvement Project, Phase 2. The project consists of reconstructing and widening the existing Great Meadow Bike Path to meet current California Department of Transportation (Caltrans) standards to the extent feasible within the current alignment. This would include reconstruction and repaving of the path, widening and paving of shoulders, correcting existing drainage issues adjacent to the path, and designating specific portions of the path for shared pedestrian and bicycle use.
Mitigation Measures:	Great Meadow Bike Path Mitigation BIO-1 would minimize impacts to American badgers, if present on site. Great Meadow Bike Path Mitigation BIO-2 would minimize temporary impacts to coastal prairie and needlegrass grassland habitat. Great Meadow Bike Path Mitigation CULT-1 includes requirements for archaeological monitoring during earth-disturbing construction within sensitive areas. Great Meadow Bike Path Mitigation CULT-2 includes protections for historic buildings and structures within the Cowell Lime Works Historic District, with specific measures for the Powder House Great Meadow Bike Path Mitigation NOIS-1 would minimize construction-period noise impacts on sensitive receptors. Great Meadow Bike Path Mitigation NOIS-2a throughNOIS-2c would minimize construction-period vibration impacts on sensitive receptors. The project would also incorporate previously adopted LRDP EIR mitigations. The complete text of these mitigation measures is provided in Appendix B.
Determination:	In accordance with CEQA, an Initial Study has been prepared by UC Santa Cruz that evaluates the environmental effects of the proposed project. On the basis of the project's Initial Study the campus has determined that, with implementation of the mitigation measures listed above, the proposed project would not have a potentially significant effect on the environment.
Public Review:	In accordance with Section 15073 of the CEQA Guidelines, the Initial Study for the project will be circulated for public and agency review from April 5 to May 6, 2019.

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Appendix B

2005 LRDP Mitigation Measures Incorporated as Part of the Proposed Project

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2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
4.1 Aesthetics	
AES-3B	For Academic Core development in and bordering the Great Meadow, the Campus shall limit the removal of natural vegetation outside building footprints, and cluster development at meadow edges.
AES-5C	Campus development shall be designed and construction activities shall be undertaken in a manner that shall minimize removal of healthy and mature trees around new projects, except where the proximity of adjacent mature trees to new development is expected to result in a safety hazard or the ultimate decline of the trees.
4.3 Air Quality	
AIR-1	The Campus shall apply standard MBUAPCD-recommended mitigation measures during construction of new facilities under the 2005 LRDP, as appropriate: • Water all active construction areas at least twice daily. • Prohibit all grading activities during periods of high wind (over 15 mph). • Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days). • Apply non-toxic binders (e.g., latex acrylic copolymer), as appropriate, to exposed areas after cut and fill operations and hydroseed area. • Require haul trucks to maintain at least 2 feet of freeboard. • Cover all trucks hauling dirt, sand, or loose materials. • Plant vegetative ground cover in disturbed areas as soon as possible. • Cover inactive storage piles. • Install wheel washers at the entrances to construction sites for all exiting trucks. • Pave all roads on construction sites. • Damp-sweep streets if visible soil material is carried out from the construction site. • Post a publicly visible sign that specifies the telephone number and person to contact regarding dust complaints. This person shall respond to complaints and take corrective action within 48 hours. The phone number of the Monterey Bay Unified Air Pollution Control District shall be visible to ensure compliance with Rule 402. • Each project shall limit the area under construction at any one time.

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
AIR-6	The Campus will minimize construction emissions by implementing measures such as those listed below: • Require the use of cleaner fuels (e.g., natural gas, ethanol) in construction equipment • Require that construction contractors use electrical equipment where possible • Require construction contractors to minimize the simultaneous operation of multiple pieces equipment at a construction site • Minimize idling time to a maximum of 5 minutes when construction equipment is not in use • Schedule operations of construction equipment to minimize exposure to emissions from construction equipment
4.4 Biological Resources	
BIO-6	To avoid or minimize the introduction or spread of noxious weeds, sudden oak death or pitch canker into uninfested areas, UC Santa Cruz shall incorporate the following measures into project plans and specifications for work on the north campus to be conducted under the 2005 LRDP. • Only certified, weed-free materials shall be used for erosion control. • UC Santa Cruz shall identify appropriate best management practices to avoid the dispersal of noxious weeds, sudden oak death and pitch canker. The Campus shall then include appropriate practices in Campus Standards for construction to be implemented during construction in all north campus areas. Typical best management practices include the use of weed-free erosion control materials and revegetation of disturbed areas with seed mixes that include native species and exclude invasive non-natives. Best management practices to avoid the spread of sudden oak death and pitch pine canker will be determined in consultation with the California Department of Forestry. • In uninfested areas, topsoil removed during excavation shall be stockpiled and used to refill the trench on site if it is suitable as backfill
BIO-9	To minimize disturbance of breeding and dispersing California red-legged frogs, all ground-disturbing construction activity within the Moore Creek watershed, such as vegetation clearing, site leveling, and grading that occurs within designated red-legged frog habitat shall be conducted during the dry season, (after May 1 and before October 15). If ground-disturbing activities cannot be completed within the dry season, UC Santa Cruz shall contact the USFWS field office to initiate the following measures and determine whether additional mitigation measures are necessary to minimize potential impacts.

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
BIO-11	Prior to construction or site preparation activities, a qualified biologist shall be retained to conduct nest surveys at each site that has appropriate nesting habitat. The survey shall be required for only those projects that will be constructed during the nesting/breeding season of sharp-shinned hawk, golden eagle, northern harrier, long-eared owl, or white-tailed kite (typically February 1 through August 31). The survey area shall include all potential nesting habitat, including mixed evergreen forest, redwood forest, and isolated trees that are within 200 feet of the proposed project grading boundaries. The survey shall be conducted no more than 14 days prior to commencement of construction activities. If active nests of sharp-shinned hawk, Cooper's hawk, golden eagle, northern harrier, Vaux's swift, long-eared owl, and white-tailed kite (or other species protected under the Migratory Bird Treaty Act and the California Fish and Game Code) are present in the construction zone or within 200 feet of the construction zone, a temporary fence shall be erected at a distance of 200 feet around the nest site (or less if determined to be appropriate by the biologist according to the species and site conditions). Clearing and construction within the fenced area shall be postponed until juveniles have fledged and there is no evidence of a second nesting attempt as determined by the biologist.
BIO-12A	Prior to any ground disturbance of grassland habitats on the lower campus, a qualified biologist will conduct a preconstruction survey to identify western burrowing owls and/or potential habitat features (e.g., burrows) and to evaluate use by burrowing owls in accordance with current CDFG survey guidelines (CDFG 1995). Surveys will be conducted within the proposed disturbance footprint and a 500-foot radius of the disturbance boundary of each proposed project. For construction activities occurring within the western burrowing owl habitat (whether during breeding or non-breeding seasons), surveys will be conducted within 30 days prior to construction. The surveys will document whether burrowing owls are nesting on or directly adjacent to disturbance areas. Survey results will be valid only for the season during which the survey is conducted. If western burrowing owls are found during the breeding or nonbreeding season, LRDP Mitigation BIO-12B will be implemented

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
BIO-12B	If burrowing owls are found, the Campus will avoid all burrowing owl nest sites to the extent feasible. Avoidance will include establishment of a non-disturbance buffer zone of at least 250 feet around each nest site during the breeding season. If burrowing owls are found outside the breeding season (September 1–January 31), avoidance will include the establishment of at least a 160-foot non-disturbance buffer zone around each burrow being used. In both cases, highly visible temporary construction fencing will delineate the buffer zone. If burrowing owl nest sites cannot be avoided, the Campus will conduct passive relocation by installing one-way doors in suitable burrow entrances that are used or may be used by the owls. This measure is described in detail below. In order to displace burrowing owls without destroying eggs, young, or adults, one-way doors will be installed on owl burrows before February 1 prior to disturbance, and each burrow will be monitored following CDFG's protocol (CDFG 1995). Suitable artificial burrows will be created nearby according to the conservation measures established for this species. The protocol includes monitoring the burrow for a 48-hour period after the one-way doors are installed. The doors will be checked every 24 hours following installation to determine whether they are still intact. If the one-way door is still correctly installed after a continuous 48-hour period (i.e., no animals have dug up the door and rendered it useless), then the one-way door will be removed and the burrows will be excavated using hand tools and plastic tubing to maintain an escape route for any animals still inside the burrow.
BIO-14	A pre-construction/grading survey of all suitable San Francisco dusky-footed woodrat habitat within 100 feet of the proposed grading footprint shall be conducted by a qualified biologist to detect any woodrat nests. The survey shall be conducted no more than 14 days prior to commencement of construction activities. If active nests (stick houses) are identified within the construction zone or within 100 feet of the construction zone, a fence shall be erected around the nest site with a 100-foot minimum buffer from construction activities. At the discretion of the biologist, clearing and construction within the fenced area would be postponed or halted until juveniles have left the nest. The biologist shall serve as a construction monitor during those periods when construction activities will occur near active nest areas to ensure that no inadvertent impacts on these nests will occur. If any woodrat is observed within the grading footprint outside of the breeding period, individuals shall be trapped and relocated to a suitable location in proximity to the project site by a qualified biologist in accordance with CDFG requirements, and the nest dismantled so it cannot be reoccupied

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
4.5 Cultural Resources	
CULT-1A	As early as possible in the project planning process, the Campus shall define the project's area of potential effects (APE) for archaeological resources based on the extent of ground disturbance and site modifications anticipated for the proposed project. The Campus shall also review confidential resource records[6] to determine whether complete intensive archaeological survey has been performed on the site and whether any previously recorded cultural resources are present.
CULT-1B	Where native soils will be disturbed, the Campus shall provide and shall require contractor crews to attend an informal training session prior to the start of earth moving, regarding how to recognize archaeological sites and artifacts. In addition, campus employees whose work routinely involves disturbing the soil shall be informed how to recognize evidence of potential archaeological sites and artifacts. Prior to disturbing the soil, contractors shall be notified that they are required to watch for potential archaeological sites and artifacts and to notify the campus if any are found. In the event of a find, the Campus shall implement LRDP Mitigation CULT-1G, below.
CULT-1C	For project sites that have not been subject to prior complete intensive archaeological survey, the Campus shall ensure that a complete intensive surface survey is conducted by a qualified archaeologist during project planning and design and prior to soil disturbing activities. If an archaeological deposit is discovered, the archaeologist will prepare a site record and file it with the California Historical Resource Information System. In the event of a find within the area of potential effects, the Campus shall consult with a qualified archaeologist to design and conduct an archaeological subsurface investigation and/or a construction monitoring plan of the project site to ascertain the extent of the deposit relative to the project's area of potential effects, to ensure that impacts to potential buried resources are avoided
CULT-1D	If it is determined that the resource extends into the project's area of potential effects, the Campus shall ensure that the resource is evaluated by a qualified archaeologist, who will determine whether it qualifies as a historical resource or a unique archaeological resource under the criteria of CEQA Guidelines §15064.5. This evaluation may require additional research, including subsurface testing, If the resource does not qualify, or if no resource is present within the project APE, this will be reported in the environmental document and no further mitigation will be required unless there is a discovery during construction.

[6]Monterey Bay Archaeological Archives, Department of Anthropology, UC Santa Cruz and California Historical Resources Information System. Northwest Information Center, Sonoma State University.

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
CULT-1E	If a resource within the project's area of potential effects is determined to qualify as an historical resource or a unique archaeological resource (as defined by CEQA), the Campus shall consult with the qualified archaeologist to consider means of avoiding or reducing ground disturbance within the site boundaries, including minor modifications of building footprint, landscape modification, the placement of protective fill, or other means that will permit avoidance or substantial preservation in place of the resource.
CULT-1F	If avoidance or substantial preservation in place is not possible for an archaeological site that has been determined to meet CEQA significance criteria, the Campus shall retain a qualified archaeologist who, in consultation with the Campus, shall prepare a research design, and plan and conduct archaeological data recovery and monitoring that will capture those categories of data for which the site is significant, prior to or during development of the site. The Campus shall also ensure that appropriate technical analyses are performed, and a full written report prepared and filed with the California Historical Resources Information System, and also shall provide for the permanent curation of recovered materials.
CULT-1G	If an archaeological resource is discovered during construction (whether or not an archaeologist is present), all soil disturbing work within 100 feet of the find shall cease. The Campus shall contact a qualified archaeologist to provide and implement a plan for survey, subsurface investigation as needed to define the extent of the deposit, and assessment of the remainder of the site within the project area to determine whether the resource is significant and would be affected by the project. LRDP Mitigation CULT-1F shall also be implemented.
CULT-2B	As early as possible in the project planning process, the Campus shall define the project's area of potential effects (APE) for historic structures. The Campus shall determine the potential for the project to result in impacts to or alteration of historic structures, based on the extent of site and building modifications anticipated for the proposed project.
CULT-2D	For a building or structure that qualifies for listing on the CRHR, the Campus shall consult with the architectural historian to consider measures that would enable the project to avoid direct or indirect impacts to the building or structure. These could include preserving a building on the margin of the project site, using it "as is," or other measures that would not alter the building.
CULT-4A	The Campus shall implement LRDP Mitigations CULT-1 through CULT-1H to minimize the potential for disturbance or destruction of human remains in an archaeological context and to preserve them in place, if feasible.
CULT-4B	The Campus shall provide a representative of the local Native American community an opportunity to monitor any excavation (including archaeological excavation) within the boundaries of a known Native American archaeological site.

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
CULT-4C	In the event of a discovery on campus of human bone, suspected human bone, or a burial, the Campus shall ensure that all excavation in the vicinity halts immediately and the area of the find is protected until a qualified archaeologist determines whether the bone is human. If the qualified archaeologist determines the bone is human, or if a qualified archaeologist is not present, the Campus will notify the Santa Cruz County Coroner of the find and protect the find without further disturbance until the Coroner has made a finding relative to PRC 5097 procedures. If it is determined that the find is of Native American origin, the Campus will comply with the provisions of PRC §5097.98 regarding identification and involvement of the Native American Most Likely Descendant (MLD).
CULT-4D	If human remains cannot be left in place, the Campus shall ensure that the qualified archaeologist and the MLD are provided an opportunity to confer on archaeological treatment of human remains, and that appropriate studies, as identified through this consultation, are carried out. The Campus shall provide results of all such for local Native American involvement in any interpretative reporting. As required by the provisions of the California Native American Graves Protection and Repatriation Act (NAGPRA), the Campus shall ensure that human remains and associated artifacts recovered from campus projects on state lands are repatriated to the appropriate local tribal group if requested, provided that the appropriate group can be identified through California NAGPRA procedures.
4.6 Geology, Soils, & Seismicity	
CULT-5A	During project planning, the Project Manager shall consult the most recent Campus Soils and Geology map to determine whether the proposed project is underlain by a formation that is known to be sensitive for paleontological resources.
CULT-5C	In the event of a discovery of a paleontological resource on campus, work within 50 feet of the find shall halt until a qualified paleontologist has examined and assessed the find and, if the resource is determined to be a unique paleontological resource, the resource is recovered. The Campus shall ensure that all finds are adequately documented, analyzed, and curated at an appropriate institution.
CULT-5D	In the event that a proposed project would result in impacts to a unique paleontological resource, the project planning team shall work together to reduce impacts to the find through design and construction modifications, to the extent feasible.

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
4.7 Hazards and Hazardous Materials	
HAZ-9A	The Campus shall continue to include the following requirements in its Campus Standards and implement them under the 2005 LRDP: • Construction work shall be conducted so as to ensure the least possible obstruction to traffic. • Contractors shall notify the University's Representative at least two weeks before any road closure. • When paths, lanes, or roadways are blocked, detour signs must be installed to clearly designate an alternate route. Fire hydrants shall be kept accessible to fire fighting equipment at all times. To ensure adequate access for emergency vehicles when construction projects would result in temporary lane or roadway closures, Physical Plant and Physical Planning and Construction shall continue to require that construction and maintenance project managers notify campus police and fire departments and the campus dispatchers of the closures and alternative travel routes.
4.8 Hydrology and Water Quality	
HYD-2B	No grading shall be conducted on hillsides (sites with slopes greater than 10 percent) during the wet season (October 1 through May 31) unless controls that prevent sediment from leaving the site are implemented. Erosion control measures, such as erosion control blankets, seeding or other stabilizing mechanisms shall be incorporated into the project erosion control plan or SWPPP and applied to graded hillside prior to predicted storm events.
HYD-3C	Each new capital project proposed under the 2005 LRDP that creates new impervious surface shall include design measures to ensure that post-development peak flows from 2-, 5- and 10-year storms do not exceed the 2-, 5-, and 10-year pre-development peak flows and that post-development peak flows from a 25-year storm do not exceed the pre-development peak flow from a 10-year storm.

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
4.10 Noise	
NOIS-1	Prior to initiation of construction of a specific development project, the Campus shall approve a construction noise mitigation program that shall be implemented for each construction project. This shall include but not be limited to the following: • Construction equipment used on campus is properly maintained and has been outfitted with feasible noise-reduction devices to minimize construction-generated noise. • Laydown and construction vehicle staging areas shall be located at least 100 feet away from noise-sensitive land uses as feasible. • Stationary noise sources such as generators or pumps shall be located at least 100 feet away from noise-sensitive land uses as feasible. • Notices of the dates and hours of anticipated construction shall be posted in academic, administrative, and residential buildings within 100 feet of construction noise sources at least a week before the start of each construction project. • Loud construction activity (i.e., construction activity such as jackhammering, concrete sawing, asphalt removal, and large-scale grading operations) within 100 feet of a residential or academic building shall not be scheduled during finals week. • Loud construction activity as described above within 100 feet of an academic or residential use shall, to the extent feasible, be scheduled during holidays, Thanksgiving break, Christmas break, Spring break, or Summer break. • Loud construction activity within 100 feet of a residential building shall be restricted to the hours between 7:30 AM and 7:30 PM, Monday through Saturday. • Loud construction activity within 100 feet of an academic building shall be scheduled to the extent feasible on weekends.

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Appendix C

Proposed Mitigation Monitoring Program

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PROPOSED MITIGATION MONITORING PROGRAM

CEQA requires that the Lead Agency establish a program to report on and monitor measures adopted as part of the environmental review process to mitigate or avoid significant effects on the environment. This Mitigation Monitoring Program (MMP) is designed to ensure that the project-specific mitigation measures identified in this Initial Study are implemented. LRDP EIR Mitigation Measures applicable to the project are monitored through the Mitigation Monitoring and Reporting Program which was adopted by The Regents in conjunction with approval of the 2005 LRDP in 2006.

The MMP for the proposed Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2, as outlined in the following table, describes monitoring and reporting procedures, monitoring responsibilities, and monitoring schedules for the project-specific mitigation measures identified in the Initial Study. Once completed, all monitoring actions will be reported in writing to or by the UC Santa Cruz Physical Planning, Development and Operations, which will maintain mitigation-monitoring records for the proposed project. The MMP will be considered by the University in conjunction with project review and will be included as a condition of project approval.

The components of the MMP include:

a) **Mitigation Measure:** The mitigation measures provide mitigation for the proposed project.

b) **Monitoring and Reporting Procedure:** Identifies the actions that must be completed for the mitigation measures to be implemented.

c) **Mitigation Timing:** Identifies the timing for implementation of each action associated with the mitigation measures in order to effectively accomplish the intended outcome.

d) **Monitoring Responsibilities:** Identifies the UC Santa Cruz entity responsible for undertaking the required action and monitoring the mitigation measure.

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2 Mitigation Monitoring Program

Project-Specific Mitigation Measure	Monitoring and Reporting Procedure	Mitigation Timing	Mitigation Responsibility
Great Meadow Bike Path Mitigation BIO-1: Prior to project construction, a qualified biologist shall inspect the project work area and adjacent areas within 100 feet for American badger dens. If an active badger den is found within the project footprint, the Campus shall contact the California Department of Fish and Wildlife regarding the latest acceptable methods for den exclusion/excavation.	Campus contract with biologist to conduct surveys. Maintain survey report, any correspondence with CDFW, and documentation of den exclusion/excavation measures in the project file.	Prior to construction.	PPDO
Great Meadow Bike Path Mitigation BIO-2: Prior to construction of the proposed project the Campus shall prepare a coastal prairie and needlegrass grassland habitat mitigation and monitoring plan to define the type of restoration, species lists, success criteria, photo documentation and reporting that will be conducted for habitat areas that will be temporarily disturbed during project construction. The habitat mitigation and monitoring plan may include a one-time topsoil salvage prior to construction in the defined areas of coastal prairie and needlegrass grassland that will be subject to disturbance for later use in reseeding soils with native grasses. The habitat mitigation and monitoring plan shall be implemented per the specifications in the plan at the conclusion of project construction. Restoration areas shall be monitored for 3 years to meet defined success criteria.	Campus contract with biologist to prepare and implement plan.	Before and after construction.	PPDO
Great Meadow Bike Path Mitigation CULT-1: The Campus shall require archaeological monitoring for all earth-disturbing construction activities within the archaeologically sensitive area extending from the convergence of the uphill/downhill segments of the bike path to a single two-way track at the northern intersection of Ranch Hill Road to the southern terminus of the bike path just north of Glenn Coolidge Drive. Monitoring would include earth-disturbing activities within staging areas as well as the bike path construction.	Include requirements in the construction contract.	During construction.	PPDO

Project-Specific Mitigation Measure	Monitoring and Reporting Procedure	Mitigation Timing	Mitigation Responsibility
Great Meadow Bike Path Mitigation CULT-2: Within the Cowell Lime Works Historic District (P-44-000200), protective fencing should be placed around any historic buildings or structures within the project area at a distance of no more than 2 feet from the existing structure. Specifically, fencing should be placed around the Powder House, a contributing feature of the District located approximately 5 feet from the eastern edge of the existing bike path in the southern portion of the project. Fencing should be placed prior to any construction activity and staging should be avoided in this area. Limit construction that creates vibration impacts around historic buildings including the Powder House. This may include using only rubber-tired vehicles within the vicinity of the Powder House. Minimize grading and other ground disturbance within the District in order to retain its integrity as a historic resource.	Include requirements in the construction contract.	Prior to and during construction.	PPDO
Great Meadow Bike Path-Mitigation-NOIS-1: UC Santa Cruz and/or the construction contractor(s) shall incorporate the following administrative controls when equipment operation is expected within 50 to 100 feet of the Music Center: • Limit equipment operation to no more than three (3) hours within any consecutive eight-hour daytime period (except for the pavement scarifier, which should be limited to 1 hour of operation per eight-hour period); or • Erect a temporary sound barrier (e.g., plywood planks, acoustical blankets, etc.) so that its height, extent, and solidity occludes line of sight between the operating equipment and the Music Center; or • If construction equipment operation cannot be limited with either option above, UC Santa Cruz and its construction contractor(s) shall coordinate with the Music Center and limit project construction hours and activities to avoid concurrence with scheduled concerts and performances.	Include requirements in the construction contract. If used, detailed design shall include the required barrier.	Before contract for construction of Phase 2 goes out to bid and during construction.	PPDO

Project-Specific Mitigation Measure	Monitoring and Reporting Procedure	Mitigation Timing	Mitigation Responsibility
Great Meadow Bike Path Mitigation NOIS-2a: UC Santa Cruz and/or the construction contractor(s) shall ensure that usage of the following construction equipment adheres to the following limits on proximity to the indicated noise-sensitive receptor: • For vibratory rollers, operating distance to the noise-sensitive receptor must not be less than: o The Music Center – 200 feet; and, o The Powder House – 22 feet. • For other conventional heavy construction equipment shown on Tables 6.13-1 through 6.13-4, operating distance to the noise-sensitive receptor must not be less than: o The Music Center – 85 feet; and, o The Powder House – 10 feet. o	Include requirements in the construction contract.	Before contract for construction of Phase 2 goes out to bid.	PP&C
Great Meadow Bike Path Mitigation NOIS-2b: If UC Santa Cruz and/or the construction contractor(s) cannot avoid the use of the equipment listed in Great Meadow Bike Path Mitigation NOIS-2a in close proximity to the Music Center based on the above distances, UC Santa Cruz shall coordinate with the Music Center and limit project construction hours and activities to avoid concurrence with scheduled concerts and performances.	Include requirements in the construction contract.	During construction.	PP&C

Project-Specific Mitigation Measure	Monitoring and Reporting Procedure	Mitigation Timing	Mitigation Responsibility
Great Meadow Bike Path Mitigation NOIS-2c: If UC Santa Cruz and/or the construction contractor(s) cannot avoid the use of the equipment listed in Great Meadow Bike Path Mitigation NOIS-2a in close proximity to the Powder House based on the above distances, or if soil conditions in the vicinity are known or are suspected to be a Class IV soil type (or otherwise transmit ground vibration more readily than that of Class III soil type (as assumed for the calculated distances of Great Meadow Bike Path Mitigation NOIS-2a), the following shall be implemented: • A pre-construction condition survey shall be prepared by a qualified independent structural engineer. • During construction, the contractor(s) shall install and maintain at least one continuously operational automated vibration monitor at the Powder House. The monitor(s) must be capable of being programmed with at least two predetermined vibratory velocity levels, such as a first-level alert equivalent to a 0.1 inches per second (in/sec) PPV to warn of continuous vibration approaching the 0.12 ips standard, and a second-level 0.25 ips PPV alert for potential transient vibration events. The monitoring system must produce real-time specific alerts (e.g., via text message and/or email to on-site personnel) when vibration velocities exceed the predetermined levels. In the event of a first-level alert, feasible steps to reduce vibratory levels shall be undertaken, including but not limited to halting/staggering concurrent activities and using lower-vibratory techniques. In the event of an exceedance of the second-level alert, work in the vicinity shall be suspended and the building visually inspected for potential damage. Results of the inspection must be logged. • With methods and materials suggested at the discretion of the independent structural engineer, the stone header over the door of the Powder House should be stabilized and/or braced during construction activities in the vicinity.	Include requirements in the construction contract.	Prior to and during construction.	PP&C

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Appendix D

Biological Resources Reports

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APPENDIX D-1
Plant Compendium

EUDICOTS

VASCULAR SPECIES

ANACARDIACEAE—SUMAC OR CASHEW FAMILY

Toxicodendron diversilobum—poison oak

APIACEAE—CARROT FAMILY

* *Foeniculum vulgare*—fennel

* —poison hemlock

Sanicula bipinnatifida—purple sanicle

* *Torilis arvensis*—spreading hedgeparsley

ASTERACEAE—SUNFLOWER FAMILY

Achillea millefolium—common yarrow

Artemisia douglasiana—Douglas' sagewort

Baccharis pilularis—coyote brush

* *Bellis perennis*—lawndaisy

* Carduus pycnocephalus ssp. *pycnocephalus*—Italian plumeless thistle

* *Cirsium vulgare*—bull thistle

Corethrogyne filaginifolia—sand-aster

Gnaphalium palustre—western marsh cudweed

Helenium puberulum—rosilla

* *Helminthotheca echioides*—bristly oxtongue

Heterotheca grandiflora—telegraphweed

* *Hypochaeris glabra*—smooth cat's ear

* *Hypochaeris radicata*—hairy cat's ear

* *Lactuca saligna*—willowleaf lettuce

* *Lactuca serriola*—prickly lettuce

* *Logfia gallica*—narrowleaf cottonrose

* *Matricaria discoidea*—disc mayweed

* *Pseudognaphalium luteoalbum*—Jersey cudweed

* *Senecio vulgaris*—old-man-in-the-Spring

* *Silybum marianum*—blessed milkthistle

* *Sonchus asper* ssp. *asper*—spiny sowthistle

* *Taraxacum officinale*—common dandelion

BRASSICACEAE—MUSTARD FAMILY

* *Brassica rapa*—field mustard
Cardamine oligosperma—little western bittercress
* *Hirschfeldia incana*—shortpod mustard
* *Lobularia maritima*—sweet alyssum
* *Raphanus sativus*—cultivated radish

CARYOPHYLLACEAE—PINK FAMILY

* *Silene gallica*—common catchfly
* *Spergula arvensis*—corn spurry
* *Stellaria media*—common chickweed

CONVOLVULACEAE—MORNING-GLORY FAMILY

* *Convolvulus arvensis*—field bindweed

DIPSACACEAE—TEASEL FAMILY

* *Dipsacus fullonum*—Fuller's teasel

EUPHORBIACEAE—SPURGE FAMILY

* *Euphorbia peplus*—petty spurge

FABACEAE—LEGUME FAMILY

Acmispon brachycarpus—foothill deervetch
* *Genista monspessulana*—French broom
Lupinus bicolor—miniature lupine
* *Medicago polymorpha*—burclover
* *Melilotus indicus*—annual yellow sweetclover
* *Trifolium angustifolium*—narrowleaf crimson clover
* *Trifolium dubium*—suckling clover
* *Trifolium hirtum*—rose clover
* *Trifolium subterraneum*—subterranean clover
* *Vicia sativa* ssp. *nigra*—garden vetch

FAGACEAE—OAK FAMILY

Quercus agrifolia—coast live oak

GERANIACEAE—GERANIUM FAMILY

* *Erodium* botrys—longbeak stork's bill
* *Erodium cicutarium*—redstem stork's bill
* *Geranium molle*—dovefoot geranium

LAMIACEAE—MINT FAMILY

* *Marrubium vulgare*—horehound*

Salvia spathacea—hummingbird sage

LAURACEAE—LAUREL FAMILY

Umbellularia californica—California bay

MALVACEAE—MALLOW FAMILY

Sidalcea malviflora ssp. laciniata—dwarf checkerbloom

MONTIACEAE—MONTIA FAMILY

Claytonia perfoliata ssp. *perfoliata*—miner's lettuce

MYRSINACEAE—MYRSINE FAMILY

* *Lysimachia arvensis*—scarlet pimpernel

ONAGRACEAE—EVENING PRIMROSE FAMILY

Taraxia ovata—goldeneggs

OXALIDACEAE—OXALIS FAMILY

* *Oxalis pes-caprae*—Bermuda buttercup

PAPAVERACEAE—POPPY FAMILY

Eschscholzia californica—California poppy

PLANTAGINACEAE—PLANTAIN FAMILY

* *Plantago coronopus*—buckhorn plantain

* *Plantago lanceolata*—narrowleaf plantain

POLYGONACEAE—BUCKWHEAT FAMILY

* *Rumex acetosella*—common sheep sorrel

PRIMULACEAE—PRIMROSE FAMILY

Primula hendersonii—mosquito bill(s), sailor caps

RANUNCULACEAE—BUTTERCUP FAMILY

Ranunculus californicus—California buttercup

ROSACEAE—ROSE FAMILY

* *Cotoneaster* sp.—cotoneaster

Rubus ursinus—California blackberry

RUBIACEAE—MADDER FAMILY

Galium oreganum—Oregon bedstraw

Galium sp.—bedstraw

SAPINDACEAE—SOAPBERRY FAMILY

Aesculus californica—California buckeye

FERNS AND FERN ALLIES

VASCULAR SPECIES

DENNSTAEDTIACEAE—BRACKEN FAMILY

Pteridium aquilinum var. *pubescens*—hairy brackenfern

DRYOPTERIDACEAE—WOOD FERN FAMILY

Polystichum munitum—western swordfern

GYMNOSPERMS AND GNETOPHYTES

VASCULAR SPECIES

CUPRESSACEAE—CYPRESS FAMILY

Sequoia sempervirens—redwood

MONOCOTS

VASCULAR SPECIES

AGAVACEAE—AGAVE FAMILY

Chlorogalum pomeridianum—wavyleaf soap plant

CYPERACEAE—SEDGE FAMILY

Cyperus eragrostis—tall flatsedge

IRIDACEAE—IRIS FAMILY

Sisyrinchium bellum—western blue-eyed grass

POACEAE—GRASS FAMILY

* *Aira caryophyllea*—silver hairgrass

* *Avena fatua*—wild oat

* *Briza maxima*—big quakinggrass

* *Briza minor*—little quakinggrass

Bromus carinatus—California brome
* *Bromus diandrus*—ripgut brome
* *Bromus hordeaceus*—soft brome
* *Cynodon dactylon*—Bermudagrass
Danthonia californica—California oat grass
* *Festuca myuros*—rat-tail fescue
* *Festuca perennis*—perennial rye grass
* *Hordeum murinum* ssp. *leporinum*—hare barley
Melica sp.—melicgrass
* *Pennisetum* clandestinum—kikuyugrass
Phalaris sp.—canarygrass
* *Poa annua*—annual bluegrass
Stipa pulchra—purple needlegrass

