UNIVERSITY OF CALIFORNIA SANTA CRUZ

2021 Long Range Development Plan

Final Environmental Impact Report

Draft EIR as Amended Through Responses to Comments

State Clearinghouse Number 2020029086

September 2021

Final Environmental Impact Report

(Draft Environmental Impact Report as Amended Through Responses to Comments)

for the

University of California, Santa Cruz Long Range Development Plan

State Clearinghouse No. 2020029086

Prepared for

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TABLE OF CONTENTS

Appendices

Figures

Tables

EXECUTIVE SUMMARY

INTRODUCTION

This Executive Summary is provided in accordance with California Environmental Quality Act (CEQA) Guidelines Section 15123. It contains an overview of the programmatic analysis contained in the Environmental Impact Report (EIR) prepared for the University of California, Santa Cruz (UC Santa Cruz) 2021 Long Range Development Plan (2021 LRDP). As stated in State CEQA Guidelines Section 15123(a), "[a]n EIR shall contain a brief summary of the proposed actions and its consequences. The language of the summary should be as clear and simple as reasonably practical." State CEQA Guidelines Section 15123(b) states, "The summary shall identify: (1) [e]ach significant effect with proposed mitigation measures and alternatives that would reduce or avoid that effect; (2) [a]reas of controversy known to the Lead Agency, including issues raised by agencies and the public; and (3) [i]ssues to be resolved including the choice among alternatives and whether or how to mitigate the significant effects." Accordingly, this summary includes a brief synopsis of the 2021 LRDP, plan alternatives, environmental impacts and mitigation, and areas of known controversy. Table ES-1 (at the end of this section) presents a summary of potential environmental impacts, their level of significance without mitigation measures, the mitigation measures, and the level of significance following the implementation of mitigation measures.

SUMMARY DESCRIPTION OF THE 2021 LRDP

The 2021 LRDP would serve as the long-term planning document that guides physical campus growth through 2040 on two of the three UC Santa Cruz campus properties located in the City of Santa Cruz: (1) the UC Santa Cruz main residential campus and (2) the Westside Research Park, located at 2300 Delaware Avenue. Together, the main residential campus and Westside Research Park constitute the LRDP area or plan area for the 2021 LRDP. It does not address planning or growth on the third campus property, the Coastal Science Campus, which is governed by a separate Coastal Long Range Development Plan (State Clearinghouse No. 2001112014). In addition, the LRDP area does not include the Scotts Valley Center, the Silicon Valley remote satellite campus, nor the UC Monterey Bay Education, Science, and Technology Center (MBEST), which was transferred to UC Santa Cruz by the U.S. Army and is located approximately 26 miles south of the main residential campus.

The 2021 LRDP embraces a compact academic core with housing around the periphery. Employee housing would be strategically located to allow access to community resources. An enhanced historic district at the entrance to the main residential campus would provide an improved community interface. Designated reserve areas would be set aside for ecological, cultural, and educational uses and natural space would protect wildlife corridors and scenic views. To improve circulation, the 2021 LRDP includes an improved and more efficient roadway network and enhanced alternative transportation throughout the main residential campus. Finally, the Westside Research Park would incorporate mixed-use academic, research, and housing on the west side of Santa Cruz.

The overall objective of the 2021 LRDP is to guide the physical planning and development of the plan area in support of the teaching, research, and public service missions of UC Santa Cruz and the broader UC system. The plan's growth assumptions are based on campus population projections and an understanding of campus needs and goals beyond the 19,500 Full-Time Equivalent (FTE) students[1] planned for under the 2005 LRDP. However, the 2021 LRDP does not commit UC Santa Cruz to any specific enrollment level, campus population, or development. The 2021 LRDP planning effort anticipates that the on-campus student population could grow from approximately 18,518 FTE (three quarter average for the 2018–2019 academic year) to a potential enrollment of 28,000 FTE students (three quarter

[1] An FTE student is a three-quarter average (Fall, Winter, and Spring quarters) measure of (1) an undergraduate student who enrolls for 45 credit hours per academic year; or (2) a graduate student (master's level or doctoral student not yet advanced to candidacy) enrolled in 36 hours per year; or (3) a graduate doctoral student who has been advanced to candidacy. The LRDP campus population forecast accounts for students studying at the main residential campus and the Westside Research Park.

average) by the 2040–2041 academic year. UC Santa Cruz faculty and staff are also anticipated to increase from approximately 2,800 FTE to approximately 5,000 FTE in the same timeframe. Because of housing challenges in the region, UC Santa Cruz plans to accommodate 100 percent of the increase in student enrollment beyond 19,500, and up to 25 percent of the additional anticipated 2,200 FTE faculty/staff members in on-campus housing, conditional on demand.[2] To accommodate the increased campus population, the 2021 LRDP proposes facility renewal and new capacity for an additional 3.1 million square feet of academic/administrative and support building space.

