Final Initial Study/Mitigated Negative Declaration

University of California Santa Cruz

Environmental Health and Safety Facility

(Tiered from 2005 LRDP EIR)

SCH# 2016042016

Prepared By:

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May 2016

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UNIVERSITY OF CALIFORNIA
Santa Cruz Campus

1 PROJECT INFORMATION

Project title:

Environmental Health and Safety Facility

Project location:

Heller Drive west of Kerr Hall, UC 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:

Office of Physical Planning & Construction
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:

UCSC 2005 Long Range Development Plan Environmental Impact Report. Available on line 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 EIR, 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 UCSC 2005 Long Range Development Plan Environmental Impact Report, 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 in accordance with Sections 15152 and 15168 of the CEQA Guidelines and Public Resources Code Section 21094. The 2005 LRDP EIR was prepared pursuant to Public Resources Code Section 21080.09 and provides the basis for tiering of subsequent projects. . 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 addressed or 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

The Draft Initial Study was circulated for public and agency review from April 6, 2016 to May 6 2016. Copies of this document were available for review at the following locations:

UCSC Physical Planning and Construction, Barn G, UC Santa Cruz

McHenry Library and the Science and Engineering Library on the UC Santa Cruz campus

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

The UC Santa Cruz web site, at http://ppc.ucsc.edu

Responses to all comments on the Draft Initial Study are presented in Appendix G. The following changes to the Draft Initial Study have been made in response to comments or to present new information:

- Throughout the document, the project description has been modified to reflect changes to the project design, including elimination of the radioactive waste building, incorporation of radioactive waste functions into the main building, the reduction in new building area resulting from elimination of the radioactive waste building, modification of the design of the roof of the main building to eliminate the slope.
- Figures 3-3 and 3-4 on pages 16 and 17, respectively, have been revised to reflect the changes to the design.
- On page 42, a summary of the results of an additional survey for California bottlebrush grass was added. The survey report was added to Appendix E.
- On page 42, a correction was made to the list of special-status wildlife species with the potential to occur on the site, removing Vaux's swift. This correction was also made in the wildlife habitat assessment report for the Project (Biosearch 2016). The revised report is included in Appendix E. On page 44, additional information about Vaux's swift habitat and life history was deleted.
- In response to a comment from the California Department of Fish and Wildlife, a reference to the absence of potential roosting habitat for Townsend's big-eared bat was added on page 42.

- In response to a comment from the Monterey Bay Unified Air Pollution Control District, an explanation of the reasons why the UC Santa Cruz Climate Action Plan does not meet the requirements specified in the CEQA Guidelines in order to be used to streamline the analysis of project-level GHG emissions.

The changes to the Project would reduce the footprint of development, the building area, and the visual building mass. No changes to the impact analysis were made as a result of the changes to the Project design.

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. The University has prepared responses to all written comments that raise CEQA-related environmental issues regarding the project. The comments and responses are included in this Final Initial Study/Mitigated Negative Declaration (IS/MND) as Appendix G. The Final IS/MND and approval of design of the EH&S Facility Project 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 Project design. The Campus anticipates that the EH&S Facility Project will be considered for design approval in June, 2016.

The Campus anticipates that a timberland conversion permit (TCP) from CalFire will be required; a timber harvest plan (THP) would be required in conjunction with the TCP. Prior to the beginning of construction, the Campus would submit a Notice of Intent to the Central Coast Storm Water Regional Control Board (SWRCB) and obtain coverage under the General Permit for Discharge of Storm Water Associated with Construction Activity. A permit from the Monterey Bay Area Unified Air Pollution Control District would be required for the laboratory fume hood and emergency generator.

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 projects, 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 projects have 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 Included in the Project

Appendix C – Proposed Mitigation Monitoring and Reporting Program

Appendix D – Air Quality and Greenhouse Gas Emission Calculations

Appendix E – Biological Resources Reports

Appendix F– Noise Technical Study

Appendix G – Responses to Comments on the Draft Initial Study/Mitigated Negative Declaration

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 the 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 Road are the primary access routes to the main campus.

The proposed site of the EH&S Facility is undeveloped, forested land on the east side of Heller Drive, a major campus road, in the central campus (Figure 3-2). To the east of the site, the land descends steeply down to an ephemeral stream channel known as the East Fork Moore Creek, Baskin Tributary. Kerr Hall, a Campus administration building, is located just east of Moore Creek, about 280 feet from the Project site. A pedestrian bridge adjacent to the northern end of the site connects a bus stop on Heller Drive and the colleges to the west with Kerr Hall and other central campus facilities. A student apartment complex, Redwood Grove, is located about 125 feet northwest of the site, on the west side of Heller Drive. An outdoor stage, part of the Campus' Performing Arts complex, lies approximately 200 feet to the southeast.

3.2 PROJECT OVERVIEW

The proposed project would construct a new ~~8,229~~7,074-gross square foot (gsf)/ ~~5,237~~4,646 assignable square foot (asf) regulated waste handling and storage facility for sorting, packaging, and accumulation of regulated waste generated by laboratory research and teaching, the arts, and maintenance on the main campus. The facility would include laboratory space; waste accumulation areas; space for processing radiation, chemical, and batteries classified as universal waste for eventual shipment off-site to approved, permitted Treatment, Storage and Disposal Facilities (TSDF); an office; and a shower/locker work room. The facility would replace the Campus' existing, temporary regulated waste facility at the base of campus and low-level radioactive storage facility in Thimann Laboratories in the central campus. The new facility would consist of a singleone-story building ~~two separate buildings, one housing the radioactive materials rooms, the other housing the chemical materials rooms and other functions. The two buildings would be connected by a covered walkway~~. Site improvements would include a loading dock, driveway and pedestrian paths, service vehicle and accessible parking, a trash and recycling area, and an electrical equipment yard. Campus utilities would be extended to the site from Heller Drive and from Kerr Hall via the pedestrian bridge.

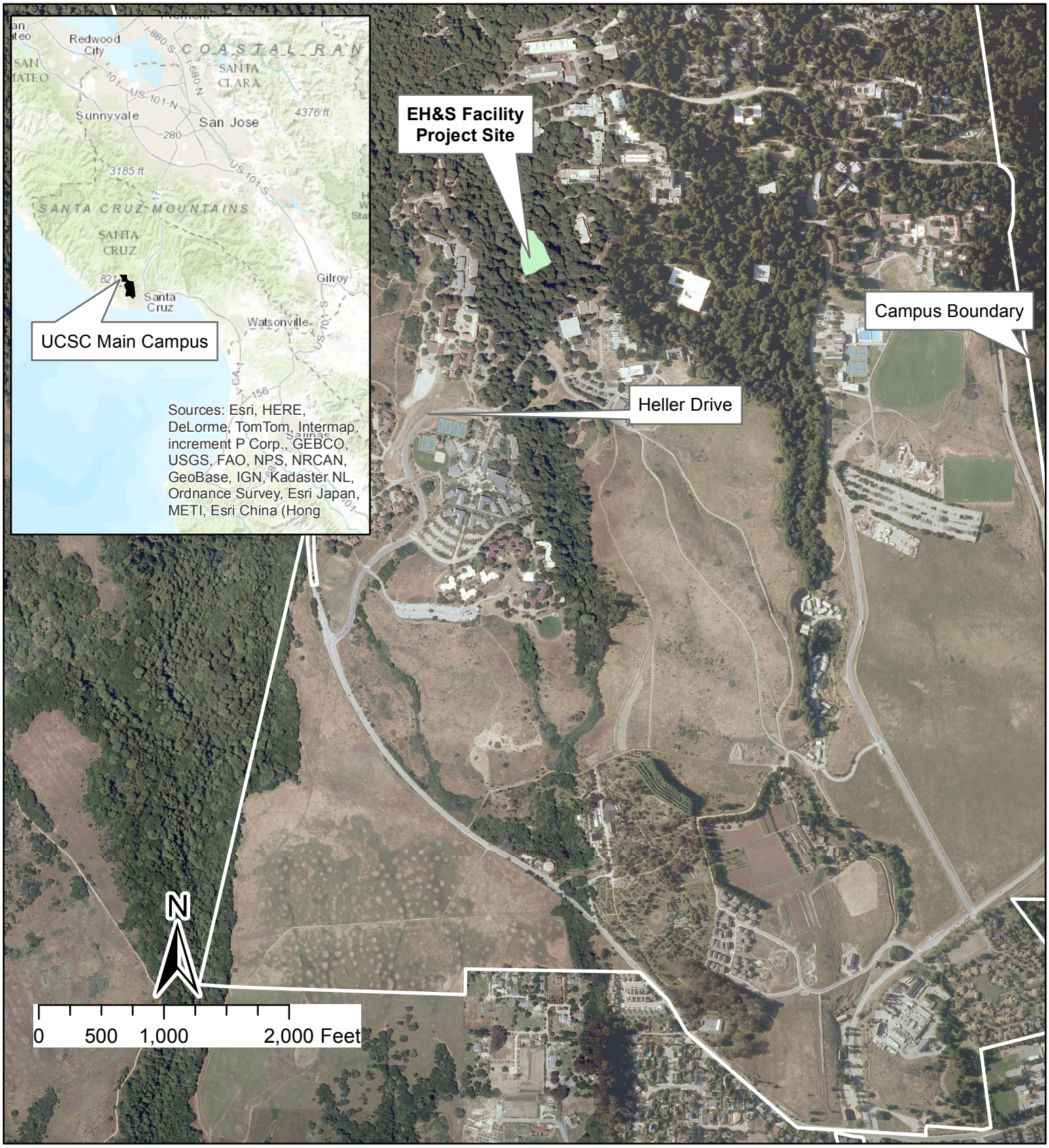

Figure 3-1: Project Location

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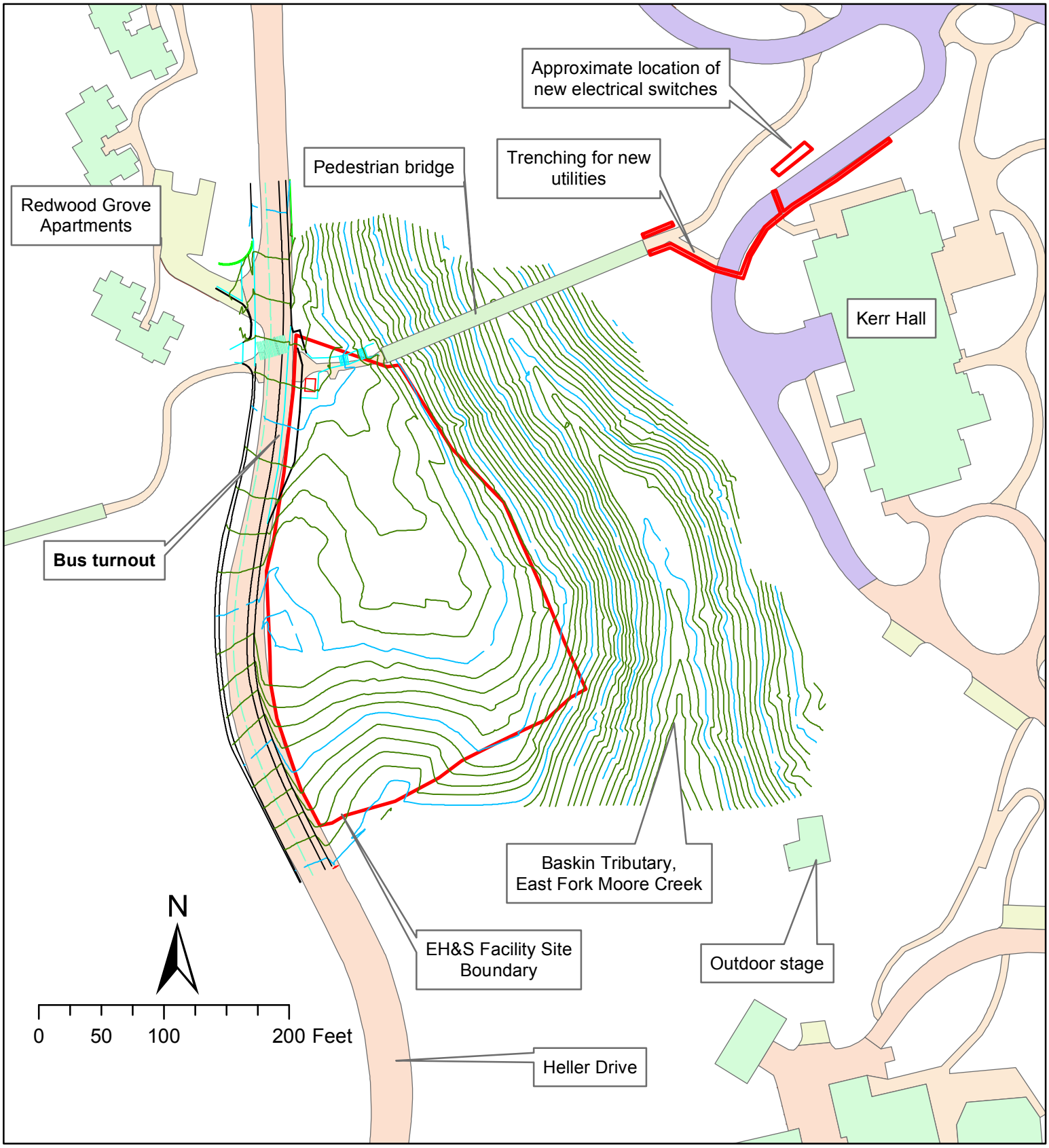

Figure 3-2: Existing Site Conditions

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3.3 PROJECT BACKGROUND, NEED AND OBJECTIVES

The campus EH&S department is responsible for overseeing regulated waste management, programs that support laboratory and research safety, radiation safety, management of environmental issues, industrial hygiene, and injury prevention.

In general, the Santa Cruz campus generates four types of regulated waste requiring appropriate facilities for handling and storage: chemical, low-level radiation, medical, and universal.

Chemical. As defined by Title 40, Code of Federal Regulations and Title 22, California Code of Regulations, the Santa Cruz campus is an Environmental Protection Agency (EPA) registered "Hazardous Waste Generator" subject to State and federal regulations requiring appropriate accumulation, packaging, labeling, storage, shipment, and disposal of toxic, reactive, flammable, and corrosive waste. Research and teaching laboratories generate a wide variety of chemical wastes including flammable chemicals such as alcohols and ether; corrosives, such as hydrochloric, nitric, and sulfuric acids; reactives and oxidizers, such as nitrate salts and mercuric salts; health hazards, such as toxics, carcinogens, and tetratogens; and other toxic chemicals. Campus maintenance work involves using hazardous materials. Custodial staff use substances such as detergents and wax strippers. The Campus garage uses various petroleum products and solvents. The paint shop uses solvents and oil-based paint. The Central Heating Plant uses materials such as nitrates, biocides, sulfuric acid, and calcium hypochlorite to treat cooling and heating hot water.

Photographic laboratories used for teaching and photographic production generate hazardous waste as a byproduct of the photographic process, such as photographic fixers (which contain heavy metals), developers, and other chemicals. The Agroecology program and the Arboretum staff each use small quantities of EH&S-approved pesticides, fertilizers, and herbicides. Office administrative staff use very small quantities of hazardous materials, primarily solvent-containing materials such as rubber cement.

Chemical waste. Campus chemical waste generators, primarily those involved in student instruction and research, have been trained by EH&S staff appropriately to segregate, package, label and hold unwanted chemical materials and waste. As waste is generated, the user enters identifying information into a computer database, creating a label and documenting the location and type of waste generated and the need for pick-up. Currently EH&S or a licensed contractor uses a box truck to pick up the waste and material from the waste generators once a week, and transport it to the interim waste handling facility near the entrance to the campus, where it is further segregated and accumulated with other compatible materials. Periodically, but no longer than every 90 days, a licensed contractor packages the compatible waste and transports the material to an approved permitted TSDF.

Radioactive waste. Radioactive instruction and research materials are used on campus under a broad scope license issued by the California Department of Public Health. The resultant radioactive waste also falls under the conditions of the license. UC Santa Cruz laboratory researchers who use radioactive materials, segregate and package dry and liquid radioactive waste that is ready for disposal in plastic carboys and cardboard containers provided by EH&S for transport and storage. The waste is sorted by EH&S personnel according to disposal criteria. Short-lived (less than 120 day half-life) radioactive waste is stored for 10 half-lives and until it is no longer distinguishable from background radiation, then disposed of in a manner that assures labels are adequately removed. Long-lived radioactive waste is transferred to a licensed broker for processing at a licensed processing facility and ultimately disposed of at a licensed disposal site. Long-lived and short-lived wastes are processed by EH&S personnel on an ongoing basis. Long-lived waste is shipped off site annually.

Medical waste. Medical waste is a general term that includes both biohazardous and sharps wastes (California Health and Safety Code Section 117690). Medical waste includes pathology waste, recognizable human anatomical parts and fixed human surgery specimens and tissues, and chemotherapy

waste, waste such as gloves, towels, empty bags, and intravenous tubing that contains or is contaminated with chemotherapeutic agents. On the UC Santa Cruz campus, medical waste is currently picked up by a contracted vendor from storage locations near the point of generation. The proposed new EH&S Facility would not be used for storage of medical waste.

Universal Waste. Specific categories of hazardous wastes which are more common and present relatively low risks, are known as "universal wastes." Universal waste is regulated by the California Department of Toxic Substances Control through requirements codified in Title 22, California Code of Regulations. Universal waste includes electronic wastes, cathode ray tubes, materials containing mercury, equipment containing mercury (e.g. mercury thermostats), dry cell batteries (e.g. flashlight batteries, AA & AAA batteries, cell phone batteries, laptop batteries, etc.); and lamps (fluorescent tubes & mercury vapor lamps). Federal and State regulations identify universal wastes and provide simple rules for handling, recycling, and disposing of them. Most of the universal waste generated on the campus consists of batteries.

Several campus entities coordinate efforts with EH&S to collect, transport, and store universal waste for shipment to an approved, licensed recycling facility. The proposed new EH&S Facility would only be used to manage batteries.

Existing Facilities

The existing regulated waste facility at the base of campus consists of 960 asf of building space and two 480-sf prefabricated units designed for the storage of chemical and universal waste. As part of an interim storage project, these facilities were recently remodeled to meet current code requirements and the needs of current waste management practices. In addition, low-level radiation waste storage and handling were moved into borrowed space in Thimann Labs, a research facility on the central campus.

The space in the existing facilities remains inadequate to accommodate existing and projected demand for waste storage efficiently. Although the Campus is permitted to store chemical waste for up to 90 days, because of the limited storage capacity, EH&S has increased the frequency of shipments to occur every four to six weeks as the Campus has grown. Waste disposal costs have increased with the frequency of shipment, along with the staff time required. Furthermore, the useful life of the modular units, which were installed in 2014, is only five to seven years, and the borrowed space in Thimann Labs would be better used for research activities.

Project Objectives

The objectives of the Project are to:

- construct a permanent regulated waste-accumulation and storage facility in compliance with current construction code requirements
- meet current minimum regulated waste accumulation and handling requirements on a site that could accommodate future expansion for additional storage and the co-location of EH&S administrative staff
- ensure continued compliance with the University of California Policy on Management of Health, Safety and the Environment.
- locate the waste handling near the primary waste generators in the central campus to reduce transportation risk and costs, increase operational efficiency

3.4 CONSISTENCY WITH THE 2005 LRDP

The Project site is designated Academic Core in the 2005 LRDP. The Academic Core designation provides for land uses that directly support the teaching, research, and public service mission of the University of California, including instruction and research, organized research, academic support, libraries, student services, institutional support, public services, and parking. The Project, which is considered institutional support, is consistent with this designation.

The 2005 LRDP building program includes approximately 144,000 gsf for institutional support, including 37,000 gsf for campus administration and 107,000 gsf for general services. The general services projects envisioned in the 2005 LRDP include a new Environmental Health and Safety facility. The proposed Project, which would add ~~8,208~~ 7,074 gsf of institutional support space, would be the first project in this program category constructed under the 2005 LRDP. Therefore, the Project would be consistent with the 2005 LRDP building program.

The Project would be staffed by existing employees. The Project would provide adequate regulated waste handling and accumulation space to meet current and anticipated demand and would enable EH&S to resume shipping at near 90-day intervals. The Project would not generate an increase in Campus enrollment.

3.5 DETAILED PROJECT DESCRIPTION

Buildings

The proposed new facility would consist of ~~two separate~~ a single one-story building~~s, one housing the chemical materials rooms and other functions, the other housing the radioactive materials rooms (Figures 3-3 and 3-4). The buildings would be connected by a covered walkway. Both buildings~~ The building would be structurally light steel building~~s~~ atop a concrete slab/beam base with concrete caissons and structural bracing where required. The loading dock would have poured concrete walls and floor system. The decision to raise the building on caissons was made to protect the integrity of the root systems of nearby trees. ~~In the main building, t~~The corridor would be open to the air using a wooden screen wall, allowing fresh airflow into the corridor and through louvered doors into most of the rooms and thereby reducing the mechanical ventilation load.

The ~~main~~ building would house a ~~593~~ 561-asf laboratory, ~~1,757~~ 1,053 asf of space for chemical waste accumulation and handling, a ~~955~~ 1,069 asf material handling room, a 212-asf room for universal waste storage and handling, ~~and~~ a shower/locker room~~. The smaller building provide 924~~, and 608 asf of space for radiation waste storage and handling.

The laboratory ~~in the main building~~ would be used to perform environmental analysis, for characterization analysis of unidentified wastes, and other types of sample analysis. The laboratory space would also be used to calibrate instruments and store calibration gases, including methane, hydrogen sulfide, and carbon monoxide. A laboratory fume hood would be provided for the safe use of scintillation mixtures (used to measure the activity of a sample of radioactive material) and calibration gases. The laboratory would also be used for hands-on training and fit testing of personal protective equipment such as respiratory protection and safety glasses, and to store emergency response and other equipment.

The chemical waste storage and accumulation room would be used for temporary accumulation of chemical waste, for aggregating liquid chemicals, and for lab packing. The universal waste storage and handling room would provide space for battery sorting and storage.

The material handling room would be used for shipping and receiving functions, including scanning and weighing of incoming containers, and weighing, labeling and preparing manifests for containers to be

shipped. The material handling room would also be used for storing carts, empty pallets, pallet jacks, and drum dollies and other supplies and equipment.

The radioactive waste ~~building~~ room would be used to receive radioactive waste which has been segregated and packaged by the users, to store the waste, and pack it for shipping.

Site Layout

Access to the facility for large trucks would be provided by a one-way, entry-only, driveway at the south end of the site (Figure 3-3); these trucks would exit at the north end of the site. The large trucks would be coming from off campus and therefore approaching the site on northbound Heller Drive. Trucks entering from the southern entrance would drive through the site and exit at the north end of the site. This drive-through configuration eliminates the need for a large paved area for trucks to turn around on the site. As sight lines for southbound vehicles at the southern entrance are limited by the curve and gradient of Heller Drive, cars and thee Campus' smaller trucks, which would be coming from the north, would enter and exit at the northern entrance. One of the goals of this design is to minimize the width of the southern entrance to limit the footprint of the Project and the impact to nearby trees.

A turn-off area for dumpsters and recycling bins would be provided along the west side of the driveway. An electrical yard (approximately 660 to 1,000 sf depending on whether the new switches are sited in the yard or near Kerr Hall) would be constructed east of the northern entrance ~~northwest of the radiation waste building~~. The Project includes one accessible parking space and three service vehicle parking spaces adjacent to the electrical yard, and space for a fourth service vehicle at the loading dock.

A sidewalk would be constructed to provide access from the bus stop on Heller Drive to the EH&S facility. ~~A raised boardwalk would connect the sidewalk to the covered walkway between the two buildings. A deck for employees to use for eating lunch or other breaks would be constructed adjacent to the covered walkway.~~

Storm Water Management

The Project must meet the Campus' Post-Construction Storm Water Requirements, which emphasize protecting and, where degraded, restoring natural watershed processes. For the proposed Project, the primary strategy for meeting these requirements is to preserve a majority of the redwood trees and other native vegetation, which would minimize the creation of new impervious surfaces, and retain the absorptive qualities of the forest floor.

Runoff from impervious surfaces would be directed to vegetated areas, a pervious parking stall pavement system, or biofiltration facilities which would include tree boxes and/or bioswales. The treated water would be routed to an infiltration gallery and retention area consisting of 60-inch bottomless corrugated metal pipes surrounded by drainage gravel. In high-flow events, overflow from the pipes would discharge to a flow-spreading outlet at the southwestern corner of the site.

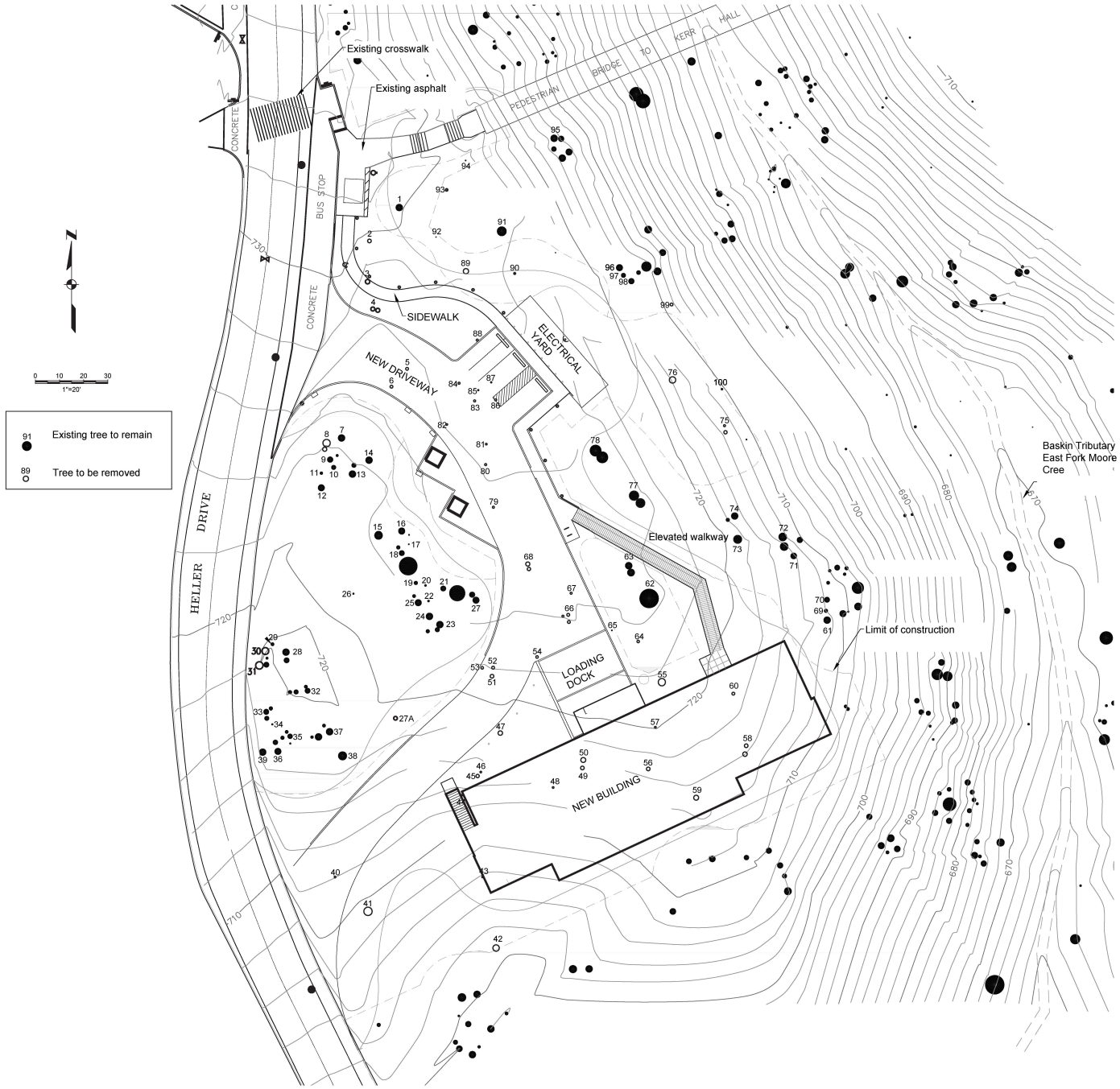

Figure 3-3: Proposed Site Plan

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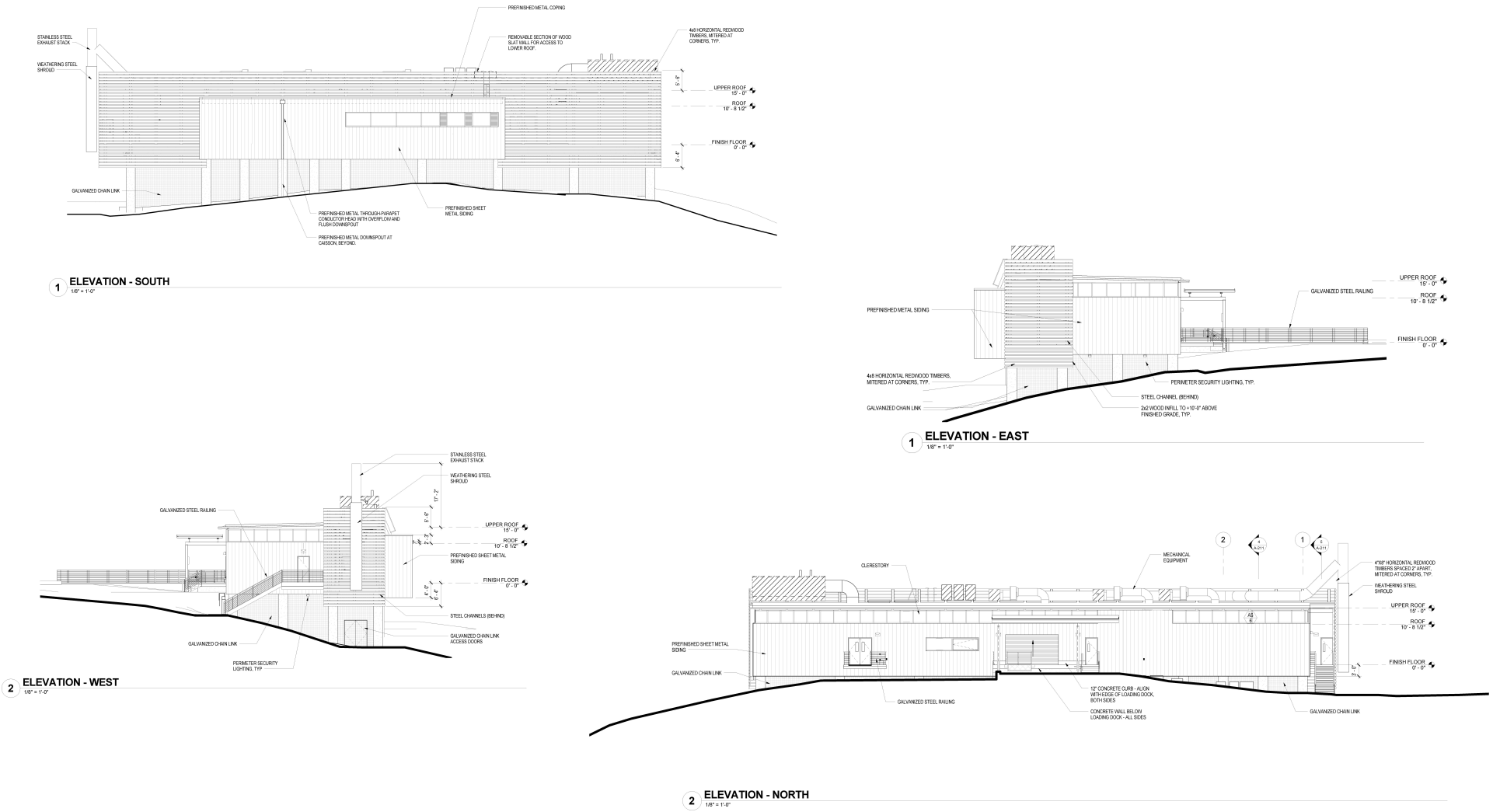

Figure 3-4: Proposed Building Elevations

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Utilities

Water and sanitary sewer service to the site would be provided by connecting to existing Campus utilities in Heller Drive. Natural gas, electricity, and telecommunications service for the new facility would connect to the Campus distribution systems at Kerr Hall.

Water. Water service to the building~~s~~ will be provided by connecting to an existing 8-inch potable water supply located in Heller Drive. Approximately 350 feet of piping will be installed beneath the egress driveway to supply domestic, fire, and irrigation water to the site. Up to three separate meters for domestic, irrigation, and fire water supply will be installed.

Indoor water demand for the new facility would be limited primarily to personal use by the staff. Temporary irrigation would be provided to support retained trees and new landscaping; permanent irrigation of some retained trees may be necessary.

Sanitary sewer. Approximately 160 feet of 6-inch sanitary sewer service line would be installed from the point of connection down the ingress driveway and connecting to the existing sewer.

Natural gas. To provide natural gas service to the site, 2-inch pipe would be installed on the Kerr Hall pedestrian bridge and then along an existing service road to the existing Campus natural gas distribution system north of Kerr Hall. Natural gas demand for the new facility is estimated at approximately 21,000 therms/year.

Electricity. Power would be extended to the site from existing 12kV feeders at Kerr Hall via the pedestrian bridge and existing service road. Two new switches would be installed in above-ground boxes adjacent to the service road or in the new electrical yard. A new transformer and a new emergency generator would also be installed in the electrical yard. The generator would be fueled by natural gas with a propane tank as an alternative fuel source. Based on preliminary estimates of the emergency power load, the generator would have a capacity of 125kW.

New telecommunications lines for the new facility would be routed across the Kerr Hall bridge and then to an existing manhole in the same trench as the electrical lines.

Landscape

Approximately 50 of the 100 trees on the site would be removed to accommodate the new facility, including about five coast redwood, 21 coast and interior live oak, seven bay laurel, two madrone, one tan oak and one big leaf maple. The Project would retain two clusters of redwood trees between Heller Drive and the new driveway to screen the new development. Several redwood trees between the sidewalk and the building~~s and covered walkway~~, including one 96-inch-diameter redwood, would also be preserved. Irrigation would be provided to retained trees whose root systems may be affected by construction, to facilitate their recovery.

Approximately 15 new redwood trees and about 12 vine maples would be planted to provide screening of the new development from Heller Drive and the pedestrian bridge. Native shrubs, ferns, iris, and ground cover would be planted along the driveway and around the building~~s~~.

Site Lighting

Site lighting would be provided for passage and security/safety. LED luminaires will be used for all exterior lighting. All exterior luminaires will be capable of bi-level settings and would use cutoff optics to limit light pollution.

Project Operations

The existing EH&S offices elsewhere on campus would continue to serve as the base for all EH&S staff. The building would be occupied by up to six staff at a time, for a total of about 24 person-hours per week.

Re-Use of Existing Facilities

Once the proposed new facility is operational, the existing, temporary, radioactive waste facility in Thimann Laboratories would be returned to its previous use as academic lab and office space. The existing temporary regulated waste facility in the "corporation yard" in the lower campus would be turned over to one or more units currently occupying space in the vicinity to meet their existing needs for additional space (e.g., Campus Police, Shop Stores, Grounds Services).

3.6 POPULATION

As explained above, the Project would be staffed by existing employees and would not generate an increase in Campus enrollment or other Campus population.

3.7 SCHEDULE AND STAGING

Project construction would begin in May 2017 and would take approximately 16 months. Construction staging would be accommodated on the Project site; additional space may be provided at the existing Campus construction staging area off of Hagar Drive near the East Remote Parking Lot.

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	☐	Geology, Soils & Seismicity
☐	Hazards & Hazardous Materials	☐	Hydrology & Water Quality	☐	Land Use & Planning
☐	Mineral Resources	☐	Noise	☐	Population & Housing
☐	Public Services	☐	Recreation	☐	Transportation, Circulation & Parking

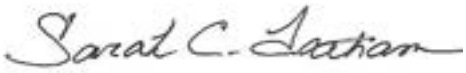
☐ Utilities/Service Systems ☐ Mandatory Findings of Significance

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.



5/27/2016

Sarah C. Latham
Vice Chancellor - Business and Administrative Services

Date

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) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☑	☐	☐	☐
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 (UCSC 2006b). The following, previously adopted LRDP EIR mitigations for potential aesthetic impacts are applicable to and included in the project (the full text of the mitigation measures is included in Appendix B). Project implementation of these mitigation measures is discussed under relevant checklist questions, below.

LRDP EIR Mitigation AES-5A (Design Advisory Board review of project design for consistency with the valued elements of the visual landscape identified in the 2005 LRDP EIR)

LRDP EIR Mitigation AES-5B (for projects in redwood forest areas, building heights will be below the height of the surrounding trees)

LRDP EIR Mitigation AES-5C (minimize removal of health and mature trees around new projects)

LRDP EIR Mitigation AES-5F (evaluation for their aesthetic value, of trees identified for removal, and replacement of large unique trees)

LRDP EIR Mitigation AES-6B (use of directional, shielded lighting to minimize light spillage an atmospheric light pollution)

LRDP EIR Mitigation AES-6C (Design Advisory Board review of project-related light and glare)

LRDP EIR Mitigation AES-6E (Design Advisory Board review of outdoor lighting fixtures to ensure the minimum amount of lighting is used)

6.1.1 Discussion of Checklist Questions

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. Important vantage points from the lower campus looking across open space areas towards the central campus include points along Empire Grade Road, Glenn Coolidge Drive, and Hagar Drive. The lower campus grasslands and forest canopy of the upper campus are visible from various points throughout the city of Santa Cruz, including the wharf, the Boardwalk and Highway 1. The campus is regarded by local residents as an important visual resource for the city because it provides an open backdrop for developed areas of western Santa Cruz. Because it is screened by trees and topography, the project site is visible only in the immediate vicinity. The southern face of the building

would be 22 feet tall; the northern face would be structure will be approximately 8.5 feet tall. The exhaust stack would extend 13 feet above the upper edge of the roof.

The Campus has prepared visual simulations of the proposed new facility from two vantage points: the pedestrian bridge north of the site, and northbound Heller Drive at the proposed southern entrance, where visibility of the building would be greatest (Figures 6.3-1 through 6.3-3).As shown in these figures, the building would not be taller than the surrounding trees that would remain after construction, and therefore would not be visible in any scenic vistas. No impact would occur.

b) The project site is not within view of any scenic highways. No special landmarks or landforms (including rock outcroppings or historic buildings) are present on the site and the project site is not located near or within view of the historic buildings or features on the lower campus. The Moore Creek East Fork corridor adjacent to the project site is considered as a valued scenic resource by the Campus and is designated as Protected Landscape in the 2005 LRDP. The project would not construct new structures within the corridor, remove trees from the drainage, or otherwise affect views of this corridor. Therefore, the proposed project would not affect any of the scenic resources identified in the 2005 LRDP and the impact would be less than significant.

c) The existing visual character of the Project site is forest land. The site is at the north end of an 850-foot stretch of Heller which is forested on both sides, and is visible from vehicles and bicycles traveling up or down Heller Drive, from the pedestrian bridge to the north of the site, and from the southern portion of the Redwood Grove student apartment complex to the northwest. The forested East Fork Moore Creek corridor to the east of the site screens the site from Kerr Hall to the east.

As shown on Figure 6.3-2, ~~the radiation waste building and~~ a portion of the ~~main~~ building would be partly visible from the pedestrian bridge, but the view would be filtered through redwood trees and native understory plants. From northbound Heller Drive, the new development would be clearly visible. However, the new development would interrupt the views of the forest only briefly; immediately north of the entrance to the southern driveway, the retained “island” of trees between Heller Drive and the driveway would largely screen the development from view.

The 2005 LRDP EIR (pp. 4-1-18 to 4.1-19) evaluated the potential that development under the LRDP could substantially degrade the existing visual character of the campus and adjacent areas, if the new facilities were not designed to be visually or aesthetically compatible with their surroundings. The aesthetic character of pathways could be adversely affected by development if it substantially changed the varied visual experience of pedestrians using them. Land use patterns as envisioned under the proposed 2005 LRDP would be sensitive to the existing natural and built context, and the 2005 LRDP envisions development that would be sensitive to the preservation of distinctive physical features, such as ravines and grasslands, and would minimize habitat fragmentation. Nonetheless new development could affect the visual character of the campus, and the impact would be potentially significant. The LRDP EIR determined that this impact would be less than significant with implementation of LRDP Mitigations AES-5A through AES-5F. LRDP Mitigations AES-5A, AES-5B, AES-5C, and AES-5F are applicable to and incorporated into the Project. As discussed below, the proposed Project is consistent with the planning principles and guidelines related to the visual quality of the Campus, and incorporates applicable LRDP EIR mitigation measures that address visual character and quality.

Consistency with LRDP Planning Principles and Guidelines

The following 2005 LRDP planning principles and guidelines apply to the Project siting design:

- *Respect the natural environment and preserve open space as much as possible through infill and clustering of new facilities, retention of valuable visual and environmental features, encouraging*

a pedestrian-friendly campus, and providing a buffer between new buildings and major roads where possible.

- *Integrate the natural and built environment through siting, development patterns and architecture that are sensitive to the natural setting. In forested areas, buildings generally should not protrude above the surrounding tree canopy; in visually sensitive areas. Encourage sustainability and efficiency in building layouts by configuring buildings simply, to balance programmatic goals with sensitivity to the natural and/or built context.*

- *Respect major landscape and vegetation features, including ravines, major grasslands, chaparral, and areas of redwood and mixed evergreen forests.*

- *Maintain continuity of wildlife habitats.*

- *Design exterior landscaping to be compatible with surrounding native plant communities; favor the use of native plants, as well as noninvasive, drought-tolerant, and fire-resistant species.*

- *Maintain natural surface drainage flows as much as possible by using sustainable design strategies to manage storm water, thereby preserving groundwater supplies, major springs, seep zones, year round springs, and major drainage channels, while at the same time preventing slope erosion.*

Consistent with these principles and guidelines, the Project would be constructed on the edge of the existing central campus development while preserving the Moore Creek wildlife corridor and a visual buffer between Heller Drive and the new facilities. Tree removal would be minimized through the use of piers in the foundations and keeping the southern driveway as narrow as possible. As shown on the visual simulations (Figures 6.3-2 and 6.3-3), the new building~~s~~ would be much lower than the tree canopy. The color palette has been chosen to blend with the surrounding environment. As described in Section 6.9, *Hydrology and Water Quality*, the storm water drainage system mimics the natural drainage patterns to the extent feasible, by infiltrating runoff on-site.

During Project planning, the Campus evaluated a number of sites throughout the Campus, including some in existing buildings or within developed areas of the central and lower campus. The siting criteria included proximity to the science and engineering buildings where 90 percent of the Campus' hazardous waste is generated; security; limiting potential topographic and geotechnical challenges; proximity to utilities; ease of emergency and service vehicle access; the potential for maintaining trees as a visual buffer; displacement of existing uses; and whether the project would be the "highest and best use of the site" (e.g., whether would it take prime academic space). The selected site is close to the science and engineering area and to existing utility infrastructure, and has good existing pedestrian and vehicular access, but the site itself experiences relatively little pedestrian traffic and the separation from other campus uses, by Heller Drive on the west, the drainage channel on the east, and forest on the south, would make it relatively easy to secure the site. As discussed in section 6.6 below, based on preliminary geotechnical studies, the potential for encountering geological hazards on the site is low. While the Project would require removal of trees, the proposed site layout has been designed to minimize the removal of the large, healthy redwood trees.

Implementation of LRDP Mitigation Measures

Consistent with LRDP Mitigation AES-5A, Project design has been reviewed twice by the UC Santa Cruz Design Advisory Board (DAB) (Sept 2015 and Nov 2015); the reviews included assessment of the consistency of the design with valued elements of the visual landscape and the character of surrounding development. Specifically, the DAB suggested using pier foundations to minimize damage to tree roots and allow trees to remain closer to the buildings; breaking up the buildings into smaller masses connected

by covered walkways; retaining trees along the back of the site to minimize views of the buildings from the informal trail in the ravine; and ensuring that the facility does not have an industrial character as viewed from the Kerr Hall pedestrian bridge. One additional DAB review is planned.

As shown by the visual simulations below, consistent with LRDP Mitigation AES-5B, the building height~~s~~ will be below the heights of the surrounding trees. To implement LRDP mitigations AES-5C and AES-5F, all of the trees on the site have been surveyed, and evaluated by an arborist for their health and structural integrity. The arborist identified 63 trees as suitable for preservation because they are in good condition, and recommended removal of 38 trees which are in poor health and/or have poor structures that cannot be mitigated. According to the arborist's report, the redwood trees on the site exhibit good health and have structural integrity and merit the highest priority for preservation. In particular, the report identified three groups of large redwood trees which contribute valuable aesthetic and ecological value to the site and which would provide screening for the facility from Heller Drive if left in place. The arborist recommended shifting the driveway to the east of these trees. The Campus has revised the Project design in response to this recommendation; the revised design is reflected in the site plan (Figure 3-3) and the visual simulations (Figures 6.3-2 and 6.3-3). As suggested by the DAB, the proposed design includes pier foundations to minimize tree removal. The southern driveway has been kept to one lane to minimize removal of adjacent trees.

In summary, the proposed Project would alter the visual character and quality of the site by introducing development into a forested area. However, the Project design is consistent with applicable LRDP planning principles and guidelines and would implement the applicable LRDP mitigations that address the potential impacts of development under the LRDP on the visual character and quality of the campus. With implementation of these previously adopted mitigation measures, the new development would be partly visible from the Kerr Hall pedestrian bridge and would be visible from a short stretch of Heller Drive. However, with the retention of significant clusters of tall redwood trees as well as other native vegetation, the low profile of the building~~s~~, and the selected color palette, the new facility would be integrated into the natural environment and the impact would be less than significant.

d) The project would include new interior light sources, and exterior lighting as necessary for safety and nighttime operations of the equipment housed outdoors**.** Consistent with LRDP Mitigations AES-6B and -6E, exterior lighting will be directional and shielded. The building façade would not include large expanses of glass or other reflective materials.