* signifies introduced (non-native) species

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APPENDIX D-2
Wildlife Compendium

BIRD

BLACKBIRDS, ORIOLES AND ALLIES

ICTERIDAE—BLACKBIRDS

Sturnella neglecta—western meadowlark

BUSHTITS

AEGITHALIDAE—LONG-TAILED TITS AND BUSHTITS

Psaltriparus minimus—bushtit

FALCONS

FALCONIDAE—CARACARAS AND FALCONS

Falco sparverius—American kestrel

FLYCATCHERS

TYRANNIDAE—TYRANT FLYCATCHERS

Empidonax difficilis—Pacific-slope flycatcher
Sayornis nigricans—black phoebe
Sayornis saya—Say's phoebe

HAWKS

ACCIPITRIDAE—HAWKS, KITES, EAGLES, AND ALLIES

Accipiter cooperii—Cooper's hawk [a]
Accipiter striatus—sharp-shinned hawk [a]
Aquila chrysaetos—golden eagle [a]
Buteo jamaicensis—red-tailed hawk
Buteo lineatus—red-shouldered hawk [a]
Buteo regalis—ferruginous hawk [a]
Elanus leucurus—white-tailed kite
Circus hudsonius—northern harrier

HERONS AND BITTERNS

ARDEIDAE—HERONS, BITTERNS, AND ALLIES

Ardea alba—great egret

HUMMINGBIRDS

TROCHILIDAE—HUMMINGBIRDS

Calypte anna—Anna’s hummingbird
Selasphorus sasin—Allen's hummingbird [a]

JAYS, MAGPIES AND CROWS

CORVIDAE—CROWS AND JAYS

Aphelocoma californica—California scrub-jay
Corvus corax—common raven

SWALLOWS

HIRUNDINIDAE—SWALLOWS

Petrochelidon pyrrhonota—cliff swallow

THRUSHES

TURDIDAE—THRUSHES

Sialia mexicana—western bluebird
Turdus migratorius—American robin

WOOD WARBLERS AND ALLIES

PARULIDAE—WOOD-WARBLERS

Cardellina pusilla—Wilson’s warbler
Setophaga coronata—yellow-rumped warbler
Setophaga townsendi—Townsend’s warbler

WOODPECKERS

PICIDAE—WOODPECKERS AND ALLIES

Colaptes auratus—northern flicker
Melanerpes formicivorus—acorn woodpecker

NEW WORLD SPARROWS

PASSERELLIDAE—NEW WORLD SPARROWS

Ammodramus savannarum—grasshopper sparrow [a]
Junco hyemalis—dark-eyed junco
Melospiza lincolnii—Lincoln's sparrow [a]

Passerculus sandwichensis—savannah sparrow [a]
Zonotrichia atricapilla—golden-crowned sparrow [a]
Zonotrichia leucophrys—white-crowned sparrow

MAMMAL

CANIDS

CANIDAE—WOLVES AND FOXES
Canis latrans—coyote

DOMESTIC

CANIDAE—WOLVES AND FOXES
* *Canis lupus familiaris*—domestic dog

BOVIDAE—BISON, GOATS AND SHEEP
* *Boa taurus*—domestic cattle

HARES AND RABBITS

LEPORIDAE—HARES AND RABBITS
Lepus californicus—black-tailed jackrabbit
Sylvilagus bachmani—brush rabbit

MUSTELIDS

MUSTELIDAE—WEASELS, SKUNKS, & OTTERS
Taxidea taxus—American badger [a]

POCKET GOPHERS

GEOMYIDAE—POCKET GOPHERS
Thomomys bottae—Botta's pocket gopher

SQUIRRELS

SCIURIDAE—SQUIRRELS
Spermophilus (Otospermophilus) beecheyi—California ground squirrel

UNGULATES

CERVIDAE—DEERS
Odocoileus hemionus—mule deer

REPTILE

LIZARDS

PHRYNOSOMATIDAE—IGUANID LIZARDS

Sceloporus occidentalis—western fence lizard

* signifies introduced (non-native) species

[a] Jones, Alex. 2019. Personal communication. March 7.

Scientific Name	Common Name	Status (Federal/State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	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. No suitable habitat present within biological study area.
Amsinckia lunaris	bent-flowered fiddleneck	None/None/1B.2	Coastal bluff scrub, Cismontane woodland, Valley and foothill grassland/annual herb/Mar–June/5–1640	No expected to occur. Suitable grassland habitat present within biological study area, but the species has not be found during previous general and focused biological surveys (BRG 2018, UCSC 2006).
Arctostaphylos andersonii	Anderson's manzanita	None/None/1B.2	Broadleafed upland forest, Chaparral, North Coast coniferous forest; openings, edges/perennial evergreen shrub/Nov–May/195–2495	Not expected to occur. No suitable habitat present within biological study area. This species has been documented within the UCSC campus (UCSC 2006).
Arctostaphylos glutinosa	Schreiber's manzanita	None/None/1B.2	Closed-cone coniferous forest, Chaparral; diatomaceous shale/perennial evergreen shrub/(Nov)Mar–Apr/555–2245	Not expected to occur. No suitable habitat present within biological study area.
Arctostaphylos ohloneana	Ohlone manzanita	None/None/1B.1	Closed-cone coniferous forest, Coastal scrub; siliceous shale/evergreen shrub/Feb–Mar/1475–1740	Not expected to occur. The biological study area is outside of the species' known elevation range and there is no suitable habitat present within biological study area.
Arctostaphylos pajaroensis	Pajaro manzanita	None/None/1B.1	Chaparral (sandy)/perennial evergreen shrub/Dec–Mar/95–2495	Not expected to occur. No suitable habitat present within biological study area.
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/390–1970	Not expected to occur. No suitable habitat present within biological study area.
Arenaria paludicola	marsh sandwort	FE/SE/1B.1	Marshes and swamps (freshwateror brackish); sandy, openings/perennial stoloniferous herb/May–Aug/5–560	Not expected to occur. No suitable habitat present within biological study area.
Calyptridium parryi var. hesseae	Santa Cruz Mountains pussypaws	None/None/1B.1	Chaparral, Cismontane woodland; sandy or gravelly, openings/annual herb/May–Aug/1000–5020	Not expected to occur. The biological study area is outside of the species' known elevation range and there is no suitable habitat present within biological study area.
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/0–1330	Not expected to occur. No suitable habitat present within biological study area.
Carex comosa	bristly sedge	None/None/2B.1	Coastal prairie, Marshes and swamps (lake margins), Valley and foothill grassland/perennial rhizomatous herb/May–Sep/0–2050	No expected to occur. Suitable coastal prairie habitat present within biological study area, but the species has not be found during previous general and focused biological surveys (BRG 2018, UCSC 2006).
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)/5–755	Not expected to occur. No suitable habitat present within biological study area.
Chorizanthe pungens var. hartwegiana	Ben Lomond spineflower	FE/None/1B.1	Lower montane coniferous forest (maritime ponderosa pine sandhills)/annual herb/Apr–July/295–2000	Not expected to occur. No suitable habitat present within biological study area.
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)/5–1475	Not expected to occur. No suitable habitat present within biological study area.
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/750–805	Not expected to occur. The biological study area is outside of the species' known elevation range.
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/5–985	Not expected to occur. No suitable habitat present within biological study area. This species has been documented within the nearby Pogonip Open Space (UCSC 2006).
Collinsia multicolor	San Francisco collinsia	None/None/1B.2	Closed-cone coniferous forest, Coastal scrub; sometimes serpentinite/annual herb/(Feb)Mar–May/95–820	Not expected to occur. No suitable habitat present within biological study area.
Dacryophyllum falcifolium	tear drop moss	None/None/1B.3	North Coast coniferous forest; carbonate/moss/N.A./160–900	Not expected to occur. No suitable habitat present within biological study area.
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/160–2625	Not expected to occur. No suitable habitat present within biological study area.
Erysimum teretifolium	Santa Cruz wallflower	FE/SE/1B.1	Chaparral, Lower montane coniferous forest; inland marine sands/perennial herb/Mar–July/390–2000	Not expected to occur. No suitable habitat present within biological study area.
Fissidens pauperculus	minute pocket moss	None/None/1B.2	North Coast coniferous forest (damp coastal soil)/moss/N.A./30–3360	Not expected to occur. No suitable habitat present within biological study area.
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./915–2625	Not expected to occur. The biological study area is outside of the species' known elevation range and there is no suitable habitat present within biological study area.

Scientific Name	Common Name	Status (Federal/State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Hoita strobilina	Loma Prieta hoita	None/None/1B.1	Chaparral, Cismontane woodland, Riparian woodland; usually serpentinite, mesic/perennial herb/May–July(Aug–Oct)/95–2820	Not expected to occur. No suitable habitat present within biological study area.
Holocarpha macradenia	Santa Cruz tarplant	FT/SE/1B.1	Coastal prairie, Coastal scrub, Valley and foothill grassland; often clay, sandy/annual herb/June–Oct/30–720	No expected to occur. Suitable coastal prairie habitat present within biological study area, but the species has not be found during previous general and focused biological surveys (BRG 2018, UCSC 2006).
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/30–655	Not expected to occur. No suitable habitat present within biological study area.
Horkelia marinensis	Point Reyes horkelia	None/None/1B.2	Coastal dunes, Coastal prairie, Coastal scrub; sandy/perennial herb/May–Sep/15–2475	Low potential to occur. Suitable coastal prairie habitat present within biological study area, but the species has not be found during previous general and focused biological surveys (BRG 2018, UCSC 2006). This species has been documented within the UCSC campus (UCSC 2006).
Lasthenia californica ssp. macrantha	perennial goldfields	None/None/1B.2	Coastal bluff scrub, Coastal dunes, Coastal scrub/perennial herb/Jan–Nov/15–1705	Not expected to occur. No suitable habitat present within biological study area.
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/390–1380	Not expected to occur. No suitable habitat with serpentine soils present within biological study area.
Malacothamnus arcuatus	arcuate bush-mallow	None/None/1B.2	Chaparral, Cismontane woodland/perennial evergreen shrub/Apr–Sep/45–1165	Not expected to occur. No suitable habitat present within biological study area.
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)/15–1165	Low potential to occur. Suitable grassland habitat present within biological study area, but the species has not be found during previous general and focused biological surveys (BRG 2018, UCSC 2006). This species has been documented within the UCSC campus (UCSC 2006).
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	Not expected to occur. No suitable habitat present within biological study area.
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/325–3935	Not expected to occur. No suitable habitat with serpentine soils present within biological study area and the species has not be found during previous general and focused biological surveys (BRG 2018, UCSC 2006).
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/195–2955	Not expected to occur. Suitable grassland habitat present within biological study area, but the species has not be found during previous general and focused biological surveys (BRG 2018, UCSC 2006).
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/1310–3610	Not expected to occur. The biological study area is outside of the species' known elevation range and there is no suitable habitat present within biological study area.
Pentachaeta bellidiflora	white-rayed pentachaeta	FE/SE/1B.1	Cismontane woodland, Valley and foothill grassland (often serpentinite)/annual herb/Mar–May/110–2035	Not expected to occur. No suitable habitat with serpentine soils present within biological study area and the species has not be found during previous general and focused biological surveys (BRG 2018, UCSC 2006).
Pinus radiata	Monterey pine	None/None/1B.1	Closed-cone coniferous forest, Cismontane woodland/perennial evergreen tree/N.A./80–605	Not expected to occur. No suitable habitat present within biological study area.
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/95–4300	Not expected to occur. No suitable habitat present within biological study area.
Plagiobothrys chorisianus var. chorisianus	Choris' popcornflower	None/None/1B.2	Chaparral, Coastal prairie, Coastal scrub; mesic/annual herb/Mar–June/5–525	Not expected to occur. No suitable habitat present within biological study area.
Plagiobothrys diffusus	San Francisco popcornflower	None/SE/1B.1	Coastal prairie, Valley and foothill grassland/annual herb/Mar–June/195–1180	Low potential to occur. Suitable grassland and coastal prairie habitat present within biological study area, but the species has not be found during previous general and focused biological surveys (BRG 2018, UCSC 2006). This species has been documented within the UCSC campus (UCSC 2006).
Polygonum hickmanii	Scotts Valley polygonum	FE/SE/1B.1	Valley and foothill grassland (mudstone and sandstone)/annual herb/May–Aug/685–820	Not expected to occur. Suitable grassland and coastal prairie habitat present within biological study area, but the species has not be found during previous general and focused biological surveys (BRG 2018, UCSC 2006).
Senecio aphanactis	chaparral ragwort	None/None/2B.2	Chaparral, Cismontane woodland, Coastal scrub; sometimes alkaline/annual herb/Jan–Apr(May)/45–2625	Not expected to occur. No suitable habitat present within biological study area.
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)/95–2115	Not expected to occur. Suitable grassland and coastal prairie habitat present within biological study area, but the species has not be found during previous general and focused biological surveys (BRG 2018, UCSC 2006).
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/30–1640	Not expected to occur. No suitable habitat with serpentine soils present within biological study area and the species has not be found during previous general and focused biological surveys (BRG 2018, UCSC 2006).

Scientific Name	Common Name	Status (Federal/State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Trifolium buckwestiorum	Santa Cruz clover	None/None/1B.1	Broadleafed upland forest, Cismontane woodland, Coastal prairie; gravelly, margins/annual herb/Apr–Oct/340–2000	Not expected to occur. No suitable habitat present within biological study area.
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)/15–1395	Not expected to occur. Suitable grassland and coastal prairie habitat present within biological study area, but the species has not be found during previous general and focused biological surveys (BRG 2018, UCSC 2006).

"Status Abbreviatioins:
FE: Federally listed as endangered
FT: Federally listed as threatened
FC: Federal Candidate for listing
DL: Delisted
SE: State listed as endangered
ST: State listed as threatened
SR: State Rare
CRPR 1A: Plants presumed extirpated in California and either rare or extinct elsewhere
CRPR 1B: Plants rare, threatened, or endangered in California and elsewhere
CRPR 2A: Plants presumed extirpated in California but common elsewhere
CRPR 2B: Plants rare, threatened, or endangered in California but more common elsewhere
CRPR 3: Review List: Plants about which more information is needed
CRPR 4: Watch List: Plants of limited distribution
1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
2 Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
3 Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)"

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Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Amphibians				
Ambystoma macrodactylum croceum	Santa Cruz long-toed salamander	FE/FP, SE	Dense riparian vegetation, thick coastal scrub, and oak woodland	Not expected to occur. No suitable habitat present within the biological study area. Additionally, the species has not be found during previous general and focused biological surveys (UCSC 2006).
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.	Not expected to occur. No suitable habitat present within the biological study area. Additionally, the species has not be found during previous general and focused biological surveys (UCSC 2006).
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.	Not expected to occur. No suitable habitat present within the biological study area. The species has been found on campus within Cave Gulch and North Campus drainages during focused biological surveys (UCSC 2006).
Rana boylii	foothill yellow-legged frog	None/SSC, PST	Rocky streams and rivers with open banks in forest, chaparral, and woodland	Not expected to occur. No suitable habitat present within the biological study area. Additionally, the species has not be found during previous general and focused biological surveys (UCSC 2006).
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	Moderate potential to occur. Although no aquatic habitat is present on the project site, the grasslands within the biological study area provide suitable upland movement habitat for this species. The species has not be found during previous general and focused biological surveys (UCSC 2006).
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	Not expected to occur. No suitable habitat present within the biological study area. Additionally, the species has not be found during previous general and focused biological surveys (UCSC 2006).
Birds				
Agelaius tricolor (nesting colony)	tricolored blackbird	BCC/SSC, PSE	Nests near freshwater, emergent wetland with cattails or tules, but also in Himalayan blackberrry; forages in grasslands, woodland, and agriculture	Low potential to occur. No suitable nesting habitat present within the biological study area; however the species could use grassland habitat for foraging. The species has not be found during previous general and focused biological surveys (UCSC 2006).
Ammodramus savannarum (nesting)	grasshopper sparrow	None/SSC	Nests and forages in moderately open grassland with tall forbs or scattered shrubs used for perches	High potential to occur. Suitable grassland habitat present within the biological study area. This species has not been found during previous general and focused biological surveys (UCSC 2006); however, this species has been detected within the biological study area in June 2013 (Jones 2019).
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	Moderate potential to occur. No suitable nesting habitat present within the biological study area; however the species could use grassland habitat for foraging. The species has not be found during previous general and focused biological surveys (UCSC 2006); however, this species has been detected within the biological study area (Jones 2019).
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	High potential to occur. Suitable grassland habitat present within the biological study area. This species is known to overwinter within the lower UCSC campus, but has not nested on the UCSC campus since 1987 (UCSC 2006).
Brachyramphus marmoratus (nesting)	marbled murrelet	FT/SE	Nests in old-growth coastal forests, forages in subtidal and pelagic habitats	Low potential to occur. Unlikely to nest within the biological study area due to lack of mature redwoods with large lateral braches. The species has not be found during previous general and focused biological surveys (UCSC 2006).
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. No suitable habitat present within the biological study area.
Circus hudsonius (nesting)	northern harrier	None/SSC	Nests in open wetlands (marshy meadows, wet lightly-grazed pastures, old fields, freshwater and brackish marshes); also in drier habitats (grassland and grain fields); forages in grassland, scrubs, rangelands, emergent wetlands, and other open habitats	Present. One individual was observed foraging over the grassland habitat within the biological survey area during the 2019 survey. However, marginal nesting habitat is present within the biological survey area.
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. No suitable habitat present within the biological study area.
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 occur. No suitable habitat present within the biological study area.
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 occur. Two individuals were incidentally detected outside the biological survey area within the Moore Creek drainage. Marginal nesting habitat is present; however, the site provides suitable foraging habitat. This species has been detected within the biological study area (Jones 2019).

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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 occur. No suitable habitat present within the biological study area.
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 occur. The site is outside of the species' known geographic range.
Passerculus sandwichensis alaudinus	Bryant's savannah sparrow	None/SSC	Nests and forages in low tidally influenced habitats, adjacent ruderal areas, moist grassland within and just above fog belt, and drier grassland	Moderate potential to occur. Grasslands habitat within the biological study area may provide marginally suitable nesting habitat for this species. The species has not be found during previous general and focused biological surveys (UCSC 2006).
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 occur. No suitable habitat present within the biological study area.
Fishes				
Eucyclogobius newberryi	tidewater goby	FE/SSC	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. The site is outside of the species' known geographic range and there is no suitable habitat present within the biological study area.
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.	Not expected to occur. No suitable habitat present within the biological study area.
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	Not expected to occur. The site is outside of the species' known geographic range and there is no suitable habitat present within the biological study area.
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. No suitable habitat present within the biological study area.
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 occur. Suitable roosting and foraging habitat present within the biological study area. However, the species has not be found during previous general and focused biological surveys (UCSC 2006).
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 occur. Suitable roosting and foraging habitat present within the biological study area. However, the species has not be found during previous general and focused biological surveys (UCSC 2006).
Eumops perotis californicus	western mastiff bat	None/SSC	Chaparral, coastal and desert scrub, coniferous and deciduous forest and woodland; roosts in crevices in rocky canyons and cliffs where the canyon or cliff is vertical or nearly vertical, trees, and tunnels	Moderate potential to occur. Suitable roosting and foraging habitat present within the biological study area. However, the species has not be found during previous general and focused biological surveys (UCSC 2006).
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat	None/SSC	Forest habitats with a moderate canopy and moderate to dense understory	Moderate potential to occur. Suitable woodland habitat present within the biological study area. However, the species has not be found during previous general and focused biological surveys (UCSC 2006).
Taxidea taxus	American badger	None/SSC	Dry, open, treeless areas; grasslands, coastal scrub, agriculture, and pastures, especially with friable soils	Moderate potential to occur. Suitable grassland habitat present within the biological study area. The species has not be found during previous general and focused biological surveys (UCSC 2006); however, signs of badger use has been detected within the biological study area in winter 2013 and 2019 (Jones 2019).
Invertebrates				
Cicindela ohlone	Ohlone tiger beetle	FE/None	Remnant native grasslands with California oatgrass (Danthonia californica) and purple needlegrass (Stipa pulchra) in Santa Cruz County	Low potential to occur. Marginally suitable grassland habitat present within the biological study area. The species has not be found during numerous focused biological surveys (UCSC 2006); however one adult individual was observed along the western edge of the Great Meadow on March 21, 2012 (Jones 2019).
Euphilotes enoptes smithi	Smith's blue butterfly	FE/None	Sand dunes, scrub, chaparral, grassland, and their ecotones	Not expected to occur. No suitable habitat present within the biological study area. Additionally, the species has not be found during previous general and focused biological surveys (UCSC 2006).

Scientific Name	Common Name	Status (Federal/State)	Habitat	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	Not expected to occur. No suitable habitat present within the biological study area. Additionally, the species has not be found during previous general and focused biological surveys (UCSC 2006).
Trimerotropis infantilis	Zayante band-winged grasshopper	FE/None	Isolated sandstone deposits in the Santa Cruz Mountains (the Zayante Sand Hills ecosystem)	Not expected to occur. No suitable habitat present within the biological study area. Additionally, the species has not be found during previous general and focused biological surveys (UCSC 2006).

"Status Abbreviations:
FE: Federally Endangered
FT: Federally Threatened
PFE: Proposed Federally Endangered
PFT: Proposed Federally Threatened
FC: Federal Candidate
FDL: Federally Delisted
BCC: U.S. Fish and Wildlife Service Bird of Conservation Concern
BLM: Bureau of Land Management Sensitive Species
USFS: U.S. Forest Service Sensitive Species
SSC: California Species of Special Concern
FP: California Fully Protected Species
WL: California Watch List Species
SE: State Endangered
ST: State Threatened
PSE: Proposed State Endangered
PST: Proposed State Threatened
SDL: State Delisted
SS: List Special Animals List, but no other status
CDF: California Department of Forestry Sensitive Species"

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Appendix E

Cultural Resources Assessment

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MEMORANDUM

To:	Ms. Alisa Klaus Senior Environmental Planner UCSC Physical Planning and Construction
From:	Dudek
Subject:	Cultural Resources Assessment for the UCSC Great Meadow Bike Path *Non Confidential*
Date:	March 13, 2019
cc:	Sarah Brewer, Dudek Micah Hale, Ph.D, Dudek
Attachment(s):	Figure 1. Project Location Map Figure 2. Project Vicinity Figure 3. Project Site Figure 4. Cultural Survey Area Attachment 1. National Archaeological Database Information Attachment 2. NWIC Records Search Results Attachment 3. NAHC Sacred Lands File Search and Native American Correspondence Attachment 4. Field Visit Photographs

Dear Ms. Klaus:

This letter documents the cultural resource assessment conducted by Dudek for the Initial Study for the Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2 (Project) put forth by the University of California, Santa Cruz (UCSC). The Project consists of reconstructing and widening the existing Great Meadow Bike Path, located in the south-central portion of the campus, to meet current California Department of Transportation (Caltrans) standards to the extent feasible within the current alignment. The goal of the project is to improve bicycle circulation and safety on the campus.

Dudek performed a cultural resource assessment, which included a records search, a field survey, outreach with local Native Americans, a determination of Project impacts to historical resources under the California Environmental Quality Act (CEQA), and management recommendations for the Project. The Regents of University of California (UC) is the lead agency responsible for compliance with CEQA.

All Dudek archaeologists meet the Secretary of the Interior's Professional Qualifications Standards for their roles on the Project. Kolin Taylor, BA, performed the archaeological survey; Sarah Brewer, BA, completed the records search and reporting; and Ryan Brady, MA, RPA, supervised the project and provided the final edits.

1 Executive Summary

The Initial Study for the Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2 (Project) consists of reconstructing and widening the existing Great Meadow Bike Path. The bike path is within the south-central portion of the University of California Santa Cruz (UCSC) campus, located northwest of the City of Santa Cruz, on the northern coast of Monterey Bay in Santa Cruz County, approximately 70 miles south of San Francisco, 30 miles southeast of San Jose and 30 miles north of Monterey (Figures 1-3). The purpose of the project is to meet current California Department of Transportation (Caltrans) standards to the extent feasible within the current alignment. The Project includes reconstruction and repaving of the path, widening and paving of shoulders, correcting existing erosion problems adjacent to the path, and designating specific portions of the path for shared pedestrian and bicycle use.

Dudek completed a records search at the Northwest Information Center (NWIC) of the California Historical Resources Information System (CHRIS) at Sonoma State University on February 12, 2019 for the Project Area and 0.5-mile buffer around the Project area. The records search revealed eight previously conducted studies within the Project area; 46 previously conducted studies within a 0.5-mile radius of the Project area; and 12 previously conducted studies within the region in general. Additional relevant studies were provided by UCSC. The Project Area extends into the boundaries of six previously-recorded historic-age cultural resources. Twenty-one additional cultural resources are recorded within a 0.5-mile radius of the Project. These include three prehistoric sites, six historic sites, six historic buildings, one historic structure, one historic district and four historic elements of a district. Records Search results can be found in Confidential Attachment 2.

The six previously-recorded historic-age cultural resources within the Project Area relate to the lime industry which played an important role in the growth of both Santa Cruz County and the State of California from the mid-19th century to the turn of the 20th century. Two of the recorded resources are historic districts. One of the districts, P-44-000200, the 32-acre Cowell Lime Works Historic District (District), is listed in the National Register of Historic Places (NRHP) as of 2007 (Maley and Watson 2007). Within the boundary of the District, the Powder House, a historic building and contributing element of the District, lies within the Project Area. Additionally, small portions of two previously recorded resources lie within the District. One is a historic-age archaeological deposit related to the Blacksmith Shop (P-44-000958), and the other is the approximate boundary of "two barns" (P-44-001027), presumably contributing elements to the District known as the Hay Barn and the Blacksmith Shop recorded in 1976 by the Office of Historic Preservation. Additional sites located outside the District but within the Project Area include P-44-000184 (CA-SCR-182H), a complex of features related to the quarrying and production of lime mortar that show the southern half of the existing bike path as lying within a historic rail and road alignment, and P-44-000276, an agricultural field which may have been used historically by the Santa Cruz Mission.

The second district, P-44-000855, the 12,000-acre Cowell Home Ranch District, which includes the elements of the Cowell Lime Works Historic District along with features related to the lime industry as far as the town of Felton, was nominated for listing in the NRHP, but not granted listing due to the overlap with the NRHP-listed Cowell Lime Works Historic District, and for inadequate description of the individual significance of each of its six non-contiguous areas. For purposes of management, the ineligible 12,000-acre Cowell Home Ranch District will not be considered a resource affected by the project.

Dudek sent a request to the Native American Heritage Commission (NAHC) on February 11, 2019 to check the Project Area and 0.5-mile study buffer against their Sacred Lands File (SLF). A reply from the NAHC on February 13, 2019 indicated positive SLF results and provided the number of a representative of the Costanoan Ohlone Rumsen-

Mutsun Tribe to contact. NAHC also provided Dudek with a list of Native American tribal group representatives who may have information about cultural resources in the area. Dudek understands that UCSC, as the lead agency, is responsible for consultation with local tribal partners. On behalf of UCSC, Dudek contacted all representatives provided by the NAHC including the Costanoan Ohlone Rumsen-Mutsun Tribe. Patrick Orozco of the Costanoan Ohlone Rumsen-Mutsun Tribe responded with a knowledge of archaeological sites in the area and a recommendation for Native American monitoring. A complete record of Native American Correspondence can be found in Confidential Attachment 3.

Dudek archaeologist Kolin Taylor, BA, completed an intensive pedestrian survey (15-meter transects) of the entire project area on February 18, 2019 (Figure 4). Survey was conducted using standard archaeological procedures and techniques. Visibility was good within the survey area adjacent to the existing bike path. Visibility was generally poor in staging areas covered with grass or asphalt; the staging area near parking lot #168 was flooded. All previously recorded cultural resources within the Project Area were revisited and photographed. See Attachment 4 for select photographs of the survey Area. Digital photographs are on file at Dudek's Santa Cruz office. No additional sites were identified in the survey effort.

The UCSC Long Range Development Plan (LRDP) Environmental Impact Report outlines a series of mitigation measures to prevent impacts to known and previously unknown cultural resources (UCSC 2006: Vol. I, Sect. 4.5). The mitigation measures involve identifying and documenting cultural resources, assessing eligibility for the CRHR, and implanting measures to reduce potential impacts to levels that are less than significant for CRHR-eligible resources. The following previously adopted LRDP mitigations for potential impacts to cultural resources are applicable to and included in the project:

- LRDP EIR Mitigation CULT-1A (Archaeological records review of project site)
- LRDP EIR Mitigation CULT-1B (Training for construction crews on how to recognize archaeological sites and artifacts)
- LRDP EIR Mitigation CULT-1C (Archaeological survey during project planning and design)
- LRDP EIR Mitigation CULT-1D (Measures to be taken if cultural resource is identified)
- LRDP EIR Mitigation CULT-1E (Avoiding or reducing ground disturbance within site boundaries)
- LRDP EIR Mitigation CULT-1F (Monitoring and data recovery plan)
- LRDP EIR Mitigation CULT-1G (Measures to be taken if an archaeological resource is discovered during construction)
- LRDP EIR Mitigation CULT-2B (Requirement to determine the potential for a project to result in impacts to historical resources)
- LRDP EIR Mitigation CULT-2D (Avoidance of direct and indirect impacts to historic buildings or structures)
- LRDP EIR Mitigation CULT-4A (Implement LRDP EIR Mitigations CULT-1A through CULT-1H to minimize potential to disturb human remains)

- LRDP EIR Mitigation CULT-4B (Native American monitoring for any excavation within a known Native American archaeological site)
- LRDP EIR Mitigation CULT-4C (Measures to be taken in the event of a discovery on campus of human bone, suspected human bone, or a burial)
- LRDP EIR Mitigation CULT-4D (Measures to be taken if human remains cannot be left in place)

Dudek's cultural resource assessment presented in this document satisfies UCSC's Mitigations LRDP EIR Cult-1A (Archaeological records review of project site), LRDP EIR Cult-1C (Archaeological survey during project planning and design), and LRDP EIR Cult-2B (Requirement to determine the potential for a project to result in impacts to historical resources) (UCSC 2006).