The 2021 LRDP proposes a mix of land use categories to accommodate academic, open space, residential, and campus support uses. Under the 2021 LRDP, these types of land use categories would be retained but have been further refined through the 2021 LRDP planning process to reflect campus needs and functions today. The 2021 LRDP identifies the following land use categories to support anticipated campus growth:

- Academic and Support Land Use Designation (approximately 170 acres)
  - Academic and Administrative Support—various spaces that support the work of teaching, learning, and research.
  - Student Support and Public Services—health and wellness, student support spaces and gathering, community amenities spaces, and athletics and recreation.
- Residential Land Use Designations (approximately 359 acres)
  - Colleges and Student Housing—colleges and student housing, academic, and support spaces
  - Employee Housing— staff and faculty housing, and support space
- Open Space Land Use Designations (approximately 1,402 acres)
  - Outdoor Research—active landscapes for teaching, research and community education, including the following existing research programs: Center for Agroecology and Sustainable Food Systems farm, the Arboretum and Botanic Garden, and the Chadwick Garden.
  - Campus Natural Reserve—land designated to protect natural features and processes for the purposes of teaching and research
  - Natural Space—land protected as open space to maintain special campus landscapes for scenic value, special vegetation and wildlife continuity
  - Campus Habitat Preserve—habitat reserve that was established pursuant to a 2005 Implementing Agreement between the U.S. Fish and Wildlife Service (USFWS) and the Regents and is referred to as Inclusionary Parcels A and D. These parcels are designated for the management of the Ohlone Tiger Beetle and California Red Legged Frog.
- Other (approximately 127 acres)
  - Historic District—land and structures intended to express the unique historic and cultural context for academic & support facilities, community-facing programs, and visitor resources.
  - Recreation & Athletics—indoor and outdoor athletic fields and facilities
  - Facilities & Operations— includes office and shop space for staff who support the continued operation of the campus.
  - Mixed Use—employee housing, academic and support space

[2] UC Santa Cruz has provided student beds up to 15,000 Full Time Equivalent (FTE) students and will continue to provide student beds for 67 percent of FTE students between an enrollment of 15,000 and 19,500 students, in accordance with the 2008 Comprehensive Settlement Agreement (CSA). The proposed LRDP will provide 100 percent of student beds for 8,500 additional FTE students and enrollment of above 19,500.

2021 LRDP GOALS AND OBJECTIVES

As noted above, the overall objective of the 2021 LRDP is to guide the physical planning and development of the plan area in support of the teaching, research, and public service missions of UC Santa Cruz and the broader UC system. Four key considerations have informed the 2021 LRDP goals: supporting the academic mission, guiding campus evolution and integrity, recognizing and connecting to the local and regional context, and establishing a framework of planning resilience and long-term sustainability. UC Santa Cruz has identified the following 2021 LRDP objectives to guide implementation of the 2021 LRDP:

- Expand campus facilities and infrastructure to allow for projected increases in student enrollment through 2040 based on statewide public educational needs and to support the academic mission, including housing for 100 percent of the additional FTE students (above the 2005 LRDP total of 19,500 FTE students) in both colleges and student housing developments, and commensurate academic and support space.
- Ensure compact and clustered development of academic, administrative, and support facilities in the academic core and student housing and colleges around the periphery to facilitate shared resources, provide convenient access, and promote pedestrian circulation.
- Provide for establishment of two new college pairs at the main residential campus to provide academic services and a close-knit intellectual and social environment.
- Protect, to the extent feasible, existing campus open spaces in the built environment, including areas designated as Natural Space to maintain an interconnectedness between natural resources, wildlife corridors and critical scenic viewsheds, and areas designated as Outdoor Research and Natural Reserve to protect natural features and processes for teaching and learning and to support dedicated outdoor research programs.
- Provide spaces for events and academic facilities to allow the campus to function as a center for public cultural life in the region through public programs, events, and services.
- Increase on-campus housing opportunities for faculty and staff at the main residential campus and the Westside Research Park, to allow up to 25 percent of the increase in faculty and staff, based on demand, to be housed on campus.
- Recognize, to the extent feasible, UC Santa Cruz and regional histories within the campus, including protecting tribal cultural resources and maintaining the integrity of existing historic structures and enhancing the Cowell Lime Works Historic District as a campus gateway.
- Develop an improved, more efficient roadway network to support transit with peripheral parking and mobility hubs.
- Promote Transportation Demand Management (TDM) and provide infrastructure to optimize trip- and vehicle-miles-travelled-reduction benefits and efficiency of transit, bike, and pedestrian access to, from, and within the campus to reduce the use of single-occupancy vehicles.
- Foster long-term physical and social resilience, including a response to climate change through climate resiliency and adaptation strategies and integrating sustainability leadership into campus teaching, learning, research, design, and operations.
- Respect and reinforce the Physical Planning Principles and Guidelines to maintain the unique character of the UC Santa Cruz campus.

SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Pursuant to State CEQA Guidelines Section 15382, a significant effect on the environment is defined as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance." Chapter 3 of this Draft EIR describes in detail the significant environmental impacts that would result from

implementation of the 2021 LRDP. Chapters 4 and 5 provide a discussion of cumulative and growth-inducing impacts, respectively. Table ES-1 summarizes the environmental impacts and mitigation measures discussed in these chapters.

SIGNIFICANT AND UNAVOIDABLE ENVIRONMENTAL IMPACTS

State CEQA Guidelines Section 21100(b)(2)(A) provides that an EIR shall include a detailed statement setting forth in a separate section "[a]ny significant effect on the environment that cannot be avoided if the project is implemented." Accordingly, this section of the summary identifies the significant environmental impacts of the plan that cannot be mitigated to a less-than-significant level.

Chapter 3, "Environmental Setting, Impacts, and Mitigation Measures," provides a description of the potential environmental impacts of the 2021 LRDP and recommends various mitigation measures to reduce impacts to the extent feasible. Chapter 4, "Cumulative Impacts," states whether the incremental effects of the 2021 LRDP are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects. After implementation of the recommended mitigation measures, most of the impacts associated with implementation of the 2021 LRDP would be reduced to a less-than-significant level. The following impacts are significant and unavoidable; that is, no feasible mitigation is available or the mitigation measures available were not sufficient to reduce them to a less-than-significant level. Note that this is only a summary of those impacts; it is important to review the discussions in Chapters 3 and 4 of this EIR to understand the full context of the impact determinations.

Implementation of the 2021 LRDP would result in the following significant and unavoidable environmental impacts, following implementation of feasible mitigation measures:

- Impact 3.3-1: Conflict with or Obstruct Implementation of an Applicable Air Quality Plan
- Impact 3.3-3: Operational Emissions of Criteria Air Pollutants and Precursors
- Impact 3.4-4: Impacts to Historical Resources
- Impact 3.12-1: Generate Substantial Temporary Construction Noise
- Impact 3.13-1: Directly or Indirectly Induce Substantial Unplanned Population Growth and Housing Demand
- Impact 3.17-1: Impacts on Water Supply

In terms of cumulative impacts, significant and unavoidable cumulative impacts would occur with respect to:

- Cumulative impacts related to air quality, historical resources, noise, population and housing, and water supply.

ALTERNATIVES TO THE 2021 LRDP

State CEQA Guidelines Section 15126.6 mandates that all EIRs include a comparative evaluation of the proposed project with alternatives to the project that are capable of attaining most of the project's basic objectives but that would avoid or substantially lessen any of the significant effects of the project. CEQA requires an evaluation of a "range of reasonable" alternatives, including the "no project" alternative. The following alternatives are under consideration for the 2021 LRDP:

- Alternative 1: No Project Alternative.
- Alternative 2: Reduced LRDP Enrollment Alternative.
- Alternative 3: Reduced Development Footprint Alternative.
- Alternative 4: Reduced Campus Growth and Use of UC MBEST Off-Site Alternative.

State CEQA Guidelines Section 15126.6(e)(2) states that when the no-project alternative is identified as the environmentally superior alternative, the EIR must also identify an environmentally superior alternative from among the other alternatives. As discussed in Chapter 6, "Alternatives," the No Project Alternative is environmentally superior for all environmental resource areas. As a result, this EIR must identify an alternative among the other alternatives that is environmentally superior. Based on the environmental analysis contained in this Draft EIR, the environmentally superior alternative would be Alternative 2.

Alternative 1 would not provide additional housing (beyond the two planned-but-not-operational projects, Student Housing West and Kresge Housing that are part of the 2005 LRDP) to accommodate any of the anticipated growth in student enrollment, and Alternatives 2 and 3 would fall short of meeting projected enrollment needs based on current UC forecasts through 2040 (i.e., up to 28,000 FTE students). While Alternative 4 would achieve a lesser level of development within the main residential campus than the 2021 LRDP, it would likely increase certain off-site impacts at UC MBEST and would not be consistent with the project objective related to compact and clustered development, as well as those objectives related to GHG and VMT efficiency. Alternative 1 (No Project), which would represent the least amount of overall development compared to existing conditions and thus, least potential physical environmental impacts, would be considered the environmentally superior alternative.