The 2005 LRDP EIR (Vol. 1, pp. 4.1-20 to 4.1-20) determined that new sources of light associated with development under the 2005 LRDP, including exterior lighting, lighted recreational facilities, walkways, parking lots, or parking structures, as well as glare from reflective surfaces or headlights of vehicular traffic would contribute to atmospheric light pollution. This is a potentially significant impact at the LRDP level, which is reduced to a less-than-significant level with implementation of LRDP Mitigations AES-6A through AES-6E. LRDP EIR Mitigations AES-6B, AES-6C and AES-6E, which require the use of shielded and directional lighting to minimize light spillage, and consideration of light and glare by the Design Advisory Board, are applicable to and incorporated in the proposed Project. The design requirements of these mitigation measures are incorporated into the Campus Standards. The proposed Project site is not visible from off campus and the new building materials and lighting would be consistent with the standards identified in the LRDP EIR Mitigation Measures. With the inclusion of the design features described above, the project would not result in significant new light or glare. The Project would not result in a new significant impact which was not identified in the LRDP EIR and Project-specific mitigation is not required.

Summary

LRDP EIR mitigations AES-5A, AES-5B, AES-5C, AES-5F, AES-6B, AES-6C and AES-6E are applicable to and incorporated into the Project. With implementation of these measures all aesthetic impacts of the Project would be less than significant. No additional mitigation is required.

Figure 6.1-1: Key to Visual Simulation Vantage Points

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Figure 6.1-2a: Existing view from pedestrian bridge.

Figure 6.1-2b: View from pedestrian bridge, with Project.

Figure 6.1-2: Existing and proposed views from bridge

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Figure 6.1-3a: Existing view from Heller Drive

Figure 6.1-3b: View from Heller Drive, with Project.

Figure 6.1-3: Existing and proposed views from Heller Drive

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6.2 AGRICULTURAL AND FORESTRY RESOURCES

AGRICULTURAL 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 (UCSC 2006b).

6.2.1 Discussion of Checklist Questions

a-b)As State lands, campus lands are not eligible for Williamson Act agreements, and they are not 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. Based on the Important Farmland map produced by the California Department of Conservation, Division of Land Resource Protection under the FMMP, the proposed project site is not designated as Prime Farmland, Unique Farmland or Farmland of Statewide Importance. Approximately 16 acres of the CASFS Farm are designated Prime Farmland or Unique Farmland in the FMMP. This land is used for agriculture and for research, training, and teaching concerning organic production methods. The Project site is not located near the CASFS Farm and would not directly or indirectly conflict with agricultural uses on the campus. No impact would occur.

The applicable land use plan is the 2005 LRDP, which designates the proposed site as Academic Core. Therefore the Project would not conflict with existing zoning for agricultural use and no impact would occur.

c) The Project site is not zoned Timberland Production. The Project site is wooded, primarily with redwoods, which is a commercial species. Under the California Forest Practice Act, the Pacific madrone and California bay growing on the site are also classified as commercial species. Therefore, the site may

be considered timberland as defined in Public Resources Code 4526.[1] However, the site is not zoned for any timber-related uses; the Campus does not use the site for growing timber; and commercial timber production would not be compatible with the 2005 LRDP land use designation or with the surrounding academic and residential land uses. Therefore, the Project would not conflict with the existing zoning for, or cause the rezoning of, forest land or timberland.

d,e) The Project would convert approximately 1.5 acre of forest land to non-forest use. The loss of forest land could result in adverse aesthetic or biological impacts, and could contribute to global climate change by releasing sequestered carbon into the atmosphere. These potential impacts are analyzed in sections 6.1 (*Aesthetics*), 6.4 (*Biological Resources*), and 6.7 (*Greenhouse Gases*). All of the potential impacts of the conversion of forest land to non-forest use would be less than significant with implementation of previously adopted LRDP EIR mitigation measures and project-specific mitigation measures identified in this Initial Study.

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. As discussed in Section 6.13, *Population and Housing*, the project would not result in an increase in population that could contribute to the demand for housing and associated development in the region. Therefore, the proposed Project would not result in the conversion of farmland to non-agricultural uses.

Summary

The proposed Project would not result in significant impacts on agricultural resources. Impacts of the conversion of forest land to non-forest use are analyzed in sections 6.1 (*Aesthetics*), 6.4 (*Biological Resources*), and 6.7 (*Greenhouse Gases*).

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) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☑	☐	☐	☐
c) 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 (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☑	☐	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☑	☐

[1] Public Resources Code defines timberland as "land … which is available for, and capable of, growing a crop of trees of a commercial species used to produce lumber and other forest products."

e) Create objectionable odors 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 (UCSC 2006b). The following, previously adopted LRDP EIR mitigations for potential air quality impacts are applicable to and included in the Project (the full text of the mitigation measures is included in Appendix B). Project implementation of these mitigation measures is discussed under relevant checklist questions, below.

LRDP EIR Mitigation AIR-1 (construction dust control measures)

LRDP EIR Mitigation AIR-2A (conservation of natural gas/minimization of emissions from space and water heating)

LRDP EIR Mitigation AIR-6 (measures to minimize construction emissions)

LRDP EIR Mitigation AIR-7 (emergency generators to use natural gas and/or propane)

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 (ARB) have established ambient air quality standards for certain "criteria" pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM_{10}), lead (Pb), and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) (California Air Resources Board 2013). Nitrogen dioxide (NO2) is a by-product of fuel combustion, and its primary sources are 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 NOX. Ozone is evaluated by assessing emissions of its precursors, volatile organic compounds (VOC), and NOx.

Toxic air contaminants (TACs) are airborne pollutants for which there are no air quality standards but which are known to have adverse human health effects. TACs are regulated under federal and state law, primarily through control requirements for stationary and mobile sources, and mitigations established through human health risk assessments. TACs are generated by a variety of stationary sources including dry cleaners, gas stations, auto body painting and refinishing, wood stoves, barbecue grills, laboratories and power plants; mobile sources such as automobiles and trucks; and "area" sources such as farms, landfills, and construction sites where diesel equipment is used.

Ambient air pollutant concentrations are affected by the rates and distribution of corresponding air pollutant emissions, as well as by the climactic and topographic influences discussed above. For example, 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. Ozone is considered a regional pollutant.

The project site is within the North Central Coast Air Basin (the Basin), which is under the jurisdiction of the Monterey Bay Unified Air Pollution Control District (MBUAPCD). The local air quality management agency (MBUAPCD) 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 the federal and state standards are met or exceeded, the local air basin is classified as in "attainment" or "non-attainment." Some areas are unclassified, which means that no monitoring data are available. Unclassified areas are considered to be in attainment. The North Central Coast Air Basin (NCCAB) is in attainment or unclassified for all federal ambient air quality standards (AAQS); it is designated as non-attainment with respect to the more stringent state PM_{10} standard and the state's eight-

hour ozone standard. Because 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 (MBUAPCD 2013).

Ambient air quality is monitored at seven MBUAPCD-operated monitoring stations. The nearest monitoring station to the project site is the Santa Cruz – 2544 Soquel Avenue monitoring station, which is located approximately four miles east of the Project site. There have been no exceedances of federal or state standards for ozone or $PM_{2.5}$ over the past three years at that monitoring station (data is not available for PM_{10}) (California Air Resources Board 2012, 2013, 2014).[2]

6.3.2 Standards of Significance

The MBUAPCD has established the following significance thresholds for project operations within the Basin:

- 137 pounds per day of volatile organic compounds (VOC)
- 137 pounds per day of nitrogen oxides (NOx)
- 550 pounds per day of carbon monoxide (CO)
- 150 pounds per day of sulphur oxides (SOx)
- 82 pounds per day of particulate matter less than 10 microns in diameter (PM_{10})

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

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

The MBUAPCD 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 Discussion of Checklist Questions

a) According to the MBUAPCD CEQA Air Quality Guidelines (MBUAPCD 2008a), 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 is based on population and housing forecasts prepared by the Association of Monterey Bay Area Governments (AMBAG) (MBUAPCD 2008b). The MBUAPCD has determined that the proposed Project is consistent with the AQMP.[3] Therefore, the Project would not conflict with the implementation of the applicable air quality plan.

b-d) An evaluation of both short-term and long-term air pollutant emissions is provided in the paragraphs below. Potential criteria pollutant emissions associated with the proposed Project were estimated using the California Emissions Estimator Model (CalEEMod) version 2013.2.2 (Appendix D). The estimate of construction-related emissions is based on a likely construction schedule and an equipment list for each phase of construction. The estimates of emissions from combustion of natural gas for space and hot water heating at the new facility are based on the whole-building energy targets for the Project. Project operations would not increase commute or vendor vehicle trips to the campus and thus would not result in air pollutant emissions from mobile sources.

[2] California Air Resources Board, 2012, 2013, 2014 Annual Air Quality Data Summaries available at http://www.arb.ca.gov/adam/topfour/topfourdisplay.php

[3] Personal communication, Bob Nunes, MBUAPCD to Alisa Klaus, UC Santa Cruz Physical Planning and Construction, January 26, 2016.

Construction Impacts

Construction of the proposed project would involve use of equipment and materials that would temporarily generate dust (including PM_{10}) and emit ozone precursor emissions (i.e., VOC and NO_X). The proposed project would disturb a total of approximately 1.5 acres of land. Project construction would generate temporary air pollutant emissions. These impacts are associated with fugitive dust (PM_{10} and $PM_{2.5}$) and exhaust emissions from heavy construction vehicles, in addition to VOC that would be released during the drying phase upon application of architectural coatings. Construction would also generate emissions of toxic air contaminants (TACs) from diesel combustion. TAC emissions would be reduced through implementation of LRDP Mitigation Measure AIR-6, which is included in the Campus' construction contract template.

Construction would generally consist of site preparation, grading, construction of the proposed facilities, paving, and architectural coating. Construction activities could result in temporary local increases in dust and PM_{10} concentrations, and as a result local visibility could be adversely affected on a temporary basis during the construction period. In addition, larger dust particles could settle out of the atmosphere close to the construction site, resulting in a potential soiling nuisance for adjacent uses. PM_{10} emitted during construction activities varies greatly, depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, and weather conditions.

The MBUAPCD does not require specific consideration and estimation of emissions from construction activities using typical construction equipment, except for PM_{10}. Construction related VOC and NOx emissions are accommodated in the emissions inventories of State- and federally-required air quality plans and therefore are not considered significant. The MBUAPCD's CEQA Guidelines establish a threshold of significance for construction-related PM_{10} emissions of 82 pounds per day, and provide the following screening level thresholds: projects with less than 2.2 acres per day of major earth moving such as grading or excavation, or 8.1 acres per day with minimal earth moving are assumed to be below the significance threshold of 82 pounds per day (MBUAPCD 2008). Assuming that 25 percent of the 1.5-acre site, or about 0.4 acre, may be subject to grading in a day, Project construction would not result in emissions of PM_{10} that would exceed the significance threshold. Taking into account implementation of the dust-control measures required under LRDP Mitigation AIR-1, the CalEEMod model estimates the maximum Project PM_{10} emissions at 3.9 lbs/day, confirming that the PM_{10} emissions would be well below the significance threshold. Project construction therefore would not result in a significant project-level air quality impact. The Campus is not planning any construction in the immediate vicinity of the Project site for which grading or other earth moving would overlap with the main PM_{10}-generating activities at the Project site. Therefore, the Project would not contribute to a significant cumulative PM_{10} impact.

Operational Impacts

The proposed Project would move existing hazardous waste operations from other locations on the campus and would be staffed by existing Campus staff. In addition, by expanding the Campus hazardous waste accumulation space, the Project would allow EH&S to accumulate waste for longer periods, as allowed under regulations, before it is picked up by vendors. For these reasons, the Project would not result in an increase in vehicle trips to Campus. Therefore, the Project would not result in indirect or other vehicle emissions of air pollutants, including NOx, VOC or CO.

Project operations would result in minor emissions of criteria pollutants from combustion of natural gas for space and domestic hot water heating, and from periodic testing of the emergency generator. Consistent with LRDP EIR Mitigation AIR-2A, the proposed Project design incorporates a number of energy efficiency elements to minimize natural gas combustion for space and water heating. Domestic hot water would be provided only for the showers and would be heated by a gas-fired instantaneous hot water heater.

The outer wall of the circulation area (hallways) of the main building would be a wooden screen wall that would allow outside air to flow into the space. This would minimize the amount of building space requiring mechanical ventilation. The fresh air flowing into the circulation area would serve as a source for passive flow of make-up air for the chemical waste storage and laboratory spaces that require mechanical ventilation. The fresh air would flow into these spaces through mechanically operated dampers in the walls. ~~For the radioactive waste building, an opening in the roof would provide a passive make-up air source.~~ The mechanical make-up air units would operate only on cool days, when the outside air will be tempered by natural gas-fired furnaces. No mechanical cooling would be provided.

The CalEEMod model estimates Project operational emissions of VOC at 0.38 lb/day and emissions of NOx at 0.56 lb/day (Appendix D). These emissions would not exceed the MBUACD threshold of 137 lb/day for each of these pollutants and would not create a significant project-level impact.

The 2005 LRDP EIR (Vol. 1, p. 4.3-25, and Vol. 4, p. 2-8) determined that development under the 2005 LRDP would result in NO_x emissions exceeding the significance threshold of 137 lb/day, but emissions of VOCs would not exceed the significance threshold. The EIR identified LRDP EIR Mitigation Measures AIR-2A, AIR-2B, and AIR-2C to reduce these emissions. However, these measures would not be sufficient to reduce total LRDP-related emissions below the threshold and the impact would be significant and unavoidable. LRDP Mitigation Measure AIR-2A, which requires design and construction features that reduce natural gas dependence, is applicable to and included in the proposed Project.

Table 6.3-1 compares projected NOx emissions as analyzed in the Draft LRDP EIR, under the Reduced Enrollment Alternative, and with current planned building space included in the University's 2015-25 Capital Financial Plan. The Draft LRDP EIR emissions projections were based on the Draft LRDP building program, which included approximately 2.6 million gsf of new non-residential building space. Under the adopted Reduced-Enrollment Alternative, the new non-residential building space is reduced to approximately 1.98 million gsf. The Draft LRDP EIR projected total NOx emissions associated with the 2005 LRDP at 486 lb/day. Natural gas combustion for non-residential space and water heating accounted for the majority of the projected emissions, at 349 lb/day. Motor vehicles, the second largest contributor to NOx emission, accounted for 99 lbs/day. The Final LRDP EIR estimates that under the Reduced Enrollment Alternative to the LRDP which was ultimately approved by The Regents, NOx emissions associated with natural gas usage and consumer products would be reduced by approximately 22 percent, to about 272 lb/day, compared to the projections in the Draft EIR, proportional to the reduction in building space. NO_x emissions from vehicle trips would be reduced by about 23 percent, to about 76 lb/day.

The Campus currently projects that the amount of building space constructed under the 2005 LRDP will be substantially smaller than the space included in the LRDP building program. To date, the Campus has only constructed approximately 122,000 gsf of new, non-residential building space under the 2005 LRDP. Even if all of the building space included in the UC 10-year Capital Financial Plan, most of which is not funded, were to be constructed in the next ten years, the total new non-residential space constructed under the 2005 LRDP would still be less than 700,000 gsf, or about 35 percent of the building program in the approved 2005 LRDP (Reduced Enrollment Alternative). Therefore, NOx emissions from non-residential space and water heating would be a maximum of about 94 lb/day, or about 254 lb/day less than projected in the Draft LRDP EIR.

In addition, since 2006, when the 2005 LRDP was approved, the number of vehicle trips to the campus has not increased, but has decreased by about 16 percent, resulting in a corresponding reduction in NO_x emissions. Other contributors to NO_x emissions are also now projected to be less than estimated in the LRDP EIR. The LRDP EIR estimated that the replacement of the old cogeneration system with two new natural gas-fired turbines would add about 17 lb/day of NO_x emissions. However, the Campus has only installed one gas turbine and does not plan to add any additional cogeneration engines. As analyzed in the Initial Study/Mitigated Negative Declaration for the Cogeneration Plant Replacement Phase 1 Project, the replacement of the old engine with the new gas turbine resulted in a net reduction in NO_x emissions of 57

lb/day In addition, energy efficiency projects, the increasing stringency of State energy efficiency requirements and UC sustainability policies, the natural gas use in new and existing buildings is likely less than anticipated in the 2005 LRDP EIR air quality analysis. For these reasons, although the 2005 LRDP Final EIR identified a significant and unavoidable impact associated with NOx emissions, the currently projected emissions for all Campus development under the 2005 LRDP are much lower than previously projected and would not exceed the significance threshold.

Table 6.3-1
Updated Estimate of NO_x Emissions under 2005 LRDP

Sources	Draft LRDP[a]	Final LRDP (Reduced Enrollment Alternative)[b]	2015-25 Capital Financial Plan[c]
Nonresidential NG Space and Water Heating	349	272	95
Residential NG Space and Water Heating[d]	14	14	14
Consumer Products	0	0	0
Emergency Generators	7	7	7
Motor Vehicles	99	76	0[e]
Cogeneration System (Change in Emissions)	17	17	-57
Total	**486**	**386**	**59**
Significance Threshold	***137***	***137***	***137***

Notes:

a) As analyzed in the Draft 2005 LRDP EIR, p. 4.3-27.
b) Final 2005 LRDP EIR, Vol. 4, p. 2-7.
c) Estimates of square footage are based on Project Planning Guides and other project planning documents.
d) The Draft LRDP EIR projected that the Campus would add 3,390 new student beds, bringing the total number of student beds to 10,281. Under the Reduced Enrollment Alternative, the total number of beds was reduced to 9,190 (Final 2005 LRDP EIR, Vol 4, p. 2-3). However under the 2008 Comprehensive Settlement Agreement, the Campus committed to a total of 10,125 beds. Thus, the number of beds currently planned is approximately the same as the number analyzed in the Draft 2005 LRDP EIR. To date, the Campus has only constructed 45 of the 125 units for employees analyzed in the Draft 2005 LRDP EIR; only one project, which would construct 39 units, is in the current Capital Financial Plan. Therefore, the amount of employee housing constructed under the 2005 LRDP will be less than analyzed in the Draft 2005 LRDP EIR.
e) The number of vehicle trips to the main campus in 2014-15 was 20,755, or about 16 percent less than the LRDP EIR baseline of 24,830, despite an increase in enrollment of approximately 11 percent. (UCSC, 2005 LRDP EIR Annual Mitigation Monitoring Report, 2014-15.)
f) The 2005 LRDP EIR estimates of additional emissions from cogeneration assumed that the Campus would replace the existing engine with two new 5 MW gas turbines. Campus has replaced the old engine with one new 4.2 MW gas turbine and is not planning to add any additional turbines. The estimated reduction in emissions is based on source testing of the old engine for permit compliance in 2010 and emissions of the selected turbine (UC Santa Cruz 2011b).

In summary, the Project would not result in a significant project-level impact with respect to criteria pollutants and would not contribute to a significant cumulative impact.

d) **Toxic Air Contaminants (TACs).**

Project operations, have the potential to result in emissions of TACs. The liquid bulking, multi-use laboratory and lab packing rooms would be equipped with chemical fume hoods to provide for safe exhausting of fumes. The fume hoods would be discharged to the exterior through a single exhaust stack. The fume hoods would operate continuously at all times.

As discussed in the 2005 LRDP EIR (Vol. 1, pp. 4.3-31 to -36), UC Santa Cruz conducted a health risk assessment (HRA) to identify potential human health risks associated with routine operations anticipated to occur under the 2005 LRDP (URS 2005). An HRA characterizes human health risks as a result of

exposure to toxic substances. The HRA evaluated total health risks for existing campus routine operations combined with routine operations associated with future development. The HRA included TAC emissions associated with existing and future (1) laboratory operations; (2) natural gas and diesel fired stationary combustion sources (such as boilers at the Central Heating Plant, boilers in individual buildings, internal combustion engines at the Cogeneration Plant, and routine firing of back-up emergency generators for maintenance and testing purposes); (3) diesel-fueled mobile sources (delivery trucks, METRO buses and campus shuttles) on campus roadways; and (4) painting operations. The HRA assumed that the existing cogeneration engine would be replaced with two Solar Mercury 50 gas-fired turbines. The HRA used the following MBUAPCD significance thresholds: for carcinogens, a cancer risk level of 10 in one million for an exposure period of 70 years; for chronic non-cancer health risks, a hazard index of 1.0 or greater based on constant exposure to TACs for a 70-year period; for acute health effects, a hazard index of 1.0 or greater based on exposure to TACs over a period of 1-hour.

The results of the HRA predicted that the total estimated cancer risk and the long-term (chronic) non-cancer risks from UC Santa Cruz routine campus operations in 2020-21 would be below the applicable significance thresholds. The highest off-campus cancer risk, for a hypothetical receptor living for 70 years on the western boundary of the campus west of Kresge College, would be 5.41 in one million. The highest on-campus cancer risk, for a hypothetical student located near College Nine and assuming a 9-year exposure period, would be 2.48 in one million. These risks are well below the significance threshold of 10 in one million. The highest non-cancer chronic hazard index would be 0.08 at a hypothetical receptor at the Science and Engineering Library, which is much lower than the threshold of 1.0. However, the short-term (acute) hazard index exceeded the significance threshold at three locations on the campus, primarily as a result of acrolein emissions from the back-up/emergency generators at the Central Heating Plant and in the Science Hill area. The highest calculated acute hazard index from short-term exposures is 1.34, for a hypothetical student at a receptor located near Baskin Engineering. The acute hazard index would also exceed 1 at two other locations in the central portion of the campus core.

The HRA conservatively assumed that as part of the routine maintenance program, all back-up/emergency generators would be tested at the same time during a 1-hour period. The 2005 LRDP EIR identifies LRDP EIR Mitigation AIR-5A, which specifies a generator testing schedule that would ensure that TAC emissions do not result in a significant health risk. The EIR determined that, if the Campus replaced the existing cogeneration engine with two new 5 MW gas turbines, as assumed in the HRA, implementation of this mitigation would reduce the impact to a less-than-significant level. LRDP EIR Mitigation AIR-5A was adopted by The Regents and is currently implemented by the Campus.

The proposed Project would contribute to the emissions of TACs from laboratory fume hoods on the central campus. The HRA derived the projected TAC emissions from laboratory fume hoods from the emissions reported by the Campus in 2002[4] by applying a growth factor of 1.44, equal to the projected growth in the student population to 21,000 in 2020-21. The results of the HRA indicated that laboratory fume hood emissions would contribute only about 1 percent of the cancer risk, and do not contain acrolein, which is the largest contributor to the non-cancer risk.

The proposed Project includes a walk-in fume hood that may be used for bulking liquid chemicals, which would involve pouring chemicals from small containers into larger containers, up to a 55-gallon drum. This activity was not taken into account in the HRA. EH&S staff have prepared an estimate of toxic air contaminant emissions associated with future liquid bulking at the new facility, and entered it into a prioritization spreadsheet provided by the MBUAPCD. The prioritization spreadsheet is used to screen projects with TAC emissions sources for their potential acute, chronic, and cancer risks. If the score for each of type of risk is below 10, then additional analysis of the risks associated with the source is not required for permitting purposes. EH&S' estimates for emissions from the new fume hood result in scores

[4] 2002 Air Toxics "Hot Spots" Emission Inventory Update Report for the University of California, Santa Cruz (2002 TEIR) submitted to the MBUAPCD (UC Santa Cruz, 2002) to fulfill AB 2588 requirements.

for cancer, chronic, and acute risk of 0.02, 0.00, and 0.17, respectively. Based on a preliminary review of these results, the MBUAPCD has indicated that the prioritization score seems to indicate that the emissions will not cause a significant health risk to those nearby.[5]

In addition to the risk created by the Project alone, the new fume hood emissions would contribute to the program-level risk associated with TAC emissions under the 2005 LRDP. As explained above, the HRA estimated that fume hood emissions would constitute approximately one percent of cancer and acute risks under the LRDP. All liquid chemical wastes delivered to the new EH&S Facility would already have been used in laboratory fume hoods on the campus. Therefore, conservatively assuming that EH&S bulks all liquid chemical wastes, the total annual fume hood emissions would be double the emissions assumed in the HRA, which could increase the risk as calculated in the HRA by about one percent. In reality, EH&S would bulk only certain chemical wastes which are generated in large quantities, so the increased risk would be less than one percent of that estimated in the HRA.

In addition, for various reasons, the actual emissions of TACs on Campus under the 2005 LRDP are expected to be far lower than projected by the HRA. First, the Campus replaced the old cogeneration engine with one 4.2 MW natural gas turbines rather than two 5 MW gas turbines (these two turbines accounted for about two-thirds of the cancer risk estimated by the HRA). Second, the Campus has replaced the diesel backup generator at the Central Heating Plant with a cleaner natural gas-fired generator. Third, the approved 2005 LRDP anticipates an enrollment of 19,500 by 2020-21, rather than 21,000.

In February 2015, the California Office of Environmental Health Hazards Assessment (OEHHA) issued new guidelines for health risk assessments for air toxics hot spots.[6] The new guidelines make several changes to the methodology, including increasing the assumed breathing rates for children and infants; adjusting time at home and duration of exposure, which differ among infants, children, and adults, reducing exposure assumptions for adults, and applying an age sensitivity factor which increases the effects of exposure on those below age 16. The South Coast Air Quality Management District estimated that use of the new methodology could increase residential risks by about three times for a single exposure pathway.[7] The MBUAPCD prioritization spreadsheet has been updated to reflect the new guidelines; therefore, the Project impact described above is less than significant. Given the small contribution of laboratory fume hood emissions to the overall TAC risk on the campus, even if the overall risk associated with TAC emissions on the campus would be greater using the new guidelines than projected in the 2005 LRDP EIR, the Project contribution to this increased risk would be minimal.

For the reasons discussed above, the proposed Project would make a small contribution to the less-than-significant impact of TAC emissions analyzed in the 2005 LRDP EIR. Consistent with LRDP EIR Mitigation AIR-7, the emergency generator would be fueled with natural gas and propane rather than diesel. Furthermore, the Campus' actual TAC emissions under the 2005 LRDP are likely to be less than projected in the LRDP EIR. The Project impact would be less than significant and no mitigation is required.

e) The Project would not create new sources of odors. No impact would occur.

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[5] David Craft, MBUAPCD, personal communication to Justin Delemus, UCSC EH&S. April 1, 2016.

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

[7] South Coast Air Quality Management District. Potential Impacts of New OEHHA Risk Guidelines on SCAQMD Programs. 2014.http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2014/may-specsess-8b.pdf. Exposure may take place through various pathways, including inhalation, ingestion, dermal exposure, mother's milk, and home gardens. For laboratory fume hood emissions, only the inhalation pathway applies.

Summary

Because the projects incorporate LRDP Mitigations AIR-1, AIR-2, AIR-6, and AIR-7 all air quality impacts of the proposed projects would be less than significant.

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 federally protected wetlands as defined by Section 404 of the Clean Water Act (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 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 (UCSC 2006b). The following, previously adopted LRDP EIR mitigations for potential impacts to biological resources are applicable to and included in the project (the full text of the mitigation measures is included in Appendix B). Project implementation of these mitigation measures is discussed under relevant checklist questions, below.

LRDP EIR Mitigation BIO-6 (avoid or minimize the introduction or spread of noxious weeds, sudden oak death or pitch canker into uninfested areas)

LRDP EIR Mitigation BIO-9 (Measures to protect California red-legged frog)

LRDP EIR Mitigation BIO-11 (preconstruction monitoring for and avoidance of nesting special-status birds)

LRDP EIR Mitigation BIO-13A and BIO-13B (survey for and avoid special-status bats)

LRDP EIR Mitigation BIO-14 (Survey for and avoidance of San Francisco dusky-footed woodrat)

6.4.1 Discussion of Checklist Questions

a) A biotic assessment of the proposed new EH&S Facility site was conducted in January 2016 (Biosearch Associates 2016). The assessment included mapping of habitats and evaluation for the potential presence of special-status plant and wildlife species and sensitive habitats. Following the habitat assessment conducted in January 2016, a survey of mosses was performed on the Project site in February 2016 (Coast Range Biological 2016). The biological resources assessment reports for the Project are included in Appendix E.

The vegetation community occupying the site is redwood forest. The site is dominated by a canopy of redwood (*Sequoia sempervirens*), with occasional Douglas-fir (*Pseudotsuga menziesii*), and a subcanopy of interior live oak (*Quercus wislizeni*), tanoak (*Notholithocarpus densiflorus*), madrone (*Arbutus menziesii*), and occasional coast live oak (*Quercus agrifolia*) and big-leaf maple (*Acer macrophyllum*). The understory consists of a mixture of native shrubs and herbaceous species, such as California hazelnut (*Corylus cornuta* subsp. *californica*), wood rose (*Rosa gymnocarpa*), sword fern (*Polystichum munitum*), creeping snowberry (*Symphoricarpos mollis*), wood strawberry (*Fragaria vesca*), wood fern (*Dryopteris arguta*), brackern fern (*Pteridium aquilinum* var. *pubescens*), redwood sorrel (*Oxalis oregana*), snakeroot (*Sanicula crassicaulis*), yerba buena (*Clinopodium douglasii*), and hedge nettle (*Stachys* sp.), with non-native species also present, including forget-me-not (*Myosotis latifolia*), English holly (*Ilex aquifolium*), and English ivy (*Hedera helix*).

Redwood forest, which covers approximately 22.5 percent of the UCSC campus, is not considered a sensitive natural community. Like all the redwood forest on the campus, the forest is second-growth, having been logged in the nineteenth century. Most of the redwoods at the site are healthy and exceed 150 feet in height.

<u>Special-Status Plants</u>

The Project site and surrounding area support some suitable habitat for several special-status plant species: tear drop moss (*Dacryophyllum falcifolium*), slender silver moss (*Anomobryum julaceum*), California bottlebrush grass (*Elymus californicus*), and minute pocket moss (*Fissidens pauperculus*). Tear drop moss and minute pocket moss are on the California Native Plant Society (CNPS) List 1B. California bottlebrush grass and slender silver moss are on CNPS List 4. Plants on List 1B are considered special-status under CEQA. Plants on List 4 are not generally considered special-status plants under CEQA but lead agencies may treat them as such based on an assessment of their rarity. This analysis includes List 4 plants which were listed in the 2005 LRDP EIR as special status plants with the potential to occur on the campus.

No special-status mosses were found on the site in the February 2016 survey. The botanical surveys for the Project were conducted outside the May-November blooming period of California bottlebrush grass, which is on the CNPS List 4. This species has not been observed on the campus in more than 20 years, but was recorded at an unknown location on the campus at some time before that (Biosearch Associates 2016). Impacts to this species would not be considered significant; however, because it is uncommon, the Campus would implement EH&S Mitigation Measure BIO-1 to minimize the potential impact.

EH&S Mitigation Measure BIO-1. A qualified botanist shall conduct a floristic plant survey for California bottlebrush grass on and within 50 feet of the project site during the May-November blooming period prior to construction. If the species is not observed during the survey, no additional mitigation is necessary. If California bottlebrush grass is observed, the population shall be mapped and quantified and a suitable buffer zone (based on proximity to the work area and other site specific factors) established, along with other protection measures, such as fencing installed around the population to protect it from disturbance. If the population cannot be avoided by the Project, seed, topsoil, and/or individual plants (since the species is a perennial) shall be collected from the impacted population and propagated on another area of the UCSC campus that supports suitable habitat for the species and is not designated for development under the LRDP (i.e., Campus Natural Reserve or Protected Landscape).

The survey for California bottlebrush grass was completed in May 2016. The species was not observed and is considered absent. The California bottlebrush grass survey report is included in Appendix E.

Special-Status Wildlife

Several special-status wildlife species have the potential to occur on the site: California red-legged frog *(Rana draytonii)*; Santa Cruz black salamander (*Aneides flavipunctatus niger)**;*** golden eagle (*Aquila chryseatos*); white-tailed kite (*Elanus leucurus*); long-eared owl (*Asio otus*); ~~Vaux's swift (*Chaetura vauxi);*~~ Allen's hummingbird (*Selasphorus sasin*); Nuttall's Woodpecker (*Picoides nuttallii*); olive-sided flycatcher (*Contopus cooperi*); oak titmouse (*Baeolophus inornatus*); other nesting native bird species protected by the Migratory Bird Treaty Act; pallid bat (*Antrozous pallidus*); long-eared myotis (*Myotis evotis*); fringed myotis (*Myotis thysanodes*); long-legged myotis (*Myotis volans*); and (San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*). No potential roosting habitat for Townsend's big-eared bat (*Corynorhinus townsendii)* is present on the site.

California Red-Legged Frog (CRLF). CRLF is listed as Threatened under the federal Endangered Species Act and as a Species of Concern by California Department of Fish and Wildlife (CDFW). On the UC Santa Cruz campus, CRLF have been documented only in the Moore Creek drainage. The nearest records are from 0.4 mile south of the Project site along the East Fork of Moore Creek, and from the College Eight detention basin, along the West Fork of Moore Creek, 0.5 mile southwest of the site. CRLF also inhabit lower reaches of the East Fork of Moore Creek and breed in the Arboretum Pond, 0.9 mile south of the Project site. The drainage channel approximately 75 feet east of the site, which is known as the Moore Creek East Fork Baskin Tributary, is an ephemeral channel, flowing only during storm events. It does not support pools, undercut banks or in-stream cover, so it provides only marginal habitat for CRLF when it holds water. However, CRLF are known to move overland up to 2 miles between breeding and non-breeding habitat. Given the presence of breeding habitat in the Arboretum Pond, within a mile of the site, CRLF could occur or pass through the project area during the rainy season.

The 2005 LRDP EIR (Vol. 1, pp. 4.4-54 to 4.4-55) determined that some infill development adjacent to the Moore Creek drainage and storm drainage improvements in Moore Creek itself could adversely impact CRLF habitat and could result in potentially significant impacts to the species. Red-legged frogs may disperse into areas envisioned for future development in the campus core, however, this possibility is considered remote because red-legged frogs have not been documented on campus within developed areas or outside of the Moore Creek riparian corridor. No development is proposed in suitable breeding or high-quality movement habitat under the 2005 LRDP, as all areas in the Moore Creek watershed that provide suitable breeding habitat and movement habitat are designated Campus Natural Reserve, and Site Research and Support which limit development. Therefore, the 2005 LRDP could have a substantial adverse effect on the local or regional red-legged frog population, but the impact would be reduced to a less-than-significant level by the implementation of previously adopted LRDP Mitigation Measure BIO-9.

This mitigation measure requires that the Campus avoid ground disturbance in the Moore Creek watershed during the rainy season and, if this is not feasible, the Campus shall implement pre-construction surveys for CRLF, biological monitoring during construction, and measures to exclude frogs from the construction site.

For the reasons discussed above, it is possible but not likely that CRLF would occur on the Project site. LRDP EIR Mitigation Measure BIO-9 is applicable to and incorporated in the Project. This would ensure that, if any CRLF are present, they would not be harmed. The impact was adequately addressed in the LRDP EIR and additional mitigation is not required.

Santa Cruz Black Salamander (*Aneides flavipunctatus niger*). The Santa Cruz black salamander subspecies occurs in moist microhabitats in a variety of habitats including deciduous woodlands, coniferous forests, open oak woodlands and meadows. The subspecies *niger* is isolated and occupies a limited range in Santa Cruz, Santa Clara and San Mateo counties. Recent genetic analysis indicates that four separate lineages are present in California, and that the southern disjunct lineage (*niger*) should be considered a separate species. The Santa Cruz black salamander is subject to a Special Closure for Santa Cruz, Santa Clara and San Mateo Counties that prohibits take under CDFW's Freshwater Sport Fishing Regulations. The Santa Cruz black salamander is regularly found at the UC Santa Cruz Upper Quarry in rock outcrops and under slabs of marble.

Santa Cruz black salamanders are found in a variety of moist habitats. The site is well-shaded and has an abundance of downed wood, and three other native salamanders – ensatina, slender salamander and arboreal salamander, were observed during reconnaissance surveys. The project site provides suitable habitat for the subspecies. If the species is present on the site, Project construction could result in harm to individual salamanders. As the species is not considered rare, this would not result in a substantial adverse impact to the species. However, to ensure that Project construction activities do not result in harm to individuals, the Campus would implement EH&S Mitigation Measure BIO-2.

> **EH&S Mitigation Measure BIO-2.** Immediately prior to, and during the initial ground disturbance, a qualified biologist should survey for Santa Cruz black salamanders. If black salamanders are found, they should be moved out of harm's way to the nearest appropriate habitat outside the Project footprint.

Nesting Birds. There are several species of special-status raptors known to occur in the vicinity of the Project site, including golden eagle (*Aquila chryseatos*), white-tailed kite (*Elanus leucurus*), long-eared owl (*Asio otus*). Suitable nesting habitat for these species and suitable foraging habitat for long-eared owl and white-tailed kite are present on the Project site. However, because of the level of human activity in the vicinity of the site, it is unlikely that these raptor species would nest on or near the site.

~~Vaux's Swift (*Chaetura vauxi*). Vaux's swift nests from southeastern Alaska south to central California, as well as portions of Central and South America. In California, it occurs primarily in the Cascades, the Sierra Nevada, and the Coast Ranges south to Santa Cruz County. In northwestern California, the species nested and roosted primarily in redwood trees, using basal hollows, cavities, stumps and broken-topped snags. Nesting in chimneys has been documented in Santa Cruz and Santa Clara Counties. The Vaux's swift is listed as a Species of Special Concern by CDFW. Vaux's swifts are considered to be an uncommon to fairly common breeding species in localized areas in Santa Cruz County. Vaux's swifts are regularly seen during the breeding season in the north campus area of UCSC (UCSC 2006b). Potential nesting habitat for Vaux's swift is present within and near the project site.~~

Allen's hummingbird (Selasphorus sasin). Allen's hummingbird breeds in a narrow band along the coast of California and southern Oregon and winters from Central California south through Baja and Central

Mexico. It is limited in distribution to lowlands within 20 miles of the coast. Nesting habitat in the San Francisco Bay region includes mixed evergreen forest, redwood forests, riparian woodland, nonnative eucalyptus and cypress groves, and occasionally live oak woodlands and coastal scrub with scattered trees. In addition to nectar, insects are taken, especially spiders. Allen's hummingbird is an extremely early migrant, and arrives on nesting grounds in January and February. Nests are often clustered and semi-colonial. The species was recently added to the federal Birds of Conservation Concern primarily due to its restricted breeding range.

Allen's hummingbird is a common breeding species in Santa Cruz County, particularly at lower elevations . It is observed frequently in the lower part of campus including the Arboretum. Suitable nesting habitat for Allen's hummingbird is present at the project site.

Nuttall's woodpecker (*Picoides nuttallii*). Nuttall's woodpecker ranges from extreme northern Baja to northern California west of the deserts and the Sierra Nevada divide. It is typically associated with oak woodlands, but will also occur in riparian woodlands and chaparral areas. It feeds primarily on insects it gleans from the underside of leaves in trees and on the ground, and also eats some vegetation. It often nests in snags along riparian areas. The species was designated as a Bird of Conservation Concern by USFWS primarily due to its restricted breeding range. The Nuttall's woodpecker is expanding its range in Santa Cruz County and is considered to be a common species. The species has been documented along Moore Creek south of the project site. Suitable nesting habitat for Nuttall's woodpecker is present at the project site.

Olive-sided flycatcher (*Contopus cooperi*). The olive-sided flycatcher nests throughout much of Canada and the western United States and winters in South America. It inhabits woodland and forest habitats generally near edges and openings. It prefers coniferous trees but the species also uses eucalyptus forest near the coast. The species is quite vociferous and is often seen calling from the tops of prominent trees. It feeds on insects, especially bees and wasps, and builds a cup nest well away from the trunk of trees. The species may depend on forest fires and other natural or man-made disturbances to create a habitat mosaic with edges and openings. The olive-sided flycatcher is designated as a Species of Special Concern by CDFW and a Bird of Conservation Concern by USFWS. The olive-sided flycatcher is a fairly common breeding species in Santa Cruz County and is known to nest at UCSC. Potential nesting habitat for the olive-sided flycatcher is present at the project site.

Oak titmouse (*Baeolophus inornatus*). The oak titmouse ranges from extreme northern Baja California through California into southwest Oregon. It inhabits open woodland habitats including oak woodland, oak-pine woodlands, and pinyon-juniper woodlands. It feeds primarily on seeds and terrestrial invertebrates, while plant material makes up most of its diet in the fall and winter. Oak titmouse is not migratory and remains territorial all year round. It nests in woodpecker or natural cavities and will use artificial nest boxes. The species was recently added to the federal Birds of Conservation Concern primarily due to its restricted breeding range. The oak titmouse is an uncommon to locally fairly common breeding species in Santa Cruz County. The species is observed frequently at UCSC. Potential nesting habitat for the oak titmouse is present at the project site.

Other Nesting Native Bird Species. In addition to the species listed above, suitable nesting habitat occurs for other bird species protected under the Migratory Bird Treaty Act (MBTA). The MBTA regulates or prohibits taking, killing, and possession of migratory bird species and their nests as listed in Title 50 Code of Federal Regulation (CFR) Section 10.13. Bird species and their nests are also protected under Section 3515 of the California Fish and Game Code. Members of the orders Falconiformes and Strigiformes (birds-of-prey) are protected under California Fish and game Code Section 3503. Potential nesting habitat for bird species protected under the MBTA and Fish and Game Codes are present at the project site.

The biological survey report for the proposed Project recommends pre-construction surveys and avoidance measures to ensure that construction activities do not disturb active nests of these species. LRDP EIR Mitigation BIO-11, which requires pre-construction surveys for Projects that begin construction during the nesting season, and the establishment of buffers for active nests, is applicable to and incorporated into the Project. With implementation of this previously adopted mitigation measure, the impact to nesting birds would be less than significant.

Special-Status Bats. Potential habitat for several special-status bat species is present in the Project area.

Pallid Bat (*Antrozous pallidus*). The pallid bat inhabits a variety of arid habitats including grassland, scrub and woodlands. It is a year-round resident in central California, where it is usually associated with oak woodland. Daytime roosts are generally in trees but also occur in rock outcrops and mines. Nocturnal roosts are often under bridges and in rock outcrops. The species is very sensitive to disturbance of roost sites. Pallid bats are not known to migrate, and winter hibernaclea are often close to summer roosts. The pallid bat is listed as a Species of Special Concern by CDFW and is designated as a High Priority Species by the Western Bat Working Group. There are no records for pallid bats on the UCSC campus, although it is known from elsewhere in Santa Cruz County. Potential roosting habitat for pallid bats is present in the vicinity of the project site.

Long-eared Myotis (*Myotis evotis*). The long-eared myotis is widespread in California but is typically uncommon throughout most of its range. It occurs in the Coast Ranges and Sierra Nevada where it inhabits a wide variety of woodland, scrub and forest habitats. It roosts in buildings, crevices, under the bark of trees and in snags. The long-eared myotis is listed as a Medium Priority species by the Western Bat Working Group. The long-eared myotis was detected on the north campus in 2001 (UCSC 2006b). Potential roosting habitat is present at the project site under tree bark and in snags.

Fringed Myotis (*Myotis thysanodes*). The fringed myotis is found throughout much of the western United States and Mexico from sea level up to 7,000 feet in elevation. It inhabits a variety of habitats including desert scrub, oak woodland and coniferous forest. Day roosts include rock crevices and trees, as well as mines and buildings. Maternity roosts can be large, numbering up to 400 individuals. This bat species is known to migrate but such movements are poorly understood. Although widely distributed, it is uncommon to rare throughout its range. The species is highly sensitive to disturbance by humans. The fringed myotis is listed as a High Priority species by the Western Bat Working Group. The fringed myotis was detected on the north campus in 2001. Potential roosting habitat is present for fringed myotis in the vicinity of the project site.

Long-legged Myotis (*Myotis volans*). The long-legged myotis is found throughout much of California with the exception of the low desert regions. It is primarily associated with coniferous forests, although it may be found in riparian and desert habitats as well. Day roosts are generally in hollow trees, rock crevices, mines and buildings. Maternity roosts can be large, numbering in the hundreds. Long-legged myotis hibernate in California, and there are likely seasonal movements between summer and winter roosts. Its population status is poorly understood. The long-legged myotis is listed as a High Priority species by the Western Bat Working Group. The long-legged myotis was detected on the north campus in 2000 (UCSC 2006b). Potential roosting habitat is present for long-legged myotis in the vicinity of the project site.

Potential impacts to non-maternity bat roosts are considered to be less than significant. However, disturbance of maternity roosts would be a potentially significant impact. This impact would be reduced to a less-than-significant level with implementation of LRDP EIR Mitigations 13A and 13B, which require field surveys for active roosts of special-status bats if tree removal or grading activity commences on a

project site during the breeding season of native bat species (April 1 through August 31), and avoidance measures if roosting bats are found. No additional mitigation is required.

San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*). The San Francisco dusky-footed woodrat occurs from San Francisco Bay south through the Santa Cruz Mountains to Elkhorn Slough and inland to the Diablo Range. The San Francisco dusky-footed woodrat is designated as a Species of Special Concern by CDFW. The species is most common in riparian, oak woodland and scrub habitats. It constructs houses out of sticks and other debris. Houses are often reused by successive generations and some can grow to be six feet or more in height, while others are well hidden and easily overlooked. The San Francisco dusky-footed woodrat is a relatively common resident of the Santa Cruz Mountains and has been recorded in the UC Santa Cruz north campus. In 2006, a woodrat house was observed near the intersection of Meyer Drive and Heller Drive approximately 800 feet south of the project. The species is relatively common along the East Fork of Moore Creek approximately 0.5 mile south of the site. Potential habitat for the San Francisco dusky-footed woodrat is present on the site.