Dudek provided additional mitigation recommendations for each of the resources in the Project Area (See section Section 11 for more detail). These include LRDP Mitigation measures LRDP EIR Cult-1B (Construction crew training), LRDP EIR Cult-1E (Avoid or reduce ground disturbance and staging within site boundaries), LRDP EIR Cult-2A (refer to LRDP mitigation AES-4 for projects within the Cowell Lime Works Historic District), and LRDP EIR Cult-2D (Avoid direct or indirect impacts to historic buildings/ structures) (UCSC 2006).

Additional project-specific mitigations include Great Meadow Bike Path Mitigation CULT-1 (monitoring earth-disturbing construction activity in project area including staging areas) and Great Meadow Bike Path Mitigation CULT-2 (protective fencing and vibrational restrictions around the Powder House, a contributing element to the NRHP/CRHR-listed Historic District).

Additionally, certain LRDP EIR measures may apply only in the case of unanticipated discoveries: LRDP EIR Cult-1F (Archaeological research design, data recovery and monitoring plan for ground-disturbing activities), LRDP EIR Cult-1G (measures for unanticipated discoveries). LRDP EIR Cult 4-A through LRDP EIR Cult 4-D (measures handling Native American sites and those containing human remains) would apply if the unanticipated discoveries are Native American in origin.

2 Project Location

The University of California Santa Cruz (UC Santa Cruz) is located on the coast of Monterey Bay in Santa Cruz County, approximately 70 miles south of San Francisco, 30 miles southeast of San Jose and 30 miles north of Monterey (Figure 1). Approximately 53 percent of the main campus, including most of the area that is currently developed, is located within the city limits of Santa Cruz; the remainder is in unincorporated Santa Cruz County. Approximately 250 acres of undeveloped campus land on the western side of Empire Grade are within the Coastal Zone.

Public open space borders the campus on two sides: Pogonip City Park and Henry Cowell Redwoods State Park on the east and Wilder Ranch State Park on the west. On the south, the campus borders the City's upper west side residential neighborhoods. The rural residential Cave Gulch neighborhood is located adjacent to a portion of the campus's northwestern boundary. To the north, the campus is bounded by private land and small-scale rural development. High Street, Bay Street, Western Drive, and Empire Grade are the primary access routes to the main campus.

The Project site is located along the existing bike path alignment within the Great Meadow in the south-central portion of the campus. The Great Meadow Bike Path is a Class I bike path (i.e., fully separated from vehicle and heavy transit traffic) extending from Coolidge Drive to Meyer Drive. The bike path was built in 1974 and serves as a primary bicycle access route from the main campus entrance to central developed campus facilities as well as undeveloped recreational areas of the upper campus. The path is approximately 1 mile long and travels at moderate to steep gradients through rolling hills and open grassy terrain for much of its length, with a grade of more than 10 percent. Downhill cyclists may choose to reach speeds up to 40 miles per hour (mph). Approximately 1,000 cyclists, both commuters and recreational riders and UC Santa Cruz affiliates and non-affiliates, use the bike path each day.

The bike path includes bidirectional portions and unidirectional (i.e., uphill and downhill) portions resulting in four distinct segments: the two-way path, the uphill path, the downhill path, and the Meyer Drive intersection. The path travels north from Coolidge Drive south of the intersection with Ranch View Road as an approximately 8-foot-wide, two-way path, where it splits into two one-way portions near Village Road (uphill and downhill), before merging into a two-way path near the eastern terminus of Meyer Drive. The uphill portion of the path is approximately 8 feet wide and the downhill portion is approximately 6 feet wide. The path provides access to numerous areas used for recreational purposes, such as fire roads and recreational trails in the upper campus, as well as providing access to academic, administrative, student life, and housing facilities. Figure 2 shows the existing bike path alignment on the UC Santa Cruz campus.

3 Project Description

The Project consists of reconstructing and widening the existing Great Meadow Bike Path, located in the south-central portion of the campus, to meet current California Department of Transportation (Caltrans) standards to the extent feasible within the current alignment. The Project includes reconstruction and repaving of the path, widening and paving of shoulders, correcting existing erosion problems adjacent to the path, and designating specific portions of the path for shared pedestrian and bicycle use.

The Great Meadow Bike Path would be fully reconstructed, including widening, repaving, and slope adjustments. Figure 3 shows the Project site with slope modification and staging areas. In addition to the widening described below, base rock shoulders varying from 1 to 2 feet in width would be added on both sides of the paved section. In the two-way section, the bike path would be widened to meet current Caltrans standards of 12 feet wide: approximately 10 feet wide for the two-way portion with 1 foot paved shoulders on either side. The two-way path would be designated for bikes only and pedestrians would be directed to use the adjacent Farm Road prior to its connection with the uphill path. The uphill path would be designated as a multi-use trail to accommodate uphill bike traffic as well as two-way pedestrian traffic and would be widened to approximately 12 feet. The downhill path would be widened to approximately 10 feet with a striped 6-foot bike lane and 2-foot shoulders. Near the Meyer Drive intersection, the alignment would also be modified to increase safety and accommodate the addition of pedestrian access from the uphill path.

Drainage issues that currently result in erosion adjacent to the paved pathways would also be corrected as part of the Project by modifying grades and cross slopes to prevent water from channelizing immediately adjacent to the pathway. Additionally, the Project would be designed to direct stormwater via sheetflow to adjacent vegetated areas and to minimize concentration of stormwater runoff. The base rock shoulders would facilitate this drainage objective. V ditches or swales may be used to transport water to vegetated areas where sheetflow of runoff would be difficult to achieve. Sewer manholes in the upper and lower two-way portions of the path would need to be

raised to the new asphalt finished grade by adding new concrete rings to the top of the manhole cone; adjustments would be approximately 1 to 6 inches.

Two methods for reconstructing the bike path are being considered for the Project: (1) full-depth reclamation (FDR), where the existing asphalt and base materials would be pulverized, mixed with cement and water, and compacted to produce a base for a new asphalt surface; and (2) asphalt overlays, which would involve grinding the top approximately 1-inch layer of the path and adding base materials to the sides to provide a new surface for paving. Asphalt overlays would be used for the two-way portion of the path near the base of the campus. The method to be used for the uphill and downhill portions of the path has not yet been determined.

In general, the worst-case area of disturbance for the Project is assumed to be approximately 30 feet in either direction from the edge of the existing path to accommodate widening and/or adjustment of slopes at certain locations. Some areas requiring more extensive slope modifications to correct drainage and erosion issues may extend out to 50 feet from the edge of the path, as shown on Figure 3. However, all or most trees within the worst-case area of disturbance would be avoided with the Project, although some shrub removal and tree trimming would be required. Additionally, the Powder House, which is a historic structure in the Cowell Lime Works Historic District located near the bottom of the two-way path, would be avoided with the Project.

The Project would remove approximately 60,000 square feet of existing asphalt bicycle path pavement and construct approximately 93,000 square feet of new bicycle path pavement, thereby creating approximately 33,000 square feet of net new impervious surface. Areas disturbed by construction of the Project would be reseeded with native grasses. No temporary or permanent irrigation would be required.

4 Regulatory Context

4.1 State of California

4.1.1 The California Register of Historical Resources

In California, the term "historical resource" includes "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (Public Resources Code (PRC) Section 5020.1(j)). In 1992, the California legislature established the California Register of Historical Resources (CRHR) "to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1(a)). The criteria for listing resources on the CRHR, enumerated in the following text, were developed to be in accordance with previously established criteria developed for listing in the NRHP. According to PRC Section 5024.1(c)(1–4), a resource is considered historically significant if it (i) retains "substantial integrity," and (ii) meets at least one of the following criteria:

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

(2) Is associated with the lives of persons important in our past

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

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

To understand the historic importance of a resource, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the resource. A resource less than 50 years old may be considered for listing in the CRHR if it can be demonstrated that sufficient time has passed to understand its historical importance (see 14 CCR 4852(d)(2)).

The CRHR protects cultural resources by requiring evaluations of the significance of prehistoric and historic resources. The criteria for the CRHR are nearly identical to those for the NRHP, and properties listed or formally designated as eligible for listing in the NRHP are automatically listed in the CRHR, as are state landmarks and points of interest. The CRHR also includes properties designated under local ordinances or identified through local historical resource surveys.

4.1.2 California Environmental Quality Act

Under CEQA, a project may have a significant effect on the environment if it may cause "a substantial adverse change in the significance of an historical resource" (PRC Section 21084.1; CEQA Guidelines Section 15064.5(b)). If a site is either (i) listed or eligible for listing in the CRHR, (ii) included in a local register of historic resources, or (iii) identified as significant in a historical resources survey (meeting the requirements of Public Resources Code Section 5024.1(q)), then it qualifies as a "historical resource" for purposes of CEQA (PRC Section 21084.1; CEQA Guidelines Section 15064.5(a)(1)-(3)). The CEQA lead agency also is not precluded from determining, based on substantial evidence, that a resource that does not meet one of these three specific criteria nevertheless qualifies as a historic resource for CEQA purposes (PRC Section 21084.1; CEQA Guidelines Section 15064.5(a)).

A "substantial adverse change in the significance of an historical resource" is defined to mean "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines Section 15064.5(b)(1); PRC Section 5020.1(q)). In turn, the significance of an historical resource is materially impaired when a project "demolishes or materially alters in an adverse manner those physical characteristics" that account for the resource being identified as an historic resource under CEQA (CEQA Guidelines Section 15064.5(b)(2)).

With respect to archeological sites, the first issue is whether the site qualifies as a historic resource under the provisions discussed above. If the archeological site does not qualify as an historic resource, and if the site also does not meet the definition of a "unique archeological resource" or a "tribal cultural resource," then any impacts to the resource are not considered significant and further evaluation is not required (PRC Section 21083.2(h); CEQA Guidelines Section 15064.5(c)). A "unique archeological resource" is defined to mean an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria: (1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information; (2) Has a special and particular quality such as being the oldest of its type or the best available example of its type; (3) Is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC Sections 21083.2(g)).

"Tribal cultural resources" are defined as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe" that are either (a) included, or determined to be eligible for inclusion, in the CRHR; (b) included in a local register of historic resources; or (c) otherwise determined to be significant, based on substantial evidence, according to specified statutory criteria (PRC Sections 5024.1(c) & 21074).

4.1.3 California State Assembly Bill 52

AB 52 of 2014 amended PRC Section 5097.94 and added PRC Sections 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2, and 21084.3. AB 52 established that TCRs must be considered under CEQA and also provided for additional Native American consultation requirements for the lead agency. Section 21074 describes a TCR as a site, feature, place, cultural landscape, sacred place, or object that is considered of cultural value to a California Native American Tribe and that is either:

- On or determined to be eligible for the California Register of Historical Resources or a local historic register; or
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1.

AB 52 formalizes the lead agency–tribal consultation process, requiring the lead agency to initiate consultation with California Native American groups that are traditionally and culturally affiliated with the project site, including tribes that may not be federally recognized. Lead agencies are required to begin consultation prior to the release of a negative declaration, mitigated negative declaration, or environmental impact report.

Section 1 (a)(9) of AB 52 establishes that "a substantial adverse change to a tribal cultural resource has a significant effect on the environment." Effects on TCRs should be considered under CEQA. Section 6 of AB 52 adds Section 21080.3.2 to the PRC, which states that parties may propose mitigation measures "capable of avoiding or substantially lessening potential significant impacts to a tribal cultural resource or alternatives that would avoid significant impacts to a tribal cultural resource." Further, if a California Native American tribe requests consultation regarding project alternatives, mitigation measures, or significant effects to tribal cultural resources, the consultation shall include those topics (PRC Section 21080.3.2[a]). The environmental document and the mitigation monitoring and reporting program (where applicable) shall include any mitigation measures that are adopted (PRC Section 21082.3[a]).

4.1.4 Native American Historic Cultural Sites

State law (PRC Section 5097 et seq.) addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project; and established the Native American Heritage Commission (NAHC) to resolve disputes regarding the disposition of such remains. In addition, the Native American Historic Resource Protection Act makes it a misdemeanor punishable by up to 1 year in jail to deface or destroy an Indian historic or cultural site that is listed or may be eligible for listing in the CRHR.

4.1.5 California Health and Safety Code section 7050.5

In the event that Native American human remains or related cultural material are encountered, Section 15064.5(e) of the CEQA Guidelines (as incorporated from PRC Section 5097.98) and California Health and Safety Code Section 7050.5 define the subsequent protocol. If human remains are encountered, excavation or other disturbances shall be suspended of the site or any nearby area reasonably suspected to overlie adjacent human remains or related material. Protocol requires that a county-approved coroner be contacted in order to determine if the remains are of Native American origin. Should the coroner determine the remains to be Native American, the coroner must contact the NAHC within 24 hours. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating, with appropriate dignity, the human remains and any associated grave goods as provided in PRC Section 5097.98 (14 CCR 15064.5(e)).

4.2 Local Regulations

The UCSC Long Range Development Plan (LRDP) outlines a series of mitigation measures to prevent impacts to known and previously unknown cultural resources (UCSC 2006: Vol. I, Sect. 4.5). The mitigation measures involve identifying and documenting cultural resources, assessing eligibility for the CRHR, and implanting measures to reduce potential impacts to levels that are less than significant (for CRHR-eligible resources). The following, LRDP mitigations are applicable to the Project:

- LRDP EIR Mitigation CULT-1A (Archaeological records review of project site)
- LRDP EIR Mitigation CULT-1B (Training for construction crews on how to recognize archaeological sites and artifacts)
- LRDP EIR Mitigation CULT-1C (Archaeological survey during project planning and design)
- LRDP EIR Mitigation CULT-1D (Measures to be taken if cultural resource is identified)
- LRDP EIR Mitigation CULT-1E (Avoiding or reducing ground disturbance within site boundaries)
- LRDP EIR Mitigation CULT-1F (Monitoring and data recovery plan)
- LRDP EIR Mitigation CULT-1G (Measures to be taken if an archaeological resource is discovered during construction)
- LRDP EIR Mitigation CULT-2B (Requirement to determine the potential for a project to result in impacts to historical resources)
- LRDP EIR Mitigation CULT-2D (Avoidance of direct and indirect impacts to historic buildings or structures)
- LRDP EIR Mitigation CULT-4A (Implement LRDP EIR Mitigations CULT-1A through CULT-1H to minimize potential to disturb human remains)
- LRDP EIR Mitigation CULT-4B (Native American monitoring for any excavation within a known Native American archaeological site)

- LRDP EIR Mitigation CULT-4C (Measures to be taken in the event of a discovery on campus of human bone, suspected human bone, or a burial)
- LRDP EIR Mitigation CULT-4D (Measures to be taken if human remains cannot be left in place)

5 Environmental Context

The Project lies within the Great Meadow of the UC Santa Cruz campus, a large open meadow sloping to the south. Geology of this area is characterized by schists of various types, mainly Paleozoic or Mesozoic in age and Miocene marine rocks in the southern third (USGS 2018). Soils are predominantly Los Osos loam (15%-30%; 30%-50%) in the northern half of the Project and predominantly Watsonville loams (15%-30%) in the southern half of the Project (SoilWeb 2018). Buried A horizons are not expected within these soil types (SoilWeb 2018). This area is mapped within a mixed hardwood forest ecological zone that include oaks and madrone (Küchler 1977). Due to historic cattle ranging and the development of the university, however, the area is now vegetated with grasses. The climate is characterized as Mediterranean, with warm dry summers and cool moist winters. For a period of record between 1893 and 2016, average temperatures range from 38° to 66° Fahrenheit in the winter and 46° to 76° Fahrenheit in the summer (Western Regional Climate Center 2018). The average annual rainfall is over 30 inches (U.S. Climate Data 2018).

6 Cultural Context

6.1 Prehistory

The prehistory of indigenous groups living within Santa Cruz County follows general patterns identified within the archaeological record of the greater Central Coast area of California. These patterns represent adaptive shifts in settlement, subsistence strategies and technological innovation demonstrated by prehistoric people throughout the Holocene and earlier. The California Central Coast Chronology (Jones et al. 2007) presents an overview of prehistoric life ranging upwards of 10,000 years. Six temporal periods describe changes in prehistoric settlement patterns, subsistence practices, and technological advances (Table 1).

Table 1. California Central Coast Chronology

Temporal Period	Date (BC-AD)	Date (BP)	Artifact Assemblage	Example Sites
Paleo-Indian (highly-mobile)	pre-8000 BC	10,000 BP or older	Isolated fluted points, sparse lithic scatters	Possibly SCL-178 and SCR-177

Temporal Period	Date (BC-AD)	Date (BP)	Artifact Assemblage	Example Sites
Millingstone/ Early Archaic (highly mobile)	8000 - 3500 BC	5,500 – 10,000 BP	Millingstones, handstones, core-cobble tools, lanceolate or large side-notched projectile points, eccentric crescents, Olivella beads: thick rectangular (L-series)	SCL-65, SCL-178, SCL-237, SCR-7, SCR-60/130, SMA-134, MNT-229
Early (sites in more varied contexts)	3500 - 600 BC	2,600 – 5500 BP	Mortar and pestle introduced, formalized flaked stone tools (Rossi Square-stemmed and Año Nuevo long-stem points), Olivella beads: Spire-lopped (A), End-ground (B2b and B2c), Cap (B4), and Rectangular (L-series)	SCL-33, SCL-178, SCL-163, SCR-7, SCR-38/123, MNT-108, MNT-238, MNT-391, MNT-1918
Middle (more long-term residences)	600 BC to AD 1000	950 – 2,600 BP	Mortars and pestles (but still some millingstone/handstones), contracting-stemmed projectile points, greater variety of Olivella shell beads, Haliotis ornaments, circular shell fishhooks, bone tools, grooved stone net sinkers	SCL-178, SCL-163, SCL-613, SCR-9, SMA-77, SMA-218, MNT-101, MNT-229, MNT-234, MNT-282
Middle-Late Transition (social reorganization due to Medieval Climatic Anomaly)	AD 1000-1250	700 – 950 BP	Mortars and pestles (but still some millingstone/handstones), bow/arrow technology introduced, Olivella shell bead types: B2, B3, G1, G2, G6, and K1, notched net sinkers, hopper mortars, and circular shell fishhooks	SCL-690, MNT-1233, MNT-281, MNT-1754, MNT-745
Late (more permanent residential sites with additional seasonal sites)	AD 1250-1769	181 – 700 BP	Mortars and pestles (but still some millingstone/handstones), Cottonwood (or Canaliño) and Desert Side-notched arrow points, flaked stone drills, steatite and clamshell disc beads, Haliotis disc beads, Olivella bead types: E1, E2, B2, B3, G1, G6, K1 types	SCL-119/SBN-24/H, SCL-272, SCL-828, SCL-341, SCR-177, MNT-879, MNT-1765, MNT-1485/H MNT-1486/H

6.1.1 Paleo-Indian (10,000 BP or older)

The Paleo-Indian era represents people's initial occupation of the region. These were highly mobile hunters who focused subsistence efforts on large mammals. Multiple migrations into the region may have occurred both terrestrially and by sea (Erlandson et al. 2007). Although no coastal Paleo-Indian sites in the Central California Coast region have been discovered, they may have been inundated as a result of rising ocean levels throughout the Holocene (Jones and Jones 1992).

Evidence of this era is generally found through isolated artifacts or sparse lithic scatters (Bertrando 2004). In the San Luis Obispo area, fluted points characterizing this era are documented near the town of Nipomo (Mills et al. 2005) and Santa Margarita (Gibson 1996), but so far, no fluted points have been found in the Central Coast north of the Santa Barbara area. Possible evidence for Paleo-Indian occupation is reported in buried contexts in CA-SCL-178 in the Santa Clara Valley and at CA-SCR-177 in Scotts Valley (Cartier 1993). The early radiocarbon dates from charcoal, however, pose questions of validity (Jones et al. 2007).

6.1.2 Millingstone (5,500 – 10,000 BP)

Settlement in the Central Coast appears with more frequency in the Millingstone Period. Sites of this era have been discovered in Big Sur (Jones 1993; Jones 2003; Fitzgerald and Jones 1999), Moss Landing (Dietz et al. 1988; Jones and Jones 1992; Milliken et al. 1999), Watsonville (Culleton et al. 2005) and in the Coyote Creek area of Santa Clara (Hildebrandt and Mikkelsen 1993). Similar to the Paleo-Indian era, people living during the Millingstone era were likely highly mobile. Assemblages are characterized by abundant millingstones and handstones, cores and core-cobble tools, thick rectangular (L-series) *Olivella* beads, and a low incidence of projectile points, which are generally lanceolate or large side-notched varieties (Jones et al. 2007). Eccentric crescents are also found in Millingstone components. Sites are often associated with shellfish remains and small mammal bone, which suggest a collecting-focused economy. Stable isotope studies on human bone, from a coastal Millingstone component at CA-SCR-60/130, indicate a diet composed of 70%–84% marine resources (Newsome et al. 2004). Contrary to these findings, deer remains are abundant at other Millingstone sites (cf. Jones et al. 2008), which suggests a flexible subsistence focus.

6.1.4 Early (2,600 – 5500 BP)

The Early Period corresponds with the earliest era the "Hunting Culture" which continues through the Middle-Late Transition (Rogers 1929). The Early Period is marked by a greater emphasis on formalized flaked stone tools, such as projectile points and bifaces, and the initial use of mortar and pestle technology. Early Period sites are located in more varied environmental contexts than millingstone sites, suggesting more intensive use of the landscape than practiced previously (Jones and Waugh 1997).

Early Period artifact assemblages are characterized by Large Side-notched points, Rossi Square-stemmed points, Spire-lopped (A), End-ground (B2b and B2c), Cap (B4), and Rectangular (L-series) *Olivella* beads. Other artifacts include less temporally diagnostic Contracting-stemmed and Año Nuevo long-stemmed points, and bone gorges. Ground stone artifacts are less common relative to flaked stone tools when compared with Millingstone-era sites.

Early Period sites are common and often found in estuary settings along the coast or along river terraces inland. Coastal sites dating to this period include CA-MNT-108 (Breschini and Haversat 1992a), CA-SCR-7 (Jones and Hildebrandt 1990), and CA-SCR-38/123 (Bryre 2002, Jones and Hildebrandt 1994). Inland sites include CA-SCL-33, CA-SCL-178 and CA-SCL-163 (Hildebrandt and Mikkelsen 1993).

Archaeologists have long debated whether the shift in site locations and artifact assemblages during this time represent either population intrusion as a result of mid-Holocene warming trends, or an in-situ adaptive shift (cf. Mikkelsen et al. 2000). The initial use of mortars and pestles during this time appears to reflect a more labor intensive economy associated with the adoption of acorn processing (cf. Basgall 1987)

6.1.5 Middle (950 – 2,600 BP)

The trend toward greater labor investment is apparent in the Middle Period. During this time, there is increased use of plant resources, more long-term occupation at habitation sites, and a greater variety of smaller "use-specific" localities. Artifacts common to this era include Contracting-stemmed projectile points, a greater variety of *Olivella* shell beads and *Haliotis* ornaments that include discs and rings (Jones 2003). Bone tools and ornaments are also common, especially in the richer coastal contexts (Jones and Ferneau 2002a; Jones and Waugh 1995), and circular shell fishhooks are present for the first time. Grooved stone net sinkers are also found in coastal sites. Mortars and

pestles become more common than millingstones and handstones at some sites (Jones et al. 2007). Important Middle Period sites include CA-MNT-282 at Willow Creek (Jones 2003; Pohorecky 1976), CA-SCR-9 in the Santa Cruz Mountains (Hylkema 1991), CA-SMA 218 at Año Nuevo (Hylkema 1991), CA-SCL-613 at San Francisquito Creek, and a continued presence at SCL-178, SCL-163 (Rosenthal and Meyer 2004).

The Middle Period is a continuation of the "Hunting Culture" because of the greater emphasis on labor-intensive technologies that include projectile and plant processing (Jones et al. 2007; Rogers 1929). Additionally, faunal evidence highlights a shift toward prey species that are more labor intensive to capture, either by search and processing time or technological needs. These labor-intensive species include small schooling fishes, sea otters, rabbits, and plants such as acorn. Early and Middle Period sites are difficult to distinguish without shell beads due to the similarity of artifact assemblages (Jones and Haney 2005).

6.1.6 Middle-Late Transition (700 – 950 BP)

The Middle-Late Transition corresponds with the end of the "Hunting Culture" (Rogers 1929). It also corresponds with social reorganization across the region due to a period of rapid climatic change known as the Medieval Climatic Anomaly (cf. Stine 1994). The Medieval Climatic Anomaly is characterized by drastic fluctuations between cool-wet and warm-dry climatic conditions (Jones et al. 1999). Archaeological sites are rarer during this period, which may reflect a decline in regional population (Jones and Ferneau 2002b). Artifacts associated with the Middle-Late Transition include contracting-stemmed, double side-notched, and small leaf-shaped projectile points. The latter are thought to represent the introduction of bow and arrow technology to the region. A variety of *Olivella* shell bead types are found in these deposits and include B2, B3, G1, G2, G6, and K1 varieties, notched line sinkers, hopper mortars, and circular shell fishhooks (Jones 1995; Jones et al. 2007). Sites that correspond with this time are CA-MNT-1233 and CA-MNT-281 at Willow Creek (Pohorecky 1976), CA-MNT-1754, and CA-MNT-745 in Priest Valley (Hildebrandt 2006) and CA-SCL-690 in San Jose (Hylkema 2007).

6.1.7 Late (181 – 700 BP)

Late Period sites are found in a variety of environmental conditions and include newly occupied task sites and encampments, as well as previously occupied localities. Artifacts associated with this era include Cottonwood (or Canaliño) and Desert Side-notched arrow points, flaked stone drills, steatite and clamshell disc beads, *Haliotis* disc beads, *Olivella* bead types E1 and E2, and earlier used B2, B3, G1, G6, and K1 types. Millingstones, handstones, mortars, pestles, and circular shell fishhooks also continue to be used (Jones et al. 2007). Sites dating to this era are found in coastal and interior contexts. Coastal sites dating to the Late Period tend to be resource acquisition or processing sites, while evidence for residential occupation is more common inland (Jones et al. 2007). Late Period sites include CA-MNT-143 at Asilomar State Beach (Brady et al. 2009), CA-MNT-1765 at Moro Cojo Slough (Fitzgerald et al. 1995), CA-MNT-1485/H and -1486/H at Rancho San Carlos (Breschini and Haversat 1992b), and CA-SCR-177 at Davenport Landing (Fitzgerald and Ruby 1997).

6.2 Ethnohistoric

The Project Area lies within the territory occupied by people called "Costanoan" by the Europeans at the time of contact. Many modern descendants prefer to be called "Ohlone," and are referred to as such hereafter. The Ohlone spoke eight separate Penutian dialects and lived between the vicinities of what is now Richmond in the north to Big Sur in the south. They were organized under approximately fifty autonomous polities or tribelets (Levy 1978). At the time of European contact, the Awaswas Ohlone dialects was reportedly spoken within the portion of Santa Cruz

County where the project area lies. Ethnographic accounts of Ohlone at the time of contact described them as living in permanent villages, but also spending time in smaller camps to collect or process seasonal resources such as acorn or shellfish (Levy 1978).

6.3 History

6.3.1 Spanish Period (1770–1822)

One of the earliest known European exploration of the Monterey Bay was a Spanish envoy mission led by Sebastián Vizcaíno in 1602. The purpose of the voyage was to survey the California coastline to locate feasible ports for shipping, and Vizcaíno had explicit instructions prohibiting the creation of settlements and interacting with local Native Americans. Finding the bay to be commodious, fertile, and extremely favorable for anchorage between Manila and Acapulco, Vizcaíno named the Bay "Monterey" after the Conde de Monterey, the present Viceroy in Mexico (Chapman 1920; Kyle 2002).

Despite being mapped as an advantageous berth for Spanish shipping efforts, the epicenter of Spanish settlement in Alta California did not make its way to the Monterey Bay until the second half of the eighteenth century. In an effort to prevent the establishment of English and Russian colonies in northern Alta California, Don Gaspar de Portolá, the Governor of Baja, embarked on a voyage in 1769 to establish military and religious control over the area. On their quest to locate the Monterey Bay from the 160-year-old accounts of Sebastián Vizcaíno, the overland Portolá expedition first reached the present-day territory of the City of Monterey on May 24, 1770. Father Junípero Serra sailed on the San Antonio from San Diego and met the Portolá expedition one week later. Following a mass by Father Serra, Portolá officially claimed the territory as part of Alta California on June 3, 1770 (Kyle 2002; Lehmann 2000; Koch 1973). Mission Santa Cruz was established near the San Lorenzo River in 1791, the twelfth mission to be established in California. Parts of the UCSC campus were likely used for agriculture or grazing during the Mission period (Edwards and Kimbro 1986). Villa Branciforte also established at that time on the eastern part of Santa Cruz as one of three Spanish civil settlements in California, albeit with limited success.

The Spanish missions drastically altered the lifeways of the native people. Spanish missionaries conscripted members of local Native American communities to move to the Mission, where they were indoctrinated as Catholic neophytes.

6.3.2 Mexican Period (1822–1846)

After more than a decade of intermittent rebellion and warfare, New Spain (Mexico and the California territory) won independence from Spain in 1821. In 1822, the Mexican legislative body in California ended isolationist policies designed to protect the Spanish monopoly on trade, and decreed California ports open to foreign merchants. Cattle that had arrived with early settlers to the area had multiplied plentifully and leather and tallow became the region's first major commodity (Cleland 2005; Dallas 1955; Conway et al. 2003).

The news of Mexican independence reached Alta California in the spring of 1822, nearly one and a half years following the end of war. The Mexican government was recognized soon after the news arrived, but the official transfer of authority from Spanish to Mexican control of the region didn't take place until September 26th, 1822. The war of independence had stimulated new Mexican leadership that promoted ideals of freedom, enlightened thought, and economic expansion in California, extending far beyond the Spanish perception of the area as a stagnant dominion lacking viability (Conway et al. 2003).

Monterey was the center of Mexican political and economic power in California. In addition to opening the port of Monterey and reforming the strict policies governing foreign trade, Mexico abolished the Spanish law prohibiting the private ownership of land. In 1834, the Mexican government also secularized the mission lands releasing the Native Americans from control of the mission-system. In order to incentivize settlers to develop uninhabited surrounding lands left empty following the decimation of native populations during Spanish occupation and to increase the population inland from the more settled coastal areas where the Spanish had first concentrated its colonization efforts, extensive land grants were offered to citizens of California during the Mexican Period. (Koch 1973; Conway et al. 2003). The land grants within the UCSC campus include the *Rancho de Cañada del Rincon en el Rio San Lorenzo de Santa Cruz*, *Rancho Zayante* and *Rancho Refugio* (Rodrigues et al. 1992:7).