The 2005 LRDP EIR (Vol. 1, pp. 4.4-60 to 4.4-61) determined that construction activities in wooded areas, primarily in the north campus, under the 2005 LRDP could result in abandonment of active woodrat nests, which would be a significant impact. This would be a potentially significant impact, as development in the north campus could remove up to about a quarter of the nests in that area. Implementation of LRDP Mitigation BIO-14, which requires preconstruction surveys and relocation of active nests, would reduce the LRDP impact to a less-than-significant level.

As discussed above, there is potential woodrat habitat in and near the Project site. LRDP Mitigation BIO-14 is applicable to and incorporated in the Project. Therefore, if woodrat nests are present, they would be identified and relocated, and the impact would be less than significant.

b,c) The biotic assessment did not identify any sensitive natural communities or wetlands on the Project site. The East Fork Moore Creek, Baskin Tributary to the east of the Project site falls under the regulatory jurisdiction of the U.S. Army Corps of Engineers, the California Regional Water Quality Control Board, and the California Department of Fish and Wildlife. The creek is located at least 75 feet from the project site and no direct impacts to jurisdictional wetlands or riparian habitat are anticipated from the proposed project. However, in light of the steep slope between the Project site and the creek, tree removal and other construction-related ground disturbance could result in indirect impacts such as discharge of litter, fuel, sediment, and other pollutants from the project site and into the creek.

As discussed further in Section 6.9, *Hydrology and Water Quality*, LRDP Mitigation Measure HYD-2, which requires that erosion control measures be applied prior to grading on hillsides during the wet season, is applicable to and incorporated into the Project. In addition, 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 Storm Water Pollution Prevention Plan (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 during construction to avoid impacts to water quality. The Campus' standard construction contract also includes requirements for containment and disposal of all construction waste, additional requirements for labeling and transport of hazardous waste, and procedures for response to and reporting of hazardous materials spills. Implementation of LRDP Mitigation Measure HYD-2, the SWPPP, and the Campus' contract standards would ensure that construction does not result in discharge of waste or other materials to the jurisdictional wetland or riparian habitat and therefore would reduce this impact to a less-than-significant level.

The Project site and adjacent redwood forest are dominated primarily by native species. The removal of trees, which could increase sunlight at the soil surface, and ground disturbance associated with the Project, which could result in an increase in areas of bare mineral soil. As a consequence, the Project has the potential to introduce invasive plants onto the Project site and adjacent undisturbed areas in the surrounding redwood forest. The 2005 LRDP EIR (pp. 4.4-48 to 4.4-49) analyzed the potential that development under the 2005 LRDP could introduce or spread noxious weeds, which could reduce the abundance or vigor of common and sensitive biological resources, including redwood forest. The LRDP EIR determined that this would represent a substantially adverse impact to sensitive natural communities. However, implementation of LRDP Mitigation BIO-6 would reduce this impact to a less-than-significant level. LRDP Mitigation BIO-6 is applicable to and incorporated in the Project, and the siting of the Project is consistent with the LRDP. Therefore, the Project impact would be less than significant with implementation of the previously adopted mitigation measure and no additional mitigation is required.

d) As discussed above, under "a)," Project construction activities could disturb nests of passerine bird species. With implementation of LRDP EIR Mitigation BIO-11, this impact would be less than significant.

The 2005 LRDP EIR (Vol. 1, pp. 4.4-61 to 4.4-62) identified several wildlife corridors on the campus, including the Moore Creek corridor, which provides a link between the Great Meadow, where many species forage, and the north campus, which is contiguous with Henry Cowell Redwoods and Wilder Ranch state parks. The Project would not create any barriers to wildlife movement in the adjacent Moore Creek tributary and no impact would occur.

e) The proposed projects are consistent with the policies of the 2005 LRDP with respect to biological resources. No other biological resources policies or ordinances are applicable. No impact would occur.

f) The proposed project sites are not within an area covered by any adopted Habitat Conservation Plan or other approved habitat conservation plan. No impact would occur.

Summary

Because the proposed Project incorporates LRDP Mitigations BIO-6, BIO-9, BIO-11, BIO-13-A, BIO-13B, and BIO-14, and with implementation of EH&S Mitigations BIO-1 and BIO-2, all biological resources impacts of the Project would be less than significant.

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 as defined in Section 15064.5?	☐	☐	☐	☑	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☑	☐	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☐	☑
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☑	☐	☐	☐

e) Cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Public Resources Code § 21074?	☐	☐	☐	☐	☑

Cultural resources issues and programmatic mitigation measures applicable to LRDP development are described in Volume I, Section 4.5, of the 2005 LRDP EIR (UCSC 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). Project implementation of these mitigation measures is discussed under relevant checklist questions, below.

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 through CULT-1H (Measures to be taken if cultural resource is identified by archaeological survey or during construction)

LRDP EIR Mitigation CULT-2B (requirement to determine the potential for a project to result in impacts to historical resources)

LRDP EIR Mitigations CULT-3A and CULT-3B (Documentation required for archaeological resources found on site if they cannot be preserved intact)

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

LRDP EIR Mitigation CULT-5A (Evaluate potential for paleontological resources; procedures to be followed if paleontological resources are found on site)

6.5.1 Discussion of Checklist Questions

a,b,d) Consistent with LRDP mitigation CULT-1A, CULT-1C, and CULT-2B, an archaeological reconnaissance survey and cultural resource inventory was prepared for the proposed Project (Condor Country Consulting 2016).

The Project's area of potential effects (APE) for archaeological and historical resources encompasses the Project site and the area to the east of the Kerr Hall pedestrian bridge which would be disturbed for construction of new utilities. The cultural resources study included a review of previous cultural resource studies and documentation relevant to the project area; a pedestrian archaeological reconnaissance survey; Native American Heritage Commission (NAHC) and tribal consultations; and the recordation and evaluation of archaeological features on State of California DPR 523 forms. There are no known historic resources or historic properties within the Project APE. There are four recorded prehistoric sites within a 1-mile radius of the Project APE, including a habitation site approximately 0.44 mile from the site, and lithic scatters between 0.53 and 0.87 mile from the Project APE.

The records search revealed that there are no previously recorded archaeological resources, historical resources or properties, or known human remains within the Project APE. During the site survey, archaeologists observed no visual indicators of shell fragments, worked bone, obsidian, lithics, exposed midden soils, or any other indicators of prehistoric deposits. However, the presence of 2 to 6 inches of

forest duff obscured the visibility of the ground, although the archaeologists used a hoe and trowels to remove the duff at intervals throughout the site so that they could see the ground surface. Therefore, the archaeological survey could not rule out the presence of archaeological resources or human remains on the site.

The archaeologists also assessed two features on the site, a barbed wire fence, and an isolated historic-era dirt road, and concluded that these features are not historical resources or historical properties for purposes of CEQA. The barbed wire fence appears to date from 40 to 60 years ago. Based on its age, the fence may have been associated with cattle ranching on the property before it was acquired by the University of California. The historic road is located on a flat area at the north end of the site, south of the Kerr Hall pedestrian bridge. The road passes near two medium diameter coast redwood tree trunks that show axed or carved notches in the trunks. These notches could have held springboards for men to stand on while they utilized large two-person handsaws to cut the trees and suggest that this may be a logging road. It is not clear where the road segment leads, as only a small isolated segment of the road is visible. It is possible that this road is associated with the Cowell Historic Lime Works District on the lower campus, which is listed on the National Register of Historic Places, or with other features on the campus associated with the historic lime industry. Many small logging roads were constructed throughout the area to facilitate logging to provide fuel for the lime kilns. However, the road segment is isolated and indistinct as a result of forest duff and trees which have grown in the road. Therefore, it cannot be definitively linked to any historic place or event, does not possess distinctive characteristics or a type, period, or method of construction or engineering. The Project archaeological survey report concludes that the barbed wire fence and road segment are not historical resources or historic properties for the purposes of CEQA.

The consultations with the Native American Heritage Commission and with Native American organizations or individuals familiar with the Project APE identified no archaeological deposits, plant collection areas, and/or traditional cultural properties within the APE through consultation. Two tribal representatives, responded by telephone to the consultation materials. They requested that (1) UC Santa Cruz keep them informed of the project as it progresses; (2) UC Santa Cruz hire an archaeological and Native American monitor to observe all earth-moving activities; (3) UC Santa Cruz consider developing an MOU with tribal representatives, and (4) UC Santa Cruz ensure that they have a contingency plan in place in case cultural resources, and in particular, Native American human remains, are encountered during construction.

Although there are no known archaeological resources on the Project site and no indication that an archaeological site is present, the pedestrian archaeological survey did not rule out the potential that unknown archaeological resources could be encountered during construction. Implementation of previously adopted LRDP Mitigation Measures CULT-1D through CULT-1H, CULT-3A and CULT-3B, and CULT-4D and CULT-4D, which are applicable to and included in the Project, would reduce the impact to a less-than-significant level. These mitigations provide for contractor training, construction monitoring by a qualified archaeologist at known archaeological sites, data recovery, procedures to be followed in the event that archaeological resources or human remains are encountered, and other measures to avoid or mitigate for impacts to cultural resources discovered during construction. With implementation of these measures, the impact would be less than significant.

c) Consistent with LRDP Mitigation CULT-5A, the campus consulted the most recent campus soils and geology map and determined that the project is sited on schist, which has low paleontological sensitivity. There are no known unique paleontological resources or geologic features on the project site. Consistent with LRDP Mitigation CULT-5C, construction contract specifications would include the requirement 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 Mitigation CULT-

5D requiring that the Campus adequately document, analyze, and curate any finds at an appropriate institution, is also a component of the Project. The project therefore would not result in a significant impact to paleontological resources.

e) The Campus initiated consultation with local tribal representatives from a list generated for the University by the Native American Heritage Commission in November 2015. The Campus mailed letters and maps to the contacts listed by the NAHC on December 14, 2016 to inquire if they knew of any unrecorded Native American cultural resources or other areas of concern within or adjacent to the Project APE, and to elicit comments, questions, or concerns with regard the project. The letters specifically requested any information that they might have related to tribal resources in or immediately adjacent to the Project APE. The consultations with the Native American Heritage Commission and with Native American organizations or individuals familiar with the Project APE identified no archaeological deposits, plant collection areas, and/or traditional cultural properties within the APE through consultation. No impact would occur.

Summary

The proposed Project incorporates previously adopted 2005 LRDP EIR Mitigations CULT-1A, CULT-1B, CULT-1C, CULT-1G, CULT-2B, CULT-3A, CULT-3B, CULT-4C, CULT-5A, CULT-5A and therefore will result in less-than-significant cultural resources impacts.

6.6 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) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:					
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.	☐	☐	☐	☐	☑
Strong seismic ground shaking?	☐	☐	☐	☑	☐
Seismic-related ground failure, including liquefaction?	☐	☐	☐	☑	☐
Landslides?	☐	☐	☐	☐	☑
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☑	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☑	☐	☐	☐

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
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial 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?	☐	☐	☐	☐	☑

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 (UCSC 2006). 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). Project implementation of these mitigation measures is discussed under relevant checklist questions, below.

LRDP EIR Mitigation GEO-1 (preparation of geotechnical investigations for new development). A geotechnical feasibility study was prepared for the Project in 2007 (Pacific Crest Engineering 2007). A detailed design-level geotechnical investigation is in progress.

6.6.1 Discussion of Checklist Questions

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 (Nolan Zinn 2005). No impact would occur.

a,ii-v) The proposed project site, like much of California, could experience significant seismic shaking. Consistent with LRDP Mitigation GEO-1, a geotechnical and geologic feasibility study has been prepared for the proposed Project (Pacific Crest Engineering 2007). The proposed EH&S Facility would be designed and constructed in conformance with the California Building Code (CBC). Consistent with the University of California Seismic Safety Policy, nonstructural building elements such as furnishings, fixtures, material storage facilities, and utilities that could create a hazard if dislodged during an earthquake would be anchored for seismic resistance.

The geotechnical feasibility study for the Project found that the site is underlain by schist bedrock cross-cut by intrusions of granitic rock, with a veneer of relatively less-consolidated surficial deposits of variable thickness blanketing the bedrock. No groundwater was encountered in any of the test borings, although perched groundwater conditions may develop on the site after periods of prolonged rainfall.

The nearest known active or potentially active fault is mapped approximately 6 miles from the site; therefore, the potential for ground surface fault rupture at the site is low. Liquefaction tends to occur in loose, saturated fine-grained sands or coarse silts. Based on the type of soil encountered and the absence of ground water, the geotechnical feasibility study concludes that the liquefaction potential and the potential for liquefaction-induced lateral spreading at the site is low.

The geotechnical feasibility study for the Project identified a potential landslide hazard associated with the steep slope at the eastern edge of the site (Pacific Crest Engineering 2007). Since the feasibility study was completed, the proposed design process has moved the development slightly further back from the top of the slope. A quantitative slope stability analysis is being performed as part of the detailed geotechnical study currently in progress. Based upon preliminary results of the analysis, the Campus anticipates that the potential landslide hazard would be addressed through design of the foundation piers and would not require revisions to the site plan. Consistent with LRDP Mitigation GEO-1, the Campus would incorporate the recommendations of the geotechnical study into the Project design and the impact would be less than significant.

b) The potential for erosion related to construction activities and to new impervious surface is addressed in Section 6.9, below.

c) 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 karst landscape, which is characterized by topographic closed depressions, sinkholes, sinking streams, subterranean drainage, and caves. As discussed in the LRDP EIR (p. 4.6-17 to 4.6-18), 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. Settling and/or collapse can occur beneath a structure which is built above an undetected cavity. These cavities can often only be identified by detailed site-specific subsurface investigations. However, campus geotechnical investigation practices and foundation design have been successful in preventing settlement or collapse of building structures. Therefore, implementation of LRPD Mitigation GEO-1, which requires characterization of project site conditions and implementation of the recommendations of the geotechnical investigation, would reduce this impact to a less-than-significant level.

The bedrock beneath the Project site was mapped as marble in the 2005 update of the Campus Geology map. However, the geotechnical feasibility study for the Project, which was the first subsurface investigation of the site, determined that the site is actually underlain by schist crosscut by intrusions of granitic rock; therefore, the potential for encountering a karst hazard is considered low. However, this conclusion was based on a limited drilling program. On the campus, even in areas underlain by schist, marble can occur as isolated lenses or pods, or may occur at depth, so it is possible that more detailed investigation, currently in progress, could reveal karst hazards on the site. Consistent with 2005 LRDP Mitigation GEO-1, which is incorporated into the Project, a detailed geotechnical study for the proposed Project is in progress. If karst hazards are identified, the Campus would follow the foundation design recommendations of the geotechnical investigation report, which would ensure that the new structures are designed and constructed to prevent damage to life or property. The impact would be less than significant with implementation of the previously adopted 2005 LRDP Mitigation GEO-1. No project-specific mitigation is required.

d) The geotechnical feasibility study for the proposed Project clay soils in the upper 4 to 5 feet which have the potential to be expansive. Expansive soils can present problems for concrete slab-on-grade floor systems. This issue can be addressed either by removing the expansive soil to a depth of 2 to 4 feet below slabs and footing elements and redensifying the soil as engineered fill. Expansive soils shrink and swell as a result of moisture changes. This can cause heaving and cracking of concrete slabs, pavements, and structures founded on shallow foundations if they are inadequately designed for these conditions. Potential risk to life and property can result if buildings were constructed on expansive soils without appropriate design. These risks can be avoided through the use of engineering solutions such as replacement of expansive soils with fill, lime treatment of soils, or deepening of foundations.

The 2005 LRDP EIR (Vol. 1, p. 4.6-16) concluded that, with implementation of 2005 LRDP Mitigation GEO-1, in conjunction with Campus Standards Handbook and compliance with the CBC, construction of campus facilities on expansive soils under the 2005 LRDP would be a less-than-significant impact.

Consistent with 2005 LRDP Mitigation GEO-1, a detailed geotechnical investigation is being conducted for the proposed Project and its recommendations will be incorporated into project design and construction. These requirements will ensure that the project incorporates appropriate soil treatment and/or foundation design. Therefore, the impact would be less than significant and additional mitigation is not required.

e) The proposed Project would be connected to the sanitary sewer and would not use septic tanks or alternative wastewater disposal systems. No impact would occur.

Summary

The proposed Project incorporates previously adopted LRDP Mitigation GEO-1, and thus all impacts of the proposed project related to geology and soils would be less than significant. No additional mitigation is required.

6.7 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 projects. Combustion of natural gas for space and hot water heating at the new facility would result in emissions of greenhouse gases. The Project would also install new equipment that would utilize electricity and thereby result in indirect GHG emissions associated with the production of electricity by PG&E. However, project operations would not increase commute or vendor vehicle trips to the campus and thus would not result in GHG emissions from mobile sources. Construction of the project would also generate one-time emissions of greenhouse gases from construction equipment and construction worker and vendor trips to the site. In addition, the removal of trees from the site would result in the release of sequestered carbon to the atmosphere.

6.7.1 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 (CO2), methane (CH4), and nitrous oxide (N2O) are the GHGs that are emitted in the greatest quantities from human activities. Emissions of CO2 are largely by-products of fossil fuel combustion. CH4 results from fossil fuel combustion as well as off-gassing associated with agricultural practices and landfills. N2O 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.

6.7.2 Regulatory Setting

In response to an increase in man-made GHG concentrations over the past 150 years, California has implemented 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 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 fbio-1

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 (California Air Resources Board 2014).

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 (most recently updated in June 2015) requires that each campus develop a long- term strategy for voluntarily meeting the State of California's goal for reducing greenhouse gas (GHG) emissions to 1990 levels by 2020, pursuant to the California Global Warming Solutions Act of 2006.[8] Additionally, UC President Janet Napolitano issued a directive

[8] http://policy.ucop.edu/doc/3100155/Sustainable%20Practices

in November 2015 for each campus to achieve climate neutrality by 2025 from scope 1 and 2 sources (on-campus stationary sources and indirect emissions from the generation of purchased energy) by 2025, and climate neutrality from specific scope 3 sources (emissions from daily commuting, and air travel) by 2050. Each campus is also required to develop GHG emission reduction goals for transportation, including fleet, commute, and business travel. Napolitano outlined four focus areas for achieving the University's aggressive climate neutrality 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 (carbon allowances and offsets).[9]

The President of the University of California has signed the American College and University Presidents Climate Commitment. Each signatory commits to completing an inventory of GHG emissions within one year, and to developing, within two years, an institutional plan to achieve climate neutrality as soon as possible. The commitment also includes specific interim actions, including requiring that new campus construction will be built to at least the US Green Building Council's LEED Silver standard or equivalent; purchasing Energy Star appliances; offsetting greenhouse gas emissions generated by institutional air travel; encouraging and providing access to public transportation; purchasing or producing at least 15 percent of the institution's electricity consumption from renewable sources; supporting climate and sustainability shareholder proposals at companies where the institution's endowment is invested; and adopting measures to reduce waste.

In October 2011, UC Santa Cruz adopted a Climate Action Plan (CAP) with actionable policies and programs, particularly in the field of climate change and GHG reduction. The Campus' goals include a target reduction from 2007 levels of 13,600 MT CO2e by 2014 and 25,300 MT CO2e by 2020. The campus met its interim targets for 2014.

In January 2015, the Campus initiated an intensive Climate and Energy Strategy (CES), which will be completed April of 2016. The CES includes a comprehensive energy efficiency audit and plan for the 2.5M SF main campus with a focus on therm savings, deep energy efficiency opportunities, and emission reductions; a renewable energy feasibility study for the main campus and some satellite sites; a technical/economic analysis based on all pertinent inputs and recommended the most cost-effective, attainable strategies (projects, policy updates, procurement, etc.) for addressing campus climate and energy goals; and development of a living lab master plan to support experiential learning and climate mitigation research.

The study resulted in the development of over 350 energy conservation measures, 20 photovoltaic, solar thermal and fuel cell projects, 12 district level energy conservation measures, designation of lab and outdoor space, equipment and materials for a Living Lab to support climate change research, and development of a complex and robust scenario analysis tool to support climate action decision-making at all levels throughout the organization.

The results of the Climate Energy Study will help the campus develop strategies for cost-effectively achieving its goals and will form the basis of study recommendations. The tool will be used regularly to revise the campus' climate and energy strategy as business conditions change.

6.7.3 Discussion of Checklist Questions

a) This analysis is based on the methodologies recommended by the California Air Pollution Control Officers Association [CAPCOA] (January 2008) *CEQA and Climate Change* white paper. The analysis focuses on CO_2, N_2O, and CH_4 as these are the GHG emissions that on-site development would generate in the largest quantities. Fluorinated gases, such as HFCs, PFCs, and SF_6, were also considered for the analysis. However, the proposed Project would not include a significant quantity of fluorinated gases since fluorinated gases are primarily associated with industrial processes.

[9] http://ucop.edu/sustainability/_files/carbon-neutrality2025.pdf

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).

CEQA Guidelines Section 15183.5(b)(1) lists the standards that a plan for the reduction of greenhouse gas emissions must meet in order to be used to streamline the analysis of project-level GHG emissions. The UC Santa Cruz Climate Action Plan (CAP) does not meet all of these requirements, including:

> *Section 15183.5(b)(1)(D) Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level; and*
> *Section 15183.5(b)(1)(E) Be adopted in a public process following environmental review.*

Therefore, the UC Santa Cruz CAP does not qualify as a plan for the reduction in greenhouse gas emissions under CEQA.

The MBUAPCD has not adopted GHG emissions thresholds to date. In December 2015 the MBUAPCD issued a public notice for an update to the District's CEQA Implementation Guidelines (for projects where the District is the lead agency) to include a GHG threshold for stationary sources (MBUAPDC 2015.

Prior to beginning the development of MBUAPCD thresholds, MBUAPCD recommended use of the adopted San Luis Obispo Air Pollution Control District (SLOAPCD) quantitative emissions threshold of 1,150 MT CO_2e per year for most land use projects. Since the MBUAPCD thresholds have been recommended but not yet adopted, the more conservative SLOAPCD threshold is the most appropriate for analysis of the Project (MBUAPCD, pers. communication, February 6, 2015). Therefore, the Project's contribution to cumulative impacts related to GHG emissions and climate change would be considered cumulatively considerable if the Project would produce more than 1,150 MT CO_2e per year.

Potential GHG emissions associated with the proposed Project were estimated using the California Emissions Estimator Model (CalEEMod) version 2013.2.2. The estimate of construction-related emissions is based on a likely construction schedule and an equipment list for each phase of construction. The estimates of emissions from combustion of natural gas for space and hot water heating at the new facility and of indirect GHG emissions associated with the production of electricity by PG&E are based on the whole-building energy targets for the Project. Project operations would not increase commute or vendor vehicle trips to the campus and thus would not result in GHG emissions from mobile sources. The CalEEMod model was also used to estimate the GHG emissions associated with conversion of forest land, which would release carbon sequestered in the trees and forest soils to the atmosphere. Emissions from construction and forest conversion are amortized over 30 years (the lifetime of the Project) and added to the operational emissions to determine the Project's total annual emissions.

The estimated emissions from Project construction and operation are presented in Table 6.7-1. The CalEEMod output is provided in Appendix D.

Table 6.7-1
Estimated GHG Emissions (Annual)

Construction and Forest Conversion (one-time emissions)	
Construction	226 MT CO_2e
Forest conversion	107 MT CO_2e
Total one-time emissions	*333 MT CO_2e*
Operations (annual)	
Energy	154 MT CO_2e per year
Area, solid waste, water	0.23 MT CO_2e per year
Subtotal operations	*154 MT CO_2e per year*

Total annual emissions	
Project operations	154 MT CO_2e per year
One-time emissions amortized over 30 years	11 MT CO_2e per year
Total annual emissions	*165 MT CO_2e per year*
GHG Significance Threshold	1,150 MT CO_2e
Exceed Threshold	**No**

Estimated using CalEEMod version 2013.2.2. See Appendix D.

As shown in Table 6.7-1, the annual GHG emissions that would result from Project construction and forest conversion, and Project operations, 165 MT CO_2e per year, are substantially lower than the threshold of significance of 1,150 MT CO_2e.

Based on the above calculations, Project-related GHG emissions would result in a less than significant climate change impact.

b) The MBUAPCD has not adopted a plan, policy, or regulation for reducing GHG emissions. The Project would comply with applicable policies of the University of California Policy on Sustainable Practices regarding design and operation of the proposed Project. Emissions associated with vehicle trips and energy efficiency are most frequently addressed in plans, policies, and regulations, including those described above. The Project would not result in a net increase in vehicle trips. The proposed Project is included in the Campus' planning to meet its GHG reduction efforts. The proposed design includes a number of elements to maximize energy efficiency, including daylight to all perimeter spaces to reduce dependency on artificial lighting; no mechanical cooling system; a passive ventilation system to minimize the need to operate the make-up air unit except during cold weather; and high-efficiency LED lighting. Implementation of the Project would not conflict with UC Santa Cruz' GHG reduction efforts, including the Campus' Climate Action Plan. Therefore, the projects would not conflict with any California regulations intended to reduce GHG emissions. The Project 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.

6.8 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 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	☐	☐	☐	☐	☑

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
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 for people residing or working in the project area?	☐	☐	☐	☐	☑
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☐	☑
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☑	☐	☐	☐
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☑	☐

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 (UCSC 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). Project implementation of these mitigation measures is discussed under relevant checklist questions, below.

LRDP EIR Mitigation HAZ-2 (enhance Campus' hazardous waste minimization program)

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

6.8.1 Discussion of Checklist Questions

a,b) The proposed new EH&S Facility would be dedicated to hazardous waste accumulation, testing, and handling. The facility would be used for handling of organic and inorganic chemical waste, including substances classified as flammable, toxic, corrosive and reactive; long- and short-term-decay radioactive waste; and batteries classified as universal waste. All hazardous waste at the site would be transported and held in closed containers, except in the liquid bulking room, where liquid wastes in small containers would be transferred to larger containers. No hazardous materials would be stored outdoors; materials would be transferred to and from trucks at the outdoor loading dock would be in closed containers.

Applicable Laws and Regulations

The LRDP EIR (pp. 4.7-2 through 4.7-11) summarizes the federal and state regulations and Campus policies and procedures which govern hazardous materials use, storage, and disposal on the Campus. Under federal regulations (40 CFR Part 262 CFR), the campus is defined as a "Large Quantity Generator" of hazardous waste. Large Quantity Generators do not have a limit on the amount of hazardous waste accumulated on site but may accumulate waste on-site only for 90 days without a permit. As a Large Quantity Generator, the Campus must comply with specific federal and state regulations for management, storage, and transport of hazardous materials; must meet emergency preparedness and prevention requirements; and must submit a biennial hazardous waste report to the U.S. EPA.

The Radiological Health Branch of the California State Department of Health Services (DHS) regulates the possession and use of radioactive materials at non-federal facilities in California. The California Radiation Control Law requires that any person desiring to possess, use, or transfer any radioactive material must have a license. UC Santa Cruz holds a "broad scope" license that governs the uses of radioactive materials in its laboratories. A broad scope license authorizes an institution to use radioactive materials for specified general purposes such as research and development. The institution, in turn, operates a program that approves and oversees each particular use of radioactive material within that institution.

The State Hazardous Materials Release Response Plans and Inventory Law of 1985 (Business Plan Act) requires that any business that handles hazardous materials prepare a Business Plan, which must include the following: (1) details, including floor plans of the facility and identification of business conducted at the site; (2) an inventory of hazardous materials that are handled or stored on the site; (3) an emergency response plan; and (4) a training program in safety procedures and emergency response for new employees who may handle hazardous materials, with an annual refresher course in the same topics for those same employees.

Under Title 49 of the Code of Federal Regulations (CFR), the U.S. Department of Transportation (DOT) has the regulatory responsibility for the safe transportation of hazardous materials between states and to foreign countries. DOT regulations govern all means of transportation, except for those packages shipped by mail, which are covered by U.S. Postal Service regulations. The federal Resource Conservation and Recovery Act of 1976 (RCRA) imposes additional standards for the transport of hazardous wastes.

The California Highway Patrol (CHP) and the California Department of Transportation (Caltrans) have primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies. The CHP enforces hazardous materials and hazardous waste labeling and packing regulations designed to prevent leakage and spills of material in transit and to provide detailed information to cleanup crews in the event of an accident. Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are all part of the responsibility of the CHP, which conducts regular inspections of licensed transporters to assure regulatory compliance. In addition, the State of California regulates the transportation of hazardous waste originating or passing through the state.

Common carriers are licensed by the CHP, pursuant to the California Vehicle Code, Section 32000. This section requires licensing every motor (common) carrier who transports, for a fee, in excess of 500 pounds of hazardous materials at one time and every carrier, if not for hire, who carries more than 1,000 pounds of hazardous material of the type requiring placards. Common carriers conduct a large portion of the business in the delivery of hazardous materials.

Relevant Project Elements

Project design and construction are required to comply with applicable provisions of the California Building Code and the California Fire Code for facilities used for storage and handling of hazardous materials. The liquid bulking room has been specially designed to meet California Fire Code requirements for exhaust systems, electrical grounding, separation of incompatible materials, and fire protection. As required by the California Fire Code, explosion control would be provided in through storage of closed containers, ventilation, spill control measures, and limits on the amounts and types of hazardous materials stored.

The Project would include an emergency alarm system to alert occupants of an emergency situation involving hazardous materials and the building would be equipped with an automatic sprinkler system for fire control. The mechanical ventilation, temperature controls, alarms and detection systems would be on the emergency power system so that they would still function in the event of a power outage.

Containment tanks, with a total capacity of 11,500 gallons, would be would be installed above grade, below the elevated structural slab of the building~~s~~, to contain fire sprinkler water. These tanks would be provided with alarms as required by the California Fire Code. A series of in-slab spill containment trenches in storage and handling areas as well as circulation spaces where such materials may be transported provide capacity for accidental spills of up to 55 gallons. Overflows from the spill-containment trenches would flow to the containment tanks. The containment tanks could be evacuated by a pump truck at the loading dock if necessary. The loading dock would be covered, and would slope toward a trench drain and a sump designed to contain an 55-gallon spill.

The 2005 LRDP EIR did not specifically analyze the development of a new hazardous waste facility on the campus, but did analyze the impacts of the potential increase in the amount transport, use, and disposal of hazardous waste (LRDP EIR pp. 4.7-21). The EIR determined that this increase would not result in a significant hazard because the Campus would continue to comply with all federal and state laws and regulations and will continue to implement all safety programs and procedures then in place as established by EH&S. These procedures would continue to limit exposure of students, faculty, staff, and the community at large to hazardous, radioactive, or biohazardous materials, to research animals, or to non-ionizing radiation. All UC Santa Cruz projects implemented under the 2005 LRDP would comply with these controls. The LRDP EIR concluded that the less-than-significant impact would be further reduced through implementation of LRDP Mitigation HAZ-2, which requires that the Campus enhance its hazardous waste minimization program. EH&S implements LRDP Mitigation HAZ-2 on an ongoing basis and the amount of hazardous waste generated by the laboratories has decreased under the 2005 LRDP despite the growth in enrollment and research activity (UC Santa Cruz 2015).

The proposed Project would be designed and built in compliance with applicable elements of the California Building and Fire codes. EH&S would continue to comply with federal and State laws and regulations governing hazardous waste management and would continue to implement LRDP Mitigation HAZ-2. For these reasons, the Project would not result in a significant hazard associated with the use, disposal, or transport of hazardous materials. No additional mitigation is required.

c) There is an existing child care center at the Family Student Housing complex, approximately 2,000 feet southwest of the Project site, but there are no existing or proposed schools or child care centers within one-quarter mile of a the Project site. No impact would occur.

d) There are no sites on campus that are listed as hazardous waste sites pursuant to Government Code Section 65962.5. 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,f) 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.

g) Construction of the proposed projects could necessitate temporary closure of one lane of Heller Drive. Consistent with LRDP Mitigation HAZ-9A, the proposed project would therefore be required to comply with standard Campus contract provisions that include: (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 will comply with these and all other relevant Campus Standards. The project's potential to interfere with to emergency operations therefore would be less than significant.

h) 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 it interfere with Campus fire management or otherwise exacerbate the existing hazard. Therefore, the project's potential to result in increased risk of wildfire would be less than significant.

Summary

Because LRDP Mitigation HAZ-9A would be implemented during construction and occupation of the project, and the Campus would continue to implement LRDP Mitigation HAZ-2, all impacts of the proposed Project related to hazards and hazardous materials would be less than significant.

6.9 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?	☐	☑	☐	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☑	☐	☐	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☑	☐	☐	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☐	☑
e) 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?	☐	☑	☐	☐	☐
f) Otherwise substantially degrade water quality?	☐	☑	☐	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☐	☑
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☐	☑
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☐	☑
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☐	☑

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 (UCSC 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). Project implementation of these mitigation measures is discussed under relevant checklist questions, below.

LRDP EIR Mitigation HYD-2B (erosion and sediment control measures for hillside grading)

LRDP EIR Mitigation HYD-3C (storm water runoff flow rate requirements for projects that create new impervious surface)

LRDP EIR Mitigation HYD-3D (storm water runoff volume control requirements for new capital projects)

Under existing conditions, the storm water infiltrates into the natural soils or flows off-site toward the East Fork Moore Creek Baskin Tributary to the east of the site. The proposed Project would construct approximately 22,000 sf of new impervious surface.

Because the proposed Project would construct more than 15,000 sf of new impervious surface, Project design and construction must comply with the elements of the Campus' Post-Construction Storm Water Management Requirements listed below. The Campus adopted these requirements, which are included in Appendix C of the Campus Standards, to comply with the State Water Resources Control Board General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s):

- Performance Requirement No. 1: Site Design and Runoff Reduction (design strategies to limit disturbance of natural drainage features and compaction of highly permeable soils, to minimize impervious surfaces and storm water runoff). To document compliance with this requirement, the Campus requires completion of a Post Construction Storm Water Management Checklist.
- Performance Requirement No. 2: Water Quality Treatment (design storm water management systems to treat storm water runoff to specific performance standards using, in order of preference, low impact development treatment systems, biofiltration treatment systems, or non-retention based treatment systems). To document compliance with this requirement, the Project design team must provide documentation, including calculations, in a Storm Water Control Plan. If a low-impact-development (LID) system is used to infiltrate and evapotransporate, it must be designed to retain stormwater runoff equal to the volume of runoff generated by the 85th percentile 24-hour storm event, based on local rainfall data.
- Performance Requirement No. 3: Runoff Retention (runoff retention requirements which vary by location, but, for the proposed Project, require: retention on site of the 85th Percentile, 24-hour Rainfall Event (1.4 inches of rainfall). This requirement must be met using storage, rainwater harvesting, infiltration and/or evapotranspiration. It is expected that infiltration and evapotranspiration will be used to meet this requirement.
- Performance Requirement No. 4: Peak Management (would apply if Performance Requirement 3 cannot be met) requires that the Project be designed and constructed to ensure that post-development storm water flows not cause excessive erosion. This could be met by limiting the post-development flow rates for the 2- through 10-year storm events to 20 percent of the pre-project 2-year peak flow rate.

To comply with Performance Requirement No. 1, the proposed design minimizes impervious surfaces through the use of a permeable paving system for the parking spaces and gravel surrounding individual concrete equipment pads in the electrical yard. Runoff from impervious areas would be directed either towards the pervious parking stalls, adjacent natural areas, or biofiltration facilities. ~~Runoff from the roof of the radioactive waste building would be directed to new landscaping to the north.~~ Runoff from the northern portion of the driveway would flow toward the natural area that would be retained between the driveway and Heller Drive. Runoff from the southern portion of the driveway and the roof of the main building would drain to the biofiltration facilities. The biofiltration facilities would include tree box filters and/or bioswales which are sized to meet the water quality standards of Performance Requirement No. 2

would be met for the 85th percentile, 24-hour storm of 1.4 inches. The treated water would be routed to an infiltration gallery and retention area consisting of bottomless, 60-inch corrugated metal pipes surrounded by drainage gravel. The infiltration gallery is sized to meet Performance Requirement No. 3 for runoff retention, and would allow peak flows for the 2-year, 5-year, and 10-year events to infiltrate on-site. In extended storm events with lower peak flows but with a higher overall volume than the storm events being treated for water quality, runoff would be routed to the infiltration gallery and discharged via an overflow pipe to a flow-spreading level header near the southwest corner of the site. The level header would be buried in duff and spacing and sizing the outlets of the header to ensure the outflow does not result in localized erosion.

6.9.1 Discussion of Checklist Questions

a,c,d,e,f) Short-Term Construction Water Quality

Ground disturbance and grading has the potential to result in water quality impacts during construction. Overall, the Project would result in approximately 1.5 acres of ground disturbance, including trenching for new utilities north of Kerr Hall. 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 Storm Water Pollution Prevention Plan (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 the building is complete to avoid impacts to water quality. The contractor would also be required to implement erosion and sediment control measures for hillside grading during the rainy season, as specified in LRDP Mitigation HYD-2B. 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.

Long-Term Operational Water Quality

Wastewater. The new EH&S facility would discharge wastewater to the Campus sanitary system, which flows to the Santa Cruz Waste Water Treatment Facility. Sanitary waste piping would be provided for the restrooms and lab spaces. Campus guidelines prohibit the discharge of hazardous materials into sinks and drains on the campus. Accidental spills would be contained in floor trenches, which would overflow to the containment tanks described in Section 6.8, above. For these reasons, hazardous materials would not be discharged to the sanitary sewer system and the Project would not result in any violation of water quality standards or waste discharge requirements. The impact would be less than significant.

Storm Water Runoff. Vehicle travel to and from the site and parking on the site would create new sources of urban pollutants, including oil and grease and heavy metals. In most storms, all site runoff, including runoff from parking spaces and most of the driveway runoff, would be managed on the site, through the "low-impact development" strategies, including pervious pavement at the parking spaces and directing runoff from pavement to landscaped or undeveloped areas.

Trench drains and curbs would prevent storm water from flowing onto the loading dock area. The loading dock area would slope toward a trench drain. All hazardous materials transferred to and from trucks at the loading dock would be in closed containers; no transfer of hazardous materials from one container to another would take place at the loading dock. In addition, the loading dock would be roofed and a manual valve would be provided to close the trench drain during deliveries. If there is a spill while the trench drain is closed, the spill would flow to the containment tanks described in Section 6.8, above and no hazardous materials would enter the storm drain system. The storm drain system for the loading dock would also incorporate a sump designed to contain a 50-gallon spill, to ensure that oil or fluid leaked from trucks does not discharge to the storm drain. The trench drains would discharge to the infiltration area at the southern end of the site, which would also be designed to provide treatment.

Compliance with the Campus' Post-Construction Storm Water Management Requirements, which include detailed documentation that the sizing and design of the storm water management system meet each performance requirement, would ensure that adequate treatment of runoff is provided in the storm water treatment areas or mechanically before it flows off-site. The Campus enforces these standards in order to comply with the State Water Resources Control Board General Permit; therefore, compliance with these requirements is mandatory. Therefore, the Project would not result in significant adverse impacts to water quality in the adjacent branch of Moore Creek.

Erosion and Siltation. LRDP Mitigations HYD-3C and HYD-3D are applicable to and incorporated into the proposed Projects. These mitigations require that post-development storm water runoff peak flow rates not exceed pre-development rates, and that every development project include design measures to maximize infiltration and dissipation of runoff near its source. The Campus implements these mitigations through the Post-Construction Storm Water Management Requirements, summarized above, under *Long-Term Operational Water Quality*. The Project would comply with these requirements by managing runoff on site, as described above under *Storm Water Runoff*. Compliance with storm water Performance Requirements No. 3 (retention of runoff through infiltration and/or evapotranspiration), or, if this standard cannot be met, Performance Requirement No. 4 (limiting peak storm water flow rates to non-erosive levels) would ensure that the Project would not result in erosion or siltation.

b) The new facility would be served by the Santa Cruz Water Department, and would not use local groundwater. Runoff from the Project sites infiltrates into the ground or flows overland toward the adjacent stream channel. Most of the flow in the East Fork of Moore Creek is captured by sinkholes or swallow holes 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 also considered a potential supplemental, non-potable water supply for the Campus. As described under a), above, except in large storms, storm water runoff from the new facility would infiltrate on-site. In large storms, runoff which does not infiltrate on site would flow overland to the creek as under natural conditions. Therefore, the Project would not result in a reduction in recharge to the karst aquifer and the impact of the additional impervious surface on groundwater recharge would be less than significant.

g-j) The proposed projects have no potential to result in impacts with respect to 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

With implementation of previously adopted LRDP Mitigations HYD-2B, HYD-3C and HYD-3D, which are applicable to and incorporated into the Project, all impacts of the Project related to hydrology and water quality would be less than significant. No additional mitigation is required.

6.10 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) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☐	☑
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☐	☑
d) 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 (UCSC 2006b).

6.10.1 Discussion of Checklist Questions

a) The new EH&S Facility Project site is on undeveloped land within the central campus, between a major campus road and Kerr Hall, which is a central campus administration building. No impact would occur.

b) The applicable land use plan for the campus is UCSC's 2005 Long Range Development Plan (2005 LRDP). The land use designation for the site is Academic Core. Academic Core designation provides for land uses that directly support the teaching, research, and public service mission of the University of California, including instruction and research, organized research, academic support, libraries, student services, institutional support, public services, and parking. The Project, which is considered institutional support, is consistent with this designation. No impact would occur.

c) The Project site is not within the purview of any habitat conservation plan or natural community conservation plan, nor would the proposed activity or development affect any area so designated, directly or indirectly. Therefore, no impact would occur.

d) A student apartment complex, Redwood Grove, is located about 115 feet northwest of the site, on the west side of Heller Drive. An outdoor stage, part of the Campus' Performing Arts complex, lies approximately 200 feet to the southeast. Kerr Hall, a Campus administration building, is located just east of Moore Creek, about 290 feet from the Project site. As analyzed in Section 6.8, *Hazards and Hazardous Materials*, the Project would not result in a significant hazard associated with the storage, handling, or transportation of hazardous waste at the new facility. As analyzed in Section 6.12, *Noise*, the Project would not result in construction or operational noise levels exceeding the applicable standard at any of the nearby sensitive receptors. The Project would not create other nuisances or conditions that would be incompatible with the adjacent uses and no impact would occur.

Summary

The proposed Project would not result in significant impacts related to land use.

6.11 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?	☐	☐	☐	☐	☑

6.11.1 Discussion of Checklist Questions

a,b) The campus is within a Zone 3 Mineral Resource Zone, according to California Geologic Survey (CGS) maps. The CGS does not consider development in a Zone 3 area as a significant impact to mineral resources under CEQA (Hill 1997). 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 any mineral resources impacts.

6.12 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) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☑	☐	☐	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☑	☐	☐	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☑	☐	☐	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☑	☐	☐	☐

Noise issues and programmatic mitigation measures applicable to LRDP development are described in Volume II, Section 4.10, of the 2005 LRDP EIR (UCSC 2006b). The following, previously adopted LRDP EIR mitigations for potential noise impacts are applicable to and included in the proposed Project. The full text of these mitigation measures is included in Appendix B. Project implementation of these mitigation measures is discussed under relevant checklist questions, below.

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

LRDP EIR Mitigation NOIS-2 (requirement that contractor truck trips use only City-designated truck routes)

6.12.1 Background

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 (or drop off) 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 (Federal Transit Administration 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.

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.

This analysis uses the following significance thresholds which were established in the 2005 LRDP EIR.

For purposes of evaluating noise impacts from traffic and other permanent noise sources, the following noise standards consistent with State guidelines and City of Santa Cruz General Plan were used:

- 60 dBA CNEL for single-family residences
- 65 dBA CNEL for multi-family residences
- 70 dBA CNEL for schools and parks

A substantial permanent increase in noise was evaluated based on the following criteria:

- A 3 dBA or greater increase if CNEL for Without Project scenario is equal to or greater than 65 dBA
- A 5 dBA or greater increase if CNEL for Without Project scenario is 50–65 dBA
- A 10 dBA or greater increase if CNEL for Without Project is < 50 dBA

A substantial temporary increase in ambient noise levels (associated mainly with construction activities) was evaluated based on the following criteria:

- 80 dBA Leq (8h)[10] daytime
- 80 dBA Leq (8h) evening
- 70 dBA Leq (8h) nighttime

<u>Sensitive Receptors</u>

For the purpose of this analysis, noise-sensitive receptors include residences, daycare centers, schools, hospitals and parks. On campus, academic buildings are considered noise sensitive. The noise sensitive

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

receptors closest to the proposed EH&S Facility site are the Redwood Grove student apartments, located about 125 feet northwest of the site, and the outdoor stage about 200 feet to the southeast. Noise levels were also calculated for Kerr Hall, an administrative office building about 280 feet to the east. The locations of these receptors are shown in Figure 6.12-1.

6.12.2 Discussion of Checklist Questions

a, c) The noise technical study for the Project (Illingworth and Rodkin 2016) is presented in Appendix F. The main sources of operational noise associated with the proposed Project would be the rooftop mechanical equipment. The project would add only a small number of vehicle trips to the site, including trips by EH&S staff from the EH&S office building to work at the facility; weekly trips by a box truck operated by EH&S to transport waste from waste generators on the campus to the facility; periodic trips, up to 90 days apart, by a chemical waste contractor to pick up the material and transport it for disposal; and, generally, annual shipments of radioactive waste. The small number of daily vehicle trips and infrequent truck trips would not have the potential to result in significant impacts on ambient noise in the vicinity.

The predominant sources of rooftop mechanical equipment noise would be the air handling systems and exhaust fans. An emergency generator is also proposed to provide power during electrical outages and would be operated for testing and maintenance every other month, a total of 9.5 hours per year.

Noise from new rooftop equipment was analyzed using the roof plan showing the equipment locations and equipment sound levels. Operational noise levels were calculated for the worst-case condition at the Redwood Grove Apartments, Sinsheimer-Stanley Festival Glen Outdoor Stage, and Kerr Hall. The attenuating effects of distance were calculated separately for each piece of equipment (or group of equipment where appropriate) and then summed to calculate the total noise level at each receptor. As the generator would operate only intermittently and for short periods of time, noise levels for the generator were calculated separately.