Although the period of Mexican control was brief overall, Mexican policies produced a lasting reputation of California as a desirable location filled with economic opportunity. Eventually, the reputation would become too advantageous for their American neighbors to the east to ignore.

6.3.3 American Period (post 1846)

The Mexican-American War began following the U.S. annexation of Texas in 1845, and the ensuing disagreement between the United States and Mexico regarding the boundary of the annexed territory. The United States officially declared war on Mexico in May of 1846, after Mexican troops crossed the Rio Grande into Texas and attacked U.S. troops stationed there (Encyclopedia Britannica 2018).

The United States of America acquired Alta California in 1848 with the end of the Mexican–American War and the signing of the Treaty of Guadalupe Hidalgo. That same year, gold was discovered in California, resulting in an influx of approximately 300,000 people. As California officially entered its statehood in 1850 (with Santa Cruz County as one of the original twenty-seven counties), the need for increased goods and services increased along with California's growing population. Entrepreneurs Albion Jordan and Isaac Davis discovered high-quality limestone in Santa Cruz in 1851 and were producing lime by 1853 (Rodrigues et al. 1992: 11). Santa Cruz incorporated as a city in 1866 and quickly prospered through logging, lime processing, commercial fishing and agriculture.

Lime Production in Santa Cruz County

The Spanish were the first to bring lime processing technology to the new world when they established the California missions in the late 18th century. Not only was lime used in the construction and maintenance of the missions through mortar, plaster and whitewash, it was also used in several other utilitarian functions such as hide tanning, food processing and disinfection (Perry et al. 2007). Early lime production involved heating a material rich in calcium carbonate (such as limestone, marble, tufa or even shell) in a wood-fired kiln to over 1,640° F, a process that took several days -- and a considerable amount of firewood -- to accomplish. The heat caused a chemical reaction, which drew the carbon dioxide from the rock, and left behind the white caustic substance called lime. Processed lime is lighter in weight than the original stone; therefore, kilns were set up near the source of the stone to make transport easier. Mission records and correspondence related to the Santa Cruz Mission (established in 1791) note an "abundance of lime" near the location of the mission (Perry et al. 2007). Two kilns in the Santa Cruz Mountains were likely producing lime for the Spanish missions, the "Old Pot Kiln" (1770 - ca. 1850) on Pogonip lands, and the "Elf Land Kiln" (P-44-000589/CA-SCR-361H) (ca. 1791 – ca. 1840) on UCSC lands (Eselius 2006).

Lime from Santa Cruz was also used during the Mexican Period (1821-1847), as memoirs from the Mexican governor, Juan Bautista Alvarado, mentions transporting lime by boat from Santa Cruz to be used as whitewash and disinfectant for the growing capital of Monterey in Alta California (Perry et al. 2007).

The industry of lime production that developed within the hills north of Santa Cruz from mid-nineteenth century to the turn of the 20th century was integral to the growth of both the city of Santa Cruz and California as a state. The discovery of gold in the foothills of the Sierra Nevada in 1848, the same year the United States of America acquired Alta California from Mexico, caused an influx of approximately 300,000 people immigrating to the region. As California officially entered its statehood in 1850 (with Santa Cruz County as one of the original twenty-seven counties), the need for building materials to keep up with the booming population growth became crucial. Finding a local source for lime was important to those building commercial and residential structures alike. Lime was also used in sugar refining, hide tanning and papermaking, all industries which developed within the county (Perry et al. 2007).

In 1852, once the gold rush sparked the need for commercial lime production, entrepreneurs Albion Jordan and Isaac Davis, among others, joined the pursuit to cash in on the marketable lime enterprise in Santa Cruz. By 1884, Santa Cruz provided one third of California's lime supply and three-quarters of San Francisco's lime market, and by 1904, lime production had peaked (Perry et al. 2007). After the turn of the 20th century, Portland cement, which was found to be a superior product for construction and did not require heating stone at the source, became more commonly used and the traditional lime kilns fell out of use. By 1946, the last lime manufacturing plant in Santa Cruz closed (Perry et al. 2007).

University of California, Santa Cruz

In 1961, the University of California Regents decided on Santa Cruz as its newest Central Coast campus. Architect John Carl Warnecke and landscape architect Thomas Church chose a model of small groups of "scholarly villages", each functionally autonomous and each with its own specific academic focus (UCSC 2005).

7 NWIC Records Search

Dudek archaeologist, Sarah Brewer, completed a records search at the Northwest Information Center (NWIC) of the California Historical Resources Information System (CHRIS) at Sonoma State University on February 12, 2019 for the Project Area and 0.5-mile buffer around the Project area. The search included any previously recorded cultural resources (including archaeological and historic built environment resources) and investigations within the Project Area, and a 0.5-mile radius buffer. In addition to official maps and records, the following sources of information were consulted as part of the records search:

- OHP Historic Properties Directory
- OHP Archaeological Determinations of Eligibility
- California Inventory of Historical Resources (1976)
- Historical Maps
- Local Inventories

- GLO and/or rancho Plat Maps

The records search revealed eight previously conducted studies within the Project area; 46 previously conducted studies within a 0.5-mile radius of the Project area; and twelve previously conducted studies within the region in general. The Project Area extends into the boundaries of six historic-age cultural resources relating to the lime industry in the late 1800's. Two resources are historic districts (P-44-000200 and P-44-000855); two are elements of a district (P-44-000958, and P-44-001027); and two are historic sites, (P-44-000184 and P-44-000276). Twenty-one additional cultural resources are recorded within a 0.5-mile radius of the Project. These include three prehistoric sites, six historic sites, six historic buildings, one historic structure, one historic district and four historic elements of a district. The complete results of the CHRIS records searches are provided in Confidential Attachment 2.

7.1 Previous Cultural Resources Studies

The records search revealed eight previously conducted studies within the Project area; 46 previously conducted studies within a 0.5-mile radius of the Project area; and twelve previously conducted studies within the region in general. The studies that were conducted within portions of the Project area include a cultural landscape report for the Cowell Ranch, five archaeological survey reports, and two reports of monitoring findings (Table 2). Additional reports were provided by UCSC, including:

- Getty Campus Heritage Grant Final Report. 2006. Prepared by Architectural Resources Group and Pacific Legacy for the University of California Santa Cruz Physical Planning and Construction

- Cultural Resources Management Plan for the Cowell Ranch and Lime Manufacturing Historic District. 2006. Prepared by the University of California, Santa Cruz, Physical Planning and Construction in collaboration with Architectural Resources Group

- Aldecoa, C. 1997. Historic Property Survey Report/Finding of Effect for the Proposed Improvements to the Intersection of Coolidge Drive and Campus Facilities Access Road, University of California, Santa Cruz. Prepared for the Physical Planning and Construction, University of California, Santa Cruz.

- Wee, S. R. 1997. Historic Resources on the Historic Cowell Ranch. Letter report. JRP Historical Consulting Services.

Table 2. Previous Technical Studies within the Records Search Area

Report Num	Authors	Year	Title	Publisher
Within Project Area				
S-003957	Rob Edwards, Patricia Padzorski, John Pryor, and James Toenjes	1978	A Preliminary Archaeological Reconnaissance of the Lands of the University of California at Santa Cruz	Gavilan Foundation
S-015955	Paul Rodrigues, Gilbert Sanchez, and Stephen A. Dietz	1992	Historic Cowell Ranch, Cultural Landscape Report	Paul Rodrigues, Gilbert Sanchez, and Stephen A. Dietz
S-018677	Charr Simpson-Smith and Rob Edwards	1996	Archaeological Monitoring for the Blacksmith's Shop: ADA Improvements at the University of California, Santa Cruz	Archaeological Associates of Central California
S-036239	Elena Reese	2005	RE.: Cultural Resources Inventory, UCSC (letter report)	Pacific Legacy, Inc.
S-045506	Michelle Kaye and Sean Dexter	2013	Archaeological Survey Report; Historic Cowell Ranch Hay Barn Reconstruction Project; University of California at Santa Cruz, Santa Cruz County, CA	Condor Country Consulting, Inc.
S-046289	Patricia Paramoure	2014	Telecommunications Infrastructure Improvements Phase A Archaeological Monitoring Report	Patricia Paramoure Archaeological Consulting
S-046387	Patricia Paramoure	2014	An Archaeological Survey of the Northern Portion of the Lower Quarry Field, University of Santa Cruz, Santa Cruz County, California	Patricia Paramoure Archaeological Consulting
S-048231	Ryan Brady and Sarah Brewer	2016	Cultural Resources Inventory for the UCSC Modular Student Housing Project, Santa Cruz, County, CA	Dudek

Report Num	Authors	Year	Title	Publisher
Within 0.5 miles of Project Area				
S-003797	Robert L. Edwards and Allan Lonnberg	1974	A Preliminary Evaluation of Archaeological and Historical Resources of the Quarry Settlement Development, Santa Cruz, California	
S-003809	Richard B. Hastings	1975	An Archaeological Site Survey of the Excess Property Slated for Recycling, 04-SCr-1/100 04220-909082-30010 (letter report)	California Department of Transportation, District 5
S-003810	Martin H. Heicksen	1974	An Evaluation of Archaeological Site SCr-94 (Santa Cruz County) Part A	
S-003810a	Martin H. Heicksen	1974	A Report and Archaeological Evaluation of a Prehistoric Cultural Resource, CA-Scr-94 Part B	
S-003890	Allan Lonnberg	1976	A Preliminary Archaeological Reconnaissance for John K. Gamman, Community Land Use Consultant, Capitola, California	
S-003912	Stephen A. Dietz	1977	An Archaeological Reconnaissance of the Approximately 9.7 acre Allen Property at 350 Meder Street in the City of Santa Cruz, California (letter report)	Archaeological Consulting and Research Service Inc.
S-003920	Rob Edwards, Micki Ryan Farley, and Robert Cartier	1977	Archaeological Evaluation of Selected Areas on the Campus of the University of California, Santa Cruz	
S-004001	Rob Edwards	1979	Intensive Surface Survey to Determine the Boundaries of Archaeological Site CA-SCR-94, University of California, Santa Cruz	Gavilan Foundation
S-004055	Maryanne Fazio Fox	1979	An Analysis of the Chipped Stone Assemblage from SCr-94	
S-004055a	Maryanne Fazio Fox	1979	[PUBLIC COPY] Edge Unit Analysis of the Lithic Assemblage from CA-SCR-94, Santa Cruz, California	
S-004109	Robert Cartier	1980	Archeological Evaluation of a Parcel on High Street in the City of Santa Cruz	Archaeological Resource Management
S-006956	Rob Edwards and Charlotte Simpson-Smith	1984	Cultural Resources Evaluation of the Faculty for Sale Housing, 7-97330	
S-006956a	MaryEllen Ryan	1984	Potential Subsurface Historical Resources, Faculty Housing Area/SCR-94 and SCR-198H, Continuing Investigations, University of California Campus, Santa Cruz, California	
S-006956b	Rob Edwards and Charlotte A. Simpson-Smith	1984	Phase Two: Surface Reconnaissance and Subsurface Testing for the Faculty For-Sale Housing Project, 7-97330	
S-006956c	Rob Edwards	1985	Faculty For-Sale Housing Project, 7-97330	

Report Num	Authors	Year	Title	Publisher
S-006956d	Andrew Black	1985	Field Notes of Archaeological Check of UCSC Faculty Apartment, Phase B Construction	
S-009999	Mark Hylkema	1988	Gray Whale Ranch Archaeological Survey	Department of Anthropology, San Jose State University
S-012109	Rob Edwards and Charlotte A. Simpson-Smith	1990	Preliminary Archaeological Reconnaissance of the Empire Grade Proposed Shoulder Widening, Santa Cruz County, California	Archaeological Associates of Central California
S-013773	Rob Edwards, Edna E. Kimbro, Robert Z. Melnick, and MaryEllen Ryan	1992	Final Report: Potential Impact to Cultural Resources, Proposed Development of Inclusion Area "D", Campus of the University of California, Santa Cruz	Archaeological Associates of Central California; Historical, Architectural, Conservation Research; Land and Community Associates; Research and Museum Services
S-013773a	Rob Edwards, Edna E. Kimbro, and Robert Z. Melnick	1992	Draft Number Three, Revised; Potential Impact to Cultural Resources of the Proposed Development of Inclusion of Area D, University of California Santa Cruz	Archaeological Associates of Central California; Historical: Architectural: Conservation Research; Land and Community Associates
S-013773b	Robert Z. Melnick and J. Timothy Keller	1991	Review and Evaluation of Potential Impact of Proposed Development of Inclusion Area 'D' on Potential Historic Landscape Resources, University of California, Santa Cruz Campus	Land and Community Associates
S-013773c	Rob Edwards and Charr Simpson-Smith	1991	Research Evaluation and Initial Field Reconnaissance of the Historical Resources of Proposed Development of the UCSC Inclusion Area 'D'	Archaeological Associates of Central California
S-013773d	Rob Edwards, Charr Simpson-Smith, and Edna Kimbro	1991	Research Evaluation and Initial Field Reconnaissance of the Historical Resources and Recommendations for the Proposed Development of the UCSC Inclusion Area 'D' and Alternate Access Routes	Archaeological Associates of Central California
S-015899	Rob Edwards and Charlotte A. Simpson-Smith	1994	UCSC Granary/Child Care Project on a Portion of CA-SCR-198H, Historic Lime Operation, Henry Cowell Ranch, Santa Cruz, California	
S-017590	Charr Simpson-Smith and Rob Edwards	1995	Archaeological Monitoring for the Barn Theater: ADA and Path Project at the University of California, Santa Cruz	Archaeological Associates of Central California
S-017591	Rob Edwards	1995	Stonehouse Lot 118 Resurfacing (letter report)	Archaeological Associates of Central California
S-018679	Rob Edwards	1996	Stores Fire Sprinkler Trench Monitoring, University of California at Santa Cruz, Project Authorization No.: ARC 015	Archaeological Associates of Central California

Report Num	Authors	Year	Title	Publisher
S-018986	Robert Cartier, Lynne Eckert, and Jon Reddington	1996	Cultural Resource Evaluation of the Pogonip Park Project in the Park Lands of the City of Santa Cruz	Archaeological Resource Management
S-020290	Mary Doane and Trudy Haversat	1998	Preliminary Archaeological Reconnaissance of Assessor's Parcel Number 001-161-36, Santa Cruz, Santa Cruz County, California	Archaeological Consulting
S-023337	Mary Doane and Trudy Haversat	2000	Preliminary Archaeological Reconnaissance of Assessor's Parcels 006-011-08 & 006-011-13, Santa Cruz, Santa Cruz County, California	Archaeological Consulting
S-023822	Mary Doane and Trudy Haversat	2001	Preliminary Archaeological Reconnaissance of Assessor's Parcel 001-161-37, Santa Cruz, Santa Cruz County, California	Archaeological Consulting
S-023948	Thomas L. Wheeler	1998	Limekilns and Ranching Features of Gray Whale Ranch	California Department of Parks and Recreation
S-029644	Mary Doane and Trudy Haversat	2005	Preliminary Archaeological Reconnaissance of Assessor's Parcel 001-161-48, Santa Cruz, Santa Cruz County, California.	Archaeological Consulting
S-034280	Sally Salzman Morgan	2007	An Archaeological Survey Report for the UC Santa Cruz Timber Harvest Plan, Santa Cruz, County, California, THP # 1-07-062 SCR	University of California, Santa Cruz
S-035231	Lorna Billat	2008	New Tower ("NT") Submission Packet, FCC Form 620, Project Name: DAS Next G UCSC - The Village, Project Number: SF-11070A	Earth Touch, Inc.
S-035233	Lorna Billat	2008	Collocation ("CO") Submission Packet, FCC Form 621, Project Name: DAS Next G UCSC - Receiving Bldg., Project Number: SF-11070A	Earth Touch, Inc.
S-036238	Elena Reese	2009	Monitoring Report and Evaluation of Historical Refuse Scatter at CA-SCR-359H, the City of Santa Cruz Reservoir site, Santa Cruz, California	Pacific Legacy, Inc.
S-036242	Elena Reese	2009	Data Recovery Program Report for the Blacksmith Shop Feature, CA-SCR-198H, University of California, Santa Cruz, Santa Cruz County, California	Pacific Legacy, Inc.
S-037161	Mary Doane and Gary S. Breschini	2010	Preliminary Archaeological Assessment for APN 001-191-67, in Santa Cruz, Santa Cruz County, California. Project 4394	Archaeological Consulting
S-038529	Mary Doane and Gary Breschini	2011	Preliminary Archaeological Assessment for APN 001-231-03, In Santa Cruz, Santa Cruz County, California	Archaeological Consulting

Report Num	Authors	Year	Title	Publisher
S-039232	Elena Reese	2012	Archaeological Monitoring for the Barn H Loading Dock Project Excavations at the University of California, Santa Cruz, Santa Cruz County, California (letter report)	Pacific Legacy, Inc.
S-042680	Carolyn Losee	2013	Collocation ("CO") Submission Packet FCC Form 621 for Stevenson College - 101 McLaughlin Drive, University of California, Santa Cruz	Archaeological Resources Technology
S-042681	Carolyn Losee	2013	Collocation ("CO") Submission Packet FCC Form 621 for Campus Fleet Garage and TSM Office Antenna Replacement - Coolidge Drive, University of California, Santa Cruz	Archaeological Resources Technology
S-044493	Matthew A. Russell and Beatrice Cox	2013	Archaeological Monitoring Summary Report for 30892244 Gas Main Western Road, City and County of Santa Cruz	Garcia and Associates
S-046358	Patricia Paramoure	2012	UCSC Archaeological Resources Study, Telecommunications Infrastructure Improvements Phase A Project, Santa Cruz County, California - (letter report)	Archaeological Consultants
S-046361	Patricia Paramoure and John Schlagheck	2014	Archaeological Monitoring and Subsurface Reconnaissance of the Historic Hay Barn Site, University of California, Santa Cruz, Santa Cruz County, California	Patricia Paramoure Archaeological Consulting
S-046361a	Patricia Paramoure	2016	Archaeological Monitoring and Artifact Analysis, Hay Barn Renovation Project at the Cowell Lime Works Historical District, University of California, Santa Cruz	Patricia Paramoure Archaeological Consulting
S-046377	Patricia Paramoure and Charles Mikulik	2014	UCSC infrastructure Phase 2 Storm Water Improvements, Jordan Gulch Main Stem Project, Archaeological Monitoring Report, Santa Cruz County, California	Patricia Paramoure Archaeological Consulting
S-046382	Patricia Paramoure	2012	Infrastructure Phase 2 Storm Water Improvements - Excavation, Trenching, and Grading Archaeological Monitoring Report, UCSC Santa Cruz County, California	Patricia Paramoure Archaeological Consulting
S-046383	Patricia Paramoure	2012	Campus Corporation Yard Fleet Vehicle Wash - Trenching, and Excavation Monitoring Report, Santa Cruz County, California	Patricia Paramoure Archaeological Consulting
S-046384	Patricia Paramoure	2014	Campus Corporation Yard CNG Stanchion Project, Archaeological Monitoring Report, UCSC Santa Cruz County, California - (letter report)	Patricia Paramoure Archaeological Consulting

Report Num	Authors	Year	Title	Publisher
S-046385	Patricia Paramoure and John Schlagheck	2014	An Archaeological Investigation of a Historic Stone Foundation Site for Proposed New Recycling Yard, University of California, Santa Cruz, Santa Cruz County, California	Patricia Paramoure Archaeological Consulting
S-046385a	Patricia Paramoure	2016	University of California at Santa Cruz New Recycling Yard Project Archaeological Monitoring Report	Patricia Paramoure
S-047398	Sean D. Dexter and Michelle Kaye Fitzgerald	2016	University of California at Santa Cruz Physical Planning and Construction Archaeological Survey Report, New Environmental Health & Safety Facility Project, University of California at Santa Cruz, Santa Cruz, CA	Condor Country Consulting, Inc.
S-048801	Patricia Paramoure	2015	University of California at Santa Cruz Student Life Seismic Corrections Phase 2A-Cardfiff House Project Archaeological Monitoring Report	Patricia Paramoure Archaeological Consulting
S-049040	Cassady Bill Vaughan, Sean D. Dexter, and Michelle Kaye Fitzgerald	2017	CAA Adendum for UC Santa Cruz EH&S THP/TCP Santa Cruz County, California	Vaughan Forestry; Condor Country Consulting
S-049916	David Brunzell	2017	Cultural Resources Assessment for the Santa Cruz Crown Castle DAS Project, Santa Cruz, Santa Cruz County, California (BCR Consulting Project No. SYN1609)	BCR Consulting, LLC
S-000848	David A. Fredrickson	1977	A Summary of Knowledge of the Central and Northern California Coastal Zone and Offshore Areas, Vol. III, Socioeconomic Conditions, Chapter 7: Historical & Archaeological Resources	The Anthropology Laboratory, Sonoma State College; Winzler & Kelly Consulting Engineers
S-004087	Robert H. Jackson	1980	An Introduction to the Historical Demography of Santa Cruz Mission and the Villa de Branciforte, 1791-1846	University of California, Santa Cruz
S-008884	Rob Edwards	1986	Review of the UCSC Long Range Development Plan on the Cultural Resources	
S-009462	Teresa Ann Miller	1977	Identification and Recording of Prehistoric Petroglyphs in Marin and Related Bay Area Counties	San Francisco State University
S-013597	Mark Gerald Hylkema	1991	Prehistoric Native American Adaptation Along the Central California Coast of San Mateo and Santa Cruz Counties	San Jose State University

Report Num	Authors	Year	Title	Publisher
S-015529	Robert L. Gearhart II, Clell L. Bond, Steven D. Hoyt, James H. Cleland, James Anderson, Pandora Snethcamp, Gary Wesson, Jack Neville, Kim Marcus, Andrew York, and Jerry Wilson	1993	California, Oregon, and Washington: Archaeological Resource Study	Espey, Huston & Associates, Inc.; Dames & Moore
S-018217	Glenn Gmoser	1996	Cultural Resource Evaluations for the Caltrans District 04 Phase 2 Seismic Retrofit Program, Status Report	California Department of Transportation
S-030204	Donna L. Gillette	2003	The Distribution and Antiquity of the California Pecked Curvilinear Nucleated (PCN) Rock Art Tradition.	University of California, Berkeley
S-032596	Randall Milliken, Jerome King, and Patricia Mikkelsen	2006	The Central California Ethnographic Community Distribution Model, Version 2.0, with Special Attention to the San Francisco Bay Area, Cultural Resources Inventory of Caltrans District 4 Rural Conventional Highways	Consulting in the Past; Far Western Anthropological Research Group, Inc.
S-036513	Andrew Pulcheon, E. Timothy Jones, and Michael Konzak	2006	Cultural Resources Background Report and Archaeological Sensitivity Map for the City of Santa Cruz General Plan Update, Santa Cruz, Santa Cruz County, California	LSA Associates, Inc.
S-036513a	Andrew Pulcheon	2009	Historical Archaeological Report for the City of Santa Cruz General Plan Update, Santa Cruz, Santa Cruz County, California	LSA Associates, Inc.
S-036513b	Ryan Brady and Sarah Brewer	2018	Cultural Resources Background Report Update with Policies, Programs, and Maps, City of Santa Cruz, Santa Cruz County, California	Dudek
S-048442	Jean Stafford, Micki Farley, and Rob Edwards	1975	Cultural Resource Management: The Santa Cruz County Model	Santa Cruz Archaeological Society; Cabrillo College
S-048927	Donald Scott Crull	1997	The Economy and Archaeology of European-made Glass Beads and Manufactured Goods Used in First Contact Situations in Oregon, California and Washington	University of Sheffield, England

7.2 Previously Recorded Resources

The Project Area extends into the boundaries of six historic-age cultural resources relating to the lime industry in the late 1800's. Two resources are historic districts (P-44-000200 and P-44-000855); one is an element of a district (P-44-001027); and three are historic sites, (P-44-000184, P-44-000276, and P-44-000958). Twenty-one additional cultural resources are recorded within a 0.5-mile radius of the Project. These include three prehistoric sites, six historic sites, six historic buildings, one historic structure, one historic district and four historic elements of a district. Records Search results can be found in Confidential Attachment 2. (Table 3).

Please see Findings (Section 10) for detailed descriptions of the resources within the Project Area.

Table 3. Previously Recorded Cultural Resources within the Project Area and 0.5-mile Buffer

Primary	Trinomial/ Other Names	Age	Type	Attributes	NRHP/CRHR Eligibility
Within Project Area					
P-44-000184	CA-SCR-182H	Historic	Site	Quarries and Tailings, Fence, Railroad grade and quarry access roads	Potentially eligible
P-44-000200	CA-SCR-198H; Cowell Lime Works Historic District	Historic	District	Historic district with kilns, quarries, tailings, fences, railroad grades, roads, buildings, structures	Listed in NRHP
P-44-000276	CA-SCR-277H; FS 11-21-86-3	Historic	Site	Possible Mission-era agricultural fields	Likely not eligible
P-44-000855	Cowell Home Ranch District	Historic	District	Historic district with kilns, quarries, tailings, fences, railroad grades, roads, buildings, structures	Nominated, but not listed in NRHP
P-44-000958	Blacksmith Shop Feature 1	Historic	Site	Historic refuse scatter	Potentially eligible
P-44-001027	Two Barns	Historic	Element of a District	Barn structures	Contributing element to the District; Listed in the Historic Properties Directory
Within 0.5-mile Buffer of Project Area					
P-44-000098	CA-SCR-94	Prehistoric	Site	lithic scatter	Potentially eligible
P-44-000145	CA-SCR-142	Prehistoric	Site	lithic and shell scatter	Potentially eligible
P-44-000183	CA-SCR-181	Prehistoric	Site	lithic scatter	Potentially eligible
P-44-000185	CA-SCR-183H; Bridge Quarry; Bridge Kiln; Jordan Gulch Middle Fork Pocket Quarries; Upper Quarry Kiln; Jordan Gulch Middle Fork Railway	Historic	Site	Bridge, quarries, kiln, railroad alignments	Likely eligible
P-44-000186	CA-SCR-184H	Historic	Site	Historic structure and sinkhole	unknown
P-44-000187	CA-SCR-185H	Historic	Site	Historic foundation	unknown

Primary	Trinomial/ Other Names	Age	Type	Attributes	NRHP/CRHR Eligibility
P-44-000188	CA-SCR-186H; Cowell Ranch Features	Historic	Site	Fences, troughs, pipes	Potentially eligible
P-44-000579	900 High Street, Santa Cruz, CA 95060; First Congregational Church	Historic	Building	Church	Recommended eligible under Criterion C
P-44-000585	CA-SCR-359H; City of Santa Cruz Reservoir	Historic	Site	water tower, spillway, reservoir, earth dam, refuse scatter	Potentially eligible
P-44-000587		Historic	Structure	Foundation, cattle trough	Not eligible
P-44-000741	Adlai E. Stevenson College	Historic	District	Educational buildings	Recommended eligible under Criterion C
P-44-000867	CA-SCR-000424H	Historic	Site	Fence and roadway	unknown
P-44-000954	Theatre / Horse Barn	Historic	Building	Barn	Contributing element to NRHP-listed District
P-44-000955	UC Santa Cruz Campus Police / Cookhouse	Historic	Building	Building	Contributing element to NRHP-listed District
P-44-000956	Carriage House	Historic	Building	Building	unknown
P-44-000957	CRHD-Blacksmith Shop	Historic	Building	Building	Contributing element to NRHP-listed District
P-44-001023	Day Care Center; Granary and Paymasters House	Historic	Element of a District	Building	Listed in the Historic Properties Directory; Contributing element to NRHP-listed District
P-44-001024	Bull Barn and Workers Housing	Historic	Element of a District	Building	Listed in the Historic Properties Directory; Non-contributing element to the District
P-44-001025	Cooperage and Lime Kilns	Historic	Element of a District	Kilns	Listed in the Historic Properties Directory; Contributing element to NRHP-listed District
P-44-001026	Barn	Historic	Element of a District	Barn	Listed in the Historic Properties Directory; Non-contributing element to the District
P-44-001041	650 Spring St	Historic	Building	Building	unknown

8 Native American Consultation

Dudek sent a request to the Native American Heritage Commission (NAHC) on February 11, 2019 to check the project area against their Sacred Lands File (SLF). A reply from the NAHC on February 13, 2019 indicated positive results within the SLF and provided the number of a representative of the Costanoan Ohlone Rumsen-Mutsun Tribe

to contact. NAHC also provided Dudek with a list of Native American tribal group representatives who may have information about cultural resources in the area. Dudek understands that UCSC, as the lead agency, is responsible for consultation with local tribal partners. On behalf of UCSC, Dudek contacted all representatives provided by the NAHC including the Costanoan Ohlone Rumsen-Mutsun Tribe. Patrick Orozco of the Costanoan Ohlone Rumsen-Mutsun Tribe responded with a knowledge of archaeological sites in the area and a recommendation for Native American monitoring. No response from additional Native American Representatives has been received to date. A complete record of Native American Consultation can be found in Confidential Attachment 3.

9 Survey

Dudek archaeologist Kolin Taylor, BA, completed an intensive pedestrian survey (15-meter transects) of the entire project area on February 18, 2019 (Figure 4). Survey was conducted using standard archaeological procedures and techniques. Visibility was good within the survey area adjacent to the existing bike path. Visibility was generally poor in staging areas covered with grass or asphalt; the staging area near parking lot #168 was flooded. All previously recorded cultural resources within the Project Area were revisited and photographed. See Attachment 4 for select photographs of the survey Area. Digital photographs are on file at Dudek's Santa Cruz office. No additional sites were identified in the survey effort.

10 Findings

The recorded boundaries of six previously recorded cultural resources cross portions of the Project Area. One NRHP-listed resource, the Cowell Lime Works Historic District (P-44-000200) is located in the southern portion of the Project (Maley and Watson 2007). A larger recorded district, the Cowell Home Ranch District was nominated in 2006, but was found ineligible for the NRHP by the State Historic Preservation Officer in 2007 (Eselius 2006). The southern half of the Project alignment lies within historic site, P-44-000184 (CA-SCR-182H). This area of the site includes a historic railway alignment related to the lime production from the mid-19th century to the turn of the 20th century. Three other historic sites overlap small portions of the Project Area. The sites include: P-44-000958, an archaeological historic deposit related to the Blacksmith shop; P-44-001027, the location of two historic barns; and P-44-000276, an agricultural field which may have been used in the Mission-era. Each resource is discussed in greater detail below.

P-44-000184 (CA-SCR-182H)

This resource was originally recorded as a narrow railway bed with 4" x 4" railroad ties and associated steel rail sections (Pryor 1978). The site record was updated in 2005 to include the Upper Quarry, Lower Quarry, Jordan Gulch Main Stem Pocket Quarry, and associated access road segments, tailings, a railroad bridge foundation, a possible channel diversion berm and a fence line (Reese and Elliott 2005). The railway alignment, known as the Jordan Gulch Main Stem which dates to 1860, connects the Jordan and Davis lime kilns (CA-SCR-198H) to the Lower Quarry, and the Upper Quarries (Reese and Elliott 2005).

S. Dexter and F. Ratcliff completed a second site record update in 2008 for Sections 4, 5 and 6 in the northern portion of the site. No new features were recorded, but one segment of the railway alignment (Section 6) was deemed a "natural drainage with no evidence of a rail alignment." Dexter and Ratcliff provided additional photo

documentation for some of the railway features. Reese and Elliot (2005) recommended the site as eligible for the NRHP/California Register (CRHR).

Potential Project impacts: The existing bike path follows the Jordan Gulch Main Stem railroad and historic road alignment from its intersection with Lower Quarry Road to the southern terminus. Although very little of the former rail alignment is evident, additional subsurface features may be present. The site is has been recommended eligible for the NRHP; however, it is unlikely that the portion of the site with the existing bike path is a contributing feature to the site's eligibility due to the disturbance already created by the bike path.

Recommended Mitigation Measures: The implementation of LRDP EIR Mitigations CULT-1B, CULT-1D, CULT-1E, CULT-1F, CULT-1G, and CULT-2B, which are applicable and incorporated into the proposed project, would avoid potentially significant impacts to this resource. These measures require avoiding or reducing ground disturbance within resource site boundaries, training of construction crews on how to recognize buried archaeological or historic sites, and measures to be taken if a subsurface cultural resource is identified, and implementation of data recovery plans where required. Additionally, the project-specific Great Meadow Bike Path Mitigation CULT-1 is recommended.

> *Great Meadow Bike Path Mitigation CULT-1* requires archaeological monitoring for all earth-disturbing construction activities within the archaeologically sensitive area extending from the convergence of the uphill/downhill segments of the bike path to a single two-way track at the northern intersection of Ranch View Road to the southern terminus of the bike path just north of Glenn Coolidge Drive. Monitoring would include activity within staging areas as well as the bike path construction.

With the above mitigations, the impact to the historic road and railway would be less than significant.

P-44-000200 (Cowell Lime Works Historic District)

This historic district, listed on the NRHP in 2007, is significant at the local level under Criterion A for its contribution to the industry of lime production in Santa Cruz County between 1853 and 1920 (Maley and Watson 2007). This district contains a collection of buildings and features related to limestone quarrying, and the processing of lime mortar, which played an important role within the building industry at a time of rapid growth in California after the gold rush. The Cowell Lime Works Historic District lists 15 contributing resources: the Granary, the Paymaster's House, the Horse Barn, the Cookhouse and associated Pig Feeder, two Workers' Cabins, Joined Pot Kilns, a Continuous Kiln, the Cooperage, the Tramway Trestle, the Hay Barn, the Blacksmith Shop, the Powder House, the Entry Gate and Landscaping at the Ranch House, and the Ranch House.

Potential Project impacts: The southernmost 500 feet of the existing bike path passes through the Cowell Lime Works Historic District. Furthermore, the current eastern edge of the bike path asphalt is just over five feet from the Powder House, a contributing feature of the Cowell Lime Works Historic District. The Powder House is a small stone building measuring 13.5 feet by 15.3 feet with a corrugated metal roof. The building was originally constructed with lime mortar, but has been repaired in some areas with Portland cement. The building has the potential to be damaged from vibrations made by heavy equipment.

Recommended Mitigation Measures: The implementation of LRDP EIR Mitigations CULT-1B, CULT-1D, CULT-1E, CULT-1F, CULT-1G, and CULT-2B (described above), which are applicable and incorporated into the proposed project, would reduce but not avoid the potential for significant impacts to this resource. Additionally, the project-specific measures Great Meadow Bike Path Mitigation CULT-1 and CULT-2 are recommended.

Great Meadow Bike Path Mitigation CULT-1 requires archaeological monitoring for all earth-disturbing construction activities within the archaeologically sensitive area extending from the convergence of the uphill/downhill segments of the bike path to a single two-way track at the northern intersection of Ranch Hill Road to the southern terminus of the bike path just north of Glenn Coolidge Drive. Monitoring would include activity within staging areas as well as the bike path construction.

Great Meadow Bike Path Mitigation CULT-2: Within the Cowell Lime Works Historic District (P-44-000200), protective fencing should be placed around any historic buildings or structures within the project area at a distance of no more than 2 feet from the existing structure. Specifically, fencing should be placed around the Powder House, a contributing feature of the District located approximately 5 feet from the eastern edge of the existing bike path in the southern portion of the project. Fencing should be placed prior to any construction activity and staging should be avoided in this area. Limit construction that creates vibration impacts around historic buildings including the Powder House. This may include using only rubber-tired vehicles within the vicinity of the Powder House. Minimize grading and other ground disturbance within the District in order to retain its integrity as a historic resource.

Implementation of the mitigation measures above would ensure that project construction would not damage the Powder House and the impacts would be reduced to less than significant.

P-44-000276 (CA-SCR-277H)

This resource is an agricultural field measuring 875 feet by 2125 feet possibly associated with Mission Santa Cruz (Edwards and Simpson-Smith 1986). The feature is described as "distinctive plow marks on a 1931 aerial photograph" and is likely not eligible for listing on the NRHP (Reese 2005).

Potential Project impacts: A small portion of this resource crosses into the Project Area.

Recommended Mitigation Measures: The implementation of LRDP EIR Mitigations CULT-1B, CULT-1D, CULT-1E, CULT-1F, CULT-1G, and CULT-2B, and Great Meadow Bike Path Mitigation CULT-1, which are applicable and incorporated into the proposed project, would avoid potentially significant impacts to this resource. These measures require avoiding or reducing ground disturbance within resource site boundaries, training of construction crews on how to recognize buried archaeological or historic sites, monitoring during construction, where appropriate, and measures to be taken if a subsurface cultural resource is identified, and implementation of data recovery plans where required. Therefore, the impact to the agricultural field would be less than significant.

P-44-000855 (Cowell Home Ranch District)

The Cowell Home Ranch District is a 12,000 acre area of land that was recommended as eligible for the NRHP in 2006 (Eselius 2006). The State Historic Preservation Officer, however, denied acceptance of the nomination due overlap with the Cowell Lime Works Historic District, and for inadequate description of the individual significance of each of its six non-contiguous areas. The proposed district includes portions of land now occupied by the University of California, Wilder Ranch State Park, Pogonip City Park and Henry Cowell Redwoods State Park. The district was nominated for its role in lime production from 1770 to 1947, with the period of greatest significance in the 1880s. At that time, lime production facilities associated with the ranch accounted for most of the lime used for construction in San Francisco and comprised about half of the lime production for the state of California (NRHP

Registration Form 2006). The proposed district included lime kilns, quarries, and railroads associated with lime production and domestic life during that era.

Potential Project impacts: Due to the vastness of this proposed district and the redundancy of its historic elements with the Cowell Lime Works Historic District and resources P-44-000184, P-44-000958 and P-44-001027, the NRHP-ineligible Cowell Home Ranch District will not be considered affected by the Project.

P-44-000958

This resource is an historic archaeological deposit measuring 67 feet (N-S) by 56 feet (E-W) and at least 5.5 feet deep, but under at least two feet of fill of native soils. This deposit is located directly north of the Blacksmith Shop, a contributing feature of the NRHP-listed Cowell Lime Works Historical District, and contains artifacts related to work conducted at the Blacksmith Shop such as metal files, hardware, horse and mule shoes, machinery parts and some domestic artifacts.

Potential Project impacts: A portion of this deposit lies within the Project Area and is shown as a Staging Area on Figure 3.

Recommended Mitigation Measures: The implementation of LRDP EIR Mitigations CULT-1B, CULT-1D, CULT-1E, CULT-1F, CULT-1G, and CULT-2B, and Great Meadow Bike Path Mitigation CULT-1, which are applicable and incorporated into the proposed project, would avoid potentially significant impacts to this resource. These measures require avoiding or reducing ground disturbance within resource site boundaries, training of construction crews on how to recognize buried archaeological or historic sites, monitoring during construction, where appropriate, and measures to be taken if a subsurface cultural resource is identified, and implementation of data recovery plans where required. Therefore, the impact to the archaeological deposit would be less than significant.

P-44-001027

This is a 1976 OHP recording of “two barns” of vernacular redwood board and batten style made with long gabled roofs. These are likely the Hay Barn and Blacksmith Shop buildings built c.1860, both contributing elements to the NRHP-listed Cowell Lime Works Historic District (P-44-000200) (Maley and Watson 2007).

Potential Project impacts: A portion of the recorded location (noted as “approximate location”) of this resource lies within the Project Area and has the potential to be affected if grading or ground-disturbance occurs within the site boundary. See the Cowell Line Works Historic District (P-44-000200) for recommended mitigation measures.

11 Summary and Recommendations

The University of California, Santa Cruz (UCSC) has put forth an Initial Study for the Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2 (Project), which entails reconstructing and widening the existing Great Meadow Bike Path, located in the south-central portion of the campus, to meet current California Department of Transportation (Caltrans) standards to the extent feasible within the current alignment.

The UCSC Long Range Development Plan (LRDP) outlines a series of mitigation measures to prevent impacts to known and previously unknown cultural resources (UCSC 2006: Vol. I, Sect. 4.5). The mitigation measures involve identifying and documenting cultural resources, assessing eligibility for the CRHR, and implanting measures to

reduce potential impacts to levels that are less than significant (for CRHR-eligible resources). The following, LRDP mitigations are applicable to the Project:

- LRDP EIR Mitigation CULT-1A (Archaeological records review of project site)
- LRDP EIR Mitigation CULT-1B (Training for construction crews on how to recognize archaeological sites and artifacts)
- LRDP EIR Mitigation CULT-1C (Archaeological survey during project planning and design)
- LRDP EIR Mitigation CULT-1D (Measures to be taken if cultural resource is identified)
- LRDP EIR Mitigation CULT-1E (Avoiding or reducing ground disturbance within site boundaries)
- LRDP EIR Mitigation CULT-1F (Monitoring and data recovery plan)
- LRDP EIR Mitigation CULT-1G (Measures to be taken if an archaeological resource is discovered during construction)
- LRDP EIR Mitigation CULT-2A (Projects within the Historic District are subject to additional mitigation AES-4)
- LRDP EIR Mitigation CULT-2B (Requirement to determine the potential for a project to result in impacts to historical resources)
- LRDP EIR Mitigation CULT-2D (Avoidance of direct and indirect impacts to historic buildings or structures)
- LRDP EIR Mitigation CULT-4A (Implement LRDP EIR Mitigations CULT-1A through CULT-1G to minimize potential to disturb human remains)
- LRDP EIR Mitigation CULT-4B (Native American monitoring for any excavation within a known Native American archaeological site)
- LRDP EIR Mitigation CULT-4C (Measures to be taken in the event of a discovery on campus of human bone, suspected human bone, or a burial)
- LRDP EIR Mitigation CULT-4D (Measures to be taken if human remains cannot be left in place)

In addition, Dudek recommends the following project-specific mitigation measures to be implemented for the Project:

> *Great Meadow Bike Path Mitigation CULT-1* requires archaeological monitoring for all earth-disturbing construction activities within the archaeologically sensitive area extending from the convergence of the uphill/downhill segments of the bike path to a single two-way track at the northern intersection of Ranch Hill Road to the southern terminus of the bike path just north of Glenn Coolidge Drive. Monitoring would include activity within staging areas as well as the bike path construction.

Great Meadow Bike Path Mitigation CULT-2: Within the Cowell Lime Works Historic District (P-44-000200), protective fencing should be placed around any historic buildings or structures within the project area at a distance of no more than 2 feet from the existing structure. Specifically, fencing should be placed around the Powder House, a contributing feature of the District located approximately 5 feet from the eastern edge of the existing bike path in the southern portion of the project. Fencing should be placed prior to any construction activity and staging should be avoided in this area. Limit construction that creates vibration impacts around historic buildings including the Powder House. This may include using only rubber-tired vehicles within the vicinity of the Powder House. Minimize grading and other ground disturbance within the District in order to retain its integrity as a historic resource.

Dudek performed a cultural resource assessment for the Project, which included a records search, a field survey, outreach with local Native Americans, a determination of Project impacts to historical resources under CEQA, and management recommendations for the Project. These actions satisfy LRDP Mitigations Cult-1A (Archaeological records review of project site), Cult-1C (Archaeological survey during project planning and design), Cult-2B (Requirement to determine the potential for a project to result in impacts to historical resources), and a preliminary assessment of Cult-1D (Measures to be taken if cultural resource is identified) (UCSC 2006).

The Project Area extends into the boundaries of six previously-recorded historic-age cultural resources relating to the lime industry which played an important role in the growth of both Santa Cruz County and the State of California from the mid-19th century to the turn of the 20th century. Table 4 details mitigation recommendations for each of the six resources. Additionally, Mitigation Cult-1G (measures for unanticipated discoveries) should be followed, if necessary, as well as Mitigations Cult 4-A through Cult 4-D (measures handling Native American sites and those containing human remains) if the unanticipated discoveries are Native American in origin.

Table 4 Management Recommendations

Resource Names	Type	Attributes	NRHP/CRHR Eligible	Recommendations
P-44-000184; CA-SCR-182H	Site	Quarries and Tailings, Fence, Railroad grade and quarry access roads	Potentially eligible	LRDP Cult-1B (Construction crew training) LRDP Cult-1E (Avoid or reduce ground disturbance and staging within site boundaries) GMBP Cult-1 (Archaeological monitoring for ground-disturbing activities)
P-44-000200; CA-SCR-198H; Cowell Lime Works Historic District	District	Historic district with kilns, quarries, tailings, fences, railroad grades, roads, buildings, structures. The Powder House, a contributing element to the district, is within the Project Area	Listed in NRHP/CRHR	LRDP Cult-1B (Construction crew training) LRDP Cult-1E (Avoid or reduce ground disturbance and staging within site boundaries) LRDP Cult-2A (refer to LRDP mitigation AES-4 for projects within the Cowell Lime Works Historic District) LRDP Cult-2D (Avoid direct or indirect impacts to historic buildings/ structures. This may include.) GMBP Cult-1 (Archaeological monitoring for ground-disturbing activities) GMBP Cult-2 (Install protective fencing around the Powder House and avoid construction activities that may cause vibratory impacts to the Powder House)

P-44-000276; CA-SCR-277H	Site	Possible Mission-era agricultural fields	Likely not eligible	LRDP Cult-1B (Construction crew training) LRDP Cult-1E (Avoid or reduce ground disturbance and staging within site boundaries) GMBP Cult-1 (Archaeological monitoring for ground-disturbing activities)
P-44-000855; Cowell Home Ranch District	District	Historic district with kilns, quarries, tailings, fences, railroad grades, roads, buildings, structures	Nominated, but found ineligible to the NRHP/CRHR	Not managed as a resource. No mitigation recommendations
P-44-000958; Blacksmith Shop Feature 1	Site	Historic refuse scatter	Potentially eligible	LRDP Cult-1B (Construction crew training) LRDP Cult-1E (Avoid or reduce ground disturbance and staging within site boundaries) GMBP Cult-1 (Archaeological monitoring for ground-disturbing activities)
P-44-001027; Two Barns	Element of a District	Historic barn buildings	Contributing element to NRHP-listed District	See P-44-000200 Cowell Lime Works Historic District

Should you have any questions relating to this report and its findings please do not hesitate to contact me directly.

Respectfully Submitted,



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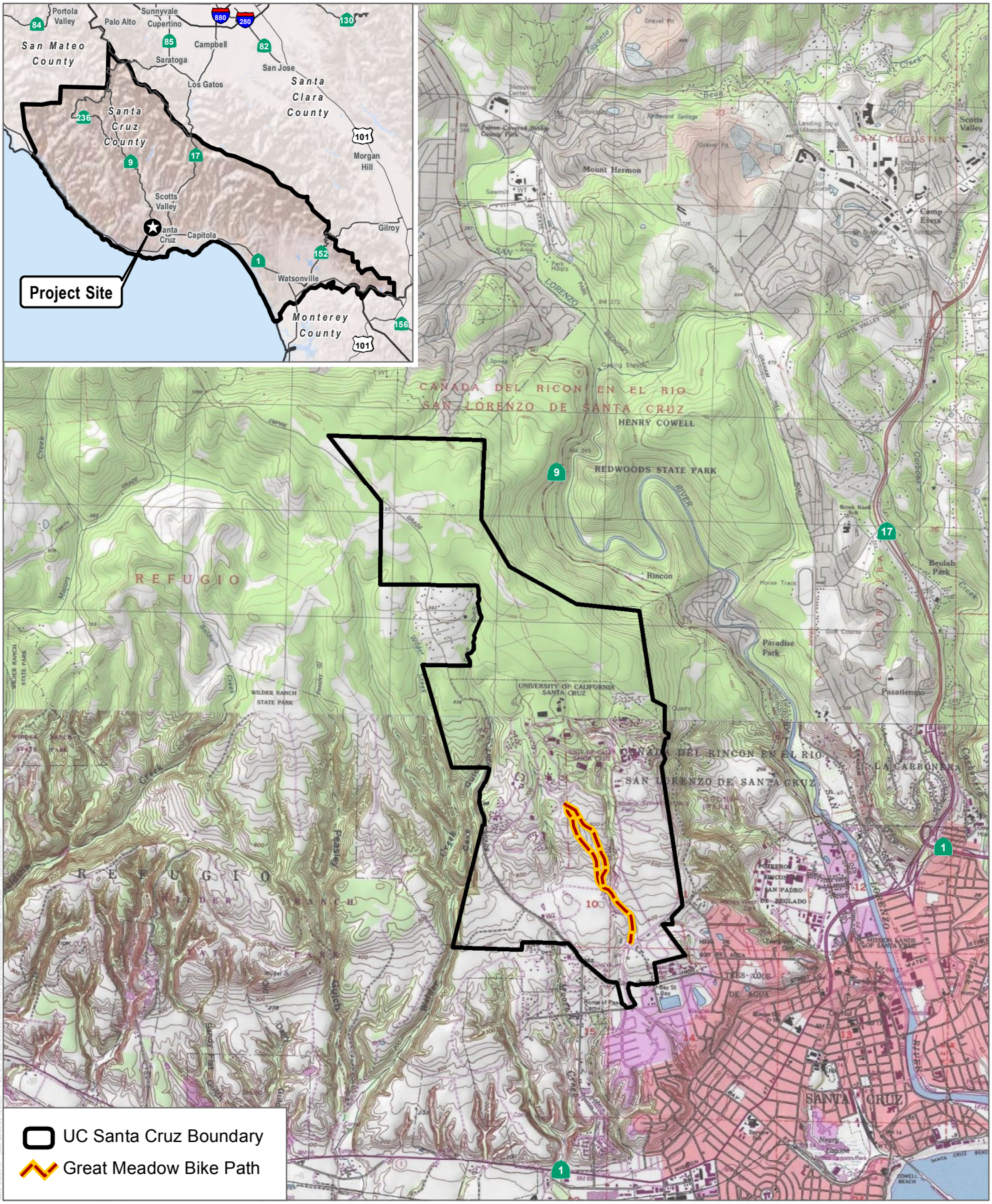
Figures

1. Project Location Map

2. Project Vicinity

3. Project Site

4. Cultural Survey Area



SOURCE: USGS 7.5 minute series Santa Cruz and Felton quadrangles

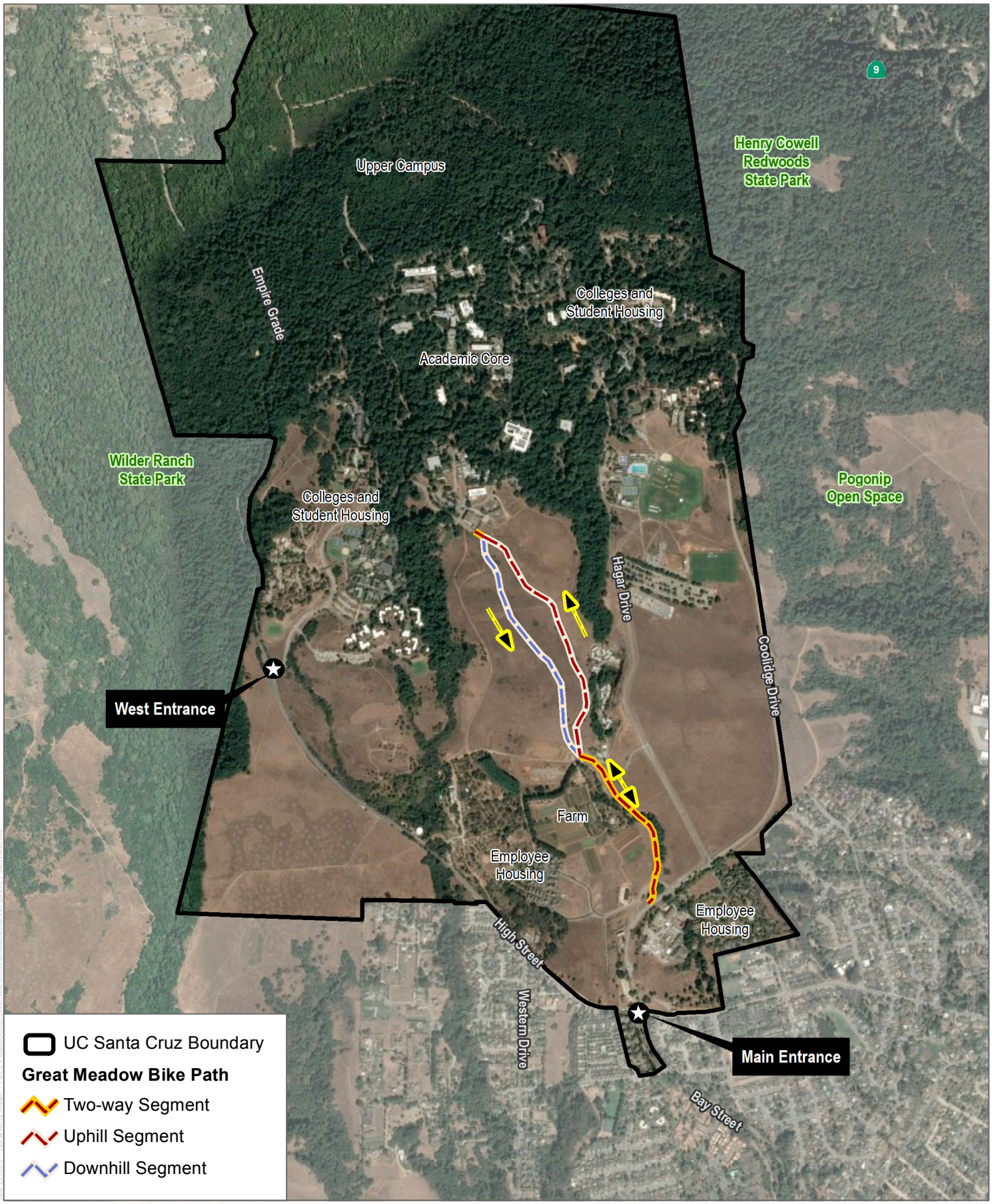
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FIGURE 1

Project Location

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2



SOURCE: Bing 2019

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FIGURE 2

Project Vicinity

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2



SOURCE: Bing 2019

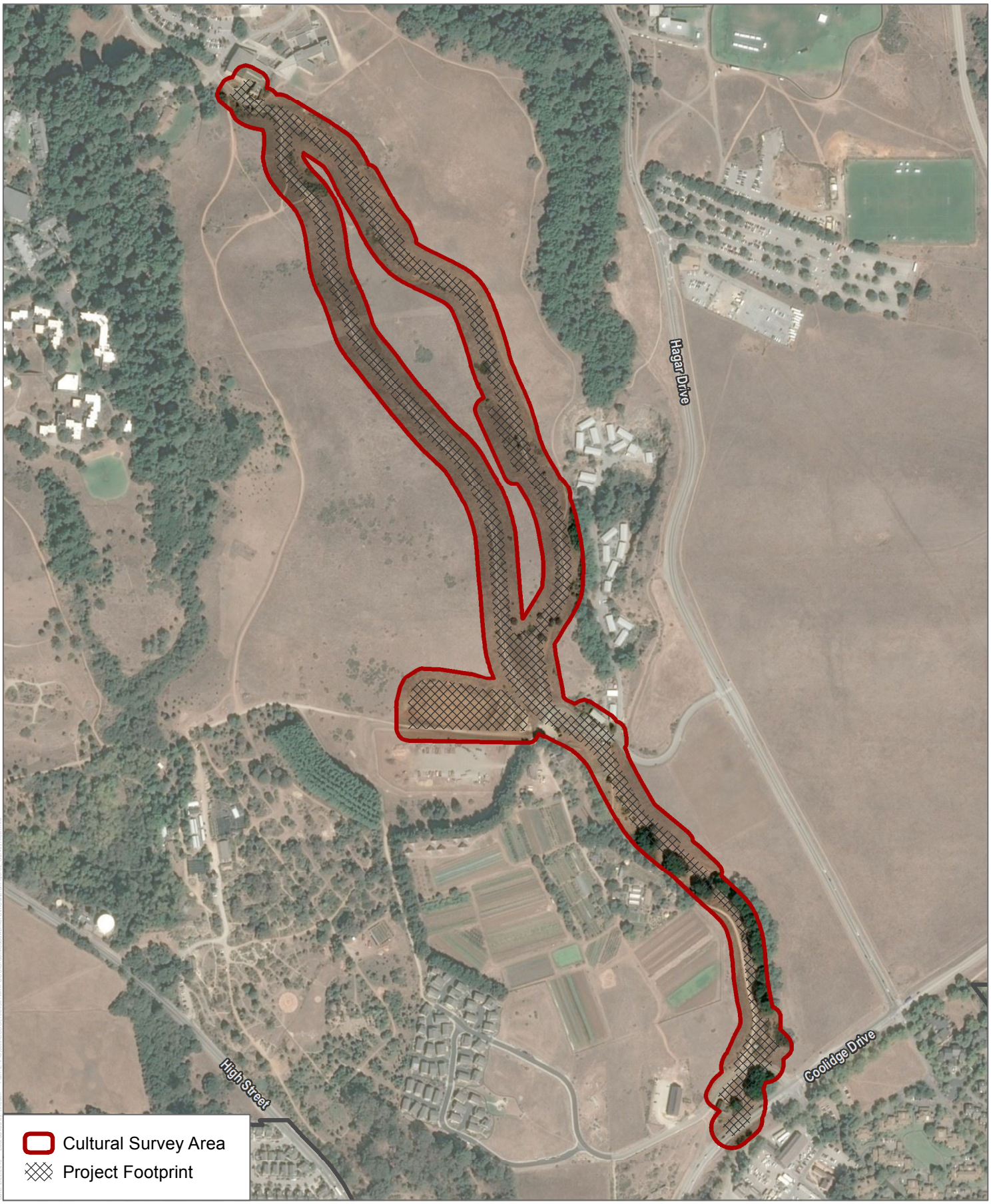
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FIGURE 3

Project Site

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2



SOURCE: Bing 2019

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FIGURE 4

Cultural Survey Area

Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2

Attachment 1

National Archaeological Database Information

NATIONAL ARCHAEOLOGICAL DATABASE (NADB) INFORMATION

Authors:	Sarah Brewer, BA, and Ryan Brady, MA, RPA
Firm:	Dudek
Project Proponent:	University of California Santa Cruz
Report Date:	February 2018
Report Title:	Cultural Resources Assessment for the UCSC Great Meadow Bike Path
Type of Study:	Archaeological Inventory
Resources:	CA-SCR-182H, CA-SCR-198H, CA-SCR-277H, P-44-000855, P-44-000958, P-44-001027
USGS Quads:	Santa Cruz and Felton 1:24,000 T11S, R2W, Sections 10 and 11
Acreage:	36.6 acres
Permit Numbers:	Permit Pending
Keywords:	Positive, pedestrian survey, CA-SCR-182H, CA-SCR-198H, CA-SCR-277H, P-44-000855, P-44-000958, P-44-001027, UC Santa Cruz, Cowell Lime Works Historic District.

Attachment 2

NWIC Records Search Results
Confidential

Attachment 3

NAHC and Native American Correspondence

Confidential Information Redacted

Sacred Lands File & Native American Contacts List Request

Native American Heritage Commission
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
916-373-3710
916-373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: 10849.0002 UCSC Great Meadow Bike Path

County: Santa Cruz

USGS Quadrangle Name: Santa Cruz

Township: 11S Range: 2W Section(s): 10 & 11

Company/Firm/Agency: Dudek

Street Address: 725 Front Street, Suite 400

City: Santa Cruz **Zip: 95060**

Phone: 831-345-8715

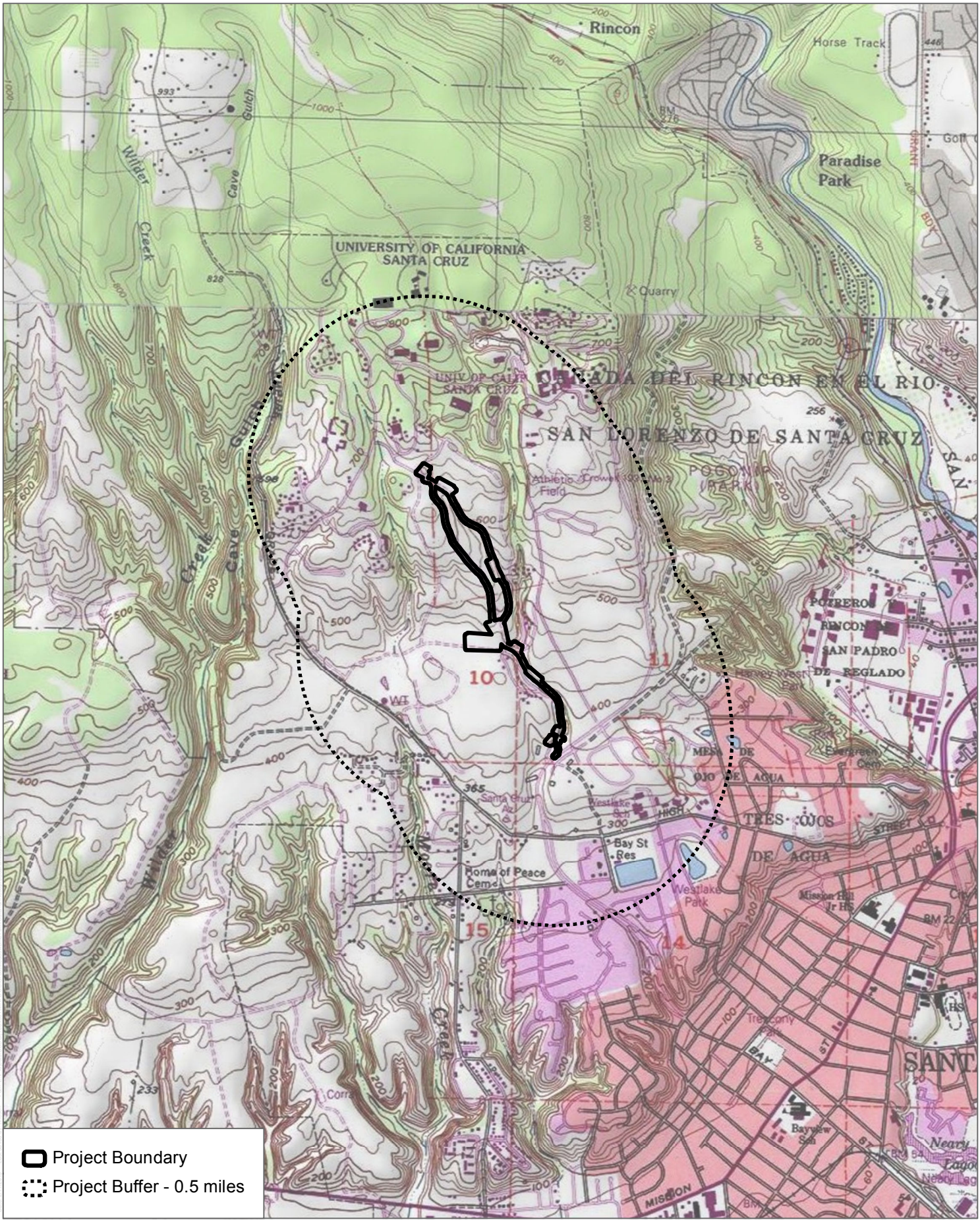
Fax: 831-600-1401

Email: rbrady@dudek.com

Project Description:

The University of California, Santa Cruz proposes to reconstruct The Great Meadow Bike Path, including widing, repaving and some slope adjustments. There are also six potential construction staging areas identified for the Project at varying locations along the bike path, also included on the attached map.