The noise analysis showed that noise levels from the rooftop mechanical equipment at the new facility would be 45 dBA Leq at Redwood Grove Apartments, 49 dBA Leq at Sinsheimer-Stanley Festival Glen Outdoor Stage, and 46 dBA Leq at Kerr Hall. Assuming 24-hour operation of this equipment, the calculated average noise level from Project operations would range from 52 to 54 dBA CNEL at the nearest receptors.

Based on a review of ambient noise data and projected traffic noise levels presented in the 2005 LRDP EIR noise analysis (Vol. 1, pp. 4.10-10, 4.10-18), existing noise levels are estimated at approximately 62 dBA CNEL at Redwood Grove Apartments and 57 dBA CNEL at the outdoor stage and Kerr Hall. The overall noise level assuming the 24-hour operation of the equipment, when added to existing conditions, would remain at 62 dBA CNEL at the Redwood Grove Apartments. Overall noise levels at the outdoor stage would increase approximately 3dBA, to 60 dBA CNEL. At Kerr Hall, the noise level would increase by approximately 1 dBA CNEL above ambient conditions, to 58 dBA CNEL. These predicted worst-case noise levels would be below the 65 dBA CNEL threshold for multi-family residences and 70 dBA CNEL threshold for schools/parks. In addition, the worst-case operational noise levels would not measurably increase ambient noise levels at receptors in the project vicinity. The impact would be less than significant and no mitigation would be required.

A review of the manufacturer’s noise data for the proposed generator indicates that operational noise levels would be 70 dBA at a distance of 23 feet, assuming that the generator would be housed in a Level 2 sound attenuated enclosure. Operational noise levels would be would be 50 dBA Leq at Kresge East Apartments, 44 dBA Leq at Sinsheimer-Stanley Festival Glen Outdoor Stage, and 47 dBA Leq at Kerr Hall during testing and emergency operations. The intermittent noise produced by testing and emergency operations would not measurably increase ambient CNEL noise levels and would not result in a significant noise impact.

b,d) Project construction is anticipated to begin in May 2017 and end in August 2018, lasting approximately 16 months. Construction noise was estimated separately for each of the following phases: demolition (22 days), site preparation (22 days), grading (20 days), building construction (230 days), architectural coatings (21 days), and paving (23 Days).

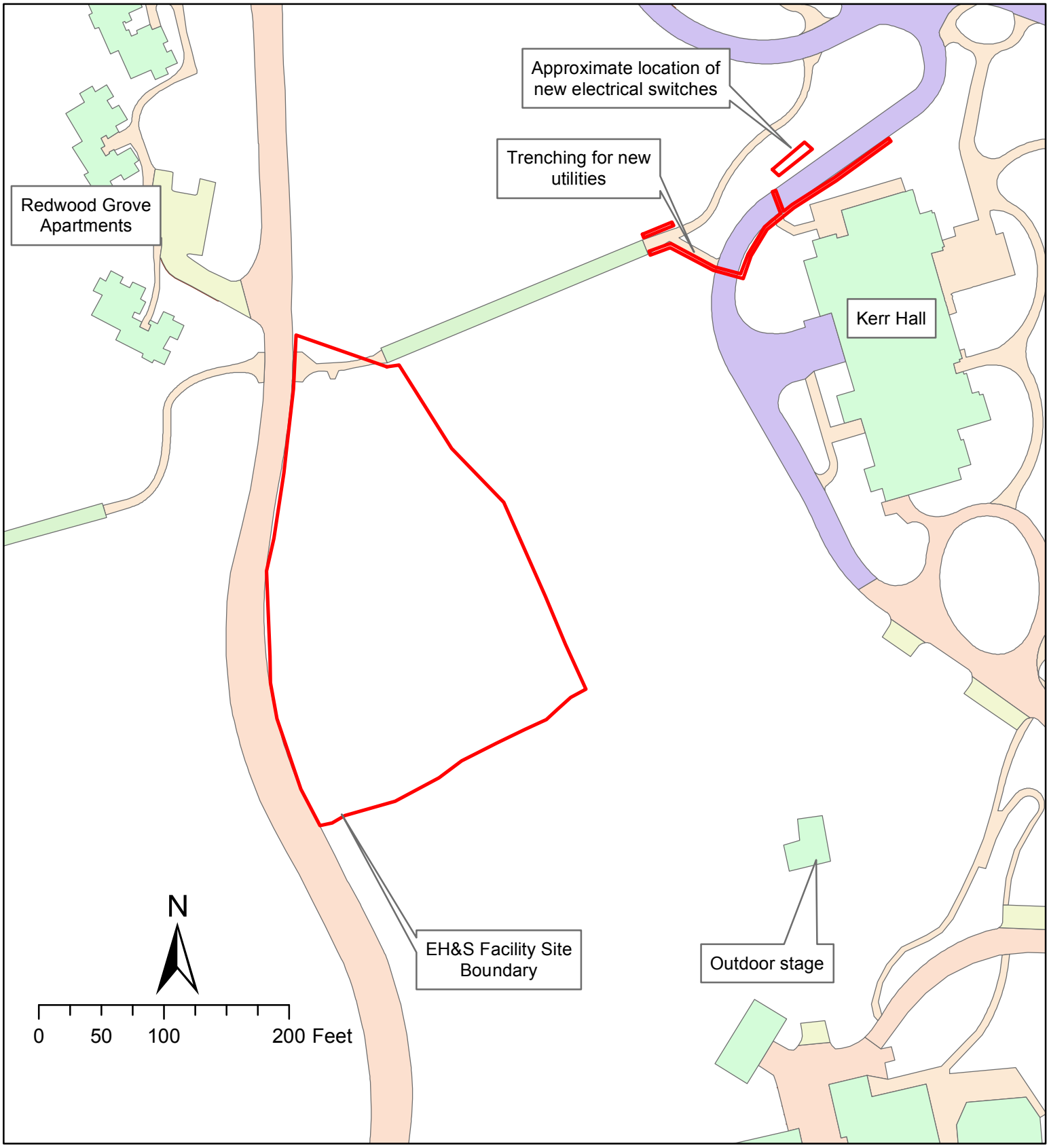

Figure 6.12-1: Noise-sensitive receptors

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Construction noise impacts would be a function of the noise levels generated by individual pieces of construction equipment, the type and number of pieces of equipment operating at any given time, the timing and duration of construction activities, the proximity of nearby sensitive land uses, and the presence or lack of shielding at these sensitive land uses. Construction noise levels would vary on a day-to-day basis during each phase of construction depending on the specific task being performed. Each construction phase would require a different combination of construction equipment and differing usage factors for such equipment. Construction noise would primarily result from the operation of heavy construction equipment and the arrival and departure of heavy-duty trucks.

The Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM) was used to calculate the average noise levels anticipated during the worst-case phases of construction that would occur across the site. This construction noise model includes representative sound levels for the most common types of construction equipment and the approximate usage factors. The usage factors represent the percentage of time that the equipment would be operating at full power. Vehicles and equipment anticipated during each phase of construction were input into RCNM to calculate noise levels at the nearest sensitive receptors to the construction activities during each phase. Anticipated construction noise levels, by construction activity and phase, are summarized in Table 6.12-1.

Table 6.12-1
Calculated Construction Noise Levels at Nearest Receptors

Construction Phase	Average Equivalent Noise Level (dBA, Leq)		
	Redwood Grove Apartments (125 feet)	Sinsheimer-Stanley Festival Glen Outdoor Stage (200 Feet)	Kerr Hall (280 feet)
Demolition	77	72	70
Site Preparation	75	70	68
Grading	74	69	67
Building Construction	78	73	71
Architectural Coatings	66	61	59
Paving	74	70	67
Overall Range of Construction Noise Levels	66 to 77	61 to 72	59 to 70

Source: Illingworth & Rodkin, Inc., February 2016.

The predicted worst-case construction noise levels resulting from construction activities occurring at distances ranging from 125 feet to 280 feet from the nearest sensitive receptors (i.e., Redwood Grove Apartments, Sinsheimer-Stanley Festival Glen Outdoor Stage, and Kerr Hall) would not exceed the significance thresholds of 80 dBA Leq (8-hour) during daytime and evening. Construction noise levels could potentially exceed 70 dBA Leq (8-hour) during nighttime; however, the implementation of previously adopted LRDP Mitigation NOIS-1 would reduce the impact to a less-than-significant level by restricting construction to the hours between 7:30 AM and 7:30 PM, Monday through Saturday. No additional mitigation would be required.

The 2005 LRDP EIR (Vol. 1, p. 4.1-17), analyzed the potential that Campus growth under the 2005 LRDP would result in a noticeable increase in ambient noise levels as a result of increased vehicular traffic on the city road network. The Draft LRDP EIR determined that the impact would be less than significant, but, in response to a public comment on the Draft EIR, the Final LRDP EIR was revised to include LRDP Mitigation NOIS-2 to further reduce the less-than-significant impact. The requirement that contractors use City-designated truck routes has been incorporated into the Campus' construction contract template and thus would be a requirement of Project construction.

Construction Vibration Assessment

The LRDP EIR determined that construction of the proposed project would not expose sensitive receptors to excessive groundborne vibration or groundborne noise because construction techniques having the potential of yielding relatively high vibration levels, such as pile driving or blasting, were not anticipated.

For structural damage, the California Department of Transportation recommends a vibration limit of 0.5 inches/second, peak particle velocity (in/sec PPV) for buildings structurally sound and designed to modern engineering standards, 0.3 in/sec PPV for older residential buildings, 0.25 for historic and some old buildings, and a conservative limit of 0.08 in/sec PPV for ancient buildings or buildings that are documented to be structurally weakened. All buildings in the project vicinity are assumed to be structurally sound, but these buildings may or may not have been designed to modern engineering standards. No ancient buildings or buildings that are documented to be structurally weakened are known to exist in the area.

6.2-2, below, presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet. Vibration levels produced by a vibratory roller (0.210 in/sec PPV at 25 feet) would represent a credible worst-case scenario for proposed construction activities.

Table 6.12-2
Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	PPV at 125 ft. (in/sec)	PPV at 280 ft. (in/sec)
Clam shovel drop		0.202	0.034	0.014
Hydromill (slurry wall)	in soil	0.008	0.001	0.001
	in rock	0.017	0.003	0.001
Vibratory Roller		0.210	0.036	0.015
Hoe Ram		0.089	0.015	0.006
Large bulldozer		0.089	0.015	0.006
Caisson drilling		0.089	0.015	0.006
Loaded trucks		0.076	0.013	0.005
Jackhammer		0.035	0.006	0.002
Small bulldozer		0.003	0.001	0.000

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Federal Transit Agency, Office of Planning and Environment, May 2006.

Vibration levels are highest close to the source, and then attenuate with increasing distance. A vibratory roller would produce vibration levels of 0.036 in/sec PPV at the Redwood Grove Apartments located approximately 125 feet northwest of the project site, and 0.015 in/sec PPV or less at Kerr Hall, approximately 265 feet east of the project site. At these distances, vibration levels would not approach or exceed the 0.3 in/sec PPV threshold used to assess the potential for cosmetic damage (e.g., minor cracks in plastered walls or the loosening of paint).

Groundborne vibration levels resulting from proposed construction equipment could be perceptible at times; however, would not be expected to cause a significant impact to receptors at the Redwood Grove Apartments or Kerr Hall because such vibration levels would only be expected to occur during daytime hours when a vibratory roller is used on the portions of the project site closest to receptors. No mitigation would be required.

Summary

Because the project incorporates LRDP Mitigation NOIS-1 and NOIS-2, all noise impacts of the proposed projects would be less than significant.

6.13 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 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 housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☐	☑
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☐	☑
d) 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 (UCSC 2006b).

6.13.1 Discussion of Checklist Questions

a,d) The Project would not construct new homes or businesses or construct infrastructure which would induce population growth or create new demand for housing, either directly or indirectly. The Project is sized to meet the existing hazardous waste handling needs of the Campus and does not support enrollment growth.

b,c) No housing is present on the Project site. 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.

6.14 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:					

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
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 (UCSC 2006b).

6.14.1 Discussion of Checklist Questions

a) i-iV) As discussed in Section 3.6, above, the proposed Project would not accommodate or result in an increase in Campus population. The construction of the new facility would slightly increase the need for fire and police protection. However, this increase in demand for services would not be great enough to result in the need for construction of new facilities. The impact would be less than significant and mitigation is not required.

Summary

The proposed Project would not create any significant impacts related to public services.

6.15 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 (UCSC 2006b), from which the analysis presented below is tiered.

6.15.1 Discussion of Checklist Questions

a) As discussed in Section 3.6, above, the proposed Project would not accommodate or result in an increase in Campus population or otherwise increase use of existing recreational facilities. No impact would occur.

b) The Project would not construct or expand recreational facilities. No impact would occur.

Summary

The proposed projects would not create any significant impacts associated with recreational facilities.

6.16 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 an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths and mass transit?	☐	☐	☐	☑	☐
b) Conflict with applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☐	☑
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☐	☑
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☑	☐
e) Result in inadequate emergency access?	☐	☐	☐	☐	☑
f) Conflict with applicable adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☑	☐

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 (UCSC 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.

6.16.1 Discussion of Checklist Questions

a) The proposed Project would move existing hazardous waste operations from other locations on the campus and would be staffed by existing Campus staff. In addition, by expanding the Campus hazardous waste accumulation space, the Project would allow EH&S to store waste for longer periods, as permitted by regulations, before it is picked up by vendors. For these reasons, the Project would not result in an increase in vehicle or transit trips to Campus. The Project would add a small number of trips to the site. These would include a small number of trips by EH&S staff from the EH&S office building to work at the facility; weekly trips by a box truck operated by EH&S to transport waste from waste generators on the campus to the facility; periodic trips, up to 90 days apart, by a contractor to pick up the waste and transport it for disposal; and, in general, annual shipments of radioactive waste. The number of trips to the

site would be too small noticeably to affect intersection or roadway operations in the vicinity. The impact would be less than significant.

b) There is no Congestion Management Agency for the City or County of Santa Cruz. For the reasons discussed under a), above, the proposed project would not conflict with level of service standards at any intersection, road or highway. No impact would occur.

c) The campus is not within an air safety zone that would require restrictions on development and there are no airports in the campus vicinity. The proposed project has no potential to affect air traffic patterns.

d) The proposed Project design includes two entrances from Heller Drive. Vehicles entering from the south would use the southern driveway, which would be a one-lane driveway, and would exit at the northern entrance. Other vehicles would use the northern entrance both to enter and leave the site. In the vicinity of the site

Heller Drive in the vicinity of the site is relatively steep and winding with a slope of seven to ten percent. Both proposed driveways are located on the inside of a curve. The northern entrance would be just south of a transit stop that serves both Campus shuttles and Metro buses. A pedestrian crossing directly north of the bus stop is heavily used by students traveling between the central campus and Kresge and Porter colleges to the west. The crossing has pedestrian-activated lights; and a pedestrian crossing warning sign for vehicles on Heller Drive.

The Campus performed a traffic engineering evaluation of the proposed driveway configuration to determine whether there would be sufficient sight distance for vehicles exiting the new facility onto Heller Drive from the northern entrance, and for southbound southbound vehicles turning left into the facility (Hatch Mott McDonald 2015). The analysis included measurements of sight distance, calculation of sight distance standards, and a survey of speeds conducted in both directions of Heller Drive near the driveways. The minimum sight distance standards (i.e. stopping sight distance) were calculated using the methodologies identified within *A Policy on Geometric Design of Highways and Streets*, published by the American Association State Highway and Transportation Officials (AASHTO) in 2011. These methodologies account for the influence of grades on both reaction time (i.e. distance traveled by the moving vehicle between driver identification of a conflicting vehicle and activating the vehicle braking system) and the actual braking time (i.e. time to reduce the moving vehicle speed to a stop).

For vehicles exiting onto Heller Drive from the northern driveway, the available sight distance towards the north (i.e. southbound Heller Drive traffic) is about 270 feet, which is longer than the minimum required sight distance of about 227 feet, and thus is more than acceptable. However, the sight line travels through the adjacent bus turnout to the north of the northern driveway; therefore, if a bus is stopped with the bus turnout, sight distance to the north is reduced by about half and would be deficient. The traffic engineering report recommended that vehicles do not exit the northern driveway when a bus is present within the bus turnout. The available sight distance towards the south (i.e. northbound Heller Drive) is only about 120 feet, less than the required 183 feet, and therefore too low. This is primarily due to two clusters of trees adjacent to Heller Drive road south of the northern driveway, and the curvature of the road. At the southern entrance, the available sight distance for southbound vehicles entering the site is about 350 feet, which is longer than the minimum required sight distance of about 243 feet. The available sight distance towards the south (i.e. northbound Heller Drive traffic) is about 400 feet, which is longer than the minimum required sight distance of about 177 feet.

The engineering report suggested several options for achieving the recommended sight distance at the northern driveway: remove the trees; relocate the driveway to the north and move the bus stop to the south; reconfigure the site to provide a single entrance, between the two proposed entrances.

The traffic engineering analysis made two additional recommendations: removal of a redundant pedestrian crossing warning sign which would partially block the line of sight from to and from the south; and relocation of an existing overhead street light which would be located in the northern driveway.

In response to the traffic engineers' recommendations, the Project plans have been modified to include removal of additional trees. This tree removal is reflected in the figures and taken into account in the analysis in this Initial Study. Based on the results of the traffic engineering analysis, the Project therefore would not substantially increase traffic hazards on Heller Drive and the impact would be less than significant.

e) As discussed in Section 6.8, above, and consistent with LRDP Mitigation HAZ-9A, which is included in the proposed Project, 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 does not interfere with emergency access. The impact of the proposed Project on emergency access would be less than significant.

f) The UC Policy on Sustainable Practices[11], and the 2005 LRDP include policies regarding public transit, bicycle, and pedestrian facilities on the campus. The UC Policy on Sustainable Practices commits the University to pursue the expansion of Transportation Demand Management (TDM) programs and projects to reduce the environmental impacts from commuting. Campuses are required or encouraged to engage in advocacy efforts with local transit districts to improve routes, to implement a pre-tax transit pass programs or universal access transit pass programs for employees, and to expand bicycle and pedestrian circulation systems. The 2005 LRDP includes three planning principles related to access in transportation: 1) promote a walkable campus; 2) discourage automobile use to and on the campus; and 3) consolidate parking facilities at perimeter campus locations.

The Project would not conflict with and would connect to existing pedestrian facilities in the vicinity, including the pedestrian bridge to Kerr Hall. Parking on the site would be limited to the minimum required for service vehicles and ADA compliance. Bike racks would be provided, and the site is adjacent to a transit stop which is served by Campus shuttles and Metro transit. These features of the Project would support travel to the site by alternative modes of transportation and therefore would be consistent with the applicable UC and LRDP policies and programs. No impact would occur.

Summary

With implementation of LRDP Mitigation HAZ-9A, all impacts of the Project related to transportation and circulation would be less than significant. No mitigation is required.

6.17 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) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☐	☑

[11] Most recently updated in June 2015. http://ucop.edu/sustainability/policies-reports/index.html

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
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑	☐
c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☑	☐
e) 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?	☐	☐	☐	☑	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☑	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☐	☑
h) Require or result in the construction or expansion of electrical, natural gas, chilled water, or steam facilities, which would cause significant environmental impacts?	☐	☐	☐	☑	☐
i) Require or result in the construction or expansion of telecommunication facilities, which would cause significant environmental impacts?	☐	☐	☐	☐	☑

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 (UCSC 2006). The following, previously adopted LRDP EIR mitigations for potential impacts related to utilities are applicable to and included in the project (the full text of the mitigation measures is included in Appendix B). Both of these mitigation measures have been incorporated into the Campus Standards and are included in the proposed building design. Project implementation of these mitigation measures is discussed under the relevant checklist questions, below.

LRDP EIR Mitigation UTIL-5 (new buildings added to Campus Energy Management System)

LRDP EIR Mitigation UTIL-9A (continuation of various current water conservation strategies, including a separate water meter for each building and each irrigation system)

6.17.1 Discussion of Checklist Questions

a) This issue is addressed in Section 6.9, *Hydrology and Water Quality*.

b,d,e) These impact questions are addressed in separate sections for domestic water and wastewater.

Domestic Water

b) Construction of a new water line to serve the new facility would require approximately 350 feet of new 8-inch water line, to connect to the Campus distribution system in Heller Drive, adjacent to the site. The disturbance associated with construction of the new water line is taken into account in the construction air quality, biological resources, climate change, cultural resources, greenhouse gas emissions and noise analysis in sections 6.3, 6.4, 6.5, 6.7, and 6.12 of this Initial Study.

d) The new facility would include a restroom; however, as the facility would be staffed by existing Campus employees, use of the restroom would not increase Campus water use. The restroom would be equipped with high efficiency fixtures (1.28-gallon-per-flush toilet, 1.5 gallon-per minute showers) and all new landscaping would be native and drought tolerant. Irrigation would be provided to new plantings temporarily, for about three years, to support establishment of the plants. In addition, irrigation water would be provided temporarily, and on a long-term basis if needed, to support the recovery and long-term survival of existing trees whose water supply would be reduced by cutting of some of their roots or surrounding development. Irrigation would be scheduled by a computer-controlled timer that responds to daily weather conditions and provides automated leak detection and shut down. The total water demand for the Project is estimated to be about 189,000 gallons/year. Consistent with LRDP Mitigation Measure UTIL-9A, building and irrigation water use would be separately metered.

The Water Supply Assessment prepared by the City in 2011 for the City's General Plan Update, concluded that the City's existing water supply would be adequate to meet projected demand through 2020 in normal water years, but may fall short of demand by up to 223 million gallons by 2030, if the higher of two potential growth scenarios proves accurate (Erler & Kalinowsky 2011).[12] The City's Water Supply Advisory Committee (WSAC) presented a revised demand forecast in its October 2015 final report. This forecast incorporates the effects of existing water conservation programs, the expected impacts of changes in the state's building and plumbing codes, the effects of income changes and price increases on water use, revising the projected growth of commercial services, and slowing the rate of growth in projected UC Santa Cruz demand. With these revisions to the demand projections in the 2010 UWMP, the City no longer forecasts an increase in water demand in the next 20 years.

Nonetheless, the City does not have adequate supplies to meet existing or future demand under drought conditions. Furthermore, the City is in the process of preparing a Habitat Conservation Plan (HCP) in connection with an incidental take permit under the federal Endangered Species Act. Although the outcome of the permit and HCP process is uncertain, it is clear that it will result in a reduction in the availability of water from the City's existing flowing sources, which would increase reliance on Loch Lomond Reservoir and thereby exacerbate the problem of water shortage during periods of drought (City of Santa Cruz Water Department 2011).

In November 2015, the City Council adopted the recommendations of the WSAC to address these challenges. These recommendations are:

- **Strategy 0 – Conservation:** Enhance the City's existing conservation programs with new programs such as increased rebates and better management of peak season demand, with the goal

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of further reducing demand by 200 to 250 mgy by 2035, with a particular focus on reducing demand during the peak season.

- **Strategy 1 – Groundwater Storage: In Lieu Water Exchanges:** Deliver available winter flows to the neighboring Soquel Creek Water District or Scotts Valley Water District, thereby reducing pumping from regional aquifers. Winter flows would also be injected into aquifers through new and existing wells. This would result in a bank of water to be extracted and returned to the SCWD when needed in future dry years.

- **Strategy 2 – Advanced Treated Recycled Water or Desalinated Water:** This strategy would provide a supplemental or replacement supply if Strategy 1 is ineffective in terms of cost-effectiveness, timeliness, or yield.

Although the City has adopted the recommendations of the WSAC, there remains uncertainty as to whether the conservation programs and groundwater storage/in-lieu water exchanges will prove effective. If they do not, there are numerous technical, financial, and regulatory considerations which remain to be addressed before the City could develop a recycled or desalinated water treatment system.

The City adopted a Water Shortage Contingency Plan in 2009 to establish its approach to reducing demand under different shortage scenarios (City of Santa Cruz Water Department 2009). The Plan includes reduction goals for UC Santa Cruz under each shortage scenario. These goals were developed in consultation with the Campus. The Campus reached, and even exceeded its reduction targets in the 2010 and 2014 when the City implemented the Plan. In 2015, the Campus reduced its peak season water use by almost 18 percent. In addition, the Campus has been implementing water conservation measures, including improvements to irrigation systems and retrofitting restroom fixtures, which have contributed to a reduction in per capita water use. UC Santa Cruz reduced annual per capita water use nearly 36% from the period between 2002 and 2005, to 2011-12 (UC Santa Cruz 2013). The Campus is planning additional fixture retrofits and infrastructure improvements which will further increase the efficiency of water use on the campus.

The Project's water use of 189,000 gpy, an average of about 518 gallons per day, is approximately 0.005 percent of the total SCWD system-wide demand in 2010, and 0.1 percent of UC Santa Cruz main campus demand in 2013, the most recent year without drought restrictions (177 million gallons). This increase in Campus water demand would not be significant, as there are adequate supplies to meet system-wide demand under normal hydrologic conditions and, under drought conditions, the increase would too small to cause a noticeable increase in the level of curtailment required of all water customers. Therefore, the project impact would be less than significant and the Project would not make a cumulatively considerable contribution to a significant water supply impact.

Wastewater

b, d) The new facility would be connected to the Campus sanitary sewer system in Heller Drive. This would require approximately 160 feet of new sewer line down the southern driveway to Heller Drive. The disturbance associated with construction of the new sewer line is taken into account in the construction air quality, biological resources, climate change, cultural resources, greenhouse gas emissions and noise analysis in sections 6.3, 6.4, 6.5, 6.7, and 6.12 of this Initial Study.

Wastewater generation at the site would be limited to personal use in restrooms by the staff working at the site (approximately 24 person-hours per week). This would result in a very minor increase in flows to the sewer line on Heller Drive, but as the facility would be staffed by existing Campus employees, would not result in an overall increase in Campus wastewater generation. No impact would occur.

c) As discussed in Section 6.9, above, all runoff from the Project site would be managed on site; the Project would not require the construction of new stormwater drainage facilities or expansion of existing facilities. The disturbance associated with construction of the new sewer line is taken into account in the construction air quality, biological resources, climate change, cultural resources, greenhouse gas, and noise analysis in sections 6.3, 6.4, 6.5, 6.7, and 6.12 of this Initial Study.

f) The Project would not demolish existing facilities so would not result in substantial amounts of construction waste. Furthermore, the construction contract would require that 75 percent of construction waste be diverted from landfill disposal. Project operations would not change the amount of solid waste generated by the Campus or the amount of waste going to landfill.

The 2005 LRDP EIR (Vol. 2, pp. 4.15-24 to 4.15-25). estimated that at full development under the 2005 LRDP the campus would dispose of a total of 3,585 tons per year. During the lifetime of the 2005 LRDP, Campus waste would constitute approximately two percent of the remaining capacity of the City's landfill in 2005. Furthermore, to further reduce the less-than-significant LRDP impact, the Campus implements LRDP Mitigation UTIL-4, which requires that the Campus continue to improve its recycling and waste reduction programs and identify additional means of reducing waste. UC Santa Cruz has steadily increased the percentage of its waste stream that is recycled, from 24 percent in 2002 to 66 percent in FY 204-15 (74 percent if construction waste is taken into account) (University of California, Santa Cruz, 2012). Since the landfill has adequate capacity to handle projected waste disposal volumes generated from campus growth under the 2005 LRDP, including the proposed project, no expansion of the landfill would be required and the project impact would be less than significant.

g) As discussed in Section 6.8, above, the Project design is consistent with applicable requirements of the California Building Code and the California Fire Code for hazardous waste facilities. Consistent with Campus policy, at the new facility, the EH&S would continue to comply with all federal and state regulations for management of hazardous wastes and no impact would occur.

h,i) The Project would not be served by the Campus' cooling water or heating hot water systems. Natural gas would be used for space heating at the new site. Natural gas demand for the new facility is estimated at approximately 21,000 therms/year. Consistent with LRDP Mitigation UTIL-5, the new building~~s~~ would be incorporated into the Campus Energy Management System, which is composed of direct digital controls at buildings throughout the campus which communicate with a head-end computer at the Central Heat Plant. The Energy Management System would control and monitor outdoor lighting, electricity usage, air handlers, exhaust fans. The connections to the Campus natural gas, electrical distribution and telecommunications systems would be made north of Kerr Hall, via the pedestrian bridge and existing service road. The disturbance associated with construction of the new gas, electrical distribution, and telecommunications infrastructure are taken into account in the construction air quality, biological resources, climate change, cultural resources, greenhouse gas, and noise analysis in sections 6.3, 6.4, 6.5, 6.7, and 6.12 of this Initial Study. No other off-site improvements to the Campus distribution system or PG&E facilities would be required to meet Project demand. The impact would be less than significant and no mitigation is required.

Summary

The project incorporates LRDP EIR mitigations UTIL-5 and UTIL-9A, and therefore all impacts of the proposed project related to utilities would be less than significant. No project specific mitigation is required.

6.18 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 construction could have impacts on individual California red-legged frog, California black salamander, nesting birds, special-status bats, and San Francisco dusky-footed woodrat and American badger. There is suitable habitat on the Project site for California bottlebrush grass, a special-status plant species. These impacts would be reduced to a less-than-significant level with implementation of LRDP EIR Mitigations BIO-9, BIO-11, BIO-13-A, BIO-13B, and BIO-14, and EH&S Mitigations BIO-1 and BIO-2. These mitigation measures require field surveys for these species and avoidance measures during construction.

b) The Project would not generate new vehicle trips or accommodate additional Campus population and therefore would not contribute to any population-related cumulative impacts. The emissions of fugitive dust (PM_{10}) from Project construction would not result in a significant cumulative air quality impact, as no other projects are planned for construction in the vicinity of the Project sites. As discussed in Section 6.4, above, the Project would contribute to potentially significant program-level impacts of development under the 2005 LRDP to California red-legged frog, nesting special-status birds, special-status bats, and San Francisco dusky-footed woodrat. The LRDP EIR determined that these impacts would all be less than significant with mitigation measures identified in the EIR and incorporated into the proposed Project.

c) As discussed in Section 6.3 and 6.12, above, with implementation of previously adopted LRDP EIR mitigation measures incorporated into the Project, Project construction and operations would not result in significant noise or air quality impacts on sensitive receptors. As discussed in Section 6.8, the storage of hazardous wastes at the Project site would not result in a significant hazard to people.

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

PROPOSED MITIGATED NEGATIVE DECLARATION

Lead Agency:	University of California
Project Proponent:	University of California Santa Cruz
Project Location:	The proposed site of the EH&S Facility is undeveloped, forested land on the east side of Heller Drive, a major campus road, in the central campus.
Project Description:	The proposed project would construct a new ~~8,229~~ 7,074-gross square foot (gsf)/ 5,237 assignable square foot (asf) regulated waste handling and storage facility sort and hold regulated waste generated by laboratory research and teaching, the arts, and maintenance on the main campus.
Mitigation Measures:	EH&S Mitigation Measure BIO-1 requires a botanical survey for California bottlebrush grass during the plant's blooming season prior to construction. If the species is observed, the population shall be avoided if feasible or the seed, topsoil and/or individual plants shall be collected and propagated at another location on the campus. EH&A Mitigation Measure BIO-2 requires surveys for and avoidance of California black salamander. The Project also incorporates 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 6 to May 6, 2016.

Appendix B

2005 LRDP Mitigation Measures

Incorporated as Part of the Proposed Project

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
Aesthetics	
AES-5A	Prior to design approval of development projects under the 2005 LRDP, the UC Santa Cruz Design Advisory Board shall review project designs for consistency with the valued elements of the visual landscape identified in the 2005 LRDP, and the character of surrounding development so that the visual character and quality of the project area are not substantially degraded.
AES-5B	For projects in redwood forest areas that are visible from areas outside the forest, building heights will be designed to be no higher than the height of the surrounding **trees**.
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.
AES-5F	Trees identified for removal will be evaluated for their aesthetic value as part of the environmental review process of individual projects. Individual construction projects that result in the removal of large oak trees or other large unique trees considered to be aesthetically valuable components of the landscape shall replace such trees at a 1-to-1 ratio, either on site, or elsewhere on campus via a contribution to the campus's Site Stewardship program for planting replacement trees.
AES-6B	Lighting for new development projects shall be designed to include directional lighting methods shielded to minimize light spillage and minimize atmospheric light pollution. This lighting should be compatible with the visual character of the project site and meet the UC Regents' Green Building Policies.
AES-6C	As part of the design review process, the UC Santa Cruz Design Advisory Board shall consider project-related light and glare and the Campus shall require the incorporation of measures into the project design to limit both to the extent allowed by code.
AES-6E	As part of the design review process, UC Santa Cruz Design Advisory Board shall review outdoor lighting fixtures for roads, pathways, and parking facilities to ensure that the minimum amount of lighting needed to achieve safe routes is used, and to ensure that the proposed illumination limits adverse effect on nighttime views.
Air Quality	

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
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.
AIR-2A	The Campus shall incorporate in each new project design and construction features that conserve natural gas and/or minimize air pollutant emissions from space and water heating. Specific measures that will be considered for each project include, but are not limited to the following: • Orientation of buildings to optimize solar heating and natural cooling; • Use of solar or low-emission water heaters in new buildings; and/or • Installation of best available wall and attic insulation in new buildings
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

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
AIR-7	UC Santa Cruz will continue its efforts in the area of TAC emission reduction.
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.
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.

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
BIO-13A	If tree removal or grading activity commences on a project site in the north campus during the breeding season of native bat species (April 1 through August 31), a field survey shall be conducted by a qualified biologist to determine whether active roosts of special-status bats (pallid bat, Pacific Townsend's big-eared bat, western red bat, long-eared myotis, fringed myotis, long-legged myotis, yuma myotis, or greater western mastiff bat) are present on the project site or in areas containing suitable roosting habitat within 50 feet of the project site. Field surveys shall be conducted in late April or early May in the season before construction begins, when bats are establishing maternity roosts but before pregnant females give birth. If no roosting bats are found, no further mitigation would be required.
BIO-13B	If roosting bats are found, disturbance of the maternity roosts shall be avoided by halting construction until either (1) the end of the breeding season or, (2) a qualified biologist removes and relocates the roosting bats in accordance with CDFG requirements.
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
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[13] to determine whether complete intensive archaeological survey has been performed on the site and whether any previously recorded cultural resources are present.

[13]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-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.
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.

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
CULT-1H	If, in the opinion of the qualified archaeologist and in light of the data available, the significance of the site is such that data recovery cannot capture the values that qualify the site for inclusion on the CRHR, the campus shall reconsider project plans in light of the high value of the resource, and implement more substantial modifications to the proposed project that would allow the site to be preserved intact, such as project redesign, placement of fill, or project relocation or abandonment. If no such measures are feasible, the Campus shall implement LRDP Mitigation CULT-3A
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-3A	If a significant archaeological resource cannot be preserved intact, before the property is damaged or destroyed, the Campus shall ensure that the resource **is** appropriately documented by implementing a program of research-directed data recovery, consistent with LRDP Mitigation CULT-1F.
CULT-3B	If a significant historic resource or unique archaeological resource cannot be preserved intact, before the property is damaged or destroyed the Campus shall ensure that the important information represented by the resource is preserved, by implementing a program of documentation as described in LRDP Mitigation CULT-2D.
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.
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.
Geology and Soils	

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
GEO-1	Where existing information is not adequate, detailed geotechnical studies shall be performed for areas that will support buildings or foundations. Recommendations of the geotechnical investigations will be incorporated into project design.
Hazards and Hazardous Materials	
HAZ-2	The Campus will enhance its hazardous waste minimization program by (1) monitoring chemical purchases and use; and 2) maintaining a hazardous waste website to provide campus waste generators with the latest information on hazardous waste requirements; recycling, treatment, and disposal options; and waste minimization techniques.
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.
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.
HYD-3D	The Campus shall require each new capital project to include design measures to minimize, to the maximum extent practicable, the increase in the volume of storm water runoff discharged from the project site to sinkholes or natural drainages. These design measures shall include features that maximize infiltration and dissipation of runoff, preferably near the area where new runoff is generated, and may include, but will not be limited to: vegetated swales, bioretention areas, infiltration trenches and basins, level spreaders, permeable pavement, minimizing directly connected impervious surfaces, storage and re-use of roof runoff, and green roofs. Within one year following approval of the 2005 LRDP, the Campus shall provide a protocol for design consultants to use in demonstrating that measures to reduce runoff are included in the project design to the maximum extent practicable

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
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.
NOIS-2	Campus Standards shall be amended to include a requirement to be imposed on all campus contracts that only City-designated truck routes shall be used for contractor truck trips accessing the campus.
Utilities	
UTIL-5	Where feasible, new campus buildings will be added to the Campus Energy Management System. Heating and cooling will be controlled based on time of use of building and outside temperature.

2005 LRDP EIR Mitigation Measures Incorporated in the Proposed Project	
UTIL-9A	The Campus shall continue to implement and improve all current water conservation strategies to reduce demand for water, including the following: • Continue the leak detection and repair program. • Install an individual water meter in each new employee housing unit to encourage residential water conservation. • Install waterless urinals in all new buildings. • Require that new contracts for washing machines in student residences be certified by the Consortium on Energy Efficiency 6 to have a water factor of 5.5 or less or meet an equivalent standard. New washing machines purchased for use in athletic facilities shall meet applicable standards for water-efficiency for institutional machines. • Incorporate water-efficient landscaping practices in all new landscape installations. Water-conservative landscaping practices shall include, but will not be limited to the following: use of water-efficient plants, temporary irrigation systems for plant establishment areas where mature plants will be able to survive without regular irrigation, grouping of plants according to their water requirements, design of planting areas to maximize irrigation pattern efficiency, and mulch covering in planting areas. • To facilitate monitoring of water usage in all new development, the Campus shall: (1) install separate meters on water lines for individual buildings and (2) install meters on irrigation lines where one point of connection irrigates 1 acre or more.

Appendix C

Proposed Mitigation Monitoring Plan

PROPOSED MITIGATION MONITORING PROGRAMs

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 Projects 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 MMPs for the proposed EH&S Facility Project, as outlined in the following tables, 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 and Construction, 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.

EH&S Facility Project Mitigation Monitoring Program

Project-Specific Mitigation Measure	Monitoring and Reporting Procedure	Mitigation Timing	Mitigation Responsibility
EH&S Mitigation Measure BIO-1. A qualified botanist shall conduct a floristic plant survey for California bottlebrush grass on and within 50 feet of the project site during the May-November blooming period prior to construction. If the species is not observed during the survey, no additional mitigation is necessary. If California bottlebrush grass is observed, the population shall be mapped and quantified and a suitable buffer zone (based on proximity to the work area and other site specific factors) established, along with other protection measures, such as fencing installed around the population to protect it from disturbance. If the population cannot be avoided by the project, seed, topsoil, and/or individual plants (since the species is a perennial) shall be collected from the impacted population and propagated on another area of the UCSC campus that supports suitable habitat for the species and is not designated for development under the LRDP (i.e., Campus Natural Reserve or Protected Landscape).	Campus contract with botanist to conduct surveys. Document survey methodology and results and relocation efforts if warranted.	May-November, prior to construction.	PP&C
EH&S Mitigation Measure BIO-2. Immediately prior to and during the initial ground disturbance, a qualified biologist should survey for Santa Cruz black salamanders. If black salamanders are found, they should be moved out of harm's way to the nearest appropriate habitat outside the Project footprint.	Campus contract with biologist to conduct surveys. Maintain survey report in the project file.	During construction.	PP&C

Appendix D

Air Quality and Greenhouse Gas Emission Calculations

New EH&S Facility

Santa Cruz County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Educational	8,820.00	User Defined Unit	1.40	8,820.00	1

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	61
Climate Zone	5			**Operational Year**	2018
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Campus hazardous waste management facility. 8,820 sf of building space on 1.4-acre site. Staffing, approximatly 24 person-hours/week.

Construction Phase - provided by project manager

Energy Use - From Title 24 calcluations. Total natural gas usage 20,596 therms/year; electrical usage 148,539 kWh/yr. Buildings are 8,820, including unconditioned space.

Water And Wastewater - assume 0.5 acres low-water-use plants

Solid Waste - From CalEEMod App D, University/College (4yr), 0.8 ton/employee/year, assuming about 0.5 FTE occupancy of the building.