Dudek is requesting a NAHC search of the Sacred Lands Files or other Native American cultural resources that may fall within the proposed project location or surrounding half-mile buffer. Please provide a Contact List with Native American tribal representatives who may have traditional interests in the project location or surrounding area.



SOURCE: USGS 7.5 minute series Santa Cruz quadrangle
Township 11S / Range 2W / Sections 10 & 11

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FIGURE 1

Record Search

Great Meadow Bike Path - Phase 2

Native American Heritage Commission
Native American Contact List
Santa Cruz County
2/13/2019

Amah MutsunTribal Band
Valentin Lopez, Chairperson
P.O. Box 5272
Galt, CA, 95632
Phone: (916) 743 - 5833
vlopez@amahmutsun.org

Costanoan
Northern Valley
Yokut

Amah MutsunTribal Band of Mission San Juan Bautista
Irenne Zwierlein, Chairperson
789 Canada Road
Woodside, CA, 94062
Phone: (650) 851 - 7489
Fax: (650) 332-1526
amahmutsuntribal@gmail.com

Costanoan

Costanoan Ohlone Rumsen-Mutsun Tribe
Patrick Orozco, Chairman
644 Peartree Drive
Watsonville, CA, 95076
Phone: (831) 728 - 8471
yanapvoic97@gmail.com

Costanoan

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28
Hollister, CA, 95024
Phone: (831) 637 - 4238
ams@indiancanyon.org

Costanoan

Muwekma Ohlone Indian Tribe of the SF Bay Area
Charlene Nijmeh, Chairperson
20885 Redwood Road, Suite 232
Castro Valley, CA, 94546
Phone: (408) 464 - 2892
cnijmeh@muwekma.org

Costanoan

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed UCSC Great Meadow Bike Path Project, Santa Cruz County.

725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

February 15, 2019 PN 10849.0002

Ms. Rosemary Cambra Chairperson
Muwekma Ohlone Indian Tribe of the San Francisco Bay Area
P.O. 360791
Milpitas, CA 95036

Subject: UCSC Great Meadow Bike Path Project, Santa Cruz County, California - Native American Outreach

Dear Ms. Cambra:

We have been retained by the University of California, Santa Cruz, to complete a cultural resources investigation regarding an Initial Study for the Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2 ("Project"). The Project will be compliant with the California Environmental Quality Act (CEQA), and relevant local municipal guidelines and regulations.

The Project site is located along existing bike path alignments that cross the Great Meadow in the south-central portion of the campus. The Great Meadow Bike Path is a Class I bike path (i.e., fully separated from vehicle and heavy transit traffic) extending from Coolidge Drive to Meyer Drive. The bike path was built in 1974 and serves as a primary bicycle access route from the main campus entrance to central developed campus facilities as well as undeveloped recreational areas of the upper campus. The path is approximately 1 mile long and travels at moderate to steep gradients through rolling hills and open grassy terrain for much of its length, with a grade of up to 7 percent.

The Project consists of reconstructing and widening the existing Great Meadow Bike Path to meet current California Department of Transportation (Caltrans) standards to the extent feasible within the current alignment.[1] This would include reconstruction and repaving of the path, widening and paving of shoulders, correcting existing erosion problems adjacent to the path, and designating specific portions of the path for shared pedestrian and bicycle use.

We have submitted and reviewed the results of search of the Sacred Lands Inventory on file with the Native American Heritage Commission (NAHC). The NAHC Sacred Lands Inventory search indicated possible sites located within the area of potential effect. The NAHC provided us your contact as someone who may have information regarding known or previously unrecorded cultural resources or sacred sites in the project vicinity.

[1] Improvements would focus on meeting Caltrans standards for width and striping, but meeting Caltrans standards for other variables (e.g., grade, speed, stopping sight distance, etc.) would require extensive realignment of the path, which is not proposed.

We are reaching out to local Native American representatives and tribes to facilitate consultation on behalf of UCSC with a request for any information relating to Native American resources in the vicinity of the proposed project. Any information you provide will remain confidential and be used for planning purposes for this project only. If you are not comfortable describing the specific resource, we can document it as an "environmentally sensitive area."

You may respond by mail, e-mail, telephone, or in person. You may also visit our office to review our research files. We expect your response within 14 days of receiving this letter. If you have any questions or comments, you can reach me by telephone at (831) 226-19472, or by e-mail at sbrewer@dudek.com. Thank you for your assistance with this project.

Sincerely,

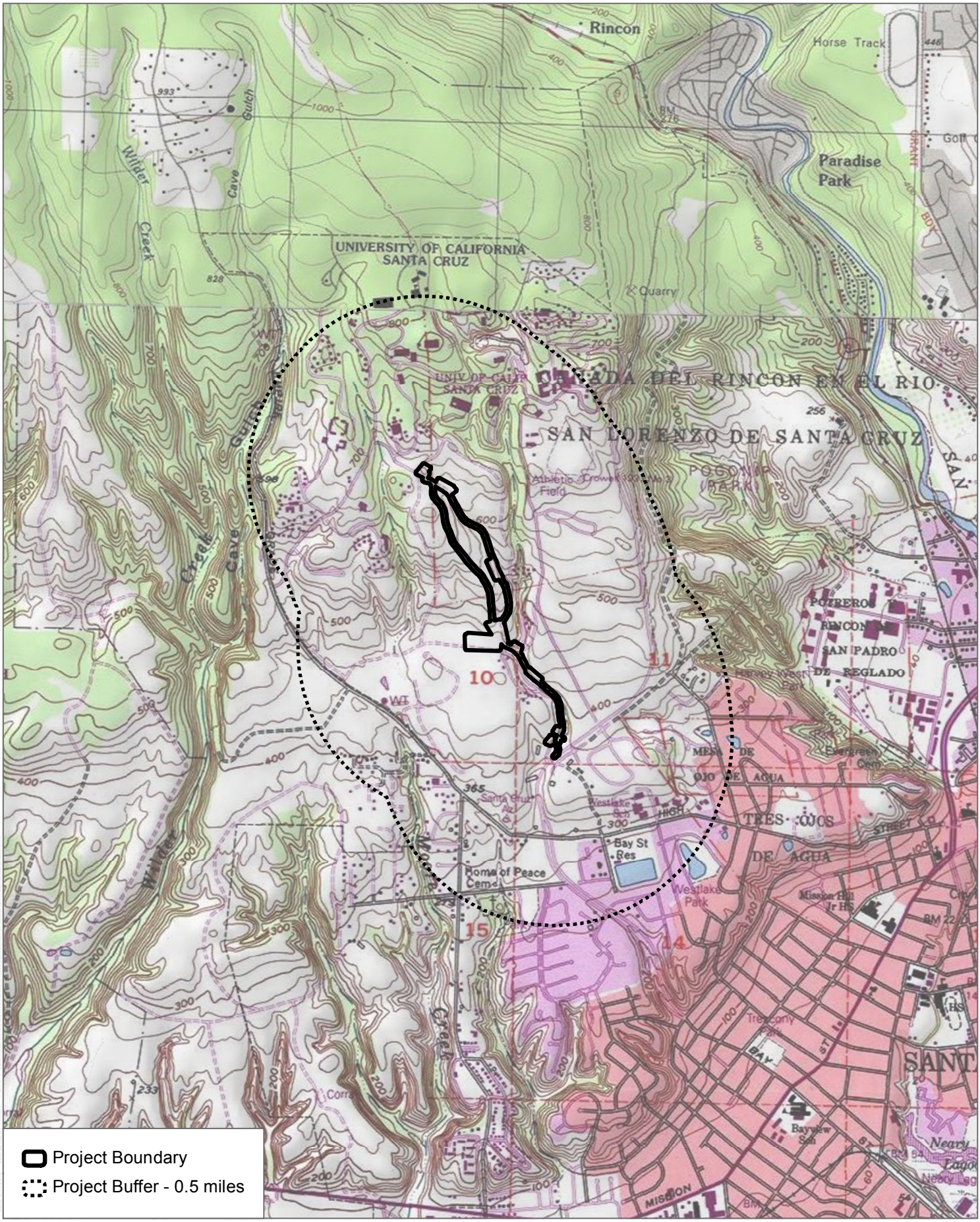


Sarah Brewer, BA
Cultural Resources
DUDEK
725 Front Street, Suite 400
Santa Cruz, California 95060
T: 831.226.9472
sbrewer@dudek.com

Attachment: Figure 1 Project Location Map

Attachment 1

Project Location Map



SOURCE: USGS 7.5 minute series Santa Cruz quadrangle
Township 11S / Range 2W / Sections 10 & 11

DUDEK

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FIGURE 1

Record Search

Great Meadow Bike Path - Phase 2

725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

February 15, 2019 PN 10849.0002

Ms. Ramona Garibay Representative
Trina Marine Ruano Family, Ohlone-Costanoan, Bay Miwok, Plains Miwok, Patwin
30940 Watkins Street
Union City, CA 94587

Subject: *UCSC Great Meadow Bike Path Project, Santa Cruz County, California - Native American Outreach*

Dear Ms. Garibay:

We have been retained by the University of California, Santa Cruz, to complete a cultural resources investigation regarding an Initial Study for the Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2 ("Project"). The Project will be compliant with the California Environmental Quality Act (CEQA), and relevant local municipal guidelines and regulations.

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The Project consists of reconstructing and widening the existing Great Meadow Bike Path to meet current California Department of Transportation (Caltrans) standards to the extent feasible within the current alignment.[2] This would include reconstruction and repaving of the path, widening and paving of shoulders, correcting existing erosion problems adjacent to the path, and designating specific portions of the path for shared pedestrian and bicycle use.

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You may respond by mail, e-mail, telephone, or in person. You may also visit our office to review our research files. We expect your response within 14 days of receiving this letter. If you have any questions or comments, you can reach me by telephone at (831) 226-19472, or by e-mail at sbrewer@dudek.com. Thank you for your assistance with this project.

Sincerely,

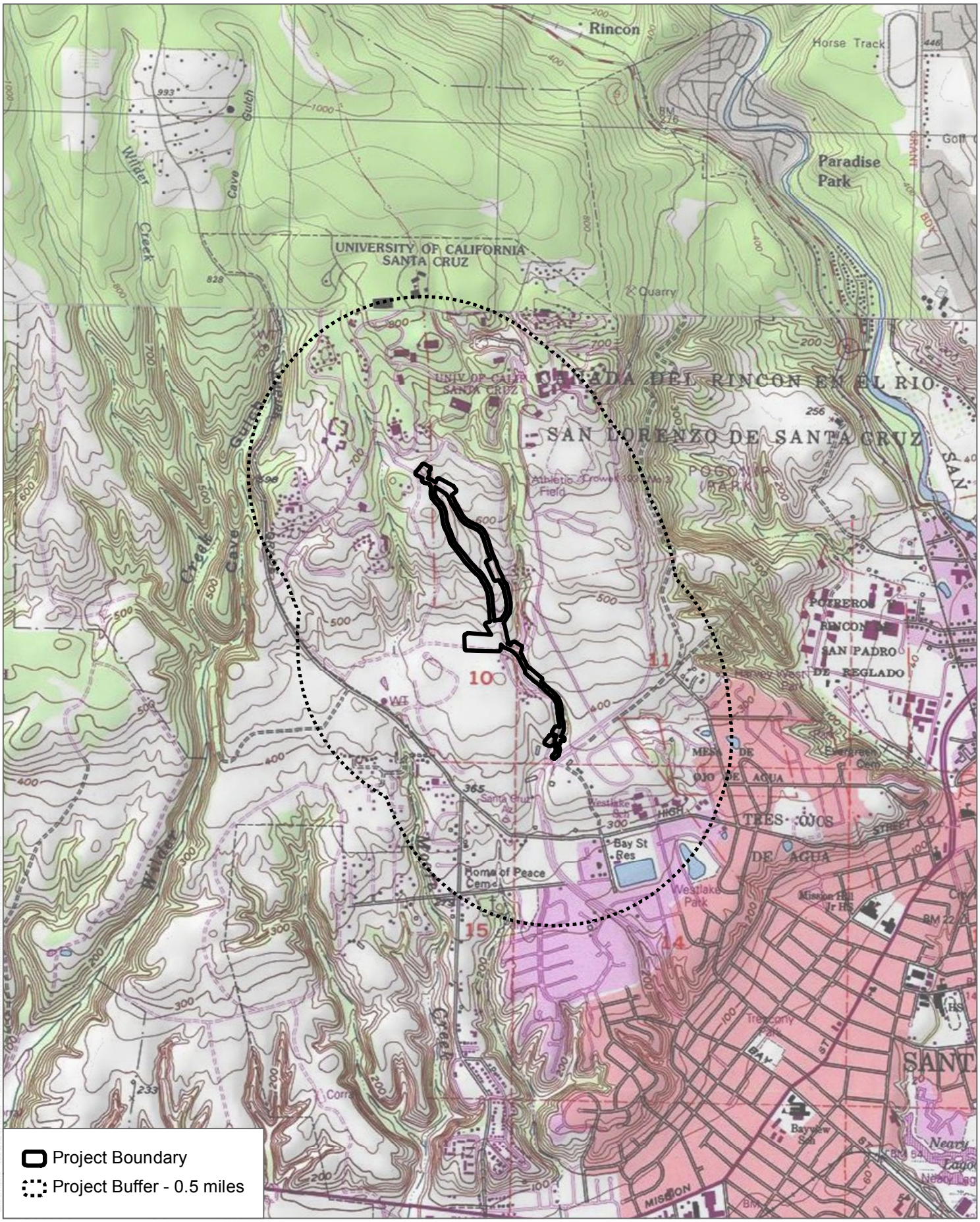


Sarah Brewer, BA
Cultural Resources
DUDEK
725 Front Street, Suite 400
Santa Cruz, California 95060
T: 831.226.9472
sbrewer@dudek.com

Attachment: Figure 1 Project Location Map

Attachment 1

Project Location Map



SOURCE: USGS 7.5 minute series Santa Cruz quadrangle
Township 11S / Range 2W / Sections 10 & 11

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FIGURE 1

Record Search

Great Meadow Bike Path - Phase 2

725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

February 15, 2019 PN 10849.0002

Mr. Edward Ketchum
Amah Mutsun Tribal Band
35867 Yosemite Ave.
Davis, CA 95616

Subject: *UCSC Great Meadow Bike Path Project, Santa Cruz County, California - Native American Outreach*

Dear Mr. Ketchum:

We have been retained by the University of California, Santa Cruz, to complete a cultural resources investigation regarding an Initial Study for the Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2 ("Project"). The Project will be compliant with the California Environmental Quality Act (CEQA), and relevant local municipal guidelines and regulations.

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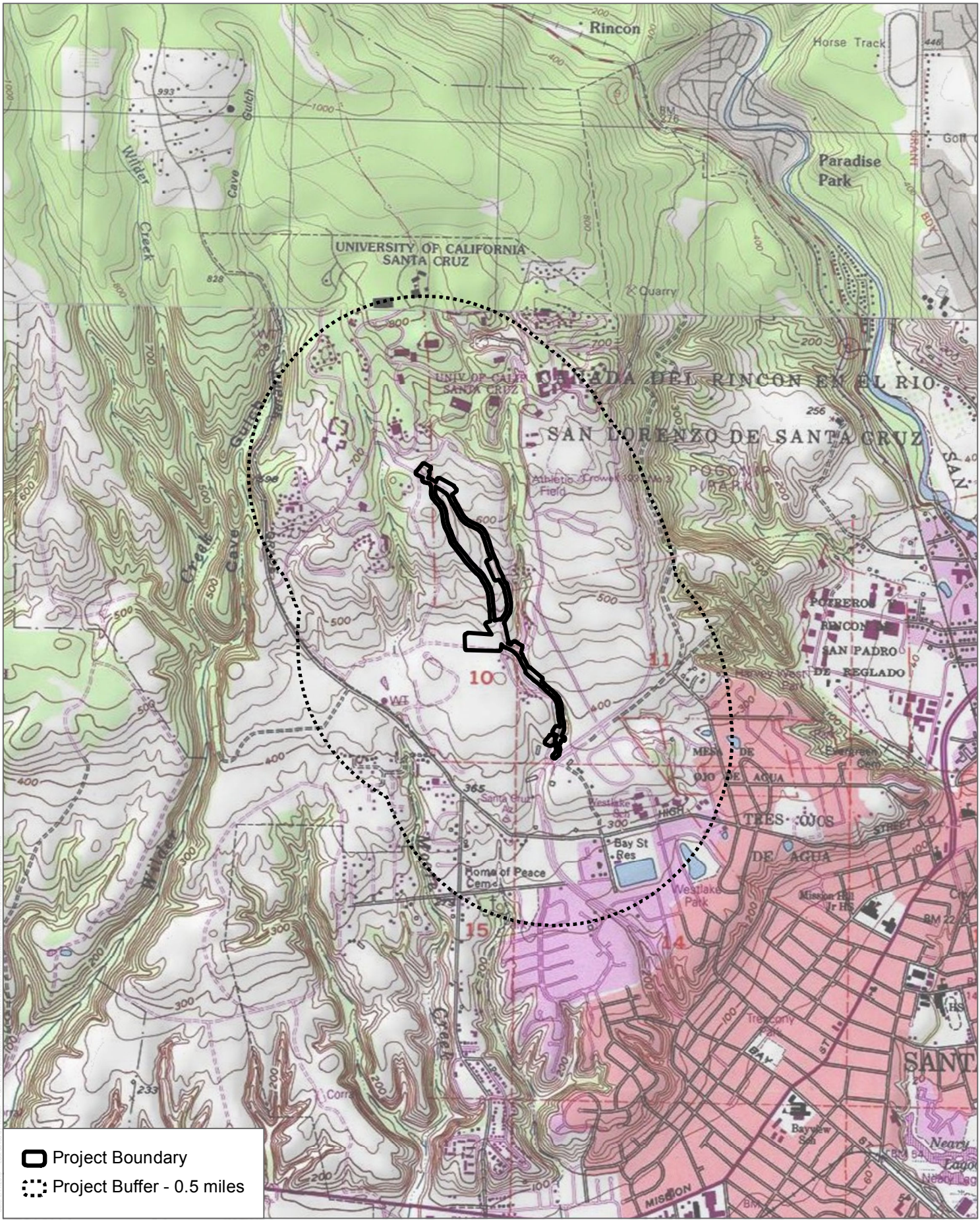


Sarah Brewer, BA
Cultural Resources
DUDEK
725 Front Street, Suite 400
Santa Cruz, California 95060
T: 831.226.9472
sbrewer@dudek.com

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Attachment 1

Project Location Map



SOURCE: USGS 7.5 minute series Santa Cruz quadrangle
Township 11S / Range 2W / Sections 10 & 11

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FIGURE 1

Record Search

Great Meadow Bike Path - Phase 2

725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

February 15, 2019 PN 10849.0002

Mr. Valentin Lopez Chairperson
Amah Mutsun Tribal Band Ohlone/Costanoan
P.O. Box 5272
Galt, CA 95632

Subject: ***UCSC Great Meadow Bike Path Project, Santa Cruz County, California - Native American Outreach***

Dear Mr. Lopez:

We have been retained by the University of California, Santa Cruz, to complete a cultural resources investigation regarding an Initial Study for the Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2 ("Project"). The Project will be compliant with the California Environmental Quality Act (CEQA), and relevant local municipal guidelines and regulations.

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You may respond by mail, e-mail, telephone, or in person. You may also visit our office to review our research files. We expect your response within 14 days of receiving this letter. If you have any questions or comments, you can reach me by telephone at (831) 226-19472, or by e-mail at sbrewer@dudek.com. Thank you for your assistance with this project.

Sincerely,

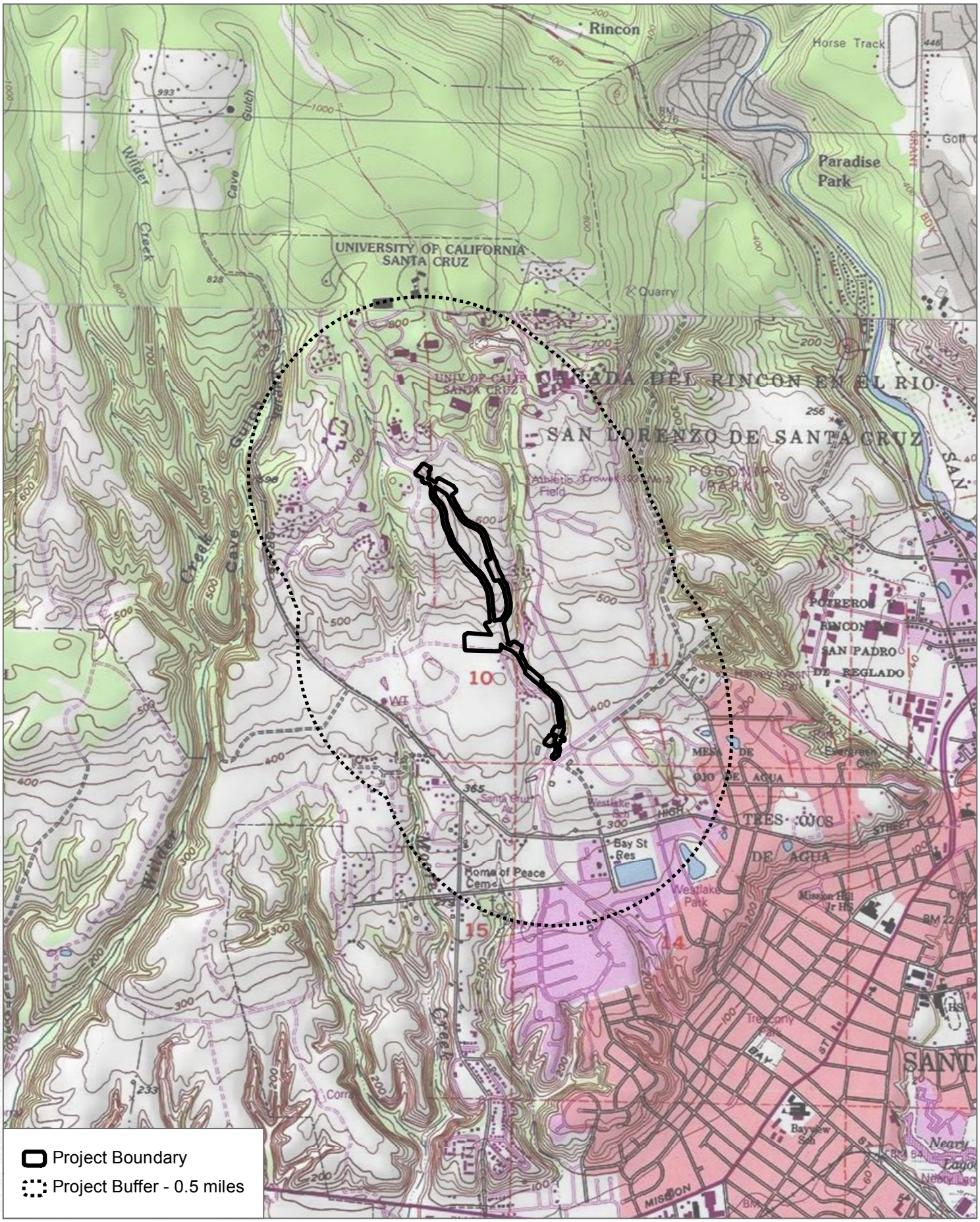


Sarah Brewer, BA
Cultural Resources
DUDEK
725 Front Street, Suite 400
Santa Cruz, California 95060
T: 831.226.9472
sbrewer@dudek.com

Attachment: Figure 1 Project Location Map

Attachment 1

Project Location Map



SOURCE: USGS 7.5 minute series Santa Cruz quadrangle
Township 11S / Range 2W / Sections 10 & 11

DUDEK

0 1,000 2,000 Feet

FIGURE 1

Record Search

Great Meadow Bike Path - Phase 2

725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

February 15, 2019 PN 10849.0002

Mr. Mark Mondragon
Amah Mutson Tribal Band
18114 Stonehaven Dr.
Salinas, CA 93908

Subject: ***UCSC Great Meadow Bike Path Project, Santa Cruz County, California - Native American Outreach***

Dear Mr. Mondragon:

We have been retained by the University of California, Santa Cruz, to complete a cultural resources investigation regarding an Initial Study for the Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2 ("Project"). The Project will be compliant with the California Environmental Quality Act (CEQA), and relevant local municipal guidelines and regulations.

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The Project consists of reconstructing and widening the existing Great Meadow Bike Path to meet current California Department of Transportation (Caltrans) standards to the extent feasible within the current alignment.[5] This would include reconstruction and repaving of the path, widening and paving of shoulders, correcting existing erosion problems adjacent to the path, and designating specific portions of the path for shared pedestrian and bicycle use.

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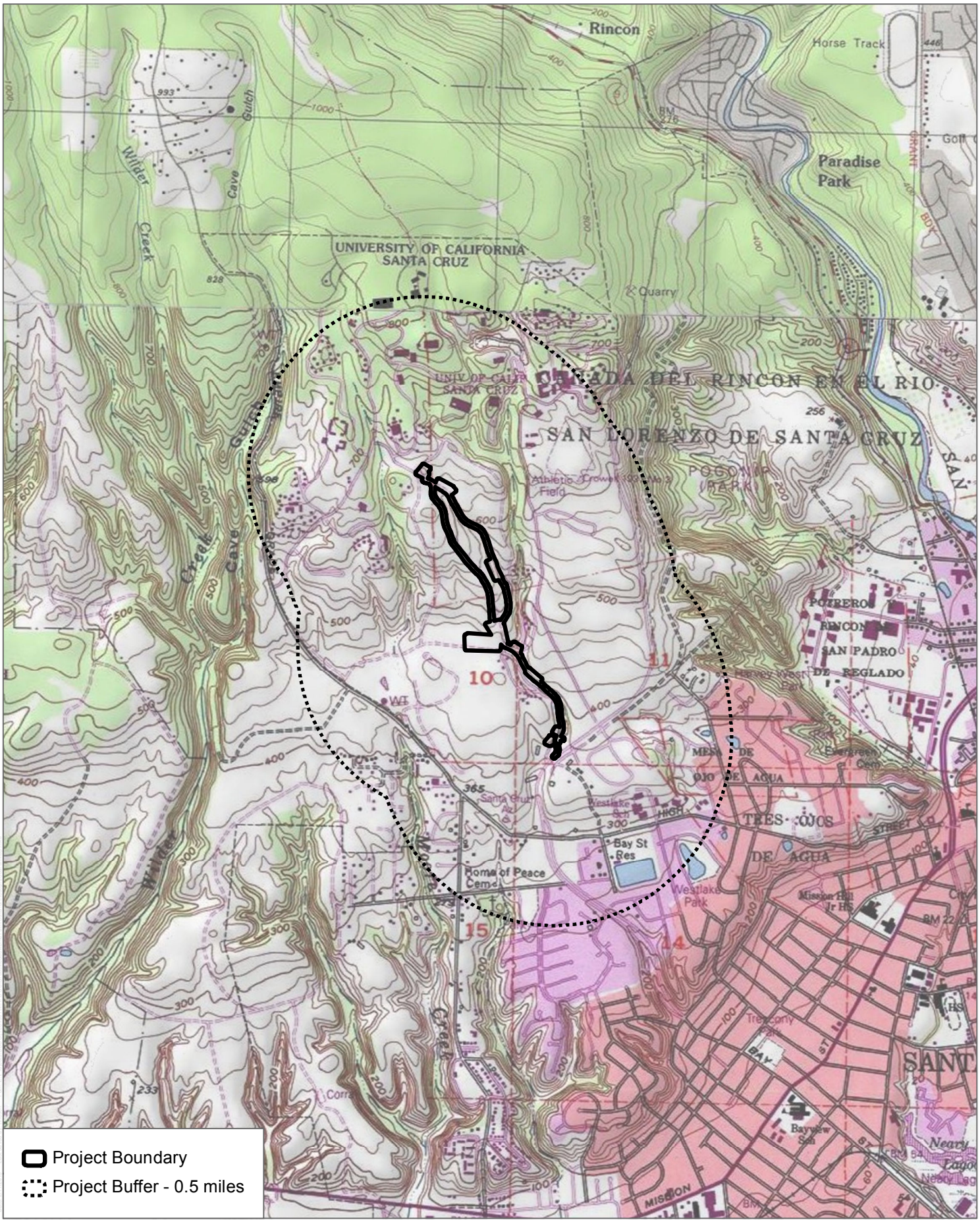


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sbrewer@dudek.com

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DUDEK

0 1,000 2,000 Feet

FIGURE 1

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725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

February 15, 2019 PN 10849.0002

Mr. Patrick Orozco
Costanoan Ohlone Rumsen-Mutsen Tribe
644 Peartree Dr.
Watsonville, CA 95076

Subject: *UCSC Great Meadow Bike Path Project, Santa Cruz County, California - Native American Outreach*

Dear Mr. Orozco:

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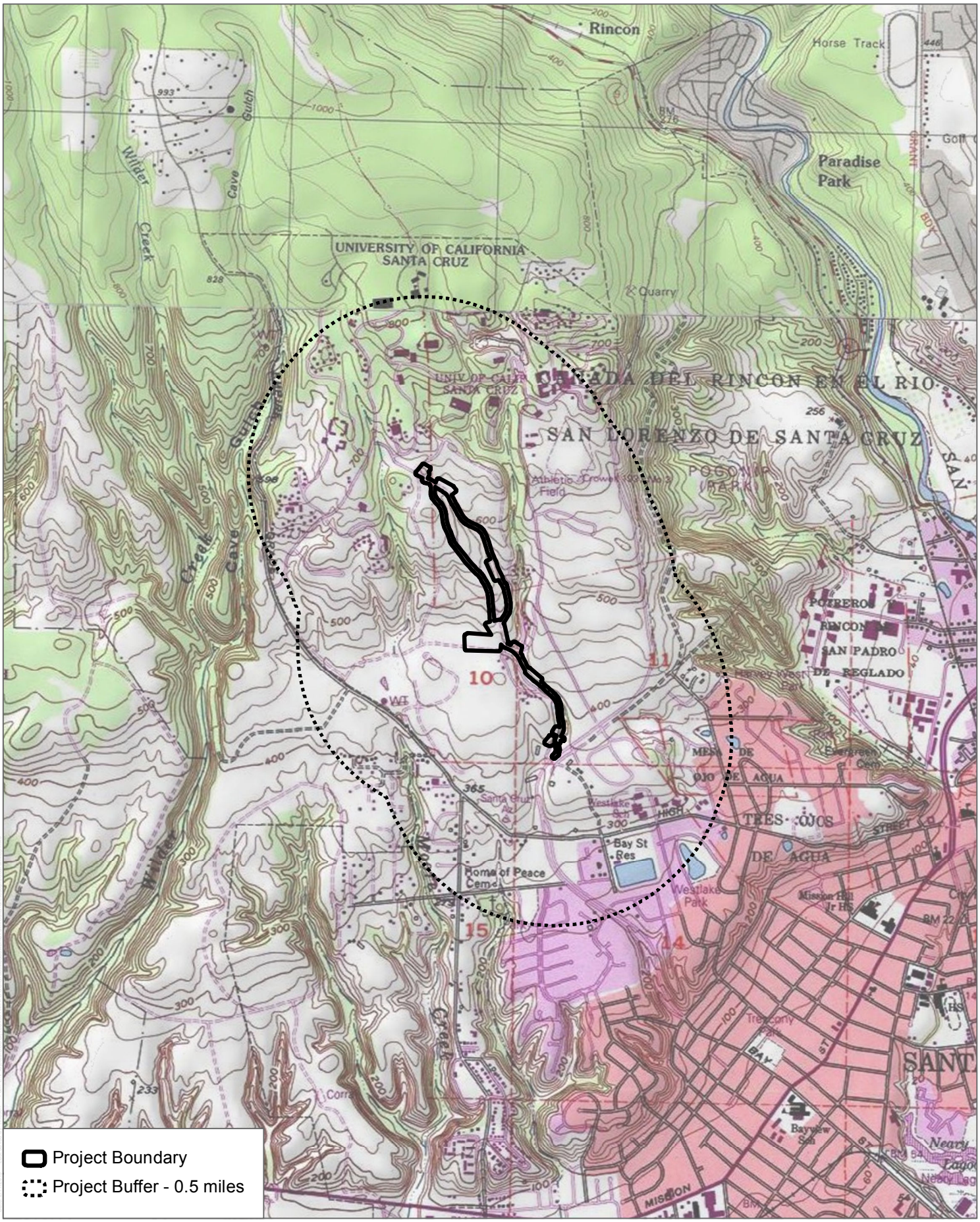


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DUDEK
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DUDEK

0 1,000 2,000 Feet

FIGURE 1

Record Search

Great Meadow Bike Path - Phase 2

725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

February 15, 2019 PN 10849.0002

Ms. Ann Marie Sayers Chairperson
Indian Canyon Mutsun Band of Costanoan
P.O. Box 28
Hollister, CA 95024

Subject: *UCSC Great Meadow Bike Path Project, Santa Cruz County, California - Native American Outreach*

Dear Ms. Sayers:

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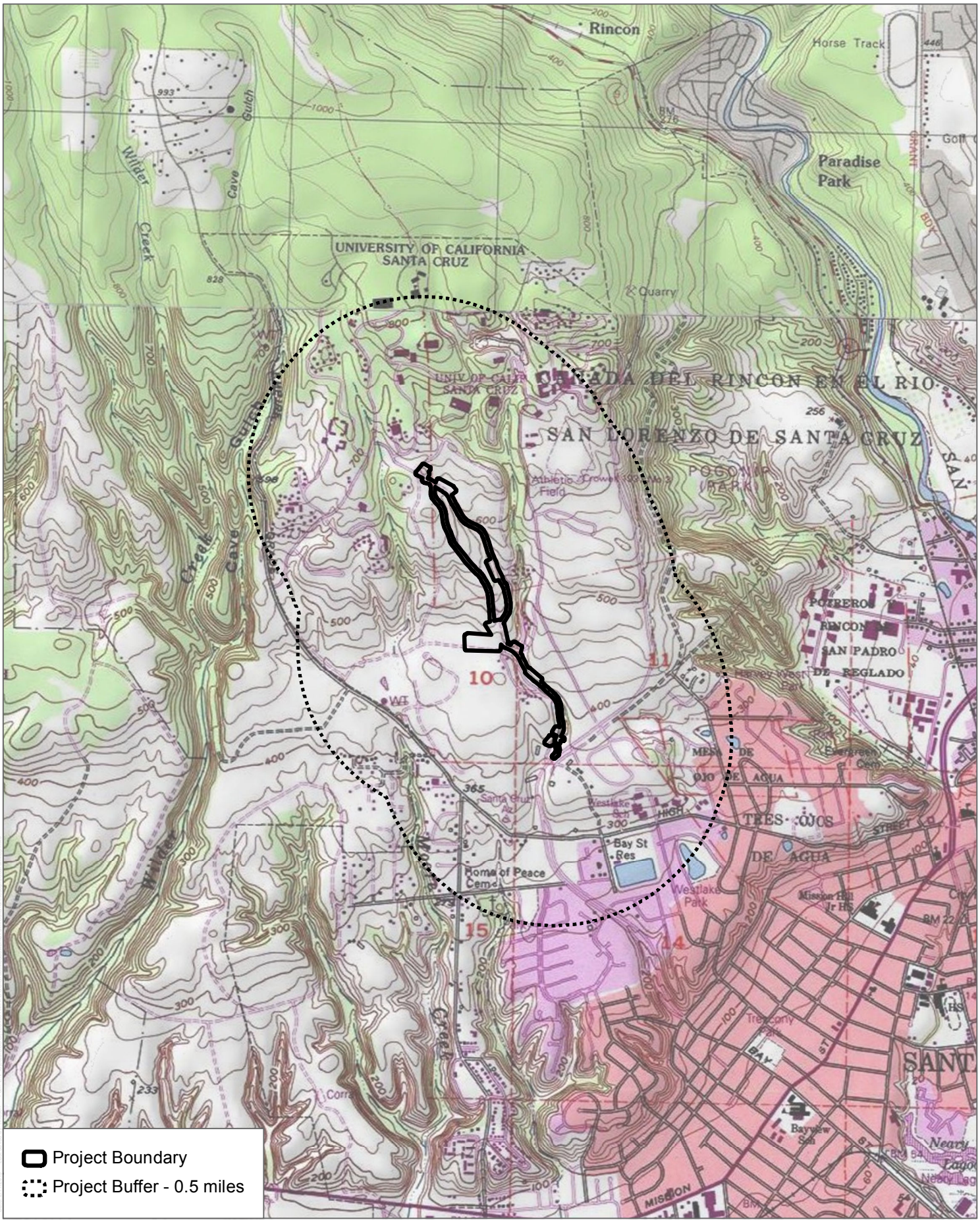


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DUDEK

0 1,000 2,000 Feet

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725 FRONT STREET, SUITE 400
SANTA CRUZ, CALIFORNIA 95060
T 831.600.1400 F 831.600.1401

February 15, 2019 PN 10849.0002

Ms. Irene Zwierlein Chairperson
Amah Mutsun Tribal Band of Mission San Juan Bautista Ohlone Costanoan
789 Canada Road
Woodside, CA 94062

Subject: *UCSC Great Meadow Bike Path Project, Santa Cruz County, California - Native American Outreach*

Dear Ms. Zwierlein:

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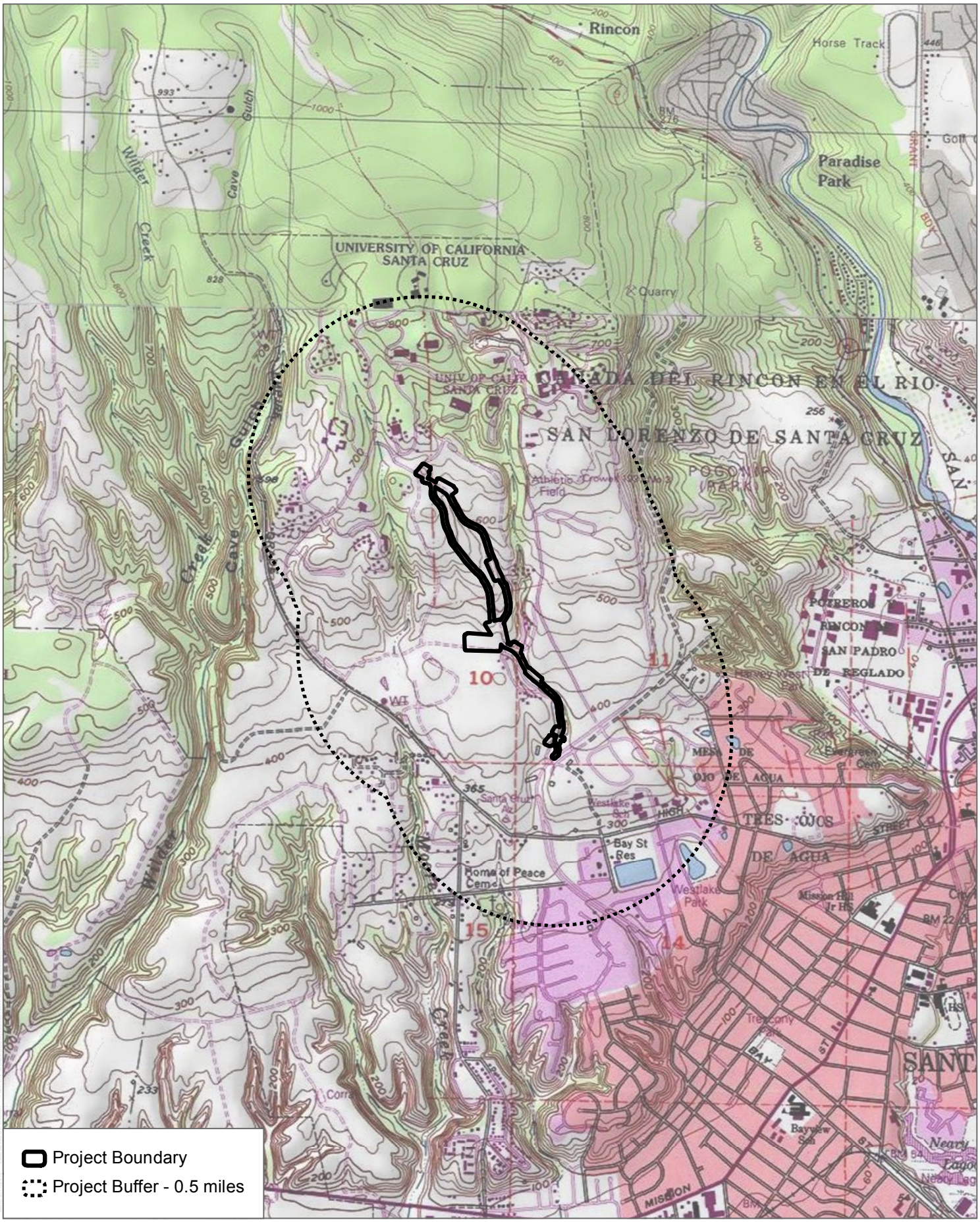


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sbrewer@dudek.com

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FIGURE 1

Record Search

Great Meadow Bike Path - Phase 2

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Sent To: Patrick Orozco

Street and Apt. No., or PO Box No.: 644 Beartree Dr

City, State, ZIP+4®: Watsonville, CA 95076

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Sent To: Ann Marie Sayers

Street and Apt. No., or PO Box No.: PO Box 28

City, State, ZIP+4®: Hollister, CA 95024

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City, State, ZIP+4®: Union City, CA 94587

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Street and Apt. No., or PO Box No.: 789 Canada RD
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City, State, ZIP+4®: Davis, CA 95616

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725 Front Street Suite 400
Santa Cruz, CA 95060

Romona Garibay
Representative
Trina Marine Ruano Family, Ohlone-Costanoan, Bay Miwok, Plains Miwok, Patwin
30940 Watkins Street
Union City, CA 94587

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ANK

Attachment 4

Field Visit Photographs

Attachment 4: Field visit photographs



IMG_0033: Overview of bike path within P-44-000200 (Cowell Lime Works Historic District) with view of the Powder House. View NNE



DSCN0823: Overview of P-44-000957 and P-44-000958, Blacksmith shop and associated archaeological deposit. View S



DSCN0815: Overview of bike path within P-44-000184. View N



DSCN0803: Staging area at bike path convergence. View NW

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Appendix F

Noise and Vibration Report

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605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 F 760.632.0164

March 28, 2019 11849.0002

Catherine Wade, Ph.D.
Project Manager
Dudek
725 Front Street, Suite 400
Santa Cruz, CA 95060

Subject: UC Santa Cruz Great Meadow Bike Path Preservation and Safety Improvement Project Phase 2 (Project) – Noise Letter Report

Per the approved revised proposal sent to Ms. Alisa Klaus (dated January 17, 2019), this letter report presents the results of a project-attributed construction activities noise and vibration impact assessment that will support the noise section of a draft Initial Study (IS). Following a summarized project description and a review of applicable noise regulations and other relevant standards, this report:

- Uses ambient noise information from the UC Santa Cruz Long Range Development Plan (LRDP) Environmental Impact Report (EIR) to help describe the noise environment in the Project vicinity;
- Quantifies project construction noise at the closest sensitive receptors, including residential buildings near the site on Dickens Way and at The Village adjoining Hagar Drive;
- Compares construction-generated noise levels to LRDP EIR thresholds to determine potential significance;
- Identifies applicable noise mitigation measures from the LRDP EIR (and assess need for additional mitigation); and,
- Qualitatively discusses project-attributed operation noise increases, based on information received to date.

To assist the reader in better understanding the noise and vibration descriptors used in this impact assessment, Attachment A provides a glossary of common acoustical terms.

1 BACKGROUND

1.1 Project Description

The proposed project consists of reconstructing and widening the existing Great Meadow Bike Path to meet current California Department of Transportation (Caltrans) standards to the extent feasible within the current alignment. (Improvements would focus on meeting Caltrans standards for width and striping, but meeting Caltrans standards for other variables [e.g., grade, speed, stopping sight distance, etc.] would require extensive realignment of the path, which is not proposed. This would include reconstruction and repaving of the path, widening and paving of shoulders, correcting existing erosion problems adjacent to the path, and designating specific portions of the path

for shared pedestrian and bicycle use. Attachment B provides an illustration of the expected project work and staging areas.

1.2 Noise & Vibration Standards

1.2.1 Federal

The U.S. Environmental Protection Agency (EPA) published what is commonly known as the "Levels Document" (EPA 1974) that developed noise level guidance to protect the public from adverse environmental noise effects. Although not a regulation, the recommended exterior day-night level (L_{dn}) of 55 dBA as a conservative goal for residential land uses has been adopted by a variety of jurisdictions and agencies when local noise regulations or other standards are lacking. The U.S. Department of Housing and Urban Development (HUD) considers exterior noise levels of 65 dBA L_{dn} acceptable for residential land uses, or even 75 dBA L_{dn} when housing units have sufficient exterior-to-interior sound insulation (i.e., to help yield interior sound levels of 45 dBA L_{dn}, consistent with EPA recommendations).

1.2.1 State of California

California Government Code Section 65302(g) requires the preparation of a Noise Element in a general plan, which shall identify and appraise the noise problems in the community. The Noise Element shall recognize the guidelines adopted by the Office of Noise Control in the State Department of Health Services and shall quantify, to the extent practicable, current and projected noise levels for the following sources: highways and freeways, primary arterials and major local streets, passenger and freight on-line railroad operations and ground rapid transit systems, aviation and airport-related operations, local industrial plants, and other ground stationary noise sources contributing to the community noise environment.

The California General Plan Guidelines, published by the Governor's Office of Planning and Research (OPR), provides guidance for the acceptability of specific land use types within areas of specific noise exposure (OPR 2017). Advisory in nature, the guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution. Local jurisdictions have the responsibility to set specific noise standards based on local conditions.

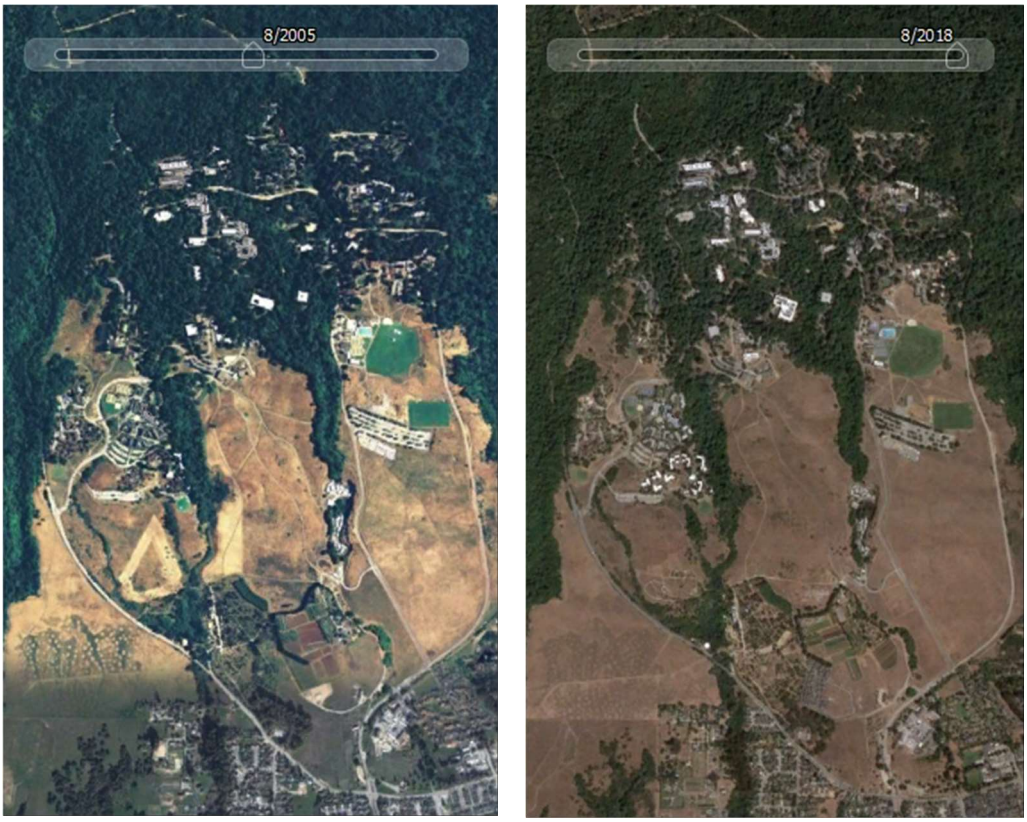
1.2.1 Regional and Local

As a state entity, the University is not subject to local noise regulations; however, local standards are important for assessing impacts and University policy seeks consistency with local plans and policies where it is practical to do so.

2 EXISTING CONDITIONS

Section 4.10 of the UC Santa Cruz 2005 LRDP EIR includes the results of an outdoor sound level survey conducted to quantify and characterize the existing ambient sound environment across the UC Santa Cruz campus. Although nearly fifteen years have transpired since this field data collection effort, the reported outdoor ambient sound levels for survey positions distributed across the campus are likely still representative of the current environmental

conditions. The campus remains situated in a largely pastoral/wooded area northwest of the suburban neighborhoods of the City of Santa Cruz, away from major roadways and commercial development. Additionally, a visual comparison of aerial imagery between the years of 2005 and 2018, as shown in Figure 1, suggests that no new large-scale development projects, such as expansion of residential areas or new industry, have been added or otherwise substantially changed the landscape in the vicinity of the campus.



2005 2018

Source: Google Earth 2018

Figure 1. Comparison of UC Santa Cruz campus vicinity aerial imagery.

This apparent lack of newly added major sound-producing sources or substantial changes to existing sources of noise should translate into relative stability of the outdoor sound environment. For these reasons, existing outdoor acoustical conditions now, as of this writing, are likely comparable to those measured in 2005; therefore, this analysis will reference and utilize (as appropriate) these previous measurement data presented in the LRDP EIR.

2.1 Pre-existing Ambient Noise Levels

The baseline sound level survey presented in the noise section of the LRDP EIR includes a collection of thirteen short-term (ST) sound pressure level (SPL) measurements taken at representative positions across the UC Santa Cruz campus. Two of these ST positions could be considered closest to the project area and are summarized as follows:

- ST-6, East Field, 49 dBA L_{eq} measured from 11:10 to 11:25 a.m., with noted sound sources including "distant fans at recreation center, pool activity, tennis, joggers, distant aircraft"; and,

- ST-10, near intersection of High Street and Cardiff Street, 66 dBA L_{eq} measured from 3:10 to 3:25 p.m., with sources including "traffic, distant aircraft, birds".

The ST-6 survey position is closest to the northern end of the project, where the bike bath terminates at the Music Center and is distant from busy City roadways. Survey position ST-10, on the other hand, is at the southern end of the UC Santa Cruz campus near the faculty residences along Dickens Way and thus closer to these traffic noise sources.

The baseline ambient noise survey of the LRDP EIR also included four long-term SPL measurement positions. Plots of hourly L_{eq} values at LT-2 and LT-3 that are nearest to the housing units along Dickens Way show a trend of generally steady daytime (7:00 a.m. to 10:00 p.m.) sound levels dipping to levels that are 5 to 15 dBA less at night (10:00 p.m. to 7:00 a.m.). The measured SPL at LT-1, positioned between family student housing and College Eight, exhibits the same pattern, with daytime levels ranging from 55 to 60 dBA hourly L_{eq} that drop to as low as 42 dBA at 4:00 a.m.

2.2 Sensitive Receptors

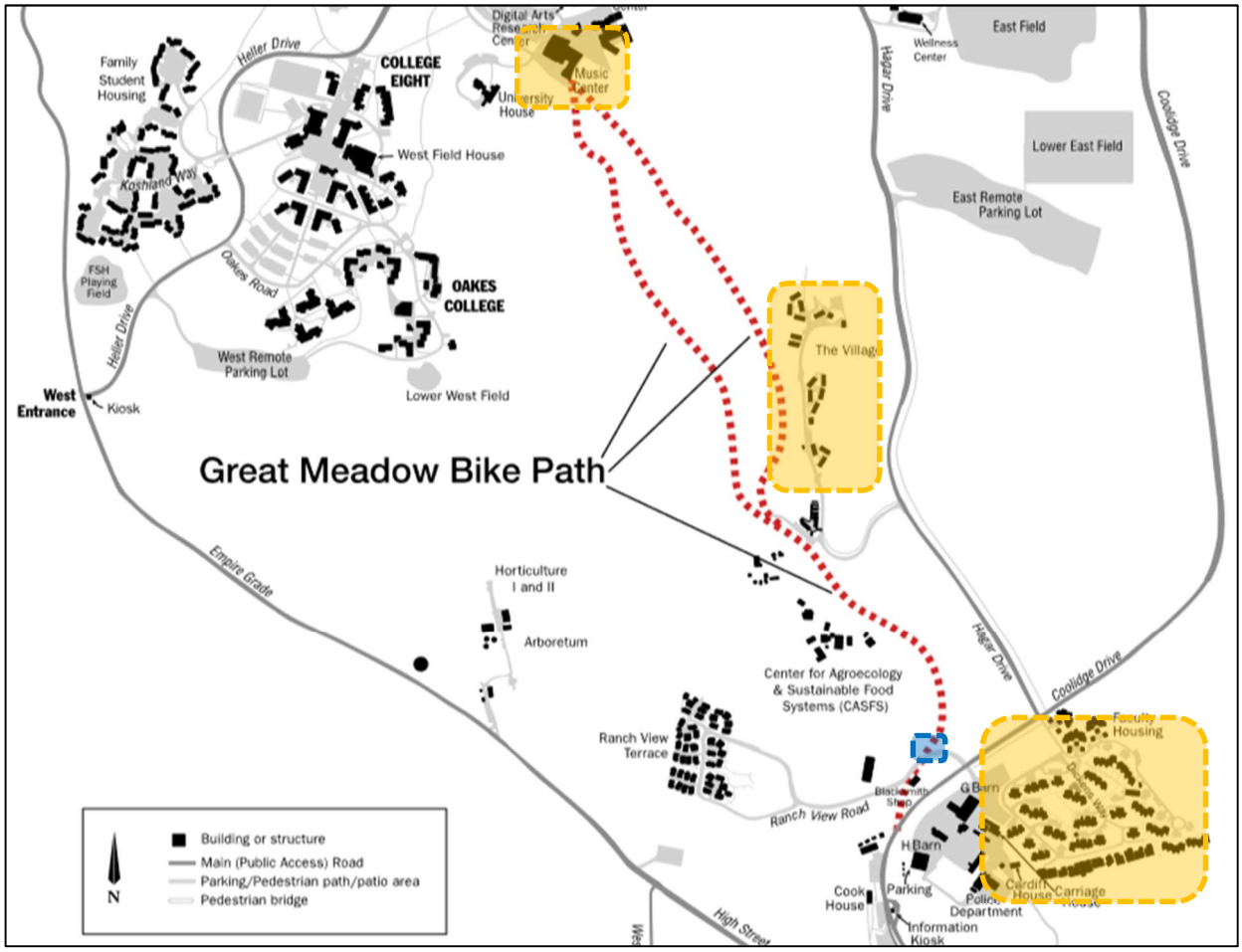
2.2.1 Noise

Consistent with the LRDP EIR, noise-sensitive receptors (NSR) generally include residences, schools, hospitals, and parks, where people are normally expected to sleep or where low ambient sound levels are expected to help provide clear communication or enhance conditions for study and contemplation. The nearest NSR that may potentially be impacted by the project are encircled in Figure 2 and include the following:

- Faculty Housing - This is an on-campus area at Dickens Way, populated with housing units that are as close as approximately 500 feet from the southern end of the project site.
- The Village -This is an on-campus area on Village Road between Hagar Drive and the eastern bike path leg, populated with multi-unit residential structures that are as close as 130 feet from the project site.
- The Music Center - The Music Center is located at the southern end of Meyer Drive and is a school building where certain levels of quiet are expected within for music performance and study. The northern end of the project site appears to be approximately 50 feet from the southern façade of the Center's main building.

2.2.2 Vibration

Typically, NSRs are also vibration-sensitive receptors since they are often residences or places of learning where occupants may perceive and become annoyed with groundborne vibration. Additionally, older structures—regardless of occupancy—can also be vibration sensitive and worthy of vibration velocity impact assessment. By way of example, the bike path currently passes within 5 feet of a small lime-mortar structure that was a "Powder House" built in the 1860's. Considered a feature of the Cowell Lime Works Historic District, which is on the National Register of Historic Places (NRHP), this structure would be considered susceptible to vibration-related damage at a level of sensitivity associated with "historic" buildings.



Source: UC Santa Cruz 2018

Figure 2. Locations of noise-sensitive and vibration-sensitive receptors (NSRs, within orange dashes; and the Cowell Lime Works Historic District Powder House, within blue dashes) nearest to Great Meadow Bike Path.

The UC Santa Cruz Music Center also represents a vibration-sensitive receptor, but at a higher level of sensitivity than a merely occupied building for education purposes. The Music Center features multiple recital and multi-function performance halls, as well as studios, that require interiors having low background sound and vibration.

3 IMPACT ASSESSMENT

The following subsections detail noise and vibration impact assessment from project construction activities and the anticipated post-construction operating conditions. Because the project tiers to the LRDP EIR, applicable impact assessment criteria are established by the LRDP EIR. Mitigation measures, if needed as a result of implementing the project, must also be compatible with the LRDP EIR requirements.

3.1 Construction Noise

3.1.1 LRDP EIR Noise Assessment & Impact Criteria

The LRDP EIR concluded that on-campus construction projects could expose NSRs to airborne noise that exceed the following standards.

- 80 dBA L_{eq8h} during the day (7:00 a.m. to 7:00 p.m.) and evening (7:00 p.m. to 10:00 p.m.); and,
- 70 dBA L_{eq8h} at night (10:00 p.m. to 7:00 a.m.).

To mitigate this potential impact, the LRDP EIR includes the following mitigation measure that applies to all projects proposed and tiered to the LRDP EIR:

LRDP Mitigation NOIS-1 : Prior to initiation of construction of a specific development project, the Campus shall approve a construction noise mitigation program that shall be implemented for each construction project. This shall include but not be limited to the following:

- Construction equipment used on campus is properly maintained and has been outfitted with feasible noise-reduction devices to minimize construction-generated noise.
- Stationary noise sources such as generators or pumps are located at least 100 feet away from noise-sensitive land uses as feasible.
- Laydown and construction vehicle staging areas are located at least 100 feet away from noise-sensitive land uses as feasible.
- Whenever possible, academic, administrative, and residential areas that will be subject to construction noise will be informed in writing at least a week before the start of each construction project.
- Loud construction activity (i.e., construction activity such as jackhammering, concrete sawing, asphalt removal, and large-scale grading operations) within 100 feet of a residential or academic building shall not be scheduled during finals week.
- Loud construction activity as described above within 100 feet of an academic or residential use shall, to the extent feasible, be scheduled during holidays, Thanksgiving break, Christmas break, Spring break, or Summer breaks.
- Loud construction activity within 100 feet of a residential building shall be restricted to the hours between 7:30 AM and 7:30 PM, Monday through Saturday.

- Loud construction activity within 100 feet of an academic building shall be scheduled to the extent feasible on weekends.

LRDP EIR noise mitigation measures NOIS-2 and NOIS-3 relate to on-campus roadway traffic noise exposures and the creation of new NSR, respectively. Since this project would neither cause an increase in roadway traffic or generate new noise-sensitive receptors, NOIS-2 and NOIS-3 are not considered relevant and thus not included in this project impact assessment.

3.1.2 Project Noise Assessment

3.1.2.1 Methodology

This analysis is based on mathematical expressions, comparable to those utilized by the Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM), to quantitatively predict noise exposure levels at NSRs due to project construction activities. The RCNM includes an extensive database of reference maximum sound levels (L_{max}) and "acoustical usage factors" for a variety of common construction equipment and vehicles, from which appropriate selections represent equipment anticipated for constructing the proposed project. Acoustical usage factor (AUF) is understood to be the average fraction of time (e.g., during an hour) that a piece of construction equipment operates at "full power".

Noise generated by project-attributed construction activities would vary with the type and quantity of equipment operating at any given time, equipment duty cycle, and the duration of construction activities. Noise exposure at a studied NSR would depend on its proximity to project construction processes and the effects of any intervening natural terrain or man-made geographic features that linearly occlude direct sound paths between the noise-producing activities and the studied NSR. To predict the aggregate noise exposure at a NSR over an eight-hour period, consistent with the LRDP EIR standard, this analysis makes the following construction activity assumptions:

- Conservatively, all anticipated equipment would be concurrently operating equidistant from the studied NSR nearest to the Project boundary; and,

- Construction periods may endure for up to thirteen (13) hours per day (6:00 a.m. to 7:00 p.m.) in proximity to the Music Center and Faculty Housing (near Dickens Way); but only between 7:30 a.m. and 7:00 p.m. when project construction activity is within 100 feet of the Village, which adheres to LRDP Mitigation NOIS-1.