Land Use Change -

Sequestration -

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Mobile Commute Mitigation - 200 vanpool riders/3608 staff and faculty

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblCommuteMitigation	EmployeeVanpoolPercentModeShare	2	5
tblEnergyUse	T24E	0.00	16.80
tblEnergyUse	T24NG	0.00	233.00
tblLandUse	LandUseSquareFeet	0.00	8,820.00
tblLandUse	LotAcreage	0.00	1.40
tblLandUse	Population	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2018
tblSequestration	NumberOfNewTrees	0.00	27.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.4423	2.3244	1.7857	2.6500e-003	0.0212	0.1468	0.1680	9.5000e-003	0.1408	0.1503	0.0000	224.8634	224.8634	0.0479	0.0000	225.8701
Total	**0.4423**	**2.3244**	**1.7857**	**2.6500e-003**	**0.0212**	**0.1468**	**0.1680**	**9.5000e-003**	**0.1408**	**0.1503**	**0.0000**	**224.8634**	**224.8634**	**0.0479**	**0.0000**	**225.8701**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.4423	2.3244	1.7857	2.6500e-003	0.0126	0.1468	0.1594	5.1000e-003	0.1408	0.1459	0.0000	224.8632	224.8632	0.0479	0.0000	225.8698
Total	**0.4423**	**2.3244**	**1.7857**	**2.6500e-003**	**0.0126**	**0.1468**	**0.1594**	**5.1000e-003**	**0.1408**	**0.1459**	**0.0000**	**224.8632**	**224.8632**	**0.0479**	**0.0000**	**225.8698**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**40.52**	**0.00**	**5.11**	**46.32**	**0.00**	**2.93**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0556	1.0700e-003	0.1141	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	0.2189	0.2189	6.0000e-004	0.0000	0.2315
Energy	0.0111	0.1007	0.0846	6.0000e-004		7.6600e-003	7.6600e-003		7.6600e-003	7.6600e-003	0.0000	152.7719	152.7719	4.0500e-003	2.4100e-003	153.6053
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0667**	**0.1018**	**0.1987**	**6.1000e-004**	**0.0000**	**8.0700e-003**	**8.0700e-003**	**0.0000**	**8.0700e-003**	**8.0700e-003**	**0.0000**	**152.9908**	**152.9908**	**4.6500e-003**	**2.4100e-003**	**153.8368**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0530	1.0700e-003	0.1141	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	0.2189	0.2189	6.0000e-004	0.0000	0.2315
Energy	0.0111	0.1007	0.0846	6.0000e-004		7.6600e-003	7.6600e-003		7.6600e-003	7.6600e-003	0.0000	152.7719	152.7719	4.0500e-003	2.4100e-003	153.6053
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0641**	**0.1018**	**0.1987**	**6.1000e-004**	**0.0000**	**8.0700e-003**	**8.0700e-003**	**0.0000**	**8.0700e-003**	**8.0700e-003**	**0.0000**	**152.9908**	**152.9908**	**4.6500e-003**	**2.4100e-003**	**153.8368**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**3.86**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
New Trees	19.1160
Vegetation Land Change	-126.5400
Total	**-107.4240**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2017	1/27/2017	5	20	
2	Site Preparation	Site Preparation	1/28/2017	1/31/2017	5	2	
3	Grading	Grading	2/1/2017	2/6/2017	5	4	
4	Building Construction	Building Construction	2/7/2017	11/13/2017	5	200	
5	Paving	Paving	11/14/2017	11/27/2017	5	10	
6	Architectural Coating	Architectural Coating	11/28/2017	12/11/2017	5	10	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 13,230; Non-Residential Outdoor: 4,410 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Cranes	1	6.00	226	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Site Preparation	Graders	1	8.00	174	0.41
Paving	Pavers	1	6.00	125	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Rubber Tired Dozers	1	6.00	255	0.40
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	174	0.41
Paving	Paving Equipment	1	8.00	130	0.36
Site Preparation	Rubber Tired Dozers	1	7.00	255	0.40
Building Construction	Welders	3	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	4.00	1.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0272	0.2659	0.2087	2.4000e-004		0.0161	0.0161		0.0150	0.0150	0.0000	22.2938	22.2938	5.6600e-003	0.0000	22.4126
Total	**0.0272**	**0.2659**	**0.2087**	**2.4000e-004**		**0.0161**	**0.0161**		**0.0150**	**0.0150**	**0.0000**	**22.2938**	**22.2938**	**5.6600e-003**	**0.0000**	**22.4126**

3.2 Demolition - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3000e-004	7.7000e-004	6.9400e-003	1.0000e-005	1.0300e-003	1.0000e-005	1.0400e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	0.9141	0.9141	6.0000e-005	0.0000	0.9154
Total	**5.3000e-004**	**7.7000e-004**	**6.9400e-003**	**1.0000e-005**	**1.0300e-003**	**1.0000e-005**	**1.0400e-003**	**2.7000e-004**	**1.0000e-005**	**2.8000e-004**	**0.0000**	**0.9141**	**0.9141**	**6.0000e-005**	**0.0000**	**0.9154**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0272	0.2659	0.2087	2.4000e-004		0.0161	0.0161		0.0150	0.0150	0.0000	22.2938	22.2938	5.6600e-003	0.0000	22.4125
Total	**0.0272**	**0.2659**	**0.2087**	**2.4000e-004**		**0.0161**	**0.0161**		**0.0150**	**0.0150**	**0.0000**	**22.2938**	**22.2938**	**5.6600e-003**	**0.0000**	**22.4125**

3.2 Demolition - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3000e-004	7.7000e-004	6.9400e-003	1.0000e-005	1.0300e-003	1.0000e-005	1.0400e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	0.9141	0.9141	6.0000e-005	0.0000	0.9154
Total	**5.3000e-004**	**7.7000e-004**	**6.9400e-003**	**1.0000e-005**	**1.0300e-003**	**1.0000e-005**	**1.0400e-003**	**2.7000e-004**	**1.0000e-005**	**2.8000e-004**	**0.0000**	**0.9141**	**0.9141**	**6.0000e-005**	**0.0000**	**0.9154**

3.3 Site Preparation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.8000e-003	0.0000	5.8000e-003	2.9500e-003	0.0000	2.9500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3100e-003	0.0242	0.0159	2.0000e-005		1.3100e-003	1.3100e-003		1.2000e-003	1.2000e-003	0.0000	1.5895	1.5895	4.9000e-004	0.0000	1.5997
Total	**2.3100e-003**	**0.0242**	**0.0159**	**2.0000e-005**	**5.8000e-003**	**1.3100e-003**	**7.1100e-003**	**2.9500e-003**	**1.2000e-003**	**4.1500e-003**	**0.0000**	**1.5895**	**1.5895**	**4.9000e-004**	**0.0000**	**1.5997**

3.3 Site Preparation - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	5.0000e-005	4.3000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0563	0.0563	0.0000	0.0000	0.0563
Total	**3.0000e-005**	**5.0000e-005**	**4.3000e-004**	**0.0000**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0563**	**0.0563**	**0.0000**	**0.0000**	**0.0563**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.6100e-003	0.0000	2.6100e-003	1.3300e-003	0.0000	1.3300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3100e-003	0.0242	0.0159	2.0000e-005		1.3100e-003	1.3100e-003		1.2000e-003	1.2000e-003	0.0000	1.5895	1.5895	4.9000e-004	0.0000	1.5997
Total	**2.3100e-003**	**0.0242**	**0.0159**	**2.0000e-005**	**2.6100e-003**	**1.3100e-003**	**3.9200e-003**	**1.3300e-003**	**1.2000e-003**	**2.5300e-003**	**0.0000**	**1.5895**	**1.5895**	**4.9000e-004**	**0.0000**	**1.5997**

3.3 Site Preparation - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	5.0000e-005	4.3000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0563	0.0563	0.0000	0.0000	0.0563
Total	**3.0000e-005**	**5.0000e-005**	**4.3000e-004**	**0.0000**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0563**	**0.0563**	**0.0000**	**0.0000**	**0.0563**

3.4 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.8300e-003	0.0000	9.8300e-003	5.0500e-003	0.0000	5.0500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.7700e-003	0.0396	0.0264	3.0000e-005		2.1300e-003	2.1300e-003		1.9600e-003	1.9600e-003	0.0000	2.6112	2.6112	8.0000e-004	0.0000	2.6280
Total	**3.7700e-003**	**0.0396**	**0.0264**	**3.0000e-005**	**9.8300e-003**	**2.1300e-003**	**0.0120**	**5.0500e-003**	**1.9600e-003**	**7.0100e-003**	**0.0000**	**2.6112**	**2.6112**	**8.0000e-004**	**0.0000**	**2.6280**

3.4 Grading - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-005	9.0000e-005	8.5000e-004	0.0000	1.3000e-004	0.0000	1.3000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1125	0.1125	1.0000e-005	0.0000	0.1127
Total	**6.0000e-005**	**9.0000e-005**	**8.5000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.1125**	**0.1125**	**1.0000e-005**	**0.0000**	**0.1127**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.4200e-003	0.0000	4.4200e-003	2.2700e-003	0.0000	2.2700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.7700e-003	0.0396	0.0264	3.0000e-005		2.1300e-003	2.1300e-003		1.9600e-003	1.9600e-003	0.0000	2.6112	2.6112	8.0000e-004	0.0000	2.6280
Total	**3.7700e-003**	**0.0396**	**0.0264**	**3.0000e-005**	**4.4200e-003**	**2.1300e-003**	**6.5500e-003**	**2.2700e-003**	**1.9600e-003**	**4.2300e-003**	**0.0000**	**2.6112**	**2.6112**	**8.0000e-004**	**0.0000**	**2.6280**

3.4 Grading - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-005	9.0000e-005	8.5000e-004	0.0000	1.3000e-004	0.0000	1.3000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1125	0.1125	1.0000e-005	0.0000	0.1127
Total	**6.0000e-005**	**9.0000e-005**	**8.5000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.1125**	**0.1125**	**1.0000e-005**	**0.0000**	**0.1127**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2955	1.9109	1.4311	2.2000e-003		0.1226	0.1226		0.1182	0.1182	0.0000	184.5473	184.5473	0.0387	0.0000	185.3605
Total	**0.2955**	**1.9109**	**1.4311**	**2.2000e-003**		**0.1226**	**0.1226**		**0.1182**	**0.1182**	**0.0000**	**184.5473**	**184.5473**	**0.0387**	**0.0000**	**185.3605**

3.5 Building Construction - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1900e-003	8.7400e-003	0.0157	2.0000e-005	6.3000e-004	1.4000e-004	7.7000e-004	1.8000e-004	1.3000e-004	3.1000e-004	0.0000	2.0443	2.0443	2.0000e-005	0.0000	2.0446
Worker	1.6200e-003	2.3700e-003	0.0214	4.0000e-005	3.1700e-003	3.0000e-005	3.2000e-003	8.4000e-004	3.0000e-005	8.7000e-004	0.0000	2.8127	2.8127	1.8000e-004	0.0000	2.8165
Total	**2.8100e-003**	**0.0111**	**0.0371**	**6.0000e-005**	**3.8000e-003**	**1.7000e-004**	**3.9700e-003**	**1.0200e-003**	**1.6000e-004**	**1.1800e-003**	**0.0000**	**4.8570**	**4.8570**	**2.0000e-004**	**0.0000**	**4.8611**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2955	1.9109	1.4311	2.2000e-003		0.1226	0.1226		0.1182	0.1182	0.0000	184.5471	184.5471	0.0387	0.0000	185.3603
Total	**0.2955**	**1.9109**	**1.4311**	**2.2000e-003**		**0.1226**	**0.1226**		**0.1182**	**0.1182**	**0.0000**	**184.5471**	**184.5471**	**0.0387**	**0.0000**	**185.3603**

3.5 Building Construction - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1900e-003	8.7400e-003	0.0157	2.0000e-005	6.3000e-004	1.4000e-004	7.7000e-004	1.8000e-004	1.3000e-004	3.1000e-004	0.0000	2.0443	2.0443	2.0000e-005	0.0000	2.0446
Worker	1.6200e-003	2.3700e-003	0.0214	4.0000e-005	3.1700e-003	3.0000e-005	3.2000e-003	8.4000e-004	3.0000e-005	8.7000e-004	0.0000	2.8127	2.8127	1.8000e-004	0.0000	2.8165
Total	**2.8100e-003**	**0.0111**	**0.0371**	**6.0000e-005**	**3.8000e-003**	**1.7000e-004**	**3.9700e-003**	**1.0200e-003**	**1.6000e-004**	**1.1800e-003**	**0.0000**	**4.8570**	**4.8570**	**2.0000e-004**	**0.0000**	**4.8611**

3.6 Paving - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.9300e-003	0.0605	0.0452	7.0000e-005		3.6700e-003	3.6700e-003		3.3800e-003	3.3800e-003	0.0000	6.1129	6.1129	1.8400e-003	0.0000	6.1515
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.9300e-003**	**0.0605**	**0.0452**	**7.0000e-005**		**3.6700e-003**	**3.6700e-003**		**3.3800e-003**	**3.3800e-003**	**0.0000**	**6.1129**	**6.1129**	**1.8400e-003**	**0.0000**	**6.1515**

3.6 Paving - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6000e-004	3.8000e-004	3.4700e-003	1.0000e-005	5.1000e-004	0.0000	5.2000e-004	1.4000e-004	0.0000	1.4000e-004	0.0000	0.4571	0.4571	3.0000e-005	0.0000	0.4577
Total	**2.6000e-004**	**3.8000e-004**	**3.4700e-003**	**1.0000e-005**	**5.1000e-004**	**0.0000**	**5.2000e-004**	**1.4000e-004**	**0.0000**	**1.4000e-004**	**0.0000**	**0.4571**	**0.4571**	**3.0000e-005**	**0.0000**	**0.4577**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.9300e-003	0.0605	0.0452	7.0000e-005		3.6700e-003	3.6700e-003		3.3800e-003	3.3800e-003	0.0000	6.1129	6.1129	1.8400e-003	0.0000	6.1515
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.9300e-003**	**0.0605**	**0.0452**	**7.0000e-005**		**3.6700e-003**	**3.6700e-003**		**3.3800e-003**	**3.3800e-003**	**0.0000**	**6.1129**	**6.1129**	**1.8400e-003**	**0.0000**	**6.1515**

3.6 Paving - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6000e-004	3.8000e-004	3.4700e-003	1.0000e-005	5.1000e-004	0.0000	5.2000e-004	1.4000e-004	0.0000	1.4000e-004	0.0000	0.4571	0.4571	3.0000e-005	0.0000	0.4577
Total	**2.6000e-004**	**3.8000e-004**	**3.4700e-003**	**1.0000e-005**	**5.1000e-004**	**0.0000**	**5.2000e-004**	**1.4000e-004**	**0.0000**	**1.4000e-004**	**0.0000**	**0.4571**	**0.4571**	**3.0000e-005**	**0.0000**	**0.4577**

3.7 Architectural Coating - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1022					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6600e-003	0.0109	9.3400e-003	1.0000e-005		8.7000e-004	8.7000e-004		8.7000e-004	8.7000e-004	0.0000	1.2766	1.2766	1.3000e-004	0.0000	1.2795
Total	**0.1039**	**0.0109**	**9.3400e-003**	**1.0000e-005**		**8.7000e-004**	**8.7000e-004**		**8.7000e-004**	**8.7000e-004**	**0.0000**	**1.2766**	**1.2766**	**1.3000e-004**	**0.0000**	**1.2795**

3.7 Architectural Coating - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	3.0000e-005	2.7000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0352	0.0352	0.0000	0.0000	0.0352
Total	**2.0000e-005**	**3.0000e-005**	**2.7000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0352**	**0.0352**	**0.0000**	**0.0000**	**0.0352**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1022					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6600e-003	0.0109	9.3400e-003	1.0000e-005		8.7000e-004	8.7000e-004		8.7000e-004	8.7000e-004	0.0000	1.2766	1.2766	1.3000e-004	0.0000	1.2795
Total	**0.1039**	**0.0109**	**9.3400e-003**	**1.0000e-005**		**8.7000e-004**	**8.7000e-004**		**8.7000e-004**	**8.7000e-004**	**0.0000**	**1.2766**	**1.2766**	**1.3000e-004**	**0.0000**	**1.2795**

3.7 Architectural Coating - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	3.0000e-005	2.7000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0352	0.0352	0.0000	0.0000	0.0352
Total	**2.0000e-005**	**3.0000e-005**	**2.7000e-004**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0352**	**0.0352**	**0.0000**	**0.0000**	**0.0352**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Transit Accessibility

Implement Trip Reduction Program

Transit Subsidy

Workplace Parking Charge

Employee Vanpool/Shuttle

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Educational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Educational	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.493512	0.037574	0.233760	0.143549	0.049865	0.006906	0.012880	0.004830	0.000942	0.002887	0.009149	0.000702	0.003444

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	43.1061	43.1061	1.9500e-003	4.0000e-004	43.2720
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	43.1061	43.1061	1.9500e-003	4.0000e-004	43.2720
NaturalGas Mitigated	0.0111	0.1007	0.0846	6.0000e-004		7.6600e-003	7.6600e-003		7.6600e-003	7.6600e-003	0.0000	109.6658	109.6658	2.1000e-003	2.0100e-003	110.3332
NaturalGas Unmitigated	0.0111	0.1007	0.0846	6.0000e-004		7.6600e-003	7.6600e-003		7.6600e-003	7.6600e-003	0.0000	109.6658	109.6658	2.1000e-003	2.0100e-003	110.3332

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Educational	2.05506e+006	0.0111	0.1007	0.0846	6.0000e-004		7.6600e-003	7.6600e-003		7.6600e-003	7.6600e-003	0.0000	109.6658	109.6658	2.1000e-003	2.0100e-003	110.3332
Total		**0.0111**	**0.1007**	**0.0846**	**6.0000e-004**		**7.6600e-003**	**7.6600e-003**		**7.6600e-003**	**7.6600e-003**	**0.0000**	**109.6658**	**109.6658**	**2.1000e-003**	**2.0100e-003**	**110.3332**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Educational	2.05506e+006	0.0111	0.1007	0.0846	6.0000e-004		7.6600e-003	7.6600e-003		7.6600e-003	7.6600e-003	0.0000	109.6658	109.6658	2.1000e-003	2.0100e-003	110.3332
Total		**0.0111**	**0.1007**	**0.0846**	**6.0000e-004**		**7.6600e-003**	**7.6600e-003**		**7.6600e-003**	**7.6600e-003**	**0.0000**	**109.6658**	**109.6658**	**2.1000e-003**	**2.0100e-003**	**110.3332**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Educational	148176	43.1061	1.9500e-003	4.0000e-004	43.2720
Total		**43.1061**	**1.9500e-003**	**4.0000e-004**	**43.2720**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Educational	148176	43.1061	1.9500e-003	4.0000e-004	43.2720
Total		**43.1061**	**1.9500e-003**	**4.0000e-004**	**43.2720**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

Use Low VOC Cleaning Supplies

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0530	1.0700e-003	0.1141	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	0.2189	0.2189	6.0000e-004	0.0000	0.2315
Unmitigated	0.0556	1.0700e-003	0.1141	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	0.2189	0.2189	6.0000e-004	0.0000	0.2315

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0102					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0345					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0109	1.0700e-003	0.1141	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	0.2189	0.2189	6.0000e-004	0.0000	0.2315
Total	**0.0556**	**1.0700e-003**	**0.1141**	**1.0000e-005**		**4.1000e-004**	**4.1000e-004**		**4.1000e-004**	**4.1000e-004**	**0.0000**	**0.2189**	**0.2189**	**6.0000e-004**	**0.0000**	**0.2315**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0102					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0319					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0109	1.0700e-003	0.1141	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	0.2189	0.2189	6.0000e-004	0.0000	0.2315
Total	**0.0530**	**1.0700e-003**	**0.1141**	**1.0000e-005**		**4.1000e-004**	**4.1000e-004**		**4.1000e-004**	**4.1000e-004**	**0.0000**	**0.2189**	**0.2189**	**6.0000e-004**	**0.0000**	**0.2315**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Educational	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Educational	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Educational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Educational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	-107.4240	0.0000	0.0000	-107.4240

10.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Trees	1.14 / 0	-126.5400	0.0000	0.0000	-126.5400
Total		**-126.5400**	**0.0000**	**0.0000**	**-126.5400**

10.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	27	19.1160	0.0000	0.0000	19.1160
Total		**19.1160**	**0.0000**	**0.0000**	**19.1160**

New EH&S Facility

Santa Cruz County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Educational	8,820.00	User Defined Unit	1.40	8,820.00	1

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	61
Climate Zone	5			**Operational Year**	2018
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Campus hazardous waste management facility. 8,820 sf of building space on 1.4-acre site. Staffing, approximatly 24 person-hours/week.

Construction Phase - provided by project manager

Energy Use - From Title 24 calcluations. Total natural gas usage 20,596 therms/year; electrical usage 148,539 kWh/yr. Buildings are 8,820, including unconditioned space.

Water And Wastewater - assume 0.5 acres low-water-use plants

Solid Waste - From CalEEMod App D, University/College (4yr), 0.8 ton/employee/year, assuming about 0.5 FTE occupancy of the building.

Land Use Change -

Sequestration -

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Mobile Commute Mitigation - 200 vanpool riders/3608 staff and faculty

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblCommuteMitigation	EmployeeVanpoolPercentModeShare	2	5
tblEnergyUse	T24E	0.00	16.80
tblEnergyUse	T24NG	0.00	233.00
tblLandUse	LandUseSquareFeet	0.00	8,820.00
tblLandUse	LotAcreage	0.00	1.40
tblLandUse	Population	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2018
tblSequestration	NumberOfNewTrees	0.00	27.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	20.7767	26.6529	21.5666	0.0258	5.8653	1.6072	7.1726	2.9711	1.5031	4.1739	0.0000	2,563.1170	2,563.1170	0.6300	0.0000	2,576.3463
Total	**20.7767**	**26.6529**	**21.5666**	**0.0258**	**5.8653**	**1.6072**	**7.1726**	**2.9711**	**1.5031**	**4.1739**	**0.0000**	**2,563.1170**	**2,563.1170**	**0.6300**	**0.0000**	**2,576.3463**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	20.7767	26.6529	21.5666	0.0258	2.6755	1.6072	3.9829	1.3466	1.5031	2.5494	0.0000	2,563.1170	2,563.1170	0.6300	0.0000	2,576.3463
Total	**20.7767**	**26.6529**	**21.5666**	**0.0258**	**2.6755**	**1.6072**	**3.9829**	**1.3466**	**1.5031**	**2.5494**	**0.0000**	**2,563.1170**	**2,563.1170**	**0.6300**	**0.0000**	**2,576.3463**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.38**	**0.00**	**44.47**	**54.68**	**0.00**	**38.92**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.3320	8.5500e-003	0.9130	7.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003		1.9303	1.9303	5.3000e-003		2.0415
Energy	0.0607	0.5520	0.4637	3.3100e-003		0.0420	0.0420		0.0420	0.0420		662.3884	662.3884	0.0127	0.0121	666.4196
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.3927**	**0.5605**	**1.3766**	**3.3800e-003**	**0.0000**	**0.0452**	**0.0452**	**0.0000**	**0.0452**	**0.0452**		**664.3187**	**664.3187**	**0.0180**	**0.0121**	**668.4611**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.3179	8.5500e-003	0.9130	7.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003		1.9303	1.9303	5.3000e-003		2.0415
Energy	0.0607	0.5520	0.4637	3.3100e-003		0.0420	0.0420		0.0420	0.0420		662.3884	662.3884	0.0127	0.0121	666.4196
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.3786**	**0.5605**	**1.3766**	**3.3800e-003**	**0.0000**	**0.0452**	**0.0452**	**0.0000**	**0.0452**	**0.0452**		**664.3187**	**664.3187**	**0.0180**	**0.0121**	**668.4611**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**3.60**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2017	1/27/2017	5	20	
2	Site Preparation	Site Preparation	1/28/2017	1/31/2017	5	2	
3	Grading	Grading	2/1/2017	2/6/2017	5	4	
4	Building Construction	Building Construction	2/7/2017	11/13/2017	5	200	
5	Paving	Paving	11/14/2017	11/27/2017	5	10	
6	Architectural Coating	Architectural Coating	11/28/2017	12/11/2017	5	10	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 13,230; Non-Residential Outdoor: 4,410 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Cranes	1	6.00	226	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Site Preparation	Graders	1	8.00	174	0.41
Paving	Pavers	1	6.00	125	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Rubber Tired Dozers	1	6.00	255	0.40
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	174	0.41
Paving	Paving Equipment	1	8.00	130	0.36
Site Preparation	Rubber Tired Dozers	1	7.00	255	0.40
Building Construction	Welders	3	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	4.00	1.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.7216	26.5855	20.8712	0.0245		1.6062	1.6062		1.5022	1.5022		2,457.4682	2,457.4682	0.6235		2,470.5620
Total	**2.7216**	**26.5855**	**20.8712**	**0.0245**		**1.6062**	**1.6062**		**1.5022**	**1.5022**		**2,457.4682**	**2,457.4682**	**0.6235**		**2,470.5620**

3.2 Demolition - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0526	0.0674	0.6954	1.3200e-003	0.1068	9.8000e-004	0.1078	0.0283	9.0000e-004	0.0292		105.6488	105.6488	6.4500e-003		105.7843
Total	**0.0526**	**0.0674**	**0.6954**	**1.3200e-003**	**0.1068**	**9.8000e-004**	**0.1078**	**0.0283**	**9.0000e-004**	**0.0292**		**105.6488**	**105.6488**	**6.4500e-003**		**105.7843**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.7216	26.5855	20.8712	0.0245		1.6062	1.6062		1.5022	1.5022	0.0000	2,457.4682	2,457.4682	0.6235		2,470.5620
Total	**2.7216**	**26.5855**	**20.8712**	**0.0245**		**1.6062**	**1.6062**		**1.5022**	**1.5022**	**0.0000**	**2,457.4682**	**2,457.4682**	**0.6235**		**2,470.5620**

3.2 Demolition - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0526	0.0674	0.6954	1.3200e-003	0.1068	9.8000e-004	0.1078	0.0283	9.0000e-004	0.0292		105.6488	105.6488	6.4500e-003		105.7843
Total	**0.0526**	**0.0674**	**0.6954**	**1.3200e-003**	**0.1068**	**9.8000e-004**	**0.1078**	**0.0283**	**9.0000e-004**	**0.0292**		**105.6488**	**105.6488**	**6.4500e-003**		**105.7843**

3.3 Site Preparation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.7996	0.0000	5.7996	2.9537	0.0000	2.9537			0.0000			0.0000
Off-Road	2.3109	24.2288	15.9299	0.0171		1.3067	1.3067		1.2022	1.2022		1,752.1239	1,752.1239	0.5369		1,763.3977
Total	**2.3109**	**24.2288**	**15.9299**	**0.0171**	**5.7996**	**1.3067**	**7.1063**	**2.9537**	**1.2022**	**4.1559**		**1,752.1239**	**1,752.1239**	**0.5369**		**1,763.3977**

3.3 Site Preparation - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0323	0.0415	0.4279	8.1000e-004	0.0657	6.0000e-004	0.0663	0.0174	5.5000e-004	0.0180		65.0146	65.0146	3.9700e-003		65.0981
Total	**0.0323**	**0.0415**	**0.4279**	**8.1000e-004**	**0.0657**	**6.0000e-004**	**0.0663**	**0.0174**	**5.5000e-004**	**0.0180**		**65.0146**	**65.0146**	**3.9700e-003**		**65.0981**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6098	0.0000	2.6098	1.3292	0.0000	1.3292			0.0000			0.0000
Off-Road	2.3109	24.2288	15.9299	0.0171		1.3067	1.3067		1.2022	1.2022	0.0000	1,752.1239	1,752.1239	0.5369		1,763.3977
Total	**2.3109**	**24.2288**	**15.9299**	**0.0171**	**2.6098**	**1.3067**	**3.9165**	**1.3292**	**1.2022**	**2.5314**	**0.0000**	**1,752.1239**	**1,752.1239**	**0.5369**		**1,763.3977**

3.3 Site Preparation - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0323	0.0415	0.4279	8.1000e-004	0.0657	6.0000e-004	0.0663	0.0174	5.5000e-004	0.0180		65.0146	65.0146	3.9700e-003		65.0981
Total	**0.0323**	**0.0415**	**0.4279**	**8.1000e-004**	**0.0657**	**6.0000e-004**	**0.0663**	**0.0174**	**5.5000e-004**	**0.0180**		**65.0146**	**65.0146**	**3.9700e-003**		**65.0981**

3.4 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9143	0.0000	4.9143	2.5256	0.0000	2.5256			0.0000			0.0000
Off-Road	1.8844	19.7889	13.1786	0.0141		1.0661	1.0661		0.9808	0.9808		1,439.1894	1,439.1894	0.4410		1,448.4496
Total	**1.8844**	**19.7889**	**13.1786**	**0.0141**	**4.9143**	**1.0661**	**5.9804**	**2.5256**	**0.9808**	**3.5064**		**1,439.1894**	**1,439.1894**	**0.4410**		**1,448.4496**

3.4 Grading - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0323	0.0415	0.4279	8.1000e-004	0.0657	6.0000e-004	0.0663	0.0174	5.5000e-004	0.0180		65.0146	65.0146	3.9700e-003		65.0981
Total	**0.0323**	**0.0415**	**0.4279**	**8.1000e-004**	**0.0657**	**6.0000e-004**	**0.0663**	**0.0174**	**5.5000e-004**	**0.0180**		**65.0146**	**65.0146**	**3.9700e-003**		**65.0981**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.2114	0.0000	2.2114	1.1365	0.0000	1.1365			0.0000			0.0000
Off-Road	1.8844	19.7889	13.1786	0.0141		1.0661	1.0661		0.9808	0.9808	0.0000	1,439.1894	1,439.1894	0.4410		1,448.4496
Total	**1.8844**	**19.7889**	**13.1786**	**0.0141**	**2.2114**	**1.0661**	**3.2775**	**1.1365**	**0.9808**	**2.1174**	**0.0000**	**1,439.1894**	**1,439.1894**	**0.4410**		**1,448.4496**

3.4 Grading - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0323	0.0415	0.4279	8.1000e-004	0.0657	6.0000e-004	0.0663	0.0174	5.5000e-004	0.0180		65.0146	65.0146	3.9700e-003		65.0981
Total	**0.0323**	**0.0415**	**0.4279**	**8.1000e-004**	**0.0657**	**6.0000e-004**	**0.0663**	**0.0174**	**5.5000e-004**	**0.0180**		**65.0146**	**65.0146**	**3.9700e-003**		**65.0981**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.9546	19.1088	14.3110	0.0220		1.2257	1.2257		1.1823	1.1823		2,034.2860	2,034.2860	0.4268		2,043.2497
Total	**2.9546**	**19.1088**	**14.3110**	**0.0220**		**1.2257**	**1.2257**		**1.1823**	**1.1823**		**2,034.2860**	**2,034.2860**	**0.4268**		**2,043.2497**

3.5 Building Construction - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0106	0.0846	0.1208	2.3000e-004	6.5400e-003	1.3500e-003	7.9000e-003	1.8600e-003	1.2400e-003	3.1000e-003		22.6097	22.6097	1.8000e-004		22.6134
Worker	0.0162	0.0207	0.2140	4.0000e-004	0.0329	3.0000e-004	0.0332	8.7200e-003	2.8000e-004	8.9900e-003		32.5073	32.5073	1.9900e-003		32.5490
Total	**0.0268**	**0.1053**	**0.3347**	**6.3000e-004**	**0.0394**	**1.6500e-003**	**0.0411**	**0.0106**	**1.5200e-003**	**0.0121**		**55.1171**	**55.1171**	**2.1700e-003**		**55.1624**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.9546	19.1088	14.3110	0.0220		1.2257	1.2257		1.1823	1.1823	0.0000	2,034.2860	2,034.2860	0.4268		2,043.2497
Total	**2.9546**	**19.1088**	**14.3110**	**0.0220**		**1.2257**	**1.2257**		**1.1823**	**1.1823**	**0.0000**	**2,034.2860**	**2,034.2860**	**0.4268**		**2,043.2497**

3.5 Building Construction - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0106	0.0846	0.1208	2.3000e-004	6.5400e-003	1.3500e-003	7.9000e-003	1.8600e-003	1.2400e-003	3.1000e-003		22.6097	22.6097	1.8000e-004		22.6134
Worker	0.0162	0.0207	0.2140	4.0000e-004	0.0329	3.0000e-004	0.0332	8.7200e-003	2.8000e-004	8.9900e-003		32.5073	32.5073	1.9900e-003		32.5490
Total	**0.0268**	**0.1053**	**0.3347**	**6.3000e-004**	**0.0394**	**1.6500e-003**	**0.0411**	**0.0106**	**1.5200e-003**	**0.0121**		**55.1171**	**55.1171**	**2.1700e-003**		**55.1624**

3.6 Paving - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1857	12.0981	9.0308	0.0133		0.7333	0.7333		0.6755	0.6755		1,347.6575	1,347.6575	0.4052		1,356.1677
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1857**	**12.0981**	**9.0308**	**0.0133**		**0.7333**	**0.7333**		**0.6755**	**0.6755**		**1,347.6575**	**1,347.6575**	**0.4052**		**1,356.1677**

3.6 Paving - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0526	0.0674	0.6954	1.3200e-003	0.1068	9.8000e-004	0.1078	0.0283	9.0000e-004	0.0292		105.6488	105.6488	6.4500e-003		105.7843
Total	**0.0526**	**0.0674**	**0.6954**	**1.3200e-003**	**0.1068**	**9.8000e-004**	**0.1078**	**0.0283**	**9.0000e-004**	**0.0292**		**105.6488**	**105.6488**	**6.4500e-003**		**105.7843**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1857	12.0981	9.0308	0.0133		0.7333	0.7333		0.6755	0.6755	0.0000	1,347.6575	1,347.6575	0.4052		1,356.1677
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1857**	**12.0981**	**9.0308**	**0.0133**		**0.7333**	**0.7333**		**0.6755**	**0.6755**	**0.0000**	**1,347.6575**	**1,347.6575**	**0.4052**		**1,356.1677**

3.6 Paving - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0526	0.0674	0.6954	1.3200e-003	0.1068	9.8000e-004	0.1078	0.0283	9.0000e-004	0.0292		105.6488	105.6488	6.4500e-003		105.7843
Total	**0.0526**	**0.0674**	**0.6954**	**1.3200e-003**	**0.1068**	**9.8000e-004**	**0.1078**	**0.0283**	**9.0000e-004**	**0.0292**		**105.6488**	**105.6488**	**6.4500e-003**		**105.7843**

3.7 Architectural Coating - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.4404					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733		281.4481	281.4481	0.0297		282.0721
Total	**20.7727**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**		**281.4481**	**281.4481**	**0.0297**		**282.0721**

3.7 Architectural Coating - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	4.0400e-003	5.1900e-003	0.0535	1.0000e-004	8.2100e-003	8.0000e-005	8.2900e-003	2.1800e-003	7.0000e-005	2.2500e-003		8.1268	8.1268	5.0000e-004		8.1373
Total	**4.0400e-003**	**5.1900e-003**	**0.0535**	**1.0000e-004**	**8.2100e-003**	**8.0000e-005**	**8.2900e-003**	**2.1800e-003**	**7.0000e-005**	**2.2500e-003**		**8.1268**	**8.1268**	**5.0000e-004**		**8.1373**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.4404					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733	0.0000	281.4481	281.4481	0.0297		282.0721
Total	**20.7727**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**	**0.0000**	**281.4481**	**281.4481**	**0.0297**		**282.0721**

3.7 Architectural Coating - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	4.0400e-003	5.1900e-003	0.0535	1.0000e-004	8.2100e-003	8.0000e-005	8.2900e-003	2.1800e-003	7.0000e-005	2.2500e-003		8.1268	8.1268	5.0000e-004		8.1373
Total	**4.0400e-003**	**5.1900e-003**	**0.0535**	**1.0000e-004**	**8.2100e-003**	**8.0000e-005**	**8.2900e-003**	**2.1800e-003**	**7.0000e-005**	**2.2500e-003**		**8.1268**	**8.1268**	**5.0000e-004**		**8.1373**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Transit Accessibility

Implement Trip Reduction Program

Transit Subsidy

Workplace Parking Charge

Employee Vanpool/Shuttle

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Educational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Educational	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.493512	0.037574	0.233760	0.143549	0.049865	0.006906	0.012880	0.004830	0.000942	0.002887	0.009149	0.000702	0.003444

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0607	0.5520	0.4637	3.3100e-003		0.0420	0.0420		0.0420	0.0420		662.3884	662.3884	0.0127	0.0121	666.4196
NaturalGas Unmitigated	0.0607	0.5520	0.4637	3.3100e-003		0.0420	0.0420		0.0420	0.0420		662.3884	662.3884	0.0127	0.0121	666.4196

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Educational	5630.3	0.0607	0.5520	0.4637	3.3100e-003		0.0420	0.0420		0.0420	0.0420		662.3884	662.3884	0.0127	0.0121	666.4196
Total		**0.0607**	**0.5520**	**0.4637**	**3.3100e-003**		**0.0420**	**0.0420**		**0.0420**	**0.0420**		**662.3884**	**662.3884**	**0.0127**	**0.0121**	**666.4196**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Educational	5.6303	0.0607	0.5520	0.4637	3.3100e-003		0.0420	0.0420		0.0420	0.0420		662.3884	662.3884	0.0127	0.0121	666.4196
Total		**0.0607**	**0.5520**	**0.4637**	**3.3100e-003**		**0.0420**	**0.0420**		**0.0420**	**0.0420**		**662.3884**	**662.3884**	**0.0127**	**0.0121**	**666.4196**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

Use Low VOC Cleaning Supplies

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.3179	8.5500e-003	0.9130	7.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003		1.9303	1.9303	5.3000e-003		2.0415
Unmitigated	0.3320	8.5500e-003	0.9130	7.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003		1.9303	1.9303	5.3000e-003		2.0415

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0560					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1888					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0873	8.5500e-003	0.9130	7.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003		1.9303	1.9303	5.3000e-003		2.0415
Total	**0.3320**	**8.5500e-003**	**0.9130**	**7.0000e-005**		**3.2900e-003**	**3.2900e-003**		**3.2900e-003**	**3.2900e-003**		**1.9303**	**1.9303**	**5.3000e-003**		**2.0415**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0560					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0873	8.5500e-003	0.9130	7.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003		1.9303	1.9303	5.3000e-003		2.0415
Total	**0.3179**	**8.5500e-003**	**0.9130**	**7.0000e-005**		**3.2900e-003**	**3.2900e-003**		**3.2900e-003**	**3.2900e-003**		**1.9303**	**1.9303**	**5.3000e-003**		**2.0415**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

New EH&S Facility

Santa Cruz County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Educational	8,820.00	User Defined Unit	1.40	8,820.00	1

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	61
Climate Zone	5			**Operational Year**	2018
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Campus hazardous waste management facility. 8,820 sf of building space on 1.4-acre site. Staffing, approximatly 24 person-hours/week.

Construction Phase - provided by project manager

Energy Use - From Title 24 calcluations. Total natural gas usage 20,596 therms/year; electrical usage 148,539 kWh/yr. Buildings are 8,820, including unconditioned space.

Water And Wastewater - assume 0.5 acres low-water-use plants

Solid Waste - From CalEEMod App D, University/College (4yr), 0.8 ton/employee/year, assuming about 0.5 FTE occupancy of the building.

Land Use Change -

Sequestration -

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Mobile Commute Mitigation - 200 vanpool riders/3608 staff and faculty

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblCommuteMitigation	EmployeeVanpoolPercentModeShare	2	5
tblEnergyUse	T24E	0.00	16.80
tblEnergyUse	T24NG	0.00	233.00
tblLandUse	LandUseSquareFeet	0.00	8,820.00
tblLandUse	LotAcreage	0.00	1.40
tblLandUse	Population	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2018
tblSequestration	NumberOfNewTrees	0.00	27.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	20.7770	26.6692	21.6087	0.0257	5.8653	1.6072	7.1726	2.9711	1.5031	4.1739	0.0000	2,558.1491	2,558.1491	0.6300	0.0000	2,571.3785
Total	**20.7770**	**26.6692**	**21.6087**	**0.0257**	**5.8653**	**1.6072**	**7.1726**	**2.9711**	**1.5031**	**4.1739**	**0.0000**	**2,558.1491**	**2,558.1491**	**0.6300**	**0.0000**	**2,571.3785**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	20.7770	26.6692	21.6087	0.0257	2.6755	1.6072	3.9829	1.3466	1.5031	2.5494	0.0000	2,558.1491	2,558.1491	0.6300	0.0000	2,571.3785
Total	**20.7770**	**26.6692**	**21.6087**	**0.0257**	**2.6755**	**1.6072**	**3.9829**	**1.3466**	**1.5031**	**2.5494**	**0.0000**	**2,558.1491**	**2,558.1491**	**0.6300**	**0.0000**	**2,571.3785**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.38**	**0.00**	**44.47**	**54.68**	**0.00**	**38.92**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.3320	8.5500e-003	0.9130	7.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003		1.9303	1.9303	5.3000e-003		2.0415
Energy	0.0607	0.5520	0.4637	3.3100e-003		0.0420	0.0420		0.0420	0.0420		662.3884	662.3884	0.0127	0.0121	666.4196
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.3927**	**0.5605**	**1.3766**	**3.3800e-003**	**0.0000**	**0.0452**	**0.0452**	**0.0000**	**0.0452**	**0.0452**		**664.3187**	**664.3187**	**0.0180**	**0.0121**	**668.4611**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.3179	8.5500e-003	0.9130	7.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003		1.9303	1.9303	5.3000e-003		2.0415
Energy	0.0607	0.5520	0.4637	3.3100e-003		0.0420	0.0420		0.0420	0.0420		662.3884	662.3884	0.0127	0.0121	666.4196
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.3786**	**0.5605**	**1.3766**	**3.3800e-003**	**0.0000**	**0.0452**	**0.0452**	**0.0000**	**0.0452**	**0.0452**		**664.3187**	**664.3187**	**0.0180**	**0.0121**	**668.4611**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**3.60**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2017	1/27/2017	5	20	
2	Site Preparation	Site Preparation	1/28/2017	1/31/2017	5	2	
3	Grading	Grading	2/1/2017	2/6/2017	5	4	
4	Building Construction	Building Construction	2/7/2017	11/13/2017	5	200	
5	Paving	Paving	11/14/2017	11/27/2017	5	10	
6	Architectural Coating	Architectural Coating	11/28/2017	12/11/2017	5	10	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 13,230; Non-Residential Outdoor: 4,410 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Cranes	1	6.00	226	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Site Preparation	Graders	1	8.00	174	0.41
Paving	Pavers	1	6.00	125	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Rubber Tired Dozers	1	6.00	255	0.40
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	174	0.41
Paving	Paving Equipment	1	8.00	130	0.36
Site Preparation	Rubber Tired Dozers	1	7.00	255	0.40
Building Construction	Welders	3	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	4.00	1.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.7216	26.5855	20.8712	0.0245		1.6062	1.6062		1.5022	1.5022		2,457.4682	2,457.4682	0.6235		2,470.5620
Total	**2.7216**	**26.5855**	**20.8712**	**0.0245**		**1.6062**	**1.6062**		**1.5022**	**1.5022**		**2,457.4682**	**2,457.4682**	**0.6235**		**2,470.5620**

3.2 Demolition - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0566	0.0838	0.7374	1.2500e-003	0.1068	9.8000e-004	0.1078	0.0283	9.0000e-004	0.0292		100.6809	100.6809	6.4500e-003		100.8164
Total	**0.0566**	**0.0838**	**0.7374**	**1.2500e-003**	**0.1068**	**9.8000e-004**	**0.1078**	**0.0283**	**9.0000e-004**	**0.0292**		**100.6809**	**100.6809**	**6.4500e-003**		**100.8164**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.7216	26.5855	20.8712	0.0245		1.6062	1.6062		1.5022	1.5022	0.0000	2,457.4682	2,457.4682	0.6235		2,470.5620
Total	**2.7216**	**26.5855**	**20.8712**	**0.0245**		**1.6062**	**1.6062**		**1.5022**	**1.5022**	**0.0000**	**2,457.4682**	**2,457.4682**	**0.6235**		**2,470.5620**

3.2 Demolition - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0566	0.0838	0.7374	1.2500e-003	0.1068	9.8000e-004	0.1078	0.0283	9.0000e-004	0.0292		100.6809	100.6809	6.4500e-003		100.8164
Total	**0.0566**	**0.0838**	**0.7374**	**1.2500e-003**	**0.1068**	**9.8000e-004**	**0.1078**	**0.0283**	**9.0000e-004**	**0.0292**		**100.6809**	**100.6809**	**6.4500e-003**		**100.8164**

3.3 Site Preparation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.7996	0.0000	5.7996	2.9537	0.0000	2.9537			0.0000			0.0000
Off-Road	2.3109	24.2288	15.9299	0.0171		1.3067	1.3067		1.2022	1.2022		1,752.1239	1,752.1239	0.5369		1,763.3977
Total	**2.3109**	**24.2288**	**15.9299**	**0.0171**	**5.7996**	**1.3067**	**7.1063**	**2.9537**	**1.2022**	**4.1559**		**1,752.1239**	**1,752.1239**	**0.5369**		**1,763.3977**

3.3 Site Preparation - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0348	0.0515	0.4538	7.7000e-004	0.0657	6.0000e-004	0.0663	0.0174	5.5000e-004	0.0180		61.9575	61.9575	3.9700e-003		62.0409
Total	**0.0348**	**0.0515**	**0.4538**	**7.7000e-004**	**0.0657**	**6.0000e-004**	**0.0663**	**0.0174**	**5.5000e-004**	**0.0180**		**61.9575**	**61.9575**	**3.9700e-003**		**62.0409**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6098	0.0000	2.6098	1.3292	0.0000	1.3292			0.0000			0.0000
Off-Road	2.3109	24.2288	15.9299	0.0171		1.3067	1.3067		1.2022	1.2022	0.0000	1,752.1239	1,752.1239	0.5369		1,763.3977
Total	**2.3109**	**24.2288**	**15.9299**	**0.0171**	**2.6098**	**1.3067**	**3.9165**	**1.3292**	**1.2022**	**2.5314**	**0.0000**	**1,752.1239**	**1,752.1239**	**0.5369**		**1,763.3977**

3.3 Site Preparation - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0348	0.0515	0.4538	7.7000e-004	0.0657	6.0000e-004	0.0663	0.0174	5.5000e-004	0.0180		61.9575	61.9575	3.9700e-003		62.0409
Total	**0.0348**	**0.0515**	**0.4538**	**7.7000e-004**	**0.0657**	**6.0000e-004**	**0.0663**	**0.0174**	**5.5000e-004**	**0.0180**		**61.9575**	**61.9575**	**3.9700e-003**		**62.0409**

3.4 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9143	0.0000	4.9143	2.5256	0.0000	2.5256			0.0000			0.0000
Off-Road	1.8844	19.7889	13.1786	0.0141		1.0661	1.0661		0.9808	0.9808		1,439.1894	1,439.1894	0.4410		1,448.4496
Total	**1.8844**	**19.7889**	**13.1786**	**0.0141**	**4.9143**	**1.0661**	**5.9804**	**2.5256**	**0.9808**	**3.5064**		**1,439.1894**	**1,439.1894**	**0.4410**		**1,448.4496**

3.4 Grading - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0348	0.0515	0.4538	7.7000e-004	0.0657	6.0000e-004	0.0663	0.0174	5.5000e-004	0.0180		61.9575	61.9575	3.9700e-003		62.0409
Total	**0.0348**	**0.0515**	**0.4538**	**7.7000e-004**	**0.0657**	**6.0000e-004**	**0.0663**	**0.0174**	**5.5000e-004**	**0.0180**		**61.9575**	**61.9575**	**3.9700e-003**		**62.0409**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.2114	0.0000	2.2114	1.1365	0.0000	1.1365			0.0000			0.0000
Off-Road	1.8844	19.7889	13.1786	0.0141		1.0661	1.0661		0.9808	0.9808	0.0000	1,439.1894	1,439.1894	0.4410		1,448.4496
Total	**1.8844**	**19.7889**	**13.1786**	**0.0141**	**2.2114**	**1.0661**	**3.2775**	**1.1365**	**0.9808**	**2.1174**	**0.0000**	**1,439.1894**	**1,439.1894**	**0.4410**		**1,448.4496**

3.4 Grading - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0348	0.0515	0.4538	7.7000e-004	0.0657	6.0000e-004	0.0663	0.0174	5.5000e-004	0.0180		61.9575	61.9575	3.9700e-003		62.0409
Total	**0.0348**	**0.0515**	**0.4538**	**7.7000e-004**	**0.0657**	**6.0000e-004**	**0.0663**	**0.0174**	**5.5000e-004**	**0.0180**		**61.9575**	**61.9575**	**3.9700e-003**		**62.0409**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.9546	19.1088	14.3110	0.0220		1.2257	1.2257		1.1823	1.1823		2,034.2860	2,034.2860	0.4268		2,043.2497
Total	**2.9546**	**19.1088**	**14.3110**	**0.0220**		**1.2257**	**1.2257**		**1.1823**	**1.1823**		**2,034.2860**	**2,034.2860**	**0.4268**		**2,043.2497**

3.5 Building Construction - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0133	0.0882	0.1919	2.3000e-004	6.5400e-003	1.3700e-003	7.9200e-003	1.8600e-003	1.2600e-003	3.1200e-003		22.4302	22.4302	1.8000e-004		22.4340
Worker	0.0174	0.0258	0.2269	3.9000e-004	0.0329	3.0000e-004	0.0332	8.7200e-003	2.8000e-004	8.9900e-003		30.9787	30.9787	1.9900e-003		31.0204
Total	**0.0307**	**0.1140**	**0.4188**	**6.2000e-004**	**0.0394**	**1.6700e-003**	**0.0411**	**0.0106**	**1.5400e-003**	**0.0121**		**53.4090**	**53.4090**	**2.1700e-003**		**53.4545**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.9546	19.1088	14.3110	0.0220		1.2257	1.2257		1.1823	1.1823	0.0000	2,034.2860	2,034.2860	0.4268		2,043.2497
Total	**2.9546**	**19.1088**	**14.3110**	**0.0220**		**1.2257**	**1.2257**		**1.1823**	**1.1823**	**0.0000**	**2,034.2860**	**2,034.2860**	**0.4268**		**2,043.2497**

3.5 Building Construction - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0133	0.0882	0.1919	2.3000e-004	6.5400e-003	1.3700e-003	7.9200e-003	1.8600e-003	1.2600e-003	3.1200e-003		22.4302	22.4302	1.8000e-004		22.4340
Worker	0.0174	0.0258	0.2269	3.9000e-004	0.0329	3.0000e-004	0.0332	8.7200e-003	2.8000e-004	8.9900e-003		30.9787	30.9787	1.9900e-003		31.0204
Total	**0.0307**	**0.1140**	**0.4188**	**6.2000e-004**	**0.0394**	**1.6700e-003**	**0.0411**	**0.0106**	**1.5400e-003**	**0.0121**		**53.4090**	**53.4090**	**2.1700e-003**		**53.4545**

3.6 Paving - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1857	12.0981	9.0308	0.0133		0.7333	0.7333		0.6755	0.6755		1,347.6575	1,347.6575	0.4052		1,356.1677
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1857**	**12.0981**	**9.0308**	**0.0133**		**0.7333**	**0.7333**		**0.6755**	**0.6755**		**1,347.6575**	**1,347.6575**	**0.4052**		**1,356.1677**

3.6 Paving - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0566	0.0838	0.7374	1.2500e-003	0.1068	9.8000e-004	0.1078	0.0283	9.0000e-004	0.0292		100.6809	100.6809	6.4500e-003		100.8164
Total	**0.0566**	**0.0838**	**0.7374**	**1.2500e-003**	**0.1068**	**9.8000e-004**	**0.1078**	**0.0283**	**9.0000e-004**	**0.0292**		**100.6809**	**100.6809**	**6.4500e-003**		**100.8164**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1857	12.0981	9.0308	0.0133		0.7333	0.7333		0.6755	0.6755	0.0000	1,347.6575	1,347.6575	0.4052		1,356.1677
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1857**	**12.0981**	**9.0308**	**0.0133**		**0.7333**	**0.7333**		**0.6755**	**0.6755**	**0.0000**	**1,347.6575**	**1,347.6575**	**0.4052**		**1,356.1677**

3.6 Paving - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0566	0.0838	0.7374	1.2500e-003	0.1068	9.8000e-004	0.1078	0.0283	9.0000e-004	0.0292		100.6809	100.6809	6.4500e-003		100.8164
Total	**0.0566**	**0.0838**	**0.7374**	**1.2500e-003**	**0.1068**	**9.8000e-004**	**0.1078**	**0.0283**	**9.0000e-004**	**0.0292**		**100.6809**	**100.6809**	**6.4500e-003**		**100.8164**

3.7 Architectural Coating - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.4404					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733		281.4481	281.4481	0.0297		282.0721
Total	**20.7727**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**		**281.4481**	**281.4481**	**0.0297**		**282.0721**

3.7 Architectural Coating - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	4.3500e-003	6.4400e-003	0.0567	1.0000e-004	8.2100e-003	8.0000e-005	8.2900e-003	2.1800e-003	7.0000e-005	2.2500e-003		7.7447	7.7447	5.0000e-004		7.7551
Total	**4.3500e-003**	**6.4400e-003**	**0.0567**	**1.0000e-004**	**8.2100e-003**	**8.0000e-005**	**8.2900e-003**	**2.1800e-003**	**7.0000e-005**	**2.2500e-003**		**7.7447**	**7.7447**	**5.0000e-004**		**7.7551**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	20.4404					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733	0.0000	281.4481	281.4481	0.0297		282.0721
Total	**20.7727**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**	**0.0000**	**281.4481**	**281.4481**	**0.0297**		**282.0721**

3.7 Architectural Coating - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	4.3500e-003	6.4400e-003	0.0567	1.0000e-004	8.2100e-003	8.0000e-005	8.2900e-003	2.1800e-003	7.0000e-005	2.2500e-003		7.7447	7.7447	5.0000e-004		7.7551
Total	**4.3500e-003**	**6.4400e-003**	**0.0567**	**1.0000e-004**	**8.2100e-003**	**8.0000e-005**	**8.2900e-003**	**2.1800e-003**	**7.0000e-005**	**2.2500e-003**		**7.7447**	**7.7447**	**5.0000e-004**		**7.7551**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Transit Accessibility

Implement Trip Reduction Program

Transit Subsidy

Workplace Parking Charge

Employee Vanpool/Shuttle

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Educational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Educational	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.493512	0.037574	0.233760	0.143549	0.049865	0.006906	0.012880	0.004830	0.000942	0.002887	0.009149	0.000702	0.003444

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0607	0.5520	0.4637	3.3100e-003		0.0420	0.0420		0.0420	0.0420		662.3884	662.3884	0.0127	0.0121	666.4196
NaturalGas Unmitigated	0.0607	0.5520	0.4637	3.3100e-003		0.0420	0.0420		0.0420	0.0420		662.3884	662.3884	0.0127	0.0121	666.4196

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Educational	5630.3	0.0607	0.5520	0.4637	3.3100e-003		0.0420	0.0420		0.0420	0.0420		662.3884	662.3884	0.0127	0.0121	666.4196
Total		**0.0607**	**0.5520**	**0.4637**	**3.3100e-003**		**0.0420**	**0.0420**		**0.0420**	**0.0420**		**662.3884**	**662.3884**	**0.0127**	**0.0121**	**666.4196**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Educational	5.6303	0.0607	0.5520	0.4637	3.3100e-003		0.0420	0.0420		0.0420	0.0420		662.3884	662.3884	0.0127	0.0121	666.4196
Total		**0.0607**	**0.5520**	**0.4637**	**3.3100e-003**		**0.0420**	**0.0420**		**0.0420**	**0.0420**		**662.3884**	**662.3884**	**0.0127**	**0.0121**	**666.4196**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

Use Low VOC Cleaning Supplies

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.3179	8.5500e-003	0.9130	7.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003		1.9303	1.9303	5.3000e-003		2.0415
Unmitigated	0.3320	8.5500e-003	0.9130	7.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003		1.9303	1.9303	5.3000e-003		2.0415

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0560					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1888					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0873	8.5500e-003	0.9130	7.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003		1.9303	1.9303	5.3000e-003		2.0415
Total	**0.3320**	**8.5500e-003**	**0.9130**	**7.0000e-005**		**3.2900e-003**	**3.2900e-003**		**3.2900e-003**	**3.2900e-003**		**1.9303**	**1.9303**	**5.3000e-003**		**2.0415**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0560					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0873	8.5500e-003	0.9130	7.0000e-005		3.2900e-003	3.2900e-003		3.2900e-003	3.2900e-003		1.9303	1.9303	5.3000e-003		2.0415
Total	**0.3179**	**8.5500e-003**	**0.9130**	**7.0000e-005**		**3.2900e-003**	**3.2900e-003**		**3.2900e-003**	**3.2900e-003**		**1.9303**	**1.9303**	**5.3000e-003**		**2.0415**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Appendix E

Biological Resources Reports

BIOLOGICAL RESOURCES ASSESSMENT, ENVIRONMENTAL HEALTH & SAFETY FACILITY, UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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16 May 2016

BIOLOGICAL RESOURCES ASSESSMENT,
ENVIRONMENTAL HEALTH & SAFETY FACILITY,
UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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BIOLOGICAL RESOURCES ASSESSMENT, ENVIRONMENTAL HEALTH & SAFETY FACILITY, UNIVERSITY OF CALIFORNIA, SANTA CRUZ

SUMMARY

A biological resources assessment for special-status plants and wildlife was conducted at the proposed Environmental Health and Safety Facility, University of California, Santa Cruz (UCSC). The project involves construction of a waste handling and storage facility to sort and hold regulated waste generated by laboratory research and teaching, the arts, and maintenance on the main campus. The project site is situated in undeveloped redwood forest habitat along Heller Drive just south of the Kerr Hall pedestrian bridge.

Forty special-status plant species were evaluated for their potential occurrence on the project site and surrounding study area. Most of these species are unlikely to occur on the project site because the study area: (1) lacks suitable habitat components (e.g., plant community, substrate and/or microhabitat) for most special-status plants known from the region, and/or (2) no special-status plants have been observed on or adjacent to the study area during previous studies, and none were observed during the current study. However, the project site and study area support some suitable habitat components for several special-status species including tear drop moss (*Dacryophyllum falcifolium*), slender silver moss (*Anomobryum julaceum*), minute pocket moss (*Fissidens pauperculus*) and California bottlebrush grass (*Elymus californicus*). The presence or absence of these species, while considered low, can't be definitely ruled out without focused surveys.

Special-status vertebrates known from the region were assessed for their potential to occur on the project site. The federally-threatened California red-legged frog (*Rana draytonii*) inhabits the lower campus and there is a low potential that it may pass through the project area or periodically use nearby Moore Creek. Suitable habitat is present for the Santa Cruz black salamander (*Aneides flavipunctatus niger*). Potential nesting habitat is present in the vicinity for golden eagle (*Aquila chryseastos*), white-tailed kite (*Elanus leucurus*), long-eared owl (*Asio otus*), Allen's hummingbird (*Selasphorus sasin*), Nuttall's woodpecker (*Picoides nuttallii*), olive-sided flycatcher (*Contopus cooperi*) and oak titmouse (*Baeolophus inornatus*). Potential roosting habitat is present for pallid bat (*Antrozous pallidus*), long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanodes*) and long-legged myotis (*Myotis volans*). Potential habitat is present for the San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*). Special-status invertebrates are not included in this analysis.

Mitigation measures intended to reduce potential negative effects to special-status plants and wildlife during and after construction are provided. The recommended mitigation measures conform to or exceed those included in the existing Long-range Development Plan (LRDP) for UCSC.

BIOLOGICAL RESOURCES ASSESSMENT, ENVIRONMENTAL HEALTH & SAFETY FACILITY, UNIVERSITY OF CALIFORNIA, SANTA CRUZ

INTRODUCTION

The proposed Environmental Health & Safety project (Project) involves construction of a regulated waste handling and storage facility at the University of California, Santa Cruz (UCSC) campus. The proposed Project consists of a main building, a radioactive storage building, an electrical equipment yard including a generator and propane tank, sidewalks and a driveway with two access points to Heller Drive. The site covers approximately 1 acre. Biosearch Associates and Coast Range Biological LLC were contracted by Physical Planning and Construction to provide a habitat assessment for special-status plants and wildlife that may be affected by development of the project. This document analyzes biological resources known from the region and assesses their potential for occurrence based on site conditions, habitat requirements and local occurrence records. The potential impacts to special-status species were determined using current development plans. Mitigation measures intended to reduce negative effects to special-status plants and wildlife are provided, which are consistent with the Long-range Development Plan (UCSC 2006).

STUDY AREA AND PROJECT DESCRIPTION

The Project is located in the west-central campus area of UCSC (Figure 1). The site is located east of Heller Drive, south of the pedestrian bridge to Clark Kerr Hall, between ~700 and ~750 feet elevation (USGS 1954). The project site consists of two areas: (1) a ~1-acre area, adjacent to and east of Heller Drive and south of the pedestrian bridge to Kerr Hall, consisting of the limits of grading and construction associated with the proposed Environmental Health and Safety Facility; and (2) a ~1,000 ft^2 utility trenching area located east of the pedestrian bridge in the vicinity of Kerr Hall (Figures 2-4). The proposed Facility site is currently undeveloped and heavily forested. The area east of the pedestrian bridge is more disturbed and is located at the edge of existing paths and roadways.

The proposed project would construct a new 7,900 gross square foot waste handling and storage facility to sort and hold regulated waste generated by laboratory research and teaching, the arts, and maintenance on the main campus (Figure 2). The facility would include laboratory space, waste storage and handling for radiation, chemical, and universal waste, a material handling room, and a shower/locker work room. The facility would replace the Campus' existing, temporary regulated waste facility at the base of campus and low-level radioactive storage facility in Thimann Laboratories in the central campus. The new facility would consist of two separate buildings: one housing the radioactive materials rooms and the other accommodating all other functions. The two buildings would be connected by a covered walkway. Site improvements would include a loading dock, driveway and pedestrian paths, service vehicle and accessible parking, a trash and recycling area, and an electrical yard. Approximately 1,000 square feet of trenching will also be necessary between the east end of the pedestrian bridge and Clark Kerr Hall in order to connect the facility to campus utilities (Figure 3).

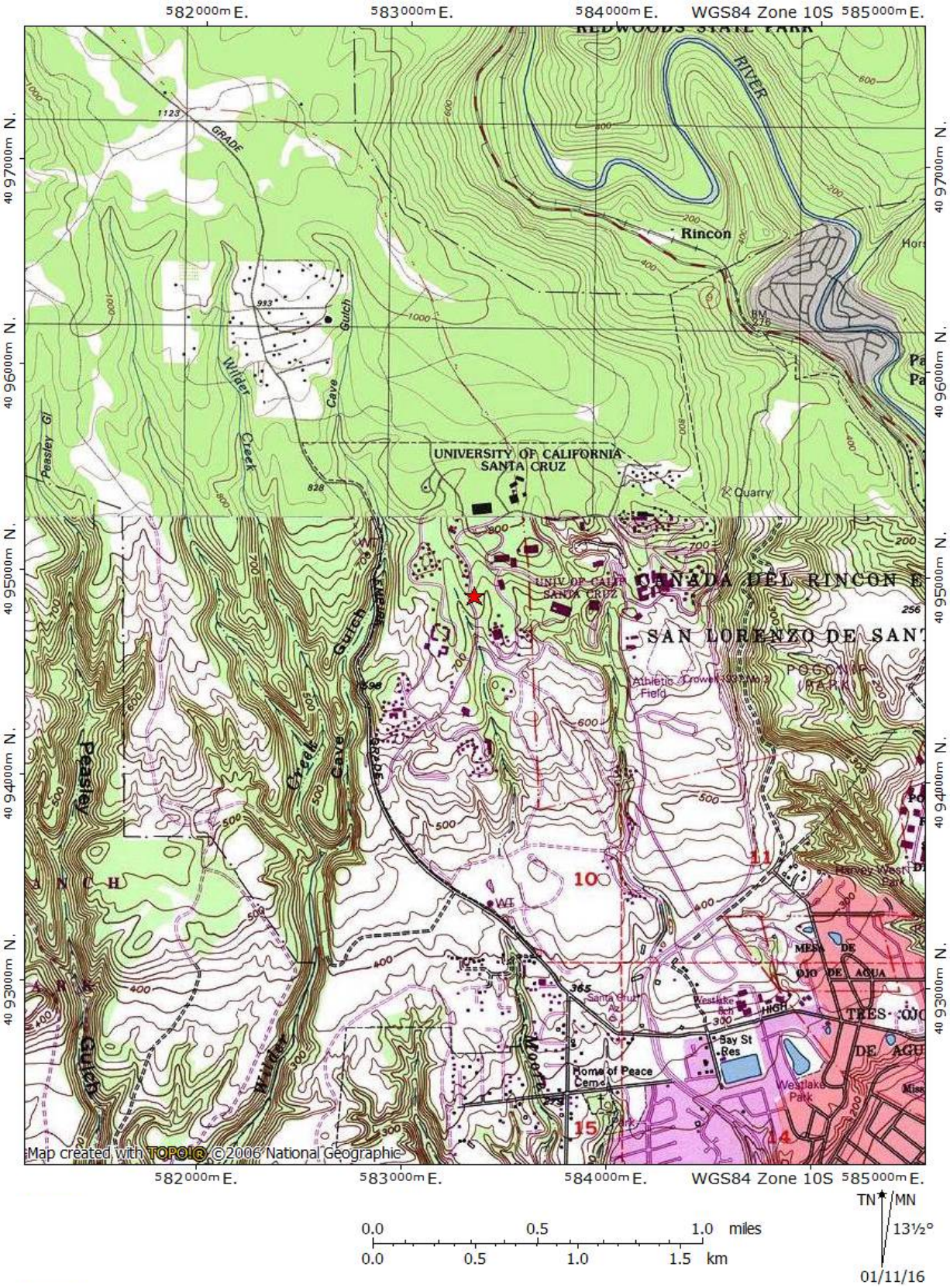

Figure 1. Location of Environmental Health and Safety Facility, UCSC, Santa Cruz Co.

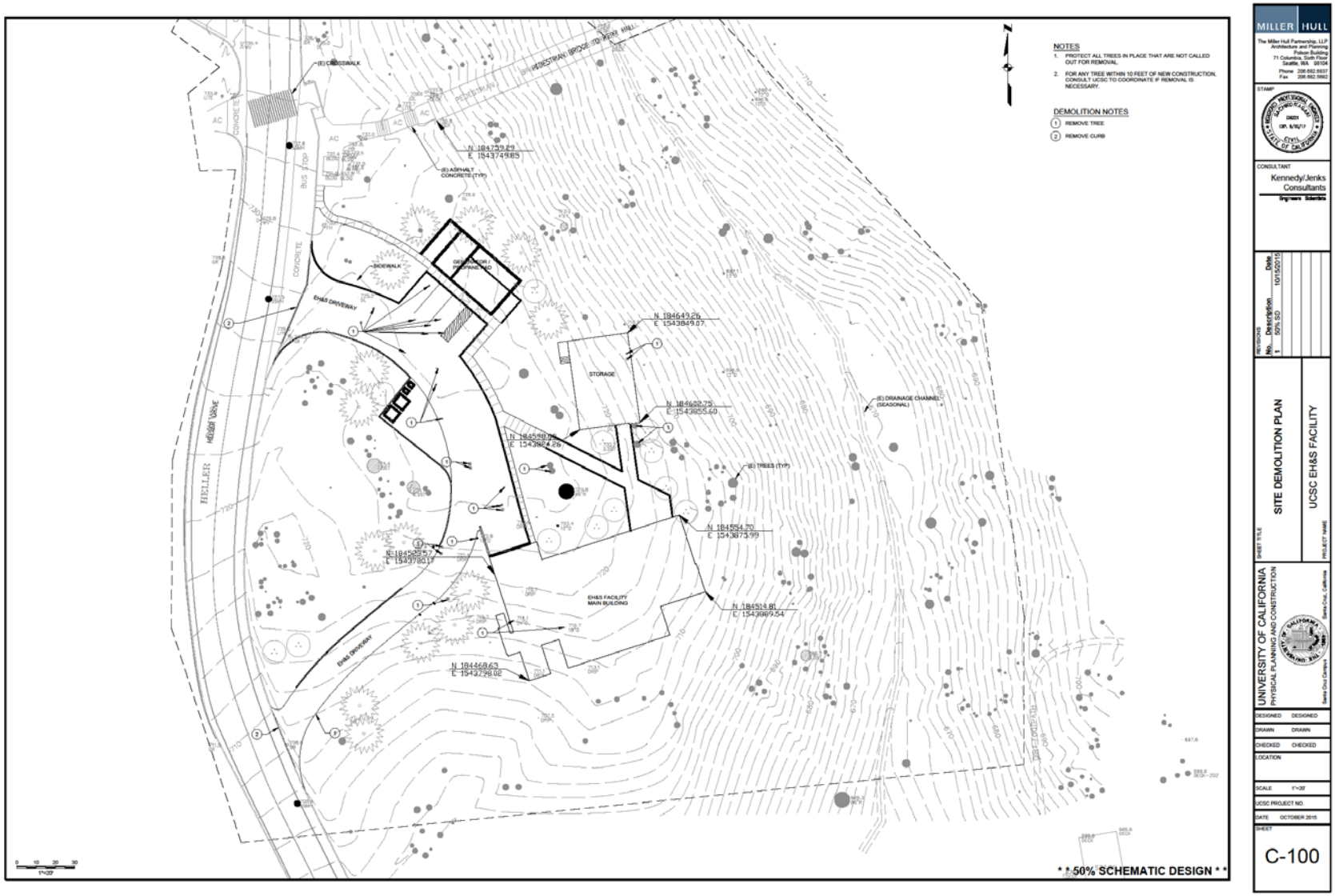

Figure 2. Environmental Health and Safety Facility site plan.

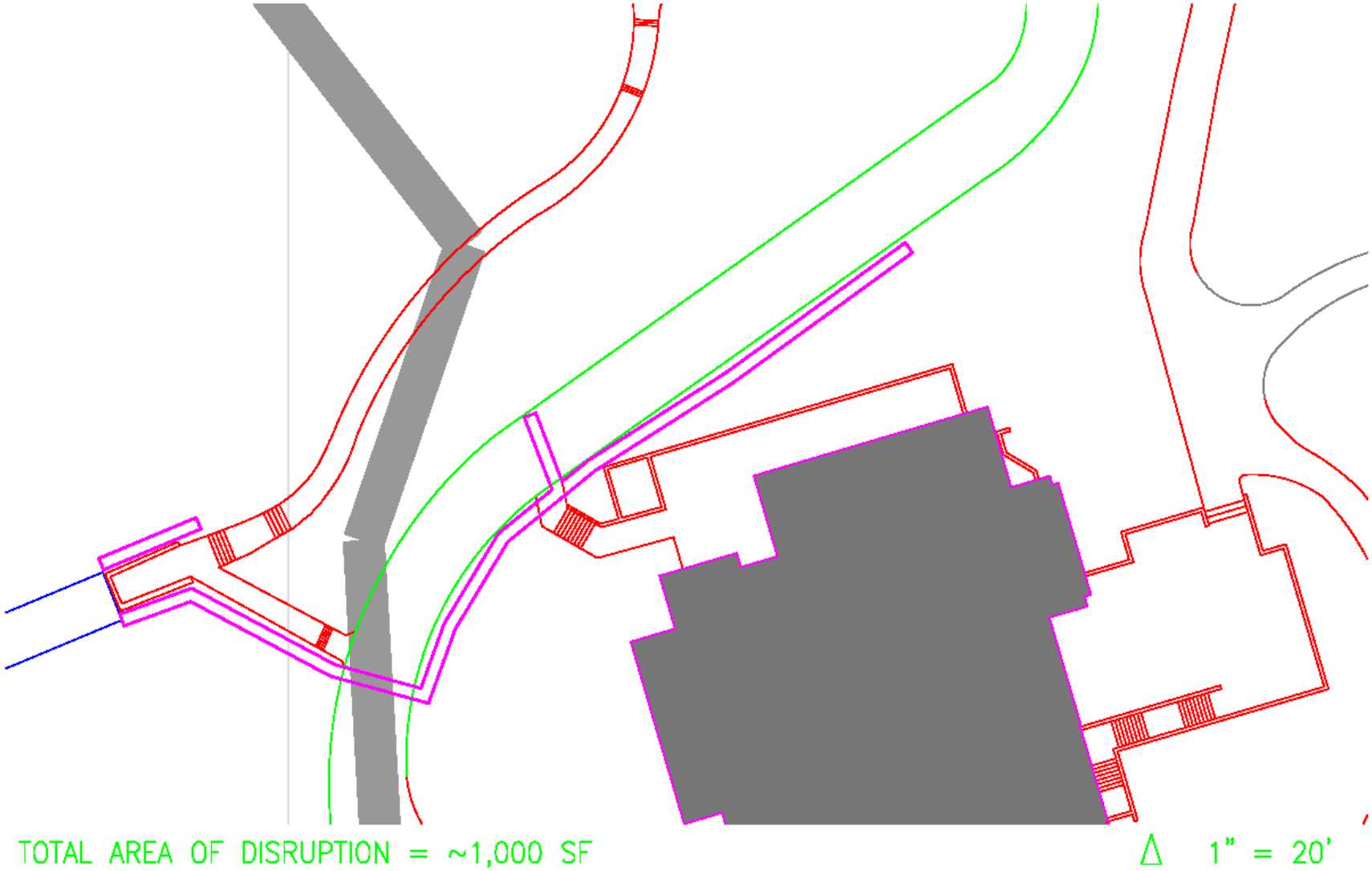

Figure 3. Location of trenching for utilities (purple) east of pedestrian bridge (blue).

METHODS

Prior to the reconnaissance field visit, a background literature search was conducted to determine the special-status plant species and sensitive habitats (including wetlands, riparian areas, and rare vegetation types) that have been documented to occur in the project area. The primary sources for this search included the California Natural Diversity Data Base (CDFW 2016), the California Native Plant Society Inventory of Rare and Endangered Plants (CNPS 2015), the United States Fish and Wildlife Service (USFWS) List of Threatened or Endangered Species (USFWS 2016a) for the Santa Cruz and surrounding USGS 7.5' quadrangles, and the UCSC Long Range Development Plan Final Environmental Impact Report (UCSC 2006). In addition, other lists and publications were consulted including the National Wetlands Inventory (USFWS 2016b), Web Soil Survey (NRCS 2016), topographic maps (USGS 1954), and aerial photographs.

The Special Animals List maintained by the California Department of Fish and Wildlife (CDFW) was used to determine the current regulatory status for each special-status wildlife species known from the region (CDFW 2015). A record search of the California Natural Diversity Data Base for the Santa Cruz and Felton USGS 7.5' series quadrangles was conducted (CDFW 2016). Locality records from eBird, an online database of bird distribution, were reviewed (eBird 2016; Sullivan, et al. 2009). Relevant literature was examined (Biosearch 2000a, 2000b, 2014; Ecosystems West 2004; Biotic Resources Group 2006; Suddjian 2013; UCSC 2006). Special-status invertebrates are not addressed in this document.

Reconnaissance-level field surveys were performed by wildlife biologists David Laabs and Mark Allaback and botanist Tom Mahony on 8, 25 and 26 January 2016. The purpose of the field visit was to document habitats on the project site (where ground disturbance related to construction of the Environmental Health and Safety Facility and utility trenching between the pedestrian bridge and Clark Kerr Hall will occur) and in the surrounding study area (which consists of the project site and a 100-foot buffer) to determine the presence or absence of suitable habitat for special-status plant species or other sensitive habitats. Floristic surveys were not conducted. Potential sensitive habitats, such as wetlands and other waters of the U.S. and State, were identified at the reconnaissance level, but a formal wetland delineation was not conducted. Habitats were drawn onto a digital orthophoto (dated June 13, 2014) using ArcGIS mapping software based on variation in texture, color, and structure. The project site boundary was estimated onto the orthophoto based on available site plans.

The suitability of the site for special-status vertebrates was assessed based on known habitat requirements for each species, the habitats present on the site and surrounding lands beyond the study area, regional locality records and knowledge of the target species. Wildlife observed or detected by sign were recorded. Invertebrates were not considered as part of this assessment. Focused wildlife surveys were not conducted.

For purposes of this assessment, special-status plant species are defined to include: (1) all plants that are listed under the Federal or State Endangered Species Acts as rare,

threatened or endangered; (2) all federal and state candidates for listing; (3) plants that qualify under the definition of "rare" in the California Environmental Quality Act (CEQA), section 15380; and (4) all plants with a Rare Plant Rank of 1 or 2 (and 3 or 4 when they meet the CEQA definition of “rare”) in CNPS (2016). In addition, species considered as special-status in the UCSC Long-Range Development Plan EIR are included (UCSC 2006). Special-status wildlife species include the following: those listed by the USFWS as Threatened or Endangered; species for which USFWS has sufficient information to list as Endangered or Threatened, but for which listing is precluded (Candidate Species); those species for which a proposed rule to list as Endangered or Threatened has been published by USFWS (Proposed species); species listed by USFWS as Birds of Conservation Concern (in Region 32); species listed by the California Fish and Game Commission as Threatened or Endangered and those species that are Candidates for listing as Threatened or Endangered; species designated by the CDFW as Species of Special Concern; and species listed as "fully protected birds", "fully protected mammals, "fully protected reptiles and amphibians" and "fully protected fish" in the California Fish and Game Code. In addition, certain species considered to meet the criteria for endangered, threatened or rare species included in Section 15830 of the CEQA Guidelines are also considered. This includes those species listed as Medium and High Priority by the Western Bat Working Group (WBWG).

RESULTS

Soils

A single soil type was mapped for the study area (NRCS 2016): Nisene-Aptos complex, 30 to 50 percent slopes. The Nisene soil is a well-drained soil normally found on mountain slopes. It is derived from residuum weathered from sandstone and shale and is fine sandy loam, sandy clay loam, and clay loam-textured above a weathered bedrock layer found at 58 to 62 inches below the soil surface. The Aptos soil is a well-drained soil normally found on hill slopes. It is derived from residuum weathered from siltstone and/or residuum weathered from sandstone and shale, and is fine sandy loam, sandy clay loam, clay loam, and loam-textured above a weathered bedrock layer found at 29 to 33 inches below the soil surface (NRCS 2016). Nisene-Aptos complex, 30 to 50 percent slopes, is not listed as a hydric soil on the National Hydric Soils List (NRCS 2014).

Hydrology

The principal hydrologic sources for the study area are direct precipitation and associated surface and sub-surface runoff. No drainage channels are present on the project site, but an intermittent/ephemeral drainage channel (hereafter referred to as "creek"), ~3-4 feet wide, drains southbound along the eastern study area boundary. The creek is a tributary to the East Fork of Moore Creek (Baskin Tributary) and was dry during the field visit. No drainages or wetlands have been previously mapped on the project site or surrounding study area in the National Wetlands Inventory (USFWS 2016b).

Potential Jurisdictional Wetlands and Other Waters

An ephemeral creek, ~3-4 feet wide, referred to as the East Fork of Moore Creek Baskin Tributary, drains southbound in the eastern portion of the study area and eventually into Moore Creek. The creek lacks vegetation and was dry during the field visit, but contains a bed, bank, and Ordinary High Water Mark (OHWM) and could fall under the regulatory jurisdiction of the United States Army Corps of Engineers (Corps), Regional Water Quality Control Board (RWQCB), and CDFW.

The Clean Water Act (CWA) gives the Corps and Environmental Protection Agency (EPA) jurisdiction over "waters of the United States" which include lakes, rivers, streams (including intermittent or ephemeral streams) and wetlands. "Wetlands" are jointly defined by the Corps and EPA as:

"Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (Federal Register 1980; Federal Register 1982).

In addition to potential jurisdictional wetlands, "waters of the U.S." other than wetlands are also potentially subject to jurisdiction under Section 404 of the CWA. "Other waters"

are seasonal or perennial water bodies, such as lakes, stream channels (including intermittent or ephemeral streams), drainages, ponds, and other surface water features that exhibit an OHWM but lack positive indicators of one or more of the three wetland parameters (hydrophytic vegetation, wetland hydrology, hydric soils) (Federal Register 1986). In non-tidal "other waters," Corps jurisdiction extends to the OHWM, defined as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressions on the bank, shelving, changes in the characteristics of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas" (Federal Register 1986; USACE 2005).

Work, such as placement of fill material, occurring within Corps jurisdiction normally requires a permit under Section 404 of the federal CWA. In addition, the Corps, under Section 401 of the federal CWA, is required to meet state water quality regulations prior to granting a Section 404 permit. This is accomplished by application to the local RWQCB for Section 401 certification that requirements have been met. In addition, "isolated" wetlands exempt from Corps jurisdiction could still be regulated by the RWQCB under the state Porter-Cologne Water Quality Control Act. Streams, rivers, and lakes up to the top of bank or drip-line of riparian vegetation (whichever is greater) also fall within the jurisdiction of the CDFW. Work within CDFW jurisdiction normally requires a Streambed Alteration Agreement.

Based on current project plans, the limits of ground disturbance will occur a minimum of 75 feet from the creek, and direct impacts to the creek would not occur as a result of the project. However, due to steep slopes between the project site and creek, indirect impacts are possible, and Mitigation Measures are recommended to address any potential indirect impacts.

Habitats

The project site and study area were mapped, at a broad scale, as Redwood Forest during previous studies (UCSC 2006), and the mapping was confirmed during this study (Figures 4-8). Redwood Forest, corresponding to Upland Redwood Forest[1]/ *Sequoia sempervirens* Forest Alliance[2], is dominated by a canopy of redwood (*Sequoia sempervirens*[3]), with occasional Douglas-fir (*Pseudotsuga menziesii*), and a subcanopy of interior live oak (*Quercus wislizeni*), tanoak (*Notholithocarpus densiflorus*), madrone (*Arbutus menziesii*), and occasional coast live oak (*Quercus agrifolia*) and big-leaf maple (*Acer macrophyllum*). The understory consists of a mixture of native shrubs and herbaceous species, such as California hazelnut (*Corylus cornuta* subsp. *californica*), wood rose (*Rosa gymnocarpa*), sword fern (*Polystichum munitum*), creeping snowberry (*Symphoricarpos mollis*), wood strawberry (*Fragaria vesca*), wood fern (*Dryopteris arguta*), brackern fern (*Pteridium aquilinum* var. *pubescens*), redwood sorrel (*Oxalis oregana*), snakeroot (*Sanicula crassicaulis*), yerba buena (*Clinopodium douglasii*), and

[1] Vegetation nomenclature follows Holland (1986).
[2] Alliance nomenclature follows Sawyer, et al. (2009).
[3] Botanical nomenclature follows Baldwin, et al. (2012).

hedge nettle (*Stachys* sp.), with non-native species also present, including forget-me-not (*Myosotis latifolia*), English holly (*Ilex aquifolium*), and English ivy (*Hedera helix*). In addition, Developed/Ruderal habitat is present in and around Kerr Hall, as well as in portions of the Redwood Forest understory along Heller Drive and adjacent sidewalks, pedestrian bridge, and other infrastructure (Figures 9 and 10). This habitat consists of developed and landscaped areas, along with Ruderal areas supporting non-native herbaceous species such as English plantain (*Plantago lanceolata*), cat's ear (*Hypochaeris* sp.), and bull thistle (*Cirsium vulgare*).

Redwood forest covers approximately 22.5% of the UCSC campus and is not considered a Sensitive Natural Community (UCSC 2006). Like all redwood forest on the campus, the forest is second growth, having been logged in the late 1800s. Most of the redwoods at the site are healthy and exceed 150 feet in height (Belton 2015).

Figure 4. Aerial image of proposed Environmental Health & Safety Facility site.

Figure 5. Northeastern portion of Environmental Health and Safety project site.

Figure 6. Central portion of Environmental Health and Safety project site.

Figure 7. Southwestern portion of Environmental Health and Safety project site.

Figure 8. Southeastern portion of Environmental Health and Safety project site.

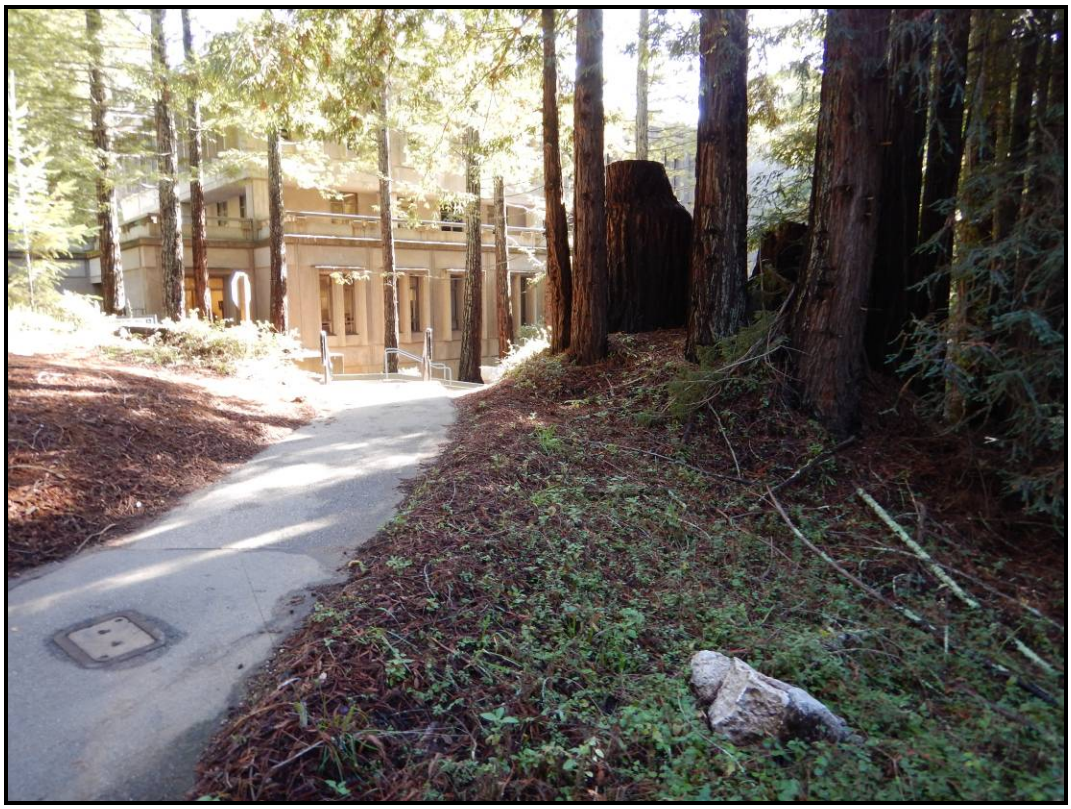

Figure 9. Utility route between pedestrian bridge and Clark Kerr Hall.

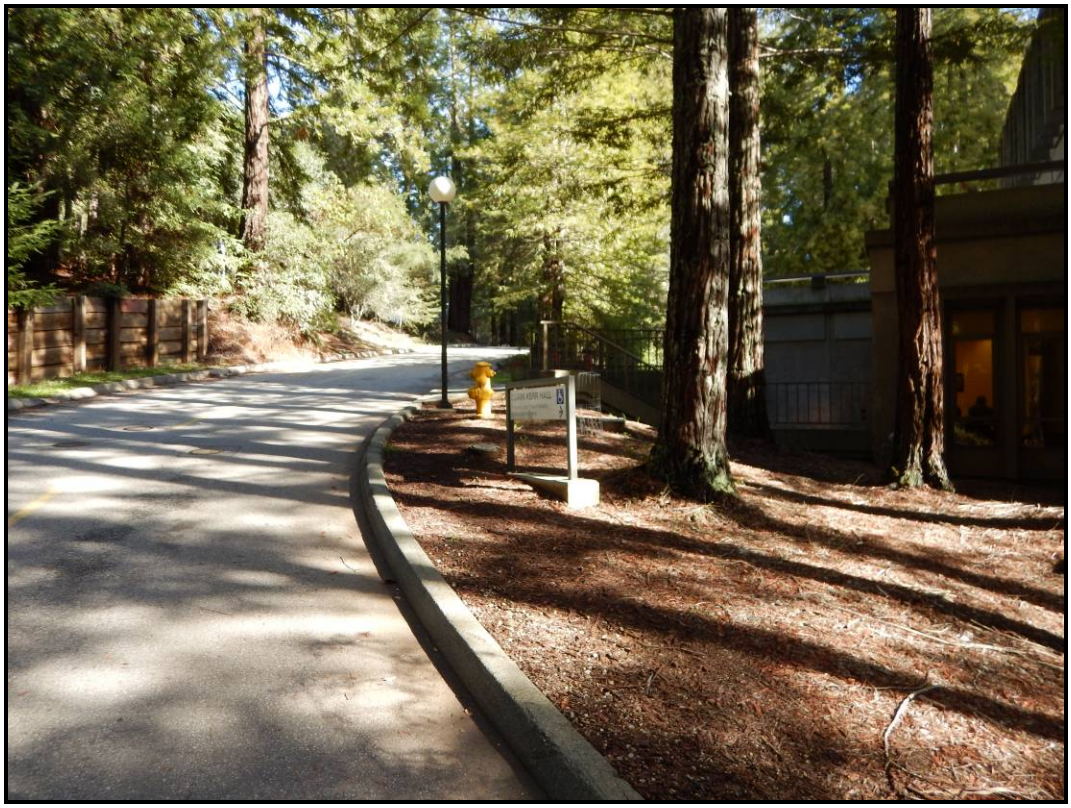

Figure 10. Utility route between pedestrian bridge and Clark Kerr Hall.

Special-status Plants

Forty special-status plant species were evaluated for their potential occurrence on the project site and surrounding study area based on the background literature search discussed previously. A list of these species, their status, and their typical habitats is presented in Table 1. Five special-status plant species have been documented to occur on the UCSC campus during previous studies (CDFW 2016; UCSC 2006): Santa Cruz manzanita (*Arctostaphylos andersonii*), Point Reyes horkelia (*Horkelia marinensis*), marsh microseris (*Microseris paludosa*), San Francisco popcornflower (*Plagiobothrys diffusus*), and tear drop moss (*Dacryophyllum falcifolium*). There have been no documented occurrences[4] of special-status plant species on the study area, and no special-status plants were identified in the vicinity during previous studies (UCSC 2006; CDFW 2015). The study area is not located within designated critical habitat for any federally-listed plant species (USFWS 2015c).

Forty-seven plant species were observed on the study area during the 8 January and 25 January 2016 field visits (Appendix A). No special-status plant species were observed, but the field visit occurred outside the typical blooming period of most plants, and no floristic surveys were conducted.

Special-status plants are unlikely to occur on the study area because the study area: (1) lacks suitable habitat components (e.g., plant community, substrate, and/or microhabitat) for most special-status plants known from the region (Table 1), and/or (2) no special-status plants have been observed on or adjacent to the study area during previous studies (UCSC 2006), and none were observed during the current study. However, the project site and study area support some suitable habitat components for several special-status species including tear drop moss, slender silver moss (*Anomobryum julaceum*), California bottlebrush grass (*Elymus californicus*), and minute pocket moss (*Fissidens pauperculus*). Due to the time period since surveys were last conducted in the area (UCSC 2006) and the fact that it was a reconnaissance visit (and not a floristic survey systematically covering the project site and study area) that occurred outside the blooming period of California bottlebrush grass, tear drop moss, slender silver moss, and minute pocket moss, the presence or absence of California bottlebrush grass, while considered low, can't be definitely ruled out without a floristic survey conducted during the appropriate blooming period. Mitigation measures to address potential impacts to special-status plants are discussed below.

[4] The lack of documented occurrences does not necessarily mean that a species does not occur in an area, only that no occurrences have been reported.

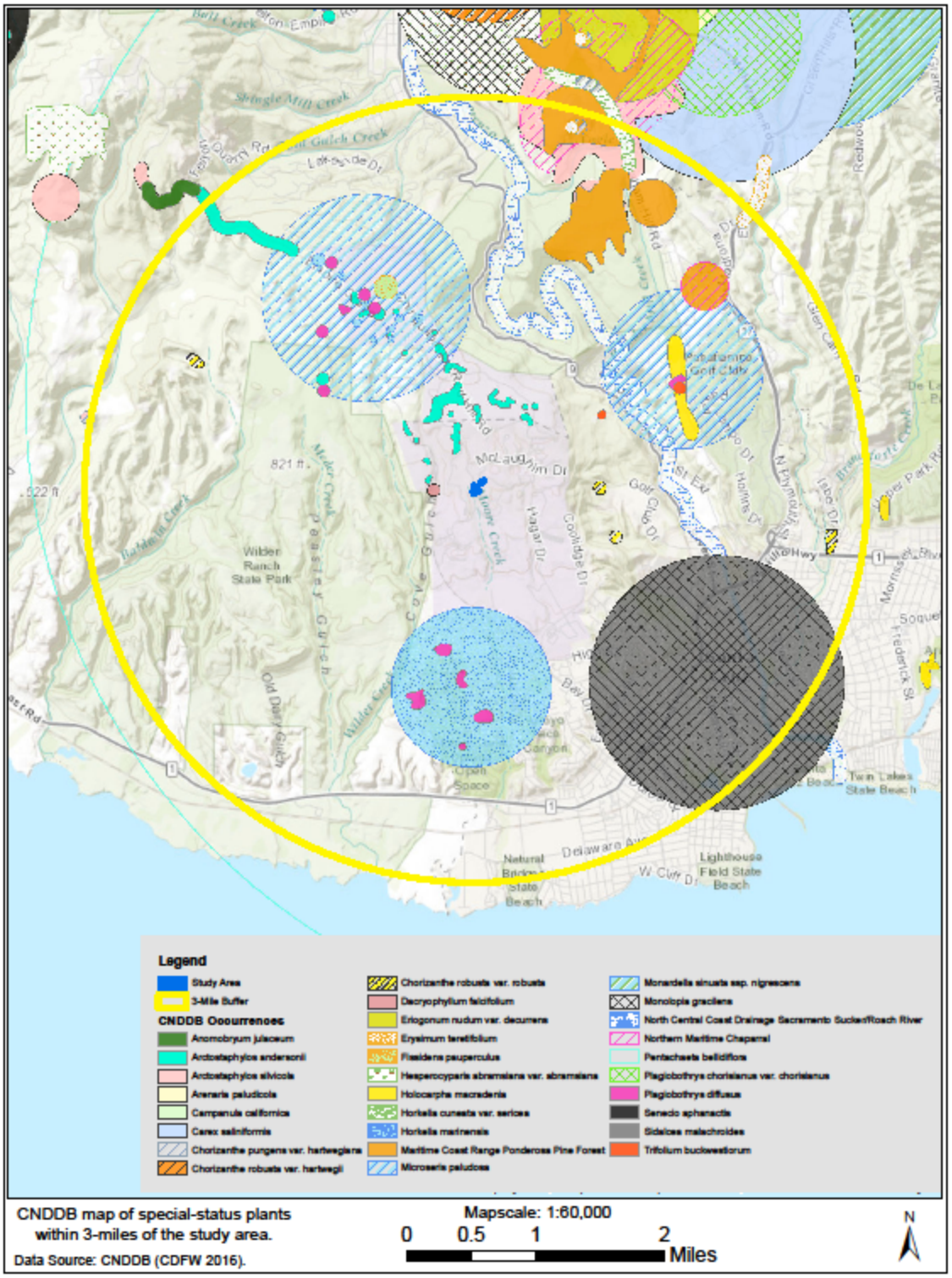

Figure 11. California Natural Diversity Data Base plant records for vicinity of Environmental Health and Safety Facility, UCSC.

Table 1. Special-status plants with potential to occur at the EH&S Project site. List compiled from searches of the CNDDB (CDFW 2016), CNPS Inventory of Rare and Endangered Plants (CNPS 2016), the USFWS List of Threatened or Endangered Species (USFWS 2016a), UCSC (2006), and other publications (e.g., Baldwin, et al. 2012).