The first of these two conditions considers the possibility of a "worst case" scenario, where the operating equipment may be clustered together or otherwise arranged close to the NSR of interest.

3.1.2.2 Predicted Results

According to the project description, there are two construction approaches under consideration as follows:

- Full-depth reclamation (FDR), where the existing asphalt and base materials would be pulverized, mixed with cement and water, and compacted to produce a base for a new asphalt surface; or,

- Asphalt overlays, which would involve grinding the top approximately 1-inch layer of the path and adding base materials to the sides to provide a new surface for paving.

For purposes of this construction noise analysis, both construction approaches are generally assumed to involve the same set of equipment and vehicles, such as pickup trucks, paving equipment, water trucks, and so on. It is assumed the asphalt overlay technique would incorporate a scarifier (or comparable source of equipment noise) to grind away the top surface of the bike path. Table 1 shows predicted hourly L_{eq} at the indicated distance of 50 feet for each piece of anticipated construction equipment assumed to be associated with the first of these two project construction approaches, with Table 2 showing the predicted values for equipment at 130 feet. Tables 3 and 4 present similar tables for the second construction approach with equipment at the same distances: 50 feet and 130 feet, respectively. The first of these two distances depicts the worst-case scenario for each of these two project construction methods, placing all equipment as close as 50 feet from the receptor (i.e., the Music Center). The 130-foot distance attempts to describe a scenario where construction equipment may be arranged along the Bike Path, at this same distance to the nearest Village residential building. The "total" predicted L_{eq} is the logarithmic sum of sound from all of the listed equipment for the approach under study.

Although construction activities may occur more than eight hours per day, the predicted 8-hour L_{eq} construction noise levels shown in Tables 1-4 at the indicated distances to the nearest NSR, as well as the total, would be representative for any consecutive eight hours within the actual per-day construction duration. For example, if construction began at 7:30 a.m., its time-varying noise level would need to comply with 80 dBA L_{eq} when evaluated between 7:30 a.m. and 3:30 p.m. As the day progresses, construction activity noise would need to comply with the same 8-hour L_{eq} standard through the final 11:00 a.m. to 7:00 p.m. evaluation period. Since the construction noise analysis conservatively assumes that each listed equipment type is operating at its same expected intensity hour by hour (as suggested by the AUF values), there is no 8-hour period that would be considered louder than another and thus the predicted L_{eq8h} values shown in Tables 1-4 could apply to any consecutive 8-hour period.

Table 1. Predicted Project Construction Equipment Sound Pressure Levels (SPL) – at 50 feet

Construction Approach – Full-depth Reclamation (FDR)						
Equipment Type	Quantity	Acoustical Usage Factor (AUF %)	Reference L_{max} at 50 feet (dBA)	Source-to-NSR Distance (feet)	Allowable Operation Time (hours)	Predicted 8-hour L_{eq} (dBA)
Dump Truck	1	40	76	50	8	72
Backhoe	1	40	78	50	8	74
Dump Truck (water truck)	1	40	76	50	8	72
Dump Truck (tackifier truck)	1	40	76	50	8	72
Roller (sheepsfoot compaction)	1	20	80	50	8	73
Roller (smooth drum compaction)	1	20	80	50	8	73
Front End Loader	1	40	79	50	8	75
Pickup Truck	1	40	75	50	8	71
Paver	1	50	77	50	8	74
Drum Mixer	1	50	80	50	8	77
					Total for Full-depth Reclamation (FDR) Approach:	**84**

Sources: FHWA 2006, Dudek 2019

Table 2. Predicted Project Construction Equipment Sound Pressure Levels (SPL) – at 130 feet

Construction Approach – Full-depth Reclamation (FDR)						
Equipment Type	Quantity	Acoustical Usage Factor (AUF %)	Reference L_{max} at 50 feet (dBA)	Source-to-NSR Distance (feet)	Allowable Operation Time (hours)	Predicted 8-hour L_{eq} (dBA)
Dump Truck	1	40	76	130	8	64
Backhoe	1	40	78	130	8	66
Dump Truck (water truck)	1	40	76	130	8	64
Dump Truck (tackifier truck)	1	40	76	130	8	64
Roller (sheepsfoot compaction)	1	20	80	130	8	65
Roller (smooth drum compaction)	1	20	80	130	8	65
Front End Loader	1	40	79	130	8	67
Pickup Truck	1	40	75	130	8	63
Paver	1	50	77	130	8	66
Drum Mixer	1	50	80	130	8	69
					Total for Full-depth Reclamation (FDR) Approach:	**75**

Sources: FHWA 2006, Dudek 2019

Table 3. Predicted Project Construction Equipment Sound Pressure Levels (SPL) – at 50 feet

Construction Approach – Asphalt Overlay						
Equipment Type	Quantity	Acoustical Usage Factor (AUF %)	Reference L_{max} at 50 feet (dBA)	Source-to-NSR Distance (feet)	Allowable Operation Time (hours)	Predicted 8-hour L_{eq} (dBA)
Dump Truck	1	40	76	50	8	72
Backhoe	1	40	78	50	8	74
Dump Truck (water truck)	1	40	76	50	8	72
Dump Truck (tackifier truck)	1	40	76	50	8	72
Roller (sheepsfoot compaction)	1	20	80	50	8	73
Roller (smooth drum compaction)	1	20	80	50	8	73
Pavement Scarifier	1	20	90	50	8	83
Front End Loader	1	40	79	50	8	75
Pickup Truck	1	40	75	50	8	71
Paver	1	50	77	50	8	74
					Total for Asphalt Overlay Approach:	**86**

Sources: FHWA 2006, Dudek 2019

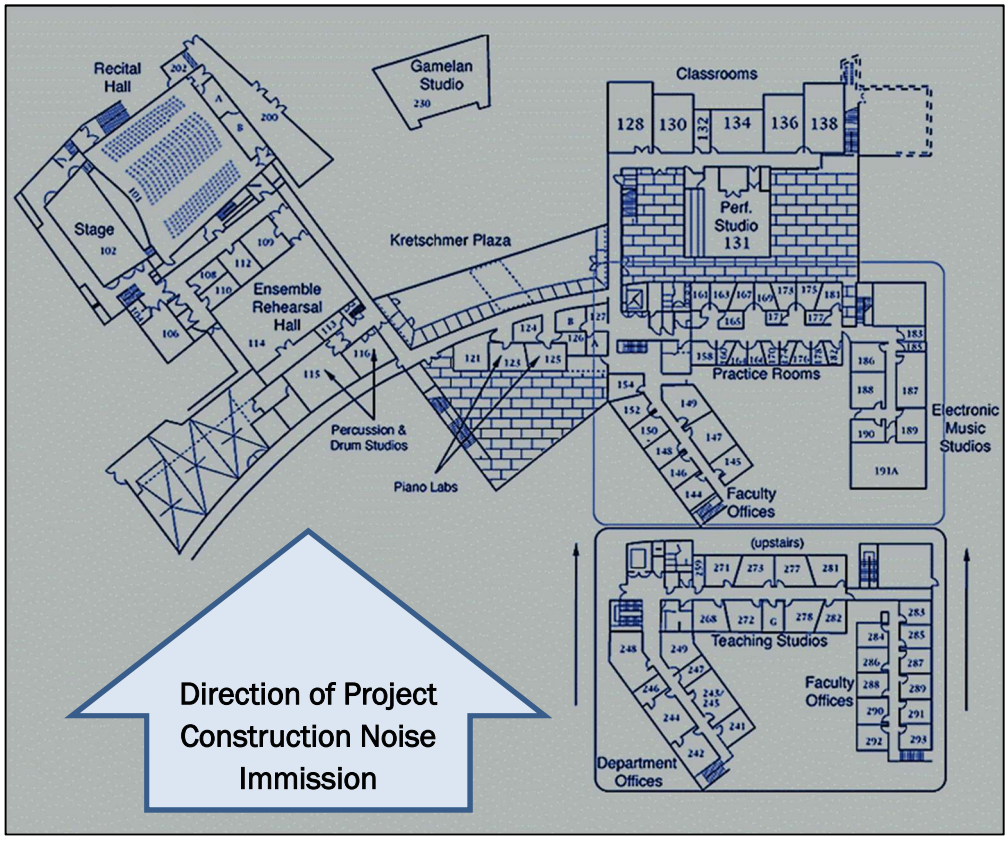
Table 4. Predicted Project Construction Equipment Sound Pressure Levels (SPL) – at 130 feet

Construction Approach – Asphalt Overlay						
Equipment Type	Quantity	Acoustical Usage Factor (AUF %)	Reference L_{max} at 50 feet (dBA)	Source-to-NSR Distance (feet)	Allowable Operation Time (hours)	Predicted 8-hour L_{eq} (dBA)
Dump Truck	1	40	76	130	8	64
Backhoe	1	40	78	130	8	66
Dump Truck (water truck)	1	40	76	130	8	64
Dump Truck (tackifier truck)	1	40	76	130	8	64
Roller (sheepsfoot compaction)	1	20	80	130	8	65
Roller (smooth drum compaction)	1	20	80	130	8	65
Pavement Scarifier	1	20	90	130	8	75
Front End Loader	1	40	79	130	8	67
Pickup Truck	1	40	75	130	8	63
Paver	1	50	77	130	8	66
					Total for Asphalt Overlay Approach:	**77**

Sources: FHWA 2006, Dudek 2019

Tables 1 and 3 show that when the loudest equipment pieces for each construction approach are allowed to operate for a full eight hours as close as 50 feet to the closest NSR (Music Center), the overall calculated L_{eq8h} would exceed 80 dBA (the applicable LRDP EIR standard) and thus create a significant impact that would require mitigation. At 130 feet, however, which represents the closest distance to construction activity for the Village NSR, combined predicted construction noise levels for the two approaches would be less than the 80 dBA L_{eq8h} threshold.

Given their proximity to the northern end of the project site (as close as 50 feet), the southern facades of the Music Center would also receive a predicted aggregate construction noise level as high as 86 dBA L_{eq8h}. Fortunately, acoustical design of the facility includes "great care has gone into isolating all practice and performance spaces from external and adjacent noise" (UC Santa Cruz 2019a). Sound and vibration isolation features include 10- to 14-inch-thick sound-insulated walls and floating concrete floors (i.e., designed to rest on resilient supports atop the main foundation). Furthermore, as illustrated in Figure 3, the layout of Music Center buildings reflects good acoustical design: noise-sensitive spaces that require low background sound levels (e.g., halls and studios) are surrounded by buffer interior spaces such as corridors that help provide physical and acoustical separation from the outdoors and its ambient noise. Nevertheless, the predicted 86 dBA L_{eq8h} exterior noise exposure at the Music Center would still be considered a significant impact requiring mitigation, based on the LRDP EIR noise standard.



Sources: UC Santa Cruz 2019, Dudek 2019

Figure 3. Site Plan of the UC Santa Cruz Music Center.

With such sound insulation already implemented in the design and construction of the Music Center, exterior-to-interior intrusion from predicted project noise should not, under most circumstances, cause disruption of activities within.

3.1.2.3 Construction Noise Mitigation

In order to lower predicted L_{eq8h} values for the noisiest expected construction equipment identified for each approach and thus yield overall construction activity noise levels that comply with the LRDP EIR NOIS-1 standard, the following mitigation measure Great Meadow Bike Path-Mitigation-NOIS-1 should be implemented.

Great Meadow Bike Path-Mitigation-NOIS-1: UC Santa Cruz and/or the construction contractor(s) shall incorporate the following administrative controls when equipment operation is expected within 50 to 100 feet of the Music Center:

- Limit equipment operation to no more than three (3) hours within any consecutive eight-hour daytime period (except for the pavement scarifier, which should be limited to 1 hour of operation per eight-hour period); or,
- Erect a temporary sound barrier (e.g., plywood planks, acoustical blankets, etc.) so that its height, extent, and solidity occludes line of sight between the operating equipment and the Music Center; or,
- If construction equipment operation cannot be limited with either option above, UC Santa Cruz and its construction contractor(s) shall coordinate with the Music Center and limit project construction hours and activities to avoid concurrence with scheduled concerts and performances.

With the options presented in the Great Meadow Bike Path-Mitigation-NOIS-1 implemented on site, acoustical contribution from the pavement scarifier would be sufficiently reduced and yield an overall predicted L_{eq8h} value that complies with the LRDP EIR standard, or construction conflicts with Music Center events would be avoided, and the impact would be reduced to a less-than-significant level.

3.2 Construction Vibration

According to the LRDP EIR, construction of future projects on the UC Santa Cruz campus would not expose sensitive receptors to excessive groundborne vibration or groundborne noise due to the expected lack of on-campus construction activities or processes involving high levels of vibration, such as blasting or pile-driving. However, given the afore-mentioned proximity of residential-type NSR to project construction activities and the presence of a historic structure within five feet of the bike path, the following predictive analysis was conducted to ascertain where and when construction activities associated with the proposed project might result in excessive groundborne vibrations at these sensitive receptors.

3.2.1 Methodology and Impact Criteria

Groundborne vibration is small, rapidly oscillating motion transmitted through the ground. The strength of groundborne vibration attenuates fairly rapidly over distance. Some soil types transmit vibration quite efficiently, while other types (primarily sandy soils) do not. Several basic measurement units are commonly used to describe the intensity of ground vibration. The descriptors used by the Federal Transit Administration (FTA) are peak particle velocity (PPV), in units of inches per second (ips), and vibration velocity decibel (VdB). The calculation to determine PPV at a given distance is as follows:

$PPV_{dist} = PPV_{ref} *(25/D)^{n}$

In the above expression PPV_{dist} = the PPV of the equipment adjusted for distance; PPV_{ref} = the reference vibration level in ips at 25 feet; and, D = the distance (in feet) from the equipment to the receiver. PPV is frequently used to assess building damage risk. The "n" exponent considered appropriate for this analysis is 1.1, which reflects Class III "Hard soils: dense compacted sand, dry consolidated clay, consolidated glacial till, some exposed rock. (cannot dig with shovel, need pick to break up)" (Caltrans 2013). The following bullets reproduce the soil classes and corresponding exponent values as presented in the Caltrans Transportation and Construction Vibration Guidance Manual (Caltrans 2013):

- Class I – Weak or soft soils: lossy soils, dry or partially saturated peat and muck, mud, loose beach sand, dune sand, recently plowed ground, soft spongy forest or jungle floor, organic soils, topsoil (shovel penetrates easily). No "n" value identified.
- Class II – Competent soils: most sands, sandy clays, silty clays, gravel, silts, weathered rock (can dig with a shovel). Exponent "n" = 1.5.
- Class III – Hard soils: dense compacted sand, dry consolidated clay, consolidated glacial till, some exposed rock (cannot dig with a shovel, need a pick to break up). Exponent "n" = 1.1.
- Class IV – Hard, competent rock: bedrock, freshly exposed hard rock (difficult to break with a hammer). No "n" value identified.

If geologic study of the proposed Project area, which is beyond the scope of this analysis, determines that "n" should instead be 1.5 or otherwise represent a different soil class, the predicted vibration velocity values presented herein may change.

The other vibration velocity descriptor, VdB, best correlates with human perception of vibration and is described as the root-mean square (RMS) velocity level in units relative to 1 micro-inch per second. As a point of reference, the average person can just barely perceive vibration velocity levels below 70 VdB (typically in the vertical direction). The calculation to determine the RMS VdB at a given distance is as follows:

$L_{v(D)} = L_{v(ref)} – 30*\log(D/25)$

where: $L_{v(D)}$ = the vibration level at the receiver; $L_{v(ref)}$ = the reference source vibration level at 25 feet; and D = the distance from the vibration activity to the receiver.

Typical background vibration levels in residential areas are no greater than 50 VdB (FTA 2006); and, the vibration velocity level at which most residential building occupants will detect and become annoyed with is approximately 94 VdB, or 0.2 ips RMS PPV (FTA 2006).

With respect to building damage risk, FTA guidance suggests that 0.2 ips PPV is also appropriate for "non-engineered timber and masonry buildings" that would likely describe the aforementioned historic structure: the Powder House. This level is also consistent with Swiss Association of Standardization (SNV) criteria for "Class III" buildings having a concrete floor, "with wooden ceilings and walls in masonry" (Caltrans 2013).

However, for historic buildings, available literature indicates there is a range of vibration velocity thresholds to potentially adopt and apply that incorporate three "key factors" as follows (Johnson and Hannen 2015): building type and condition, vibration source type, and "importance factor" that considers the cultural or economic value of the structure. A review of this literature points to 0.12 ips PPV for continuous vibration sources and 0.3 ips PPV for single-event vibrations as apparent appropriate vibration velocity thresholds to apply to a historic building of this kind for the following reasons:

1. The SNV vibration velocity thresholds for "Class IV" building class structures, including "objects of historic interest", match these levels (i.e., 0.1 ips PPV and 0.3 ips PPV for continuous and transient vibration sources, respectively) when such sources are in the frequency range of 10-30 Hz (Caltrans 2013).

2. The National Cooperative Highway Research Program (NCHRP) "NCHRP 25-25/Task 72" report (Wilson, Ihrig & Associates et al. 2012) summarizes several sources of guidance, which include American Association of State and Highway Transportation Officials (AASHTO) guidance that 0.12 ips PPV represents a "threshold for cracks" with respect to "historic sites or other critical locations."

3. A structural engineer (MME 2019) has had opportunity to inspect the Powder House structure and shared the following remarks:

    a. "In general, the building is in fair condition and the only distress we observed was the stone header over the door was displaced. The displacement of the stone header appears to be the result of the wood header supporting the stone deteriorating."

    b. "It appears some of the mortar has been patched or re-pointed over time."

    c. "Based on the sloping site and the existing grade is lower than the floor elevation on the downhill side we can surmise the building has a foundation below grade. The fact that the building walls do not exhibit distress currently or visible cracks in the walls the foundation is providing adequate support. The floor of the building is concrete and also shows no signs of distress."

    d. "The building has stood the test of time of over 150 years with adjacent traffic nearby and has maintained its integrity."

    e. "The building has exterior stone walls of approximately 16" to 20" thick and a very light timber roof, which do not appear brittle."

Because the anticipated construction activity for the proposed project involves equipment and processes that are generally not single events or "transient", which one might use to define vibration producers such as controlled detonation or pile-driving impacts, this analysis assumes that the 0.12 ips PPV criterion should be used to assess potential vibration impact to the Powder House.

The Music Center, due to its concert hall and recording studio spaces that are highly sensitive to vibration and the potential for groundborne noise generation caused by induced vibration of building structures and surfaces, should have a more stringent disturbance threshold of 65 VdB (0.007 ips PPV), compatible with FTA guidance (FTA 2006).

3.2.2 Predicted Results

Table 5 presents predicted vibration velocity levels at the indicated sensitive receptors for four categories of anticipated construction equipment: vibratory roller, jackhammer, front-end loader (or a large bulldozer and similarly powered heavy construction equipment), and a small bulldozer. Based on FTA reference data (FTA 2006), the vibratory roller would be expected to have the highest levels of vibration from among the equipment listed in Tables 1 through 4. The front-end loader vibration level (0.089 ips PPV), from FTA data, is conservatively assumed to be representative of other equipment on site. Italicized values show what conditions (i.e., larger distances between the vibration source and the sensitive receptor) would be required in order to yield vibration velocity levels that are compliant with the selected standards to avoid impacts.

While not appearing in Tables 1-4, use of a jackhammer (or other man-portable impact-type vibratory equipment) would represent an alternative to using engine-driven equipment having higher vibratory levels. But because a jackhammer (and comparable impact-type tools) would tend to emit noise at levels comparable to the pavement scarifier (i.e., between 85 and 90 dBA L_{max} at a reference distance of 50 feet), it too—if used—would need to operate for less than eight hours per day of construction activity.

A "small bulldozer" does not appear in Tables 1-4, but represents smaller, less vibratory construction equipment that UC Santa Cruz or its contractors may elect to use in lieu of heavier and/or more powerful equipment on site.

Table 5. Project Construction Activity Vibration at Indicated Receptor Distances

Vibration-sensitive Receptor	Distance to Vibration Source (feet)	Peak Particle Velocity (PPV, ips)	Vibration Velocity (RMS VdB)
Predicted Vibration Velocity from a Roller (reference PPV = 0.21 ips at 25 feet)			
The Village	130	0.03	79
Music Center	50	0.097	88*
Music Center	*200*	*0.007*	*65**
Faculty Housing (Dickens Way)	500	0.008	66
Powder House	5	0.57	103**
Powder House	*22*	*0.12*	*89***
Predicted Vibration Velocity from a Jackhammer (reference PPV = 0.035 ips at 25 feet)			
The Village	130	0.006	63
Music Center	50	0.005	62*
Faculty Housing (Dickens Way)	500	0.001	50
Powder House	5	0.09	87**
Predicted Vibration Velocity from a Small Bulldozer (reference PPV = 0.003 ips at 25 feet)			
The Village	130	0.0005	42
Music Center	50	0.0004	41*
Faculty Housing (Dickens Way)	500	0.0001	29
Powder House	5	0.006	63**
Predicted Vibration Velocity from a Front-end Loader (reference PPV = up to 0.089 ips at 25 feet)			
The Village	130	0.014	71
Music Center	50	0.012	70*
Music Center	*85*	*0.007*	*65**
Faculty Housing (Dickens Way)	500	0.003	58
Powder House	5	0.22	95**
Powder House	*10*	*0.12*	*89***

Sources: FTA 2006, Dudek 2018
*assumes the Music Center facilities have piles or spread-footing foundations that provide a 10 VdB coupling loss.
**consistent with site observations from structural engineer that the Powder House sits on a "foundation below grade" (MME 2019), which FTA suggests for a "1-2 Story Masonry" structure provides a 7 VdB coupling loss (FTA 2006).

Table 5 illustrates that usage of a roller at the indicated distances from the nearest residential structures at the Village would be less than the 0.2 ips PPV or 94 VdB standards for building damage risk and human annoyance, respectively. But at an anticipated distance of only 5 feet, the roller would create far more vibration than would be considered appropriate for a historic structure like the Powder House. Usage of a jackhammer at no less than 5

feet away from the Powder House façade, however, would be compliant with 0.12 ips PPV, the suggested vibration velocity criterion for historic buildings, as would operation of a loaded truck or front-end loader at a distance of 10 feet. Table 5 also shows that small construction equipment (e.g., "small bulldozer") could operate at the indicated distances to the four receptors and comply with the vibration criteria. Construction equipment would also need to be kept further away from the Music Center, due to its increased sensitivity (related to its interior functions and needs), as indicated by the minimum distances (italicized and in gray) between construction equipment and the nearest facade.

Passenger car and sports utility vehicle (SUV) traffic on the unpaved road adjoining the Bike Path in the vicinity of the Powder House is not expected to cause vibration damage risk to the historic structure. FHWA research (Heywood et al. 2002) indicates that at vehicle speeds in the range of 25-30 miles per hour, measured ground vibration at a distance of 5 feet from roadway traffic was less than 0.003 ips PPV.

To help ensure these construction-attributed groundborne vibration velocity exposures at NSRs are kept below the previously discussed criteria, the following mitigation measure Great Meadow Bike Path-Mitigation-NOIS-2 should be implemented. Additionally, as a good construction practice and based on the expectation of it being used as an travel route across the proposed Project site, the unpaved "Farm Road" parallel to the Bike Path should be properly maintained to avoid and/or minimize potholes, washboarding, and other surface roughness effects that cause bumps, drops, or other phenomena that create or amplify ground-borne vibration from vehicle and equipment traffic.

Great Meadow Bike Path-Mitigation-NOIS-2a: UC Santa Cruz and/or the construction contractor(s) shall ensure that usage of the following construction equipment adheres to the following limits on proximity to the indicated NSR:

- For vibratory rollers, operating distance to the NSR must not be less than:
    - The Music Center – 200 feet; and,
    - The Powder House – 22 feet.
- For other conventional heavy construction equipment shown on Tables 1 through 4, operating distance to the NSR must not be less than:
    - The Music Center – 85 feet; and,
    - The Powder House – 10 feet.

Great Meadow Bike Path-Mitigation-NOIS-2b: If UC Santa Cruz and/or the construction contractor(s) cannot avoid the use of the equipment listed in Great Meadow Bike Path Mitigation NOIS-2a in close proximity to the Music Center based on the above distances, UCSC shall coordinate with the Music Center and limit project construction hours and activities to avoid concurrence with scheduled concerts and performances.

Great Meadow Bike Path-Mitigation-NOIS-2c: If UC Santa Cruz and/or the construction contractor(s) cannot avoid the use of the equipment listed in Great Meadow Bike Path Mitigation NOIS-2a in close proximity to the Powder House based on the above distances, or if soil conditions in the vicinity are known or are suspected to be a Class IV soil type (or otherwise transmit ground vibration more readily than that of Class III soil type (as assumed for the calculated distances of Great Meadow Bike Path Mitigation NOIS-2a), the following shall be implemented:

- A pre-construction condition survey shall be prepared by a qualified independent structural engineer.
- During construction, the contractor(s) shall install and maintain at least one continuously operational automated vibration monitor at the Powder House. The monitor(s) must be capable of being programmed with at least two predetermined vibratory velocity levels, such as a first-level alert equivalent to a 0.1 inches per second (in/sec) PPV to warn of continuous vibration approaching the 0.12 ips standard, and a second-level 0.25 ips PPV alert for potential transient vibration events. The monitoring system must produce real-time specific alerts (e.g., via text message and/or email to on-site personnel) when vibration velocities exceed the predetermined levels. In the event of a first-level alert, feasible steps to reduce vibratory levels shall be undertaken, including but not limited to halting/staggering concurrent activities and using lower-vibratory techniques. In the event of an exceedance of the second-level alert, work in the vicinity shall be suspended and the building visually inspected for potential damage. Results of the inspection must be logged.
- With methods and materials suggested at the discretion of the independent structural engineer, the stone header over the door of the Powder House should be stabilized and/or braced during construction activities in the vicinity.

With Great Meadow Bike Path-Mitigation-NOIS-2a implemented on site, propagated groundborne vibration levels would be sufficiently reduced to yield exposure levels at NSRs that comply with FTA and Caltrans guidance thresholds. If construction contractor(s) cannot avoid the use of the equipment listed in Great Meadow Bike Path Mitigation NOIS-2a in close proximity to the Music Center, UC Santa Cruz will limit construction hours and activities in close proximity to the Music Center during concerts and performances under Great Meadow Bike Path Mitigation NOIS-2b. If construction contractor(s) cannot avoid the use of the equipment listed in Great Meadow Bike Path Mitigation NOIS-2a in close proximity to the Powder House, UC Santa Cruz will implement a pre-construction site survey and in-progress construction vibration monitoring under Great Meadow Bike Path Mitigation NOIS-2c.

3.3 Operations Noise & Vibration

The proposed project involves renovation of an on-campus bicycle path that, upon completion, is not expected to directly increase or otherwise alter flows of automotive traffic on nearby UC Santa Cruz campus and City roadways. The project will neither install or operate new or refurbished stationary noise-producing equipment, such as heating, ventilation, and air-condition (HVAC) systems. Hence, the project should have no noise and vibration impacts with respect to transportation noise and stationary noise sources. Consequently, LRDP EIR mitigation measures NOIS-2 and NOIS-3 would not be needed for the proposed project.

4 CONCLUSIONS

In summary, this letter report concludes the following:

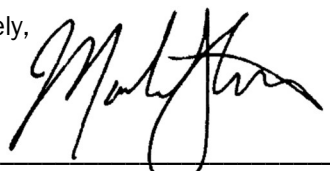
- This project, tiered to the LRDP EIR, would require implementation of mitigation measure LRDP EIR Mitigation NOIS-1, but not NOIS-2 or NOIS-3. These latter measures apply to transportation noise sources and the creation of new sensitive receptors, which do not apply to the proposed project.

- With practical administrative control on the operating hours per day for the noisiest pieces of anticipated onsite equipment, or implementation of temporary noise barriers as described in Great Meadow Bike Path-Mitigation-NOIS-1, construction noise attributed to the project would not cause exterior noise exposures at the nearest NSR that exceed LRDP EIR impact criteria, or construction conflicts with Music Center events would be avoided.

- As described in Great Meadow Bike Path-Mitigation-NOIS-2, respecting limitations on operating distance between certain types of construction equipment and the nearest receptors that are most sensitive to groundborne vibration, construction activities are not expected to cause significant impacts with respect to FTA and Caltrans guidance. If construction contractor(s) cannot avoid the use of the equipment listed in Great Meadow Bike Path Mitigation NOIS-2a in close proximity to the Music Center, UCSC will limit construction hours and activities in close proximity to the Music Center during concerts and performances under Great Meadow Bike Path Mitigation NOIS-2b. Implementation of Great Meadow Bike Path Mitigation NOIS-2c would help protect the Powder House historic structure from excessive construction-attributed vibration.

Should you have any questions regarding the presented results and findings of this letter report, please do not hesitate to contact me (760.479.4297).

Sincerely,



Mark Storm, INCE Bd. Cert.
Senior Acoustician

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Attachment A

Glossary of Acoustical Terms

Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
A-Weighted Sound Level (dBA)	The sound pressure level (SPL) in decibels as measured on a sound level meter (SLM) using the A-weighted filter network, which de-emphasizes the very low and very high frequency components of the measured sound in a manner similar to the frequency response of the average healthy human ear.
Day-night Sound Level (L_{dn})	The A-weighted equivalent continuous sound level over a 24-hour period with a 10 dB adjustment added to sound levels occurring during the nighttime hours (10 p.m. to 7 a.m.).
Decibel (dB)	The unit for expressing SPL and is equal to 10 times the logarithm (to the base 10) of the ratio of the measured sound pressure squared to a reference pressure, which is 20 micropascals.
Equivalent Sound Level ($L_{eq[xh]}$)	The value corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period. The L_{eq} may feature notation in its subscript indicating the time period (e.g., eight hours as "8h") of energy averaging.
Maximum Sound Level (L_{max})	The highest value measured by an SLM over a given sample period, based on a time-weighted sound level in dB using a "fast" or "slow" time constant.
Peak Particle Velocity (PPV)	The maximum instantaneous positive or negative peak of a vibration wave. (In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction-generated vibration for building damage risk and human annoyance.
Statistical Sound Level (L_x)	The sound level, in dB, that is exceeded "x" percent of the time during a given measurement period. For instance, L_{50} is often called the "median" value as it is not the average or mean sound level. The L_{90} is often referred to as a "background" sound level, as it is exceeded 90% of the time and would therefore characterize the acoustical contribution of continuous or steady-state sources from a measurement period.
Vibration Velocity Decibel (VdB)	Ten times the common logarithm of the ratio of the square of the amplitude of the RMS vibration velocity to the square of the amplitude of the reference RMS vibration velocity. The reference velocity in the United States is one micro-inch per second.

Attachment B

Expected Project Work Site and Staging Areas



Source: Bing 2019, Dudek 2019

Figure B-1. Project Site and Staging Areas