Species	Status	Typical Habitat	Habitat Assessment of Study Area
Amsinckia lunaris bent-flowered fiddleneck	1B.2	Coastal bluff scrub, cismontane woodland, valley and foothill grassland, 3-500 m. Blooms March-June.	Previously reported from UCSC campus but no occurrences currently known (UCSC 2006). No suitable habitat present on the study area.
Anomobryum julaceum slender silver moss	4.2	Broadleaved upland forest, lower montane coniferous forest, North Coast coniferous forest (damp rock and soil on outcrops, usually on roadcuts), 100-1,000 m.	Potential suitable habitat present in Redwood Forest (UCSC 2006), though microhabitat, such as rock outcrops, generally lacking from study area.
Arctostaphylos andersonii Santa Cruz manzanita	1B.2	Broadleafed upland forest, chaparral, North Coast coniferous forest (openings, edges), 60-730 m. Blooms November-May.	Known from the north UCSC campus (UCSC 2006; CDFW 2016). No suitable habitat present on the study area and species not observed during field visit.
Arctostaphylos pajaroensis Pajaro manzanita	1B.1	Chaparral (sandy), 30-760 m. Blooms December-March.	Considered absent from the UCSC campus (UCSC 2006). Not observed on the study area during field visit.
Arctostaphylos silvicola Bonny Doon manzanita	1B.2	Closed-cone coniferous forest, chaparral, lower montane coniferous forest (inland marine sands), 120-600 m. Blooms January-March.	Considered absent from the UCSC campus (UCSC 2006). Not observed on the study area during field visit.
Arenaria paludicola marsh sandwort	FE, SE, 1B.1	Sandy openings in freshwater or brackish marshes and swamps, 3-170 m. Blooms May-August.	Considered absent from the UCSC campus (UCSC 2006). No suitable habitat present on the study area and not expected to occur.
Campanula californica swamp harebell	1B.2	Bogs and fens, closed-cone coniferous forest, coastal prairie, meadows and seeps, freshwater marshes and swamps, north coast coniferous forest (mesic), 1-405 m. Blooms June-October.	Considered absent from the UCSC campus (UCSC 2006). No suitable habitat present on the study area and not expected to occur.
Carex comosa bristly sedge	2B.1	Coastal prairie, valley and foothill grassland, marshes and swamps (lake margins, mesic sites), 0-625 m. Blooms May-September.	Considered absent from the UCSC campus (UCSC 2006). No suitable habitat present on the study area and not expected to occur.
Carex saliniformis deceiving sedge	1B.2	Coastal prairie, coastal scrub, meadows and seeps, coastal salt marshes (mesic sites), 3-230 m. Blooms June-July.	Considered absent from the UCSC campus (UCSC 2006). No suitable habitat present on the study area and not expected to occur.
Chorizanthe pungens var. *hartwegiana* Ben Lomond spineflower	FE, 1B.1	Lower montane coniferous forest (maritime ponderosa pine sandhills), 90-610. Blooms April-July	Previously reported from UCSC campus but no occurrences currently known (UCSC 2006). No suitable sandy habitat present on the study area and not expected to occur.
Chorizanthe robusta var. *hartwegii* Scotts Valley spineflower	FE, 1B.1	Meadows and seeps (sandy), valley and foothill grassland (mudstone and Purisima outcrops), 230-245 m. Blooms April-July.	Considered absent from the UCSC campus (UCSC 2006). No suitable habitat present on the study area and not expected to occur.

Species	Status	Typical Habitat	Habitat Assessment of Study Area
Chorizanthe robusta var. *robusta* robust spineflower	FE. 1B.1	Maritime chaparral, cismontane woodland, coastal dunes, coastal scrub (sandy or gravelly), 3-330 m. Blooms April-September.	Considered absent from the UCSC campus (UCSC 2006). No suitable habitat present on the study area and not expected to occur.
Collinsia multicolor San Francisco collinsia	1B.2	Closed-cone coniferous forest, coastal scrub (sometimes serpentinite), 30-250 m. Blooms February-May.	Considered absent from the UCSC campus (UCSC 2006). No suitable habitat present on the study area and not expected to occur.
Dacryophyllum falcifolium tear drop moss	1B.3	Limestone substrates and rock outcrops in North Coast coniferous forest, 50-275 m.	Previously documented on UCSC campus west of study area along Empire Grade Road (CDFW 2016). Some suitable habitat present on study area and species documented in vicinity, though microhabitat, such as rock outcrops, generally lacking from study area.
Elymus californicus California bottlebrush grass	4.3	Broadleafed upland forest, cismontane woodland, north coast coniferous forest, riparian woodland, 15-470 m. Blooms May-November.	Previously reported from UCSC campus but no occurrences currently known (UCSC 2006). Suitable habitat present in Redwood Forest.
Eriogonum nudum var. *decurrens* Ben Lomond buckwheat	1B.1	Chaparral, cismontane woodland, lower montane coniferous forest (sandy maritime ponderosa pine sandhills), 50-800 m. Blooms June-October.	Considered absent from the UCSC campus (UCSC 2006). No suitable sandy habitat present on the study area and not expected to occur.
Erysimum teretifolium Santa Cruz wallflower	FE, SE, 1B.1	Chaparral, lower montane coniferous forest (inland marine sands), 120-610 m. Blooms March-July.	Considered absent from the UCSC campus (UCSC 2006). No suitable habitat present on the study area and not expected to occur.
Fissidens pauperculus minute pocket moss	1B.2	North Coast coniferous forest (damp coastal soil), 10-1,024 m.	Potential suitable habitat present in Redwood Forest (UCSC 2006).
Grindelia hirsutula var. *maritima* San Francisco gumplant	3.2	Coastal bluff scrub, coastal scrub, valley and foothill grassland (sandy or serpentinite), 15-400 m. Blooms June-September.	Considered absent from the UCSC campus (UCSC 2006). No suitable sandy habitat present on the study area and not expected to occur.
Hesperocyparis abramsiana var. *abramsiana* Santa Cruz cypress	FE, SE, 1B.2	Closed-cone coniferous forest, chaparral, lower montane coniferous forest (sandstone or granitic), 280-800 m.	Considered absent from the UCSC campus (UCSC 2006). Not observed on the study area during field visit.
Hoita strobilina Loma Prieta hoita	1B.1	Chaparral, cismontane woodland, riparian woodland (usually serpentinite, mesic), 30-860 m. Blooms May-October.	Considered absent from the UCSC campus (UCSC 2006). No suitable habitat present on the study area and not expected to occur.
Holocarpha macradenia Santa Cruz tarplant	FT, SE, 1B.1	Coastal prairie, coastal scrub, valley and foothill grassland (often clay, sandy), 10-220 m. Blooms June-October.	No natural populations known from the UCSC campus (UCSC 2006). No suitable habitat present on the study area and not expected to occur.
Horkelia cuneata var. *sericea* Kellogg's horkelia	1B.1	Closed-cone coniferous, maritime chaparral, coastal prairie, coastal dunes, coastal scrub (sandy or gravelly openings), 10-200 m. Blooms April-September.	Considered absent from the UCSC campus (UCSC 2006). No suitable habitat present on the study area and not expected to occur.

Species	Status	Typical Habitat	Habitat Assessment of Study Area
Horkelia marinensis Point Reyes horkelia	1B.2	Coastal dunes, coastal prairie, coastal scrub (sandy), 5-755 m. Blooms May-September.	Present in Marshall Field (UCSC 2006). No suitable habitat present on the study area and not expected to occur.
Leptosiphon grandiflorus large-flower linanthus	4.2	Coastal bluff scrub, closed-cone coniferous forest, cismontane woodland, coastal dunes, coastal prairie, coastal scrub, valley and foothill grassland (sandy). 5-1,220 m. Blooms April-August.	Considered absent from the UCSC campus (UCSC 2006). Suitable habitat absent from study area and species not expected to occur.
Malacothamnus arcuatus arcuate bush mallow	1B.2	Chaparral, cismontane woodland, 15-355 m. Blooms April-September.	Considered absent from the UCSC campus (UCSC 2006). No suitable habitat present and species not observed on study area during field visit.
Microseris paludosa marsh microseris	1B.2	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland (mesic), 5-355 m. Blooms April-July.	Known from mima mound habitat in coastal prairie in lower campus and from upper campus in Marshall Field (UCSC 2006). Suitable habitat absent from study area and species not expected to occur.
Mielichhoferia elongata elongate copper moss	4.3	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, subalpine coniferous forest (metamorphic rock, usually acidic, usually vernally mesic, often roadsides, sometimes carbonate), 0-1,960 m.	Considered absent from the UCSC campus (UCSC 2006). Suitable habitat generally lacking. Species not expected to occur.
Monolopia gracilens woodland woollythreads	1B.2	Broadleafed upland forest openings, chaparral openings, cismontane woodland, North Coast coniferous forest openings, valley and foothill grassland (serpentine), 100-1,200 m. Blooms Feb-July.	No documented occurrences on UCSC campus. Serpentine habitat lacking. Not expected to occur on study area.
Pedicularis dudleyi Dudley's lousewort	SR, 1B.2	Maritime chaparral, cismontane woodland, north coast coniferous forest, valley and foothill grassland, 60-900 m. Blooms April-June.	Considered absent from the UCSC campus (UCSC 2006). Marginal habitat components present in Redwood Forest but species not expected to occur on study area.
Penstemon rattanii var. *kleei* Santa Cruz Mountains beardtongue	1B.2	Chaparral, lower montane coniferous forest, North Coast coniferous forest, 400-1,100 m. Blooms May-June.	Considered absent from the UCSC campus (UCSC 2006). Study area outside elevational range of the species. Species not expected to occur.
Pentachaeta bellidiflora white-rayed pentachaeta	FE, SE, 1B.1	Cismontane woodland, coastal scrub, valley and foothill grassland (often serpentinite), 35-620 m. Blooms March-May.	Considered absent from the UCSC campus (UCSC 2006). Suitable habitat absent from study area and species not expected to occur.
Piperia candida white-flowered rein orchid	1B.2	Broadleafed upland forest, lower montane coniferous forest, North Coast coniferous forest (sometimes serpentinite), 30-1,310 m. Blooms March-September.	Some habitat components present but species not previously reported from UCSC campus and no documented occurrences in vicinity. Species not expected to occur.

Species	Status	Typical Habitat	Habitat Assessment of Study Area
Plagiobothrys chorisianus var. *chorisianus* Choris' popcorn-flower	1B.2	Chaparral, coastal prairie, coastal scrub (mesic), 15-160 m. Blooms March-June.	Not previously reported from UCSC campus. Suitable habitat absent from study area and species not expected to occur.
Plagiobothrys diffusus San Francisco popcorn-flower	SE, 1B.1	Coastal prairie, valley and foothill grassland, 60-360 m. Blooms March-June.	Known from Marshall Field on UCSC campus (UCSC 2006; CDFW 2016). Suitable habitat absent from study area and species not expected to occur.
Polygonum hickmanii Scotts Valley polygonum	FE, SE, 1B.1	Valley and foothill grassland (mudstone and sandstone), 210-250 m. Blooms May-August.	Considered absent from the UCSC campus (UCSC 2006). Suitable habitat absent from study area and species not expected to occur.
Sidalcea malachroides maple-leaved checkerbloom	4.2	Broadleafed upland forest, coastal prairie, coastal scrub, north coast coniferous forest, riparian woodland (often disturbed areas), 0-730 m. Blooms March-August.	Some suitable habitat components present but species is considered absent from the UCSC campus (UCSC 2006). Not expected to occur on study area.
Silene verecunda ssp. *verecunda* San Francisco campion	1B.2	Coastal bluff scrub, chaparral, coastal prairie, coastal scrub, valley and foothill grassland (sandy), 30-645 m. Blooms February-August.	Considered absent from the UCSC campus (UCSC 2006). Suitable habitat absent from study area and species not expected to occur.
Stebbinsoseris decipiens Santa Cruz microseris	1B.2	Broadleafed upland forest, closed-cone coniferous forest, chaparral, coastal prairie, coastal scrub, valley and foothill grassland (open areas, sometimes serpentinite), 10-500 m. Blooms April-May.	Considered absent from the UCSC campus (UCSC 2006). Suitable habitat absent from study area and species not expected to occur.
Trifolium buckwestiorum Santa Cruz clover	1B.1	Broadleafed upland forest, cismontane woodland, coastal prairie (gravelly, margins), 105-610 m. Blooms April-October.	Considered absent from the UCSC campus (UCSC 2006). Suitable habitat absent from study area and species not expected to occur.

Key to Status:	
FE	Federal Endangered
FT	Federal Threatened
SE	State Endangered
SR	State Rare
1B	CNPS Rare Plant Rank of plants rare, threatened, or endangered in California and elsewhere
2	CNPS Rare Plant Rank of plants rare, threatened, or endangered in California but more common elsewhere
3	CNPS Rare Plant Rank of plants about which we need more information (a review list)
4	CNPS Rare Plant Rank of plants of limited distribution (a watch list)
.1/.2/.3	Seriously endangered in California/Fairly endangered in California/ Not very endangered in California

Special-status Wildlife

Special-status wildlife species were analyzed for their potential to occur at the project site, based on the background literature review and site visits. The status, habitat associations, local occurrence records and potential for occurrence are provided in Table 2. Several special-status species have been documented in the vicinity of the project site and have the potential to occur on the site. While the level of human activity at the site decreased habitat suitability for many special-status species, their presence cannot be ruled out without additional surveys.

One listed species, the federally-threatened California red-legged frog, inhabits the lower campus area and there is a low potential that individuals may periodically use or pass through the project area or the nearby tributary to Moore Creek. Such movements are expected to be restricted to wet conditions.

Suitable habitat is present on the project site for the Santa Cruz black salamander, a locally rare species that is subject to a Special Closure by CDFW. Several special-status birds are known from the area and could nest onsite or in the vicinity, including golden eagle, white-tailed kite, long-eared owl, Allen's hummingbird, Nuttall's woodpecker, olive-sided flycatcher, oak titmouse. Several special-status bat species are known from the area, including pallid bat, long-eared myotis, fringed myotis and long-legged myotis. The San Francisco dusky-footed woodrat is known from the vicinity and could occur on or near the site. More detailed habitat assessments for these species are provided below. The remaining special-status vertebrates were considered to have very low or no potential to inhabit the project site or nearby areas and are not addressed in detail (Table 2).

California Red-legged Frog (*Rana draytonii*). The California red-legged frog is a large (85-138 mm), nocturnal species that historically occupied much of central and southern California. The species requires still or slow-moving water during the breeding season, where it deposits large egg masses, usually attached to submergent or emergent vegetation. Breeding typically occurs between December and April, depending on annual environmental conditions and locality. Eggs require 6 to 12 days before hatching and metamorphosis occurs 3.5 to 7 months after hatching (Stebbins 2003). Following metamorphosis between July and September, juveniles generally do not travel far from aquatic habitats. Movements of individuals generally begin with the first rains of the weather-year or in response to receding water. Radio-telemetry data indicates that individuals engage in straight-line movements irrespective of riparian corridors and can move up to two miles (Bulger, et al. 2003). California red-legged frogs utilize ephemeral water sources during certain times of the year. They may take refuge in small mammal burrows, leaf litter or other moist areas during periods of inactivity or whenever it is necessary to avoid desiccation (Rathbun, et al. 1993; Jennings and Hayes 1994). Occurrence of this frog has shown to be negatively correlated with presence of introduced bullfrogs (Moyle 1973; Hayes and Jennings 1986, 1988). Genetic studies support the recent separation of the subspecies *draytonii* and *aurora* into separate species based on different lineages (Shaffer, et al. 2004). The California red-legged frog was listed as Threatened by the USFWS in 1996 (Miller, et al. 1996).

Local Occurrences: California red-legged frogs at UCSC have been documented only in the lower campus in the Moore Creek drainage (Biosearch 2000a, 2000b, 2014; Ecosystems West 2004). The nearest records are from 0.4 mile south of the project site along the East Fork of Moore Creek (CDFW 2016) and from the College 8 Detention Basin along the West Fork of Moore Creek, 0.5 mile southwest (CDFW 2016). California red-legged frogs also inhabit the lower reaches of the East Branch of Moore Creek and breed in the Arboretum Pond (Biosearch Wildlife Surveys 2000a, 2000b, 2008; 2014). The Arboretum Pond is the only known breeding site on campus and is located 0.9 mile south of the project site.

Habitat Assessment: There are no aquatic habitats on the project site. An ephemeral tributary to the East Fork of Moore Creek is situated ~75 feet east of the Project. This reach does not support pools, undercut banks or in-stream cover, so provides only marginal habitat for red-legged frogs when it holds water. California red-legged frogs are known to move overland up to two miles between breeding and non-breeding habitat. Given the presence of a breeding pond (Arboretum Pond) within a mile, California red-legged frogs could occur or pass through the project area during the rainy season.

Santa Cruz Black Salamander (*Aneides flavipunctatus niger*). The Santa Cruz black salamander subspecies occurs in moist microhabitats in a variety of habitats including deciduous woodlands, coniferous forests, open oak woodlands and meadows. The subspecies *niger* is isolated and occupies a limited range in Santa Cruz, Santa Clara and San Mateo counties. Recent genetic analysis indicates that four separate lineages are present in California, and that the southern disjunct lineage (*niger*) should be considered a separate species (Rissler and Apodaca 2007). Based on this analysis, the California Wildlife Habitat Relationship System maintained by CDFW now considers the southern disjunct lineage a full species, *Aneides niger*. The Santa Cruz black salamander is subject to a Special Closure for Santa Cruz, Santa Clara and San Mateo Counties that prohibits take under CDFW's Freshwater Sport Fishing Regulations.

Local Occurrences: The Santa Cruz black salamander is regularly found at the Upper Quarry, located ~0.3 mile ENE of the site, in rock outcrops and under slabs of marble (Chris Lay; UCSC Museum of Natural History Curator; pers. comm.).

Habitat Assessment: Santa Cruz black salamanders are found in a variety of moist habitats. The site is well-shaded and has an abundance of downed wood, and three other native salamanders - ensatina (*Ensatina eschscholtzii*), slender salamander (*Batrachoseps attenuatus*) and arboreal salamander (*Aneides lugubris*) - were observed during reconnaissance surveys. The project site provides suitable habitat for the subspecies.

Golden Eagle (*Aquila chrysaetos*). The golden eagle is a large, wide-ranging raptor that inhabits grassland and savanna habitats in hilly and mountainous terrain. Golden eagles require extensive areas of habitat for feeding and maintaining territories, with nesting territories estimated to range up to 36 sq. mi. In California, ground squirrels and hares are primary food sources, but the species will also eat carrion (Zeiner, et al. 1990). Nests are typically built at remote sites with a vantage of the surrounding area. Nests are usually

placed on escarpments, in tall trees, or occasionally on human-made structures such as transmission towers (Kochert, et al. 2002). Successful nests are re-used in subsequent years, progressively becoming enlarged. Lead poisoning, human disturbances near nest sites, collisions with transmission wires and wind turbines, agricultural and urban development of grasslands are identified as threats to golden eagles (Remsen 1978; Kochert, et al. 2002). The golden eagle is listed as a Species of Special Concern and as "fully protected" by CDFW. It is also listed as a Bird of Conservation Concern by the USFWS.

Local Occurrences: Golden eagles are considered to be an uncommon but regular breeding species in Santa Cruz County (Suddjian 2013). Golden eagles nested historically on the upper campus, but no nesting has been documented in recent years (UCSC 2006). Adult and juvenile golden eagles have been observed foraging on the lower UCSC campus and Pogonip (UCSC 2006; eBird 2016; pers. obs.).

Habitat Assessment: Although suitable nesting habitat is present in some of the larger trees in the vicinity of the project, the level of human activity greatly reduces the likelihood that the species would nest nearby.

White-tailed Kite (*Elanus leucurus*). The white-tailed kite is a medium-sized raptor that occupies low-elevation grassland, agricultural, wetland, oak woodland and oak savanna habitats (Dunk 1995). The species is distributed throughout the coastal foothills and valleys along the entire length of the state, throughout the Central Valley, and into the foothills of the Sierra Nevada (Dunk 1995). It nests in a wide variety of trees and shrubs, either isolated or part of larger stands. Typically, four eggs are laid in February and March and chicks hatch after 30-32 days. Juveniles often share their parent's home range for at least one season. During the non-breeding season, the species roosts communally. Nearby open areas are required for foraging, and the species will use certain types of agricultural fields. Food habit studies have demonstrated that voles make up a large proportion of its diet, although other small mammals, birds and insects are also eaten (Dunk 1995). The species hunts during the day primarily by hovering and searching for prey. White-tailed kites in California are generally resident, although they may occupy different areas during the non-breeding and breeding seasons. The species underwent a dramatic reduction in numbers due to habitat loss and hunting, and was extirpated throughout much of its range in the early 1900s. Between the 1940s and early 1980s, the population recovered and its range expanded. More recently, population declines have again been noted, possibly as a result of the conversion of agricultural lands to urban uses (Dunk 1995). In California, the white-tailed kite is listed as "Fully Protected" in the California Fish and Game Code and as a Bird of Conservation Concern by the USFWS.

Local Occurrences: White-tailed kites are considered to be an uncommon but regular breeding species in Santa Cruz County and a fairly common species during the winter months (Suddjian 2013). White-tailed kites have been documented throughout the UCSC campus (eBird 2016). Nesting by the species was documented on UCSC in 2004, ~0.5 mile NNE of the Project (CDFW 2016).

Habitat Assessment: Suitable nesting and foraging habitat for white-tailed kites is present at or near the project site, although the level of human activity reduces the likelihood that the species would breed nearby.

Long-eared Owl (*Asio otus*). The long-eared owl is a medium-sized, nocturnal raptor that is widely distributed across the continental United States and southern Canada. It nests and roosts in densely vegetated habitats in proximity to more open foraging habitats (Marks, et al. 1994). In California, a variety of habitats are used including oak savanna, oak woodland, and coniferous forest, often near riparian areas (Johnsgard 2002). Although the species forages primarily on small mammals, it will also prey on birds (Marks, et al. 1994). Long-eared owls usually do not build their own nests but take over stick nests built by other species. The nesting season is typically March through June. In arid habitats such as the southwest, population levels may be limited by the amount of available nesting habitat. The species has declining severely in southern California (Bloom 1994). Loss of riparian habitats as well as open foraging habitats has contributed to the decline of the species. The long-eared owl is listed as a Species of Special Concern by the CDFW.

Local Occurrences: Long-eared owls are considered to be rare in Santa Cruz County (Suddjian 2013). Winter records of long-eared owl have been reported at UCSC in recent years and one observation was recorded during the nesting season in the North Campus area (UCSC 2006).

Habitat Assessment: Potential foraging and roosting habitat is present for the long-eared owl in the vicinity of the project. However, the level of human activity makes it unlikely that the species would nest in proximity to the project area.

Allen's Hummingbird (*Selasphorus sasin*). Allen's hummingbird breeds in a narrow band along the coast of California and southern Oregon and winters from Central California south through Baja and Central Mexico. It is limited in distribution to lowlands within 20 miles of the coast. Nesting habitat in the San Francisco Bay region includes mixed evergreen forest, redwood forests, riparian woodland, nonnative *Eucalyptus* and cypress groves, and occasionally live oak woodlands and coastal scrub with scattered trees (Mitchell 2000). In addition to nectar, insects are taken, especially spiders. Allen's hummingbird is an extremely early migrant, and arrives on nesting grounds in January and February (Mitchell 2000). Males engage in a distinct J-shaped flight pattern when courting females. Nests are often clustered and semi-colonial. Females typically produce two broods. The species was recently added to the federal Birds of Conservation Concern primarily due to its restricted breeding range.

Local Occurrences: Allen's hummingbird is a common breeding species in Santa Cruz County, particularly at lower elevations (Suddjian 1990; 2013). It is observed frequently in the lower part of campus including the Arboretum (eBird 2016; pers. obs.).

Habitat Assessment: Suitable nesting habitat for Allen's hummingbird is present at the project site.

Nuttall's Woodpecker (*Picoides nuttallii*). Nuttall's woodpecker ranges from extreme northern Baja to northern California west of the deserts and the Sierra Nevada divide. It is typically associated with oak woodlands, but will also occur in riparian woodlands and chaparral areas (Lowther 2000). It feeds primarily on insects it gleans from the underside of leaves in trees and on the ground, and also eats some vegetation. It often nests in snags along riparian areas. Males perform most of the incubation. Pairs remain on territories all year round. The species was designated as a Bird of Conservation Concern by USFWS primarily due to its restricted breeding range.

Local Occurrences: The Nuttall's woodpecker is expanding its range in Santa Cruz County and is considered to be a common species (Suddjian 1990, 2013). The species has been documented along Moore Creek south of the project site (eBird 2016).

Habitat Assessment: Suitable nesting habitat for Nuttall's woodpecker is present at the project site.

Olive-sided Flycatcher (*Contopus cooperi*). The olive-sided flycatcher nests throughout much of Canada and the western United States and winters in South America (Altman, et al. 2000). It inhabits woodland and forest habitats generally near edges and openings. It prefers coniferous trees but the species also uses eucalyptus forest near the coast (Shuford 1993; Widdowson 2008). The species is quite vociferous and is often seen calling from the tops of prominent trees. It feeds on insects, especially bees and wasps, and builds a cup nest well away from the trunk of trees (Widdowson 2008). The species may depend on forest fires and other natural or man-made disturbances to create a habitat mosaic with edges and openings (Widdowson 2008). The olive-sided flycatcher is designated as a Species of Special Concern by CDFW and a Bird of Conservation Concern by USFWS.

Local Occurrences: The olive-sided flycatcher is a fairly common breeding species in Santa Cruz County and is known to nest at UCSC (Suddjian 1990, 2013).

Habitat Assessment: Potential nesting habitat for the olive-sided flycatcher is present at the project site.

Oak Titmouse (*Baeolophus inornatus*). Oak titmouse ranges from extreme northern Baja California through California (Coast, Transverse, and Peninsular Ranges and western foothills of Sierra Nevada) into southwest Oregon (Cicero 2000). It inhabits open woodland habitats including oak woodland, oak-pine woodlands, and pinyon-juniper woodlands (Cicero 2000). It feeds primarily on seeds and terrestrial invertebrates, while plant material makes up most of its diet in the fall and winter. Oak titmouse is not migratory and remains territorial all year round. It nests in woodpecker or natural cavities and will use artificial nest boxes. Mates typically remain together from year to year. The species was recently added to the federal Birds of Conservation Concern primarily due to its restricted breeding range.

Local Occurrences: The oak titmouse is an uncommon to locally fairly common breeding species in Santa Cruz County (Suddjian 1990, 2013). The species is observed frequently at UCSC (eBird 2016).

Habitat Assessment: Potential nesting habitat for the oak titmouse is present at the project site.

Other Nesting Native Bird Species. In addition to the species listed above, suitable nesting habitat occurs for other bird species protected under the Migratory Bird Treaty Act (MBTA). The MBTA regulates or prohibits taking, killing, and possession of migratory bird species and their nests as listed in Title 50 Code of Federal Regulation (CFR) Section 10.13. Bird species and their nests are also protected under Sections 3515 of the California Fish and Game Code. Members of the orders Falconiformes and Strigiformes (birds-of-prey) are protected under California Fish and game Code Section 3503. Potential nesting habitat for bird species protected under the MBTA and Fish and Game Codes are present at the project site.

Pallid Bat (*Antrozous pallidus*). The pallid bat inhabits a variety of arid habitats including grassland, scrub and woodlands (Hermanson and O'Shea 1983). It is a year-round resident in central California, where it is usually associated with oak woodland. Daytime roosts are generally in trees but also occur in rock outcrops and mines. Nocturnal roosts are often under bridges and in rock outcrops. One or two young are born in May or June. Maternal colonies generally number less than 100 individuals. Pallid bats feed on insects and arachnids, which are often taken on the ground. The species is very sensitive to disturbance of roost sites. Pallid bats are not known to migrate, and winter hibernaclea are often close to summer roosts. The pallid bat is listed as a Species of Special Concern by CDFW and is designated as a High Priority Species by the Western Bat Working Group.

Local Occurrences: There are no records for pallid bats on the UCSC campus (UCSC 2006), although it is known from elsewhere in Santa Cruz County (CDFW 2016).

Habitat Assessment: Potential roosting habitat for pallid bats is present in the vicinity of the project site.

Long-eared Myotis (*Myotis evotis*). The long-eared myotis is widespread in California but is typically uncommon throughout most of its range. It occurs in the Coast Ranges and Sierra Nevada where it inhabits a wide variety of woodland, scrub and forest habitats. It feeds on a variety of arthropods, which are captured in flight, gleaned from foliage or occasionally from the ground. It roosts in buildings, crevices, under the bark of trees and in snags. The long-eared myotis is listed as a Medium Priority species by the Western Bat Working Group.

Local Occurrences: The long-eared myotis was detected on the north campus in 2001 (UCSC 2006).

Habitat Assessment: Potential roosting habitat is present at the project site under tree bark and in snags.

Fringed Myotis (*Myotis thysanodes*). The fringed myotis is found throughout much of the western United States and Mexico from sea level up to 7,000 feet in elevation. It inhabits a variety of habitats including desert scrub, oak woodland and coniferous forest (O'Farrell and Studier 1980). Day roosts include rock crevices and trees, as well as mines and buildings. Birth of a single young occurs in May or June. Maternity roosts can be large, numbering up to 400 individuals (O'Farrell and Studier 1980). The species feeds primarily on beetles. It is known to migrate but such movements are poorly understood. Although widely distributed, it is uncommon to rare throughout its range. The species is highly sensitive to disturbance by humans. The fringed myotis is listed as a High Priority species by the Western Bat Working Group.

Local Occurrences: The fringed myotis was detected on the north campus in 2001 (UCSC 2006).

Habitat Assessment: Potential roosting habitat is present for fringed myotis in the vicinity of the project site.

Long-legged Myotis (*Myotis volans*). The long-legged myotis is found throughout much of California with the exception of the low desert regions (Warner and Czaplewski 1984; Hoffmeister 1986). It is primarily associated with coniferous forests, although it may be found in riparian and desert habitats as well (Warner and Czaplewski 1984). Day roosts are generally in hollow trees, rock crevices, mines and buildings. A single young is produced each year in June or July. Maternity roosts can be large, numbering in the hundreds. Long-legged myotis hibernate in California, and there are likely seasonal movements between summer and winter roosts. The species feeds primarily on moths, but will also eat beetles, flies and termites (Warner and Czaplewski 1984). Its population status is poorly understood. The long-legged myotis is listed as a High Priority species by the Western Bat Working Group.

Local Occurrences: The long-legged myotis was detected on the north campus in 2000 (UCSC 2006).

Habitat Assessment: Potential roosting habitat is present for long-legged myotis in the vicinity of the project site.

San Francisco Dusky-footed Woodrat (*Neotoma fuscipes annectens*). The San Francisco dusky-footed woodrat occurs from San Francisco Bay south through the Santa Cruz Mountains to Elkhorn Slough and inland to the Diablo Range (Hall 1981). The species is most common in riparian, oak woodland and scrub habitats (Carraway and Verts 1991). It constructs houses out of sticks and other debris. Houses are often reused by successive generations and some can grow to be six feet or more in height, while others are well-hidden and easily overlooked. Houses are used for rearing young, protection from predators, resting, food storage, thermal protection and social interaction (Carraway and

Verts 1991). They are constructed on the ground, in rocky outcrops or in trees and are often found in concentrations along riparian corridors. Woodrat houses are used by a wide variety of native amphibians, small mammals, reptiles and insects (Ingles 1965; Carraway and Verts 1991). A study of the closely related big-eared woodrat (*N. macrotis*) found that densities in oak woodland increased significantly if a vegetative under-story was present (Tietje 1995). The San Francisco dusky-footed woodrat is listed by the CDFW as a Species of Special Concern.

Local Occurrences: The San Francisco dusky-footed woodrat is a relatively common resident of the Santa Cruz Mountains and has been recorded in the north campus area of UCSC (UCSC 2006). In 2006, a woodrat house was observed near the intersection of Meyer Drive and Heller Drive approximately 800 feet south of the project (Biosearch 2006). The species is relatively common along the East Fork of Moore Creek approximately 0.5 mile south of the site (Biosearch 2014).

Habitat Assessment: Potential habitat for the San Francisco dusky-footed woodrat is present on the site.

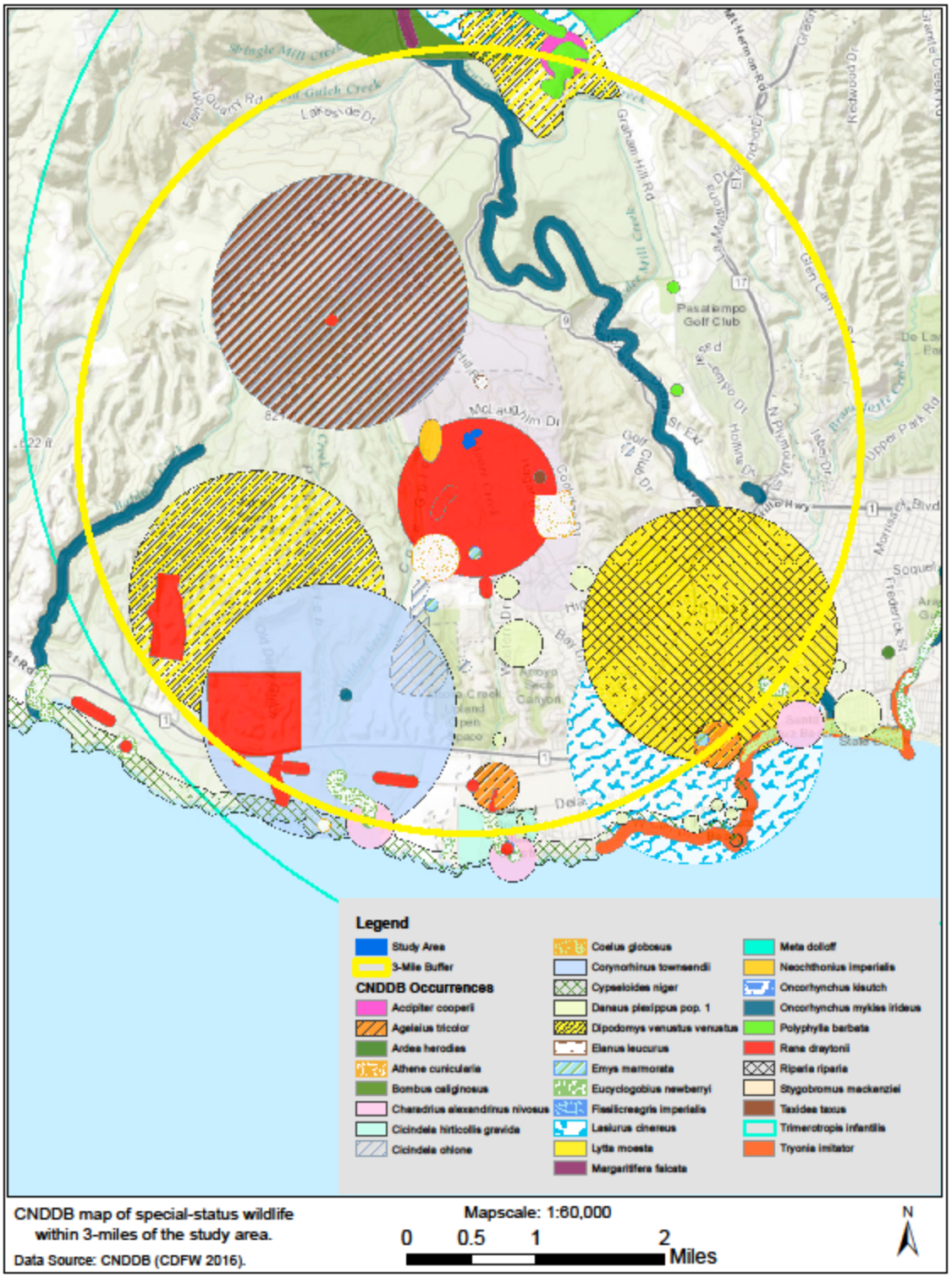

Figure 12. California Natural Diversity Data Base wildlife records for vicinity of Environmental Health and Safety Facility, UCSC.

Table 2. Special-status wildlife occurring or potentially occurring at Environmental Health and Safety Facility Project.

Common Name *Scientific Name*	**Status (USFWS/ CDFW/Other)**	**General Habitat Requirements**	**Potential for Occurrence**
AMPHIBIANS			
Santa Cruz black salamander *Aneides flavipunctatus niger*	-/ Special Closure	Found in coastal grassland, open oak and conifer woodlands, redwood forest, mixed evergreen forest and along riparian corridors	Suitable habitat present at Project site.
California red-legged frog *Rana draytonii*	FT/ SSC	Breeds in ponds, freshwater marshes, slow-moving creeks.	No suitable aquatic habitats at Project site; could occur onsite during winter months.
REPTILES			
Western pond turtle *Emys marmorata*	-/ SSC	Ponds, creeks and rivers; nests and winters in grasslands.	No suitable aquatic or nesting habitat at Project site.
Coast (Blainville's) horned lizard *Phrynosoma blainvilii*	-/ SSC	Sandy soils in chaparral, grasslands and open woodlands. Feeds primarily on native ants.	No suitable habitat at Project site.
BIRDS			
Golden eagle *Aquila chryseatos* (nesting and wintering)	BCC/ FP	Open and semi-open habitats including grasslands, scrub, coniferous forests and tundra; nests in large trees and cliffs.	Suitable nesting habitat present at Project site, but not expected to nest at Project site due to high levels of human activity.
Bald eagle *Halieaeetus leucocephalus* (nesting and wintering)	BCC/ FP	Coniferous forests near water body	No suitable nesting habitat present at Project site.
Northern harrier *Circus cyaneus* (nesting)	-/ SSC	Marsh and grassland habitats; nests on ground.	No suitable nesting habitat at Project site.
Ferruginous hawk *Buteo regalis* (wintering)	BCC/ -	Expansive open grasslands; forages primarily on ground squirrels.	No suitable wintering habitat at Project site.
White-tailed kite *Elanus leucurus* (nesting)	-/ FP	Low-elevation grassland, grassland, agricultural, wetlands and savannah habitats.	Suitable nesting habitat present at Project site.

Common Name *Scientific Name*	**Status (USFWS/ CDFW/Other)**	**General Habitat Requirements**	**Potential for Occurrence**
Marbled murrelet *Brachyramphus marmoratus* (nesting)	FT/ SE	Nests in old-growth conifer forests near ocean.	No suitable nesting habitat present at Project site.
Burrowing owl *Athene cunicularia* (nesting & some wintering sites)	BBC/ SSC	Grasslands and open scrub with suitable burrows.	No suitable nesting habitat at Project site.
Long-eared owl *Asio otus* (nesting)	-/ SSC	Open woodland and coniferous forests, often near riparian areas.	Suitable nesting habitat present at Project site.
Vaux's swift *Chaetura vauxi* (nesting)	-/ SSC	Nests primarily in redwood snags and basal hollows, sometimes chimneys of residences.	No suitable nesting habitat at Project site.
Short-eared owl *Asio flammeus* (nesting)	-/ SSC	Freshwater and saltwater marshes, meadows and irrigated fields.	No suitable nesting habitat at Project site.
Black swift *Cypseloides niger* (nesting)	BCC/ SSC	Nests in crevices and caves on sea cliffs, or on cliffs near or behind waterfalls	No suitable nesting habitat at Project site.
Allen's hummingbird *Selasphorus sasin* (nesting)	BCC/ -	Nests in narrow coastal belt in woodland and scrub habitat	Suitable nesting habitat present at Project site.
Nuttall's woodpecker *Picoides nuttallii* (nesting)	BCC/ -	Oak woodlands and riparian corridors.	Suitable nesting habitat present at Project site.
Olive-sided flycatcher *Contopus cooperi* (nesting)	BCC/ -	Nests primarily in coniferous forests with open canopy; also uses Eucalyptus forest along coast.	Suitable nesting habitat present at Project site.
Loggerhead shrike *Lanius ludovicianus* (nesting)	BCC/ SSC	Variety of open habitats with short vegetation including open woodlands, pastures and agricultural fields.	No suitable nesting habitat present at Project site.
Oak titmouse *Baeolophus inornatus* (nesting)	BCC/ -	Oak woodland, oak-pine and pinyon-juniper woodland.	Suitable nesting habitat present at Project site.

Common Name *Scientific Name*	**Status (USFWS/ CDFW/Other)**	**General Habitat Requirements**	**Potential for Occurrence**
Yellow warbler *Setophaga petechia* (nesting)	BCC/ SSC	Deciduous riparian woodlands along streams and lakes.	No suitable nesting habitat present at Project site.
Yellow-breasted chat *Icteria virens* (nesting)	-/ SSC	Nests in riparian woodlands or riparian scrub thickets	No suitable nesting habitat present at project site.
Grasshopper sparrow *Ammodramus savannarum* (nesting)	-/ SSC	Short- to mid-height open grasslands.	No suitable nesting habitat present at Project site.
Bryant's savannah sparrow *Passerculus sandwichensis alaudinus*	-/ SSC	Nests in tidally-influenced habitats and moist grasslands in coastal fog belt	No suitable nesting habitat present at Project site.
Tricolored blackbird *Agelaius tricolor* (nesting colony)	BCC/ SSC	Nest in colonies in fresh-water marshes, dense brambles and extensive patches of thistle; forage in grasslands.	No suitable nesting habitat present at Project site.
Lawrence's goldfinch *Spinus lawrencei* (nesting)	BCC/ -	Dry, open scrub and woodland habitats.	No suitable nesting habitat present at Project site.
MAMMALS			
Pallid bat *Antrozous pallidus*	-/ SSC/ WBWG (H)	Roosts in caves, trees and buildings; forages in variety of habitats.	Potential roosting habitat present at Project site.
Townsend's big-eared bat *Corynorhinus townsendii*	-/ SC/ WBWG (H)	Roosts in caves, buildings, hollow redwoods; forage in many habitats.	No potential roosting habitat present at Project site.
Western red bat *Lasiurus blossevilli*	-/ SSC/ WBWG (H)	Roosts in foliage of trees and shrubs in riparian habitats.	No potential roosting habitat present at Project site.
Long-eared myotis *Myotis evotis*	-/ -/ WBWG (M)	Roosts in rock crevices, mines, caves and in cavities and crevices of trees and snags	Potential roosting habitat present at Project site.

Common Name *Scientific Name*	**Status (USFWS/ CDFW/Other)**	**General Habitat Requirements**	**Potential for Occurrence**
Fringed myotis *Myotis thysanodes*	-/ -/ WBWG (H)	Maternity roosts in bridge crevices, tree cavities and under exfoliating bark.	Potential roosting habitat present at Project site.
Long-legged myotis *Myotis volans*	-/ -/ WBWG (H)	Roosts in trees, rock crevices, mines and buildings; primarily in montane forests.	Potential roosting habitat present at Project site.
Yuma myotis *Myotis yumanensis*	-/ -/ WBWG (M)	Roosts in buildings, mines, caves, bridges or tree hollows	Potential roosting habitat present at Project site.
Western mastiff bat *Eumops perotis californicus*	-/ SSC/ WBWG (H)	Roosts in significant rock features; found in a variety of habitats including desert scrub, chaparral and oak woodland.	No potential roosting habitat present at Project site.
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	-/ SSC	Inhabits deciduous and mixed woodlands, scrub, thickets, riparian corridors	Suitable habitat present on Project site.
American badger *Taxidea taxus*	-/ SSC	Variety of open habitats especially grassland and oak savannah.	No suitable habitat on Project site.

Status Codes:

Federal -	FE	Listed as Endangered under Federal Endangered Species Act (ESA)
	FT	Listed as Threatened under ESA
	BCC	Fish and Wildlife Service Birds of Conservation Concern (for Region 32)
State -	SE	Listed as Endangered under California Endangered Species Act (CESA)
	ST	Listed as Threatened under CESA
	SC	Candidate for listing under CESA
	FP	Fully Protected Species under Fish and Game Code of California
	SSC	Species of Special Concern designated by California Department of Fish and Wildlife
	Special Closure	Special Closure for Santa Cruz, Santa Clara and San Mateo Counties prohibits take of black salamanders with CA sport-fishing license
Other -	WBWG	Listed as Medium (M) or High (H) Priority by Western Bat Working Group

DISCUSSION AND RECOMMENDATIONS

Development of the proposed Project would result in direct disturbance to approximately ~1 acre of redwood forest. The area is currently undeveloped and heavily forested. The Project will result in the removal of approximately 30 trees. While many of these trees are small, unhealthy Douglas firs, some are redwoods, coast live-oaks, California bay-laurels and madrones.

Several special-status vertebrates are known from the vicinity of the Project. This analysis is based on known habitat requirements for each species, the habitats present on the site and surrounding lands, regional locality records, knowledge of the target species and recent studies at UCSC (Biosearch Wildlife Surveys 2000a, 2000b; Ecosystems West 2004; Biotic Resources Group 2006; UCSC 2006; Biosearch 2014). The federally-threatened California red-legged frog may use the adjacent tributary to the East Fork of Moore Creek seasonally for foraging and shelter, although the potential for the species in this area is considered low. The Santa Cruz black salamander could be affected, if it is present onsite. The site is well-shaded and has an abundance of downed wood, and three other native salamanders – ensatina, slender salamander and arboreal salamander, were observed during reconnaissance surveys. Several special-status birds could be affected if project construction is scheduled during the breeding season (typically February through August). Suitable nesting habitat is present within 200 feet of the project for golden eagle, white-tailed kite, long-eared owl, Nuttall's woodpecker, olive-sided flycatcher, Allen's hummingbird and oak titmouse. Suitable roosting habitat is present in the vicinity of the project site for pallid bat, fringed myotis and long-legged myotis. The San Francisco dusky-footed woodrat could be affected by construction.

Mitigation measures intended to reduce negative effects to special-status wildlife are provided below, which generally conform to those put forth in the Long-range Development Plan (UCSC 2006).

Potential Impact 1: Portions of the project site and surrounding study area support suitable habitat for California bottlebrush grass, and the field visit occurred outside the May-November blooming period of this species. In addition, the project site and study area support at least some suitable habitat components for tear drop moss, slender silver moss, and minute pocket moss. Though these species were not observed during the reconnaissance field visits, a systematic survey was not conducted. If any of these species are present on or adjacent to the project site, they could be adversely impacted by project ground disturbance. Tear drop moss and minute pocket moss have a CNPS RPR of 1B.3 and 1B.2, respectively, and would be considered special-status species under CEQA. California bottlebrush grass and slender silver moss have a RPR of 4.3 and 4.2, respectively. Impacts to species with a RPR of 4 are not typically considered special-status species under CEQA. However, due to their uncommon status, Mitigation Measures are included to address any impacts to these species.

Mitigation Measure 1a: A qualified botanist shall conduct a survey for tear drop moss, slender silver moss, and minute pocket moss on and within 50 feet of the project site prior

to project construction (the survey can be conducted any time of year). If these species are not observed during the survey, no additional mitigation is necessary. If any of these species are observed, the population shall be mapped and quantified and a suitable buffer zone (based on species requirements, proximity to the work area and other site specific factors) established, along with other protection measures, such as fencing installed around the population to protect it from disturbance. If the population cannot be avoided by the project, impacts to the population shall be quantified and a mitigation and monitoring plan developed in consultation with CDFW.

Mitigation Measure 1b: A qualified botanist shall conduct a floristic plant survey for California bottlebrush grass on and within 50 feet of the project site during the May-November blooming period prior to construction. If the species is not observed during the survey, no additional mitigation is necessary. If California bottlebrush grass is observed, the population shall be mapped and quantified and a suitable buffer zone (based on proximity to the work area and other site specific factors) established, along with other protection measures, such as fencing installed around the population to protect it from disturbance. If the population cannot be avoided by the project, seed, topsoil, and/or individual plants (since the species is a perennial) shall be collected from the impacted population and propagated on another area of the UCSC campus that supports suitable habitat for the species and is not designated for development under the LRDP (i.e., Campus Natural Reserve or Protected Landscape).

Potential Impact 2: The project site and adjacent areas are composed of Redwood Forest dominated primarily by native species. Due to tree removal (which could increase sunlight at the soil surface) and other ground disturbance (which could result in increased areas of bare mineral soil) associated with the project, the project has the potential to introduce invasive plants onto the project site and adjacent undisturbed areas in surrounding Redwood Forest.

Mitigation Measure 2: LRDP Mitigation Measure BIO-6 (UCSC 2006) shall be implemented to address potential invasive plant species impacts related to the project.

Potential Impact 3: The creek in the eastern portion of the study area falls under the regulatory jurisdiction of the Corps, RWQCB, and the CDFW. The creek is located at least 75 feet from the project site and no direct impacts to the creek are anticipated from the proposed project. However, due to tree removal and other ground disturbance on the project site and the steep slopes between the creek and the project site, indirect impacts are possible due to potential discharge of litter, fuel, sediment, and other pollutants from the project site and into the creek.

Mitigation Measure 3: LRDP Mitigation Measures HYD-2A and HYD-2B (UCSC 2006) shall be implemented during tree removal and other project ground disturbance to prevent erosion impacts to the creek.

Potential Impact 4. California red-legged frogs are known to occupy the lower UCSC campus, but have not been observed in the central campus or upper campus areas.

Aquatic habitats in the vicinity of the project site are seasonal. Overall, the potential for occurrence on the project site is considered low.

Mitigation Measure 4a: Consistent with LRDP Mitigation Measure BIO-9 (UCSC 2006), in order to minimize disturbance of breeding and dispersing California red-legged frogs, all ground-disturbing activity shall be conducted during the dry season (after 1 May and before 15). If ground-disturbing activities cannot be completed within the dry season, UCSC shall contact USFWS to initiate the following measures and determine whether additional measures are necessary to minimize potential impacts.

- To prevent California red-legged frogs from moving through the construction site during the rainy season, temporary exclusion fencing shall be placed around the construction work area at least one week prior to the start of construction activities. The fence shall be made of a fine-meshed material that does not allow red-legged frogs to pass through, and the bottom shall be buried to a depth of two inches so that California red-legged frogs cannot crawl under the fence.

- A qualified wildlife biologist shall monitor all construction activities within California red-legged frog upland habitat daily during initial ground-disturbing activities. The biological monitor shall look for red-legged frogs during grading, excavation, and vegetation removal activities. Once all initial ground-disturbing activities area completed, the biologist shall perform spot checks of the site once a week. If a red-legged frog is discovered, construction activities shall cease in the immediate vicinity of the individual until USFWS is contacted and the frog has been removed from the construction area by a qualified biologist with a permit to handle the species or by USFWS personnel, and released near a suitable burrow at least 300 feet away from the construction area.

- Prior to the start of daily construction activities, the biological monitor shall inspect the perimeter fence ensure that it si not ripped or has holes and that the base is still buried. The fence will also be inspected to ensure that no frogs are trapped in the fence. Any frogs found along and outside the fence will be closely monitored until they move away from the construction area.

Potential Impact 5. The project could result in impacts to Santa Cruz black salamanders if they are present on the site.

Mitigation Measure 5: Immediately prior to, and during the initial ground disturbance, a qualified biologist should survey for Santa Cruz black salamanders. If black salamanders are found, they should be moved out of harm's way to the nearest appropriate habitat outside the project footprint.

Potential Impact 6. The project could result in impacts to special-status birds if they are nesting in the vicinity including golden eagle, white-tailed kite, long-eared owl, Allen's hummingbird, Nuttall's woodpecker, olive-sided flycatcher and oak titmouse, as well as

other species protected under the Migratory Bird Treaty Act and the California Fish and Game Code.

Mitigation Measure 6: Consistent with UCSC LRDP Mitigation BIO-11 (UCSC 2006), measures should be taken to reduce impacts to nesting special-status birds. Within 14 days prior to construction, a qualified biologist should conduct nest surveys for special-status birds throughout appropriate habitat within 200 feet of the project boundaries. The survey is required for only those projects that will be constructed during the nesting/breeding season (typically February 1 through August 31). If active nests of special-status birds (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 should 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 should be postponed until juveniles have fledged and there is no evidence of a second nesting attempt as determined by the biologist. The biologist should 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.

Potential Impact 7. The project could result in disturbance to daytime roost sites of colonially-roosting special status bats or maternity roost sites of special-status bats including pallid bat, long-eared myotis, fringed myotis and long-legged myotis.

Mitigation Measure 7: Consistent with UCSC LRDP Mitigation BIO-13 (UCSC 2006), measures should be taken to reduce impacts to special-status bat species. If tree removal or grading activity is to commence during the breeding season of native bat species (April 1 through August 31), a field survey should be conducted by a qualified biologist to determine whether active roosts of special-status bats are present on the project site or in areas containing suitable roosting habitat within 50 feet of the project site. All trees and structures on and in the vicinity of the project site should be assessed for their suitability for use by roosting bats. Any trees or structures that are identified as being high-potential roost sites should be surveyed more intensively, by eye and using acoustical equipment if necessary to determine whether bats are present. If high-potential roost sites are identified in areas that will not be disturbed during construction, they should be identified and avoided during construction. If a high-potential roost site is identified in an area that cannot be avoided, exclusion measures should be developed in consultation with CDFW. If no high-potential roosting sites are found, no further mitigation would be required.

Potential Impact 8. San Francisco dusky-footed woodrat houses and individuals may be disturbed if they are present at the project site.

Mitigation Measure 8: Consistent with UCSC LRDP Mitigation BIO-14 (UCSC 2006), a pre-construction survey for San Francisco dusky-footed woodrat houses should be conducted within 14 days prior to construction in appropriate habitat within 100 feet of the limits of construction. San Francisco dusky-footed woodrat houses should be avoided if possible and fenced with temporary fencing to avoid disturbance at the direction of the

project biologist. The biologist should 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 woodrat houses are observed within the grading footprint, individuals should be trapped and released into artificial shelters built in proximity to the project site by a qualified biologist in accordance with CDFW requirements.

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Appendix 1. Plant species observed at the study area on 8 and 25 January 2016.

Scientific Name	Common Name
Acacia sp.*	acacia
Acer macrophyllum	big-leaf maple
Anisocarpus madioides	woodland madia
Arbutus menziesii	Pacific madrone
Baccharis pilularis	coyote brush
Bromus cf. laevipes	woodland brome
*Carduus pycnocephalus**	Italian thistle
Carex sp.	sedge
Ceanothus thyrsiflorus	blue blossom
*Cirsium vulgare**	bull thistle
Clinopodium douglasii	yerba buena
Corylus cornuta subsp. *californica*	California hazelnut
Cynoglossum grande	hound's tongue
Dryopteris arguta	wood fern
Fragaria vesca	wood strawberry
Galium triflorum	sweet-scented bedstraw
*Hedera helix**	English ivy
Hypochaeris sp.*	cat's-ear
*Ilex aquifolium**	English holly
Iris douglasiana	Douglas iris
Juncus patens	spreading rush
Lathyrus vestitus	Pacific pea
Lonicera hispidula	honeysuckle
Mimulus aurantiacus	sticky monkeyflower
*Myosotis latifolia**	forget-me-not
Notholithocarpus densiflorus	tanoak
Osmorhiza berteroi	sweet-cicely
Oxalis oregana	redwood sorrel
Oxalis sp.*	buttercup
Pentagramma triangularis subsp. *triangularis*	goldback fern
*Plantago lanceolata**	English plantain
Polystichum munitum	swordfern
Pseudotsuga menziesii	Douglas-fir
Pteridium aquilinum var. *pubescens*	bracken fern
Quercus agrifolia	coast live oak
Quercus wislizeni	interior live oak
Rosa gymnocarpa	wood rose
Rubus ursinus	California blackberry
Sanicula crassicaulis	Pacific snakeroot
Sequoia sempervirens	coast redwood
Stachys sp.	hedge nettle
Symphoricarpos albus	snowberry
Symphoricarpos mollis	creeping snowberry
*Torilis arvensis**	field hedge-parsley
Umbellularia californica	California bay
Viola ocellata	two-eyed violet
Woodwardia fimbriata	giant chain fern
* = non-native species	

Appendix 2. Wildlife species observed or detected by sign at the project site on 8 and 26 January 2016.

Amphibia	**Amphibians**
Plethodontidae	Lungless Salamanders
Ensatina eschscholtzii xanthopicta	Yellow-eyed ensatina
Aneides lugubris	Arboreal salamander
Batrachoseps attenuatus	California slender salamander
Aves	**Birds**
Corvidae	Jays, Magpies and Crows
Cyanocitta stelleri	Steller's jay
Corvus corax	Common raven
Paridae	Titmice and Chickadees
Poecile rufescens	Chestnut-backed chickadee
Certhiidae	Creepers
Certhia americana	Brown creeper
Troglodytidae	Wrens
Troglodytes pacificus	Pacific wren
Emberizidae	Sparrows
Junco hyemalis	Dark-eyed junco
Mammalia	**Mammals**
Talpidae	Moles
Scapanus latimanus	Broad-footed mole
Sciuridae	Squirrels
Sciurus griseus	Western gray squirrel
Cervidae	Deer, elk and relatives
Odocoileus hemionus	Mule deer

February 17, 2016

Alisa Klaus
Senior Environmental Planner
UCSC Physical Planning and Construction
1156 High Street
Santa Cruz, CA 95064

Re: Special-Status Moss Survey, UCSC Environmental Health and Safety Building Project

Dear Ms. Klaus:

At your request, I conducted a special-status moss survey on a portion of the University of California, Santa Cruz (UCSC) campus for the Environmental Health and Safety Building project ("project site"). The project site consists of two areas: (1) a ~1-acre area, adjacent to and east of Heller Drive and south of the pedestrian bridge to Kerr Hall, consisting of the limits of grading and construction associated with the proposed Environmental Health and Safety Building; and (2) a ~1,000 ft^2 utility trenching area located east of the pedestrian bridge in the vicinity of Kerr Hall (Figure 1). During a Biological Resources Assessment (BRA) prepared for the project site (Biosearch Associates 2016), suitable habitat was found for three special-status moss species: slender silver moss (*Anomobryum julaceum*[1]), tear drop moss (*Dacryophyllum falcifolium*), and minute pocket moss (*Fissidens pauperculus*). The purpose of this survey is to determine the presence or absence of these species on the project site and surrounding 50-foot buffer (the project site and buffer constitute the "study area" for this survey).

PROJECT SITE AND STUDY AREA

The project site is located east of Heller Drive, in the west-central portion of the UCSC campus, between ~700 and ~750-feet elevation (USGS 1954) (Figure 1). Most of the project site is currently undeveloped, but the utility trenching area is located in and adjacent to developed areas associated with Kerr Hall. The study area consists of undeveloped campus land as well as developed areas associated with Heller Drive, the pedestrian bridge, Kerr Hall, and adjacent infrastructure.

Vegetation

The project site and study area are dominated by Redwood Forest, corresponding to Upland Redwood Forest[2]/ *Sequoia sempervirens* Forest Alliance[3], consisting of a canopy of redwood (*Sequoia sempervirens*[4]), with occasional Douglas-fir (*Pseudotsuga menziesii*), and a subcanopy of interior live oak (*Quercus wislizeni*), coast live oak (*Quercus agrifolia*), tanoak (*Notholithocarpus densiflorus*), madrone (*Arbutus menziesii*), and occasional big-leaf maple (*Acer macrophyllum*). The understory consists of a mixture of native shrubs and herbaceous species, such as California hazelnut (*Corylus cornuta* subsp. *californica*), wood rose (*Rosa gymnocarpa*), sword fern (*Polystichum munitum*), creeping snowberry (*Symphoricarpos mollis*), wood strawberry (*Fragaria vesca*), wood fern (*Dryopteris arguta*),

[1] Nomenclature follows CNPS (2016).
[2] Vegetation nomenclature follows Holland (1986).
[3] Alliance nomenclature follows Sawyer et al. (2009).
[4] Botanical nomenclature follows Baldwin et al. (2012).

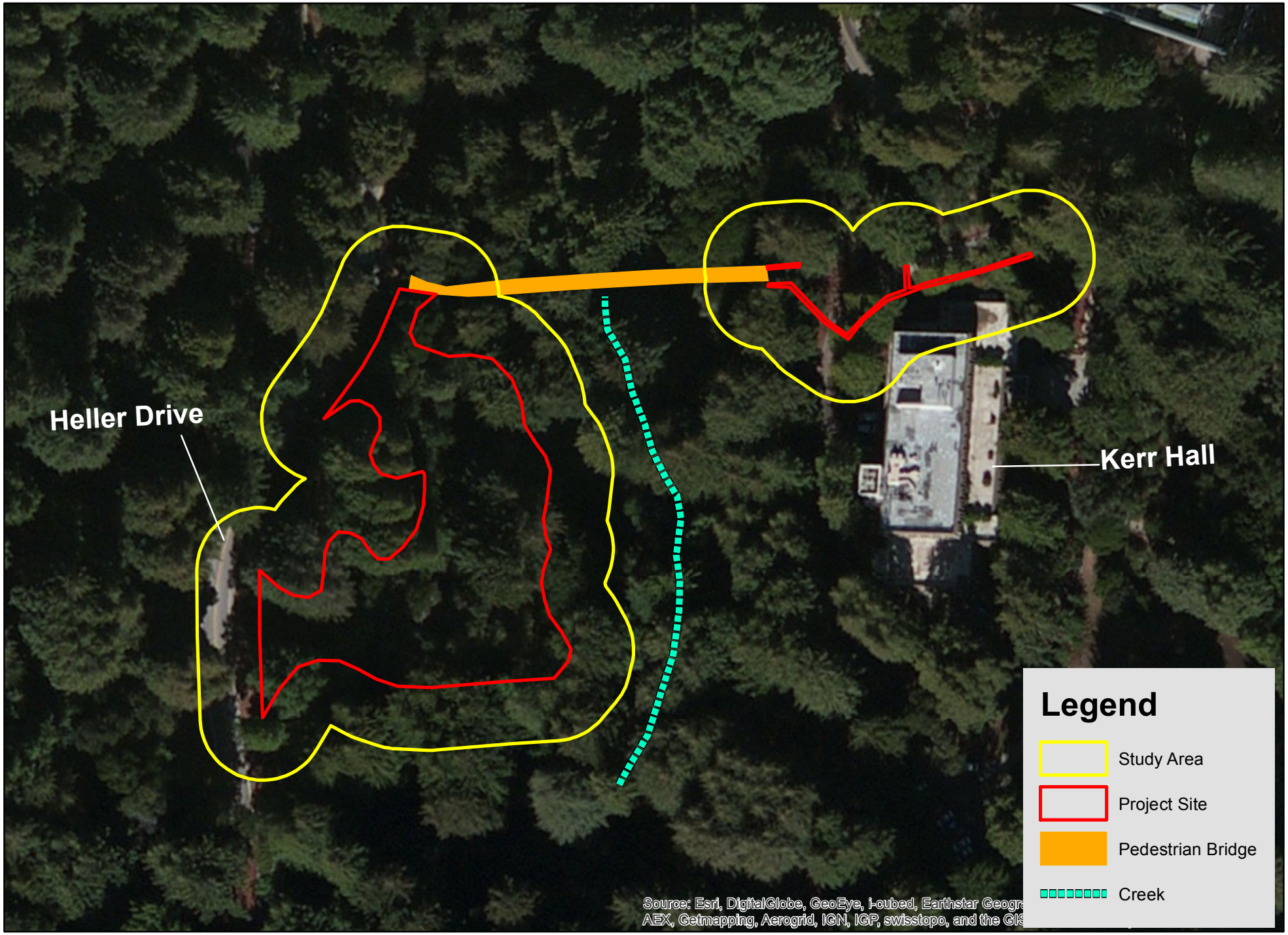

Figure 1. Map of the project site and study area.

Orthophoto date: 6/13/14

Mapscale: 1:1,200

0 50 100 200 300 Feet

COAST RANGE BIOLOGICAL LLC

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bracken fern (*Pteridium aquilinum* var. *pubescens*), redwood sorrel (*Oxalis oregana*), snakeroot (*Sanicula crassicaulis*), yerba buena (*Clinopodium douglasii*), and hedge nettle (*Stachys* sp.), with non- native species also present, including forget-me-not (*Myosotis latifolia*), English holly (*Ilex aquifolium*), and English ivy (*Hedera helix*). In addition, Developed/Ruderal habitat is present in and around Kerr Hall, as well as in portions of the Redwood Forest understory along Heller Drive and adjacent sidewalks, pedestrian bridge, and other infrastructure. This habitat consists of developed and landscaped areas, along with Ruderal areas supporting non-native herbaceous species such as English plantain (*Plantago lanceolata*), rough cat's ear (*Hypochaeris radicata*), and bull thistle (*Cirsium vulgare*).

Soils and Hydrology

One soil type has been mapped for the study area (NRCS 2016): Nisene-Aptos complex, 30 to 50 percent slopes. The Nisene soil is a well-drained soil normally found on mountain slopes. It is derived from residuum weathered from sandstone and shale and is fine sandy loam, sandy clay loam, and clay loam-textured above a weathered bedrock layer found at 58 to 62 inches below the soil surface. The Aptos soil is a well-drained soil normally found on hillslopes. It is derived from residuum weathered from siltstone and/or residuum weathered from sandstone and shale, and is fine sandy loam, sandy clay loam, clay loam, and loam-textured above a weathered bedrock layer found at 29 to 33 inches below the soil surface (NRCS 2016).

The principal hydrologic sources for the study area are direct precipitation and associated surface and sub-surface runoff. No drainage channels are present on the project site, but an intermittent/ephemeral drainage channel (hereafter referred to as "creek"), ~3-4 feet wide, drains southbound near the eastern study area boundary. The creek is a tributary to Moore Creek and was dry during the survey.

METHODS

Prior to the survey, as part of the BRA prepared for the project (Biosearch Associates 2016), a background literature search was conducted to determine which special-status botanical resources have been documented to occur in the study area region. The primary sources for this search included the California Natural Diversity Data Base (CDFW 2016), the California Native Plant Society Inventory of Rare and Endangered Plants (CNPS 2016), the U.S. Fish and Wildlife Service List of Threatened or Endangered Species (USFWS 2016a), and the UCSC Long Range Development Plan Final Environmental Impact Report (UCSC 2006). In addition, other lists and publications were consulted, including the National Wetlands Inventory (USFWS 2016b), Web Soil Survey (NRCS 2016), topographic maps (USGS 1954), and aerial photographs.[5]

Tom Mahony and Neal Kramer traversed the study area on foot on February 16, 2016, following methods outlined in Nelson (1987) and CDFG (2009). All vascular and non-vascular plant species observed were noted (Appendix A). Species that could not be identified in the field were taken back to the lab and keyed using Baldwin et al. (2012) and Malcolm et al. (2009).

RESULTS AND CONCLUSIONS

Seventy-two plant species were observed on the study area during the survey (Appendix A)[6]. None of these are special-status species. The survey was focused on slender silver moss, tear drop moss, and minute pocket moss. Since these species should have been identifiable at the time of the survey and were

[5] See Biosearch Associates (2016) for detailed methodology and results of the background literature search.
[6] Several moss species were observed on the study area that were not able to be identified to species, but were determined not to be the target moss species and are not included in Appendix A.

not observed, these species are considered absent from the study area and no additional surveys for special-status moss species are recommended.

The conclusions of this report reflect conditions observed at the time of the field visit and my interpretation of those conditions. Please contact me if you have questions or need additional information.

Sincerely,

Tom Mahony
Principal/Plant Ecologist

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Appendix A. Plant species observed on the study area during the February 16, 2016 survey.

Scientific Name	Common Name
*Acacia melanoxylon**	blackwood acacia
Acer macrophyllum	big-leaf maple
Adenocaulon bicolor	trailplant
Anisocarpus madioides	woodland madia
Arbutus menziesii	Pacific madrone
Baccharis pilularis	coyote brush
*Briza maxima**	rattlesnake grass
Bromus cf. laevipes	woodland brome
Cardamine californica	milk maids
Cardamine oligosperma	bitter cress
*Carduus pycnocephalus**	Italian thistle
Carex spp.	sedge
Ceanothus thyrsiflorus	blue blossom
*Cerastium glomeratum**	mouse-ear chickweed
*Cirsium vulgare**	bull thistle
Clinopodium douglasii	yerba buena
Corylus cornuta subsp. *californica*	California hazelnut
Cotoneaster sp.*	cotoneaster
*Cotula australis**	southern brassbuttons
Cynoglossum grande	hound's tongue
*Cynosurus echinatus**	hedgehog dogtail
Dryopteris arguta	wood fern
*Ehrharta erecta**	panic veldt grass
Erigeron canadensis	horseweed
*Euphorbia peplus**	petty spurge
Fragaria vesca	wood strawberry
Galium aparine	goose grass
Galium californicum subsp. *californicum*	California bedstraw
Galium triflorum	sweet-scented bedstraw
Gamochaeta ustulata	purple cudweed
*Genista monspessulana**	French broom
*Geranium dissectum**	cutleaf geranium
*Hedera helix**	English ivy
*Hypochaeris radicata**	rough cat's-ear
*Ilex aquifolium**	English holly
Iris douglasiana	Douglas iris
Juncus patens	spreading rush
Lathyrus vestitus	Pacific pea
Lonicera hispidula	honeysuckle
*Medicago polymorpha**	bur clover
Mimulus aurantiacus	sticky monkeyflower
*Myosotis latifolia**	forget-me-not
Nemophila sp.	nemophila
Notholithocarpus densiflorus	tanoak
Osmorhiza berteroi	sweet-cicely

Scientific Name	Common Name
*Oxalis corniculata**	creeping wood sorrel
Oxalis oregana	redwood sorrel
*Oxalis pes-caprae**	Bermuda buttercup
Pentagramma triangularis subsp. *triangularis*	goldback fern
*Plantago lanceolata**	English plantain
Polystichum munitum	swordfern
Pseudotsuga menziesii	Douglas-fir
Pseudognaphalium sp.*	cudweed
Pteridium aquilinum var. *pubescens*	bracken fern
Quercus agrifolia	coast live oak
Quercus wislizeni	interior live oak
Rosa gymnocarpa	wood rose
Rubus ursinus	California blackberry
Sanicula crassicaulis	Pacific snakeroot
Sequoia sempervirens	coast redwood
Stachys sp.	hedge nettle
*Stellaria media**	common chickweed
Symphoricarpos albus	snowberry
Symphoricarpos mollis	creeping snowberry
*Taraxacum officinale**	common dandelion
*Torilis arvensis**	field hedge-parsley
Toxicodendron diversilobum	poison oak
Umbellularia californica	California bay
Viola ocellata	two-eyed violet
Whipplea modesta	modesty
Woodwardia fimbriata	giant chain fern
* = non-native species	

Appendix F

Noise Technical Study

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality
1 Willowbrook Court, Suite 120
Petaluma, CA 94954

Memo

Date: March 2, 2016

To: Alisa Klaus
Senior Environmental Planner
UCSC Physical Planning and Construction

From: Michael Thill
Principal Consultant
Illingworth & Rodkin, Inc.

Subject: **Environmental Health & Safety Building, UC Santa Cruz – Noise and Vibration Levels associated with Construction and Operations**

The proposed Environmental Health & Safety Building (EH&S) project would construct a new 7,900-gross square foot (gsf) / 5,100 assignable square foot (asf) regulated waste handling and storage facility to sort and hold regulated waste generated by laboratory research and teaching, the arts, and maintenance on the main campus. The facility would include laboratory space, waste storage and handling for radiation, chemical, and universal waste, a material handling room, and a shower/locker work room.

This memo presents the results of the noise and vibration assessment of project construction activities and the results of the operational noise assessment of proposed mechanical equipment. Appendix A presents the fundamentals of environmental noise and vibration for those who may not be familiar with acoustical terminology and/or concepts.

Construction Noise Assessment

Construction noise impacts evaluated in the 2005 Long Range Development Plan (LRDP) EIR[1] were assessed with regard to the following significance thresholds:

- 80 dBA L_{eq} (8-hour) during daytime and evening; and
- 70 dBA L_{eq} (8-hour) during nighttime.

The LRDP EIR determined that construction of campus facilities could expose nearby sensitive receptors to excessive airborne noise but not to excessive groundborne vibration or groundborne noise. LRDP Mitigation NOIS-1, which is applicable to and included in all of the proposed LRDP Projects, requires that the following measures are implemented:

LRDP Mitigation NOIS-1: Prior to initiation of construction of a specific development project, the Campus shall approve a construction noise

[1] University of California Santa Cruz 2005 Long Range Development Plan Final Environmental Impact Report, University of California Santa Cruz, Office of Physical Planning & Construction, September 2006.

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.

The construction of the proposed project is anticipated to begin in May 2017 and end in August 2018, lasting approximately 16 months. Project construction phases would include demolition (22 days), Site Preparation (22 days), Grading (20 Days), Building Construction (230 Days), Architectural Coatings (21 Days), and Paving (23 Days).

Noise generated by project-related construction activities would be a function of the noise levels generated by individual pieces of construction equipment, the type and amount of equipment operating at any given time, the timing and duration of construction activities, the proximity of nearby sensitive land uses, and the presence or lack of shielding at these sensitive land uses. Construction noise levels would vary on a day-to-day basis during each phase of construction depending on the specific task being completed. Each construction phase would require a different combination of construction equipment necessary to complete the task and differing

usage factors for such equipment. Construction noise would primarily result from the operation of heavy construction equipment and the arrival and departure of heavy-duty trucks.

The Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM) was used to calculate the average noise levels anticipated during the worst-case phases of construction that would occur across the site. This construction noise model includes representative sound levels for the most common types of construction equipment and the approximate usage factors of such equipment that were developed based on an extensive database of information gathered during the construction of the Central Artery/Tunnel Project in Boston, Massachusetts (CA/T Project or "Big Dig"). The usage factors represent the percentage of time that the equipment would be operating at full power. Vehicles and equipment anticipated during each phase of construction were input into RCNM to calculate noise levels at the nearest sensitive receptors to the construction activities during each phase. Anticipated construction noise levels, by construction activity and phase, are summarized in Table 1.

TABLE 1 Calculated Construction Noise Levels at Nearest Receptors

Construction Phase	Average Equivalent Noise Level (dBA, L_{eq})		
	Kresge East / Redwood Grove Apartments (125 feet)	**Sinsheimer-Stanley Festival Glen Outdoor Stage (200 Feet)**	**Kerr Hall (280 feet)**
Demolition	77	72	70
Site Preparation	75	70	68
Grading	74	69	67
Building Construction	78	73	71
Architectural Coatings	66	61	59
Paving	74	70	67
Overall Range of Construction Noise Levels	66 to 77	61 to 72	59 to 70

Source: Illingworth & Rodkin, Inc., February 2016.

The predicted worst-case construction noise levels resulting from construction activities occurring at distances ranging from 125 feet to 280 feet from the nearest sensitive receptors (i.e., Kresge East Apartments, Sinsheimer-Stanley Festival Glen Outdoor Stage, and Kerr Hall) would not exceed the significance thresholds of 80 dBA L_{eq} (8-hour) during daytime and evening. Construction noise levels could potentially exceed 70 dBA L_{eq} (8-hour) during nighttime; however, the implementation of the LRDP mitigation measures would reduce the impact to a less-than-significant level by restricting construction to the hours between 7:30 AM and 7:30 PM, Monday through Saturday. No additional mitigation would be required.

Construction Vibration Assessment

The LRDP EIR determined that construction of the proposed project would not expose sensitive receptors to excessive groundborne vibration or groundborne noise because construction techniques having the potential of yielding relatively high vibration levels, such as pile driving or blasting, were not anticipated.

For structural damage, the California Department of Transportation recommends a vibration limit of 0.5 inches/second, peak particle velocity (in/sec PPV) for buildings structurally sound and designed to modern engineering standards, 0.3 in/sec PPV for older residential buildings, 0.25 for historic and some old buildings, and a conservative limit of 0.08 in/sec PPV for ancient buildings or buildings that are documented to be structurally weakened. All buildings in the project vicinity are assumed to be structurally sound, but these buildings may or may not have been designed to modern engineering standards. No ancient buildings or buildings that are documented to be structurally weakened are known to exist in the area.

Table 2, below, presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet. Vibration levels produced by a vibratory roller (0.210 in/sec PPV at 25 feet) would represent a credible worst-case scenario for proposed construction activities.

TABLE 2 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	PPV at 125 ft. (in/sec)	PPV at 280 ft. (in/sec)
Clam shovel drop		0.202	0.034	0.014
Hydromill (slurry wall)	in soil	0.008	0.001	0.001
	in rock	0.017	0.003	0.001
Vibratory Roller		0.210	0.036	0.015
Hoe Ram		0.089	0.015	0.006
Large bulldozer		0.089	0.015	0.006
Caisson drilling		0.089	0.015	0.006
Loaded trucks		0.076	0.013	0.005
Jackhammer		0.035	0.006	0.002
Small bulldozer		0.003	0.001	0.000

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Federal Transit Agency, Office of Planning and Environment, May 2006.

Vibration levels are highest close to the source, and then attenuate with increasing distance at the rate $(Dref/D)^{1.1}$, where D is the distance from the source in feet and Dref is the reference distance of 25 feet. Using the attenuation rate above[2], a vibratory roller would produce vibration levels of 0.036 in/sec PPV at the Kresge East Apartments located approximately 125 feet northwest of the project site. Vibration levels produced by a vibratory roller are calculated to be 0.015 in/sec PPV or less at Kerr Hall, approximately 280 feet east of the project site. At these distances, vibration levels would not approach or exceed the 0.3 in/sec PPV threshold used to assess the potential for cosmetic damage (e.g., minor cracks in plastered walls or the loosening of paint). There would be no impact to buildings in the vicinity of the project site because of the distance separating the buildings from proposed construction activities. Groundborne vibration levels resulting from proposed construction equipment could be perceptible at times; however, would not be expected to cause a significant impact to receptors at the Kresge East Apartments or Kerr Hall because such vibration levels would only be expected to occur during daytime hours when a vibratory

[2] These levels are based on calculations assuming normal propagation conditions, using a standard equation of PPV_{eqmt}-$PPV_{ref} * (25/D)^{1.1}$.

roller is used on the portions of the project site closest to receptors. No mitigation would be required.

Operational Noise Assessment – Mechanical Equipment

The LRDP EIR identified the following thresholds to assess potential noise impacts due to the operation of permanent stationary sources of noise such as generators and cooling towers. For these noise sources, the thresholds of significance are:

- 60 dBA CNEL for single-family residences; 65 dBA CNEL for multi-family residences; and 70 dBA CNEL for schools/parks, or
- Increases of 10 dBA CNEL, 5 dBA CNEL and 3 dBA CNEL, respectively, for receptors whose predicted (without project) CNEL would be less than 50 dBA CNEL, between 50 and 65 dBA CNEL, and greater than or equal to 65 dBA CNEL, respectively.

The proposed project would include rooftop mechanical equipment, such as heating, ventilation, and air conditioning systems. The predominant sources of rooftop mechanical equipment noise would be the air handling systems and exhaust fans. An emergency generator is also proposed to provide power during electrical outages and would be operated for testing and maintenance every other month, a total of 9.5 hours per year.

Noise from new rooftop equipment was analyzed using the roof plan showing the equipment locations and equipment sound levels. Operational noise levels were calculated for the worst-case condition at the Kresge East Apartments, Sinsheimer-Stanley Festival Glen Outdoor Stage, and Kerr Hall. The attenuating effects of distance were calculated separately for each piece of equipment (or group of equipment where appropriate) and then summed to calculate the total noise level at each receptor. The results of the calculations showed that operational noise levels would be 45 dBA L_{eq} at Kresge East Apartments, 49 dBA L_{eq} at Sinsheimer-Stanley Festival Glen Outdoor Stage, and 46 dBA L_{eq} at Kerr Hall. Assuming 24-hour operation of this equipment, the calculated CNEL noise level would range from 52 to 56 dBA CNEL at the nearest receptors.

Based on a review of the ambient noise data summarized in LRDP Table 4.10-3 and the predicted traffic noise levels summarized in LRDP Table 4.10-6, existing noise levels are approximately 62 dBA CNEL at Kresge East/Redwood Grove Apartments and 57 dBA CNEL at Sinsheimer-Stanley Festival Glen Outdoor Stage and Kerr Hall. The overall noise level assuming the 24-hour operation of the proposed mechanical equipment (52 dBA CNEL), when added to existing conditions (62 dBA CNEL), would remain at 62 dBA CNEL at the Kresge East/Redwood Grove Apartments. The overall noise level assuming the 24-hour operation of the equipment (56 dBA CNEL), when added to existing conditions (57 dBA CNEL), would be 60 dBA CNEL at Sinsheimer-Stanley Festival Glen Outdoor Stage, approximately 3 dBA CNEL above ambient conditions. The overall noise level assuming the 24-hour operation of the equipment (53 dBA CNEL) would be 58 dBA CNEL at Kerr Hall, approximately 1 dBA CNEL above ambient conditions. Predicted worst-case noise levels would be below the 65 dBA CNEL threshold used to assess noise and land use compatibility for multi-family residences and the 70 dBA CNEL threshold used to assess noise and land use compatibility for schools/parks resulting

in a less-than-significant impact. Worst-case operational noise levels would not substantially increase ambient noise levels at receptors in the project vicinity resulting in a less-than-significant impact. No additional mitigation would be required.

A Cummins 85 GGHG emergency generator is proposed to provide power during electrical outages and would be tested for maintenance purposes every other month, a total of 9.5 hours per year. A review of the manufacturer's noise data for the generator indicates that operational noise levels would be 70 dBA at a distance of 23 feet, assuming that the generator would be housed in a Level 2 sound attenuated enclosure. Operational noise levels would be would be 50 dBA L_{eq} at Kresge East/Redwood Grove Apartments, 45 dBA L_{eq} at Sinsheimer-Stanley Festival Glen Outdoor Stage, and 47 dBA L_{eq} at Kerr Hall during testing and emergency operations. The intermittent noise produced by testing and emergency operations would not measureable increase ambient CNEL noise levels and would result in a less-than-significant noise impact. No additional mitigation would be required.

APPENDIX A: FUNDAMENTALS OF NOISE AND VIBRATION

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A decibel (dB) is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table A-1.

There are several methods of characterizing sound. The most common in California is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table A-2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.
The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the 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 and human complaints. Table A-3 displays the reactions of people and the effects on buildings that continuous vibration levels produce.

The annoyance levels shown in Table A-3 should be interpreted with care since vibration may be found to be annoying at much lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related ground-borne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess ground-borne vibration and almost exclusively to assess the potential of vibration to induce structural damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life are evaluated against different vibration limits. Studies have shown that the threshold of perception for average persons is in the range of 0.008 to 0.012 in/sec PPV. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as minor cracking of building elements, or may threaten the integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher and there is no general consensus as to what amount of vibration may pose a threat for structural damage to the building. Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

TABLE A-1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
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.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE A-2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), Caltrans, September 2013.

TABLE A-3 Reaction of People and Damage to Buildings From Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Virtually no risk of damage to normal buildings
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential dwellings such as plastered walls or ceilings
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to newer residential structures

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, May 2006.

Appendix G

Responses to Comments on the Draft Initial Study

REC'D MAY 10 2016

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

May 6, 2016

Alisa Klaus
University of California
PP&C, 1156 High St
Santa Cruz, CA 95064

Subject: Environmental Health and Safety Facility Project
SCH#: 2016042016

Dear Alisa Klaus:

The State Clearinghouse submitted the above named Mitigated Negative Declaration to selected state agencies for review. The review period closed on May 4, 2016, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Sincerely,

Scott Morgan
Director, State Clearinghouse

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# 2016042016
Project Title Environmental Health and Safety Facility Project
Lead Agency University of California, Santa Cruz

Type MND Mitigated Negative Declaration

Description The proposed project would construct a new 8,229 gsf/5,237 assignable sf regulated waste handling and storage facility for sorting, packaging, and accumulation of regulated waste generated by lab research and teaching, the arts, and maintenance on the main campus. The proposed site of the new facility is undeveloped, forested land on the east side of Heller Dr, a major campus road, on the UC Santa Cruz main campus, in the city of Santa Cruz. The facility would replace the Campus' existing temporary regulated waste facility at the base of campus and low-level radioactive storage facility in Thimann Laboratories in the central campus. Campus utilities would be extended to the site from Heller Dr and nearby developed areas via the pedestrian bridge.

Lead Agency Contact

Name Alisa Klaus
Agency University of California
Phone 831-459-3732 **Fax**
email
Address PP&C, 1156 High St
City Santa Cruz **State** CA **Zip** 95064

Project Location

County Santa Cruz
City Santa Cruz
Region
Lat / Long 36° 59' 48.2" N / 122° 03' 46.6" W
Cross Streets High St/Bay Dr
Parcel No. 001-011-13
Township 11S **Range** 2W **Section** **Base** Diablo

Proximity to:

Highways 1, 17, 9
Airports
Railways
Waterways Moore Creek, Jordan Gulch, San Lorenzo River
Schools Westlake ES
Land Use Campus Support (under UC Santa Cruz 2005 Long Range Development Plan)

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Drainage/Absorption; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Noise; Minerals; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Landuse; Cumulative Effects; Other Issues

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Reviewing Agencies Resources Agency; Department of Fish and Wildlife, Region 3; Department of Parks and Recreation; Department of Water Resources; Resources, Recycling and Recovery; California Highway Patrol; Caltrans, District 5; Department of General Services; Air Resources Board; Regional Water Quality Control Board, Region 3; Department of Toxic Substances Control; Native American Heritage Commission; State Lands Commission

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Date Received 04/05/2016 **Start of Review** 04/05/2016 **End of Review** 05/04/2016

Note: Blanks in data fields result from insufficient information provided by lead agency.

Comments received by email
May 12, 2016

Melissa A. Farinha
California Department of Fish and Wildlife
Environmental Scientist - Santa Cruz County
7329 Silverado Trail
Napa, CA 94558
(707) 944-5579

SA-1-1 I reviewed the draft IS/MND for the Environmental Health and Safety Facility Project and had a couple questions. It is my understanding that Townsend's big-eared bats are present on the campus and that a maternity roost was found in the basal hollow of a redwood tree. Is this correct? If so, will mitigation measures be added to the IS/MND so that all impacts to this species in particular will be avoided, such as performing basal hollow roost surveys closer to the beginning of construction to reduce the chances that the bats were missed by surveys being done too early in the breeding season? Currently these bats are candidates for listing and is being afforded the same protections as if it were listed under CESA. If you have the location for the roost tree we would greatly appreciate it if someone could forward it to us.

SA-1-2 Can you have someone from Biosearch verify that the Vaux's swift nesting habitat is not in the form of tree hollows? It's unclear in the biological assessment. Additionally, the impacts evaluation/discussion on the Townsend's is missing from the main body of text and only shows up in the generic species habitat evaluation table, so not sure why that's missing? Also, please let us know what the results are of the bat maternity roost surveys.

Response to Comment Letter SA-1

Response to Comment SA-1-1: Guano samples indicating roosting Townsend's big-eared bat was found in tree hollows in the west fork of Cave Gulch on the north campus was found by EcoSystems West in 2001.[1] These tree hollows are about 0.9 mile north of the EH&S site. The Campus has provided the commenter with a copy of the report documenting this find.

The biological assessment for the proposed EH&S Facility Project did not find any potential roosting habitat for Townsend's big eared bat on the Project site (p. 32 of Appendix E of the Draft IS/MND). However, as there is potential habitat for other special-status bat species, LRDP EIR Mitigation Measures BIO-13A and -13B, which require field surveys for bats in late April or early May the season before construction starts, will be implemented (p. 45 of the Draft IS/MND). The mitigation measure specifies that the surveys be conducted in late April or early May, when the weather is warm enough that bats are active but before they establish maternity roosts. The text of the Draft Initial Study only discusses species with the potential to occur on the Project site. However, as Townsend's big-eared bat is a candidate species for listing under the California Endangered Species Act and has been detected on the campus, the text of the Draft Initial Study has been revised at page 42 to state that no suitable roosting habitat for this species is present on the Project site or within 100 feet of the site boundary.

Response to Comment SA-1-2: The statement in the Draft IS/MND (p. 43) that potential nesting habitat for Vaux's swift is present within and near the Project site is incorrect, and was an error in the drafting of the biological assessment. The Draft IS/MND has been revised to delete this statement. The biological assessment report (Biosearch Associates 2016) has also been revised to delete this statement. The revised report is included in the Final IS/MND as Appendix E.

[1] Ecosystems West. 2004. *Botanical and Wildlife Assessment of the University of California, Santa Cruz North Campus Study Area.* October.

Comment Letter RA-1

Monterey Bay Air Resources District
Serving Monterey, San Benito, and Santa Cruz Counties

24580 Silver Cloud Court
Monterey, CA 93940
PHONE: (831) 647-9411 • FAX: (831) 647-8501

May 3, 2016

Alisa Klaus, Senior Environmental Planner
Office of Physical Planning & Construction
University of California Santa Cruz
1156 High Street, Barn G
Santa Cruz, CA 95064

EIRcomment@ucsc.edu
EH&S

Re: NOP/MND for UCSC Environmental Health and Safety Facility Project

Dear Ms. Klaus:

Thank you for providing the Monterey Bay Air Resources District (Air District) with the opportunity to comment on the above-referenced document. Although the Air District has reviewed the document and find that District requirements seem to be adequately addressed we do have the following suggestions:

RA-1-1

1. Section 2.4 Project Approvals, Page 7 – This section indicates that permits from the Monterey Bay Area Unified Air Pollution Control District may be required for an emergency generator and fume hood. Please contact Amy Clymo, Interim Engineering/Compliance Manager 831-647-9411 x227 for any questions you may have regarding Air District permit requirements for these units.

Also, please note the recent Air District name change to the Monterey Bay Air Resources District.

RA-1-2

2. Figure 3-2, Existing Site Conditions – This figure suggests that several hundred feet of trenching will be undertaken to connect new underground utilities to the facility. Should older asbestos containing pipes or other hazardous materials be encountered during construction, the requirements of Air District Rule 424 National Emissions Standards for Hazardous Air Pollutants could be triggered. Rule 424 contains the investigation and reporting requirements for asbestos. If you have any questions about District Rule 424, please contact Mike Sheehan, District Compliance Inspector III, at (831)647-9411 x 217.

RA-1-3

3. 6.7.3 Discussion of Checklist Questions, Page 55 – Based on calculations from the CalEEMod land use emissions model this section demonstrates a less than significant impact on greenhouse gas (GHG) emissions by showing that project level GHG emissions are below San Luis Obispo's bright line threshold.

As you may know, under § 15183.5(b) of the CEQA Guidelines lead agencies may streamline the analysis of project level GHGs by demonstrating consistency of the project with a programmatic GHG emissions reduction plan, such as adopted Climate Action Plan. Section 6.7.2 of the IS/MND indicates that UCSC adopted a Climate Action Plan in 2011. Please explain why the more streamlined approach of demonstrating consistency with the adopted Climate Action Plan was not used in this case to show a less than significant impact.

Best Regards,

Robert Nunes
Air Quality Planner

cc: David Frisbey, Air Quality Planner
Bill Chevalier, Air Monitoring and Planning Supervisor
Mike Sheehan, Compliance Inspector

Response to Comment Letter RA-1

Response to Comment RA-1-1: Comment noted. The Campus will coordinate with the Air District to the permit requirements.

Response to Comment RA-1-2: Comment noted. The Campus does not anticipate encountering any pipes containing asbestos or other hazardous materials as no demolition of existing utility lines is proposed but will comply with Air District Rule 424 in the event that any such materials are encountered unexpectedly.

Response to Comment RA-1-3: CEQA Guidelines Section 15183.5(b)(1) lists the standards that a plan for the reduction of greenhouse gas ("GHG") emissions must meet in order to be used to streamline the analysis of project-level GHG emissions as suggested by the commenter. The UC Santa Cruz Climate Action Plan (CAP) was prepared to address Campus GHG reduction strategies campus-wide, based on the requirements of the American College and University Presidents Climate Commitment and does not establish performance standards for future individual buildings required for the Campus to meet its GHG reduction goals. The UC Santa Cruz CAP does not meet all of the standards listed in CEQA Guidelines Section 15183.5(b)(1), and therefore, the UC Santa Cruz CAP does not qualify as a plan to be used in analyzing the reduction of greenhouse gas emissions under CEQA. For this reason, the IS/MND instead utilizes CalEEMod calculations of GHG emissions to analyze the relative significance of the Project's GHG emissions, and evaluates the consistency of the Project with the University of California Policy on Sustainable Practices.