Alternative 2 would result in lesser impacts compared to the 2021 LRDP, especially with respect to the overall level of development, but it would not altogether avoid the significant and unavoidable impacts associated with historic resources, noise, population and housing, and water supply that were identified for the 2021 LRDP. Similarly, Alternative 3 would result in generally lesser environmental effect than the 2021 LRDP, however, Alternative 3 would have potentially greater historic resources impacts related to denser and potentially larger/higher structures within the central campus subarea. Thus, when the impact reductions afforded by Alternative 2 are compared to those provided by Alternative 3, Alternative 2 would result in greater impact reductions and is thus considered superior to Alternative 3.

AREAS OF CONTROVERSY

In accordance with CEQA Section 21092 and State CEQA Guidelines Section 15082, a notice of preparation (NOP) was prepared and circulated for public review between February 25, 2020 and March 30, 2020. In light of concerns regarding COVID-19, the public review period was later extended to April 8, 2020. The NOP was submitted to the State Clearinghouse. Two public scoping sessions were held on March 12, 2020, from noon to 2:00 p.m. and from 6:00 p.m. to 8:00 p.m. A third scoping meeting was held on April 1, 2020 from 6:00 p.m. to 8:00 p.m. Because of concerns regarding COVID-19, the sessions were not held in person, as originally planned. Instead, they were held in a virtual format via a live video feed. Appendix B contains the comment letters submitted in response to the NOP and transcripts from the NOP scoping meetings.

As reflected in the comments received during the NOP comment period, the major areas of controversy associated with the plan are:

- increased demand for off-campus housing;
- impacts to scenic resources including visual character, vistas, views, and corridors;
- impacts to threatened and endangered species as a result of potential future development;
- impacts to grazing land and forest cover;
- impacts to archaeological, historic, and tribal cultural resources;
- potential modifications to the great meadow; and
- potential traffic impacts associated with on-campus population growth.

All the substantive environmental issues raised in the NOP comment letters and at the scoping meetings have been addressed or otherwise considered during preparation of this Draft EIR.

Table ES-1 Summary of Impacts and Mitigation Measures

Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
3.1. Aesthetics			
Impact 3.1-1: Result in a Substantial Adverse Effect on a Scenic Vista Implementation of the 2021 LRDP would result in the construction and operation of additional facilities within the UC Santa Cruz main residential campus and Westside Research Park that could result in alteration of scenic vantage and viewpoint locations including views towards the coast. However, regarding views both from and toward campus, new development would be designed and constructed in a manner consistent with, and generally adjacent to, existing development which has already altered some long-distance views. In addition, any campus-related development would be required to comply with the UC Santa Cruz Design Review Process, and standards set forth in the UC Santa Cruz Campus Standards Handbook, and be generally consistent with the Physical Design Framework and the Physical Planning Principles and Guidelines in the 2021 LRDP, which are established to provide aesthetically compatible facilities. Therefore, this impact would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.1-2: Result in Adverse Effects on the Aesthetic Quality of the Cowell Lime Works Historic District Implementation of the 2021 LRDP would result in temporary and permanent visual changes associated with new development that could affect the Cowell Lime Works Historic District on the UC Santa Cruz main residential campus. Development under the 2021 LRDP could degrade the aesthetic quality of the Cowell Lime Works Historic District, which is considered a scenic resource. This would be a potentially significant impact.	PS	**Mitigation Measure 3.4-4a: Protect Cowell Lime Works Historic District** *(Refer to Section 3.4, "Cultural Resources")*	LTS
Impact 3.1-3: Degrade Existing Visual Character or Quality Implementation of the 2021 LRDP would result in temporary and permanent visual changes throughout the UC Santa Cruz main residential campus and Westside Research Park, especially in areas valued for their visual character or quality including publicly accessible vantage points along Empire Grade west of the Santa Cruz city limits. While new buildings and other development resulting from 2021 LRDP implementation would be required to comply with standards set forth in the UC Santa Cruz Campus Standards Handbook and be generally consistent with the Physical Design Framework and the Physical Planning Principles and Guidelines in the 2021 LRDP to ensure consistency with the existing character and quality of the campus and surrounding areas, visual changes resulting from construction and new development could degrade the existing visual character and quality within	PS	**Mitigation Measure 3.1-3a: Require Setback Distance from Empire Grade** UC Santa Cruz shall require that development located north of the Arboretum and Botanic Garden entrance under the 2021 LRDP, which could be seen from Empire Grade, include a minimum setback of 200 feet from Empire Grade. If establishment of a 200-foot buffer is not feasible, a vegetated barrier or screen that prevents a direct line of site between a resource and developed structures shall be provided. Vegetation shall be native to California and selected to match existing vegetation located nearby. **Mitigation Measure 3.1-3b: Implement Design Measures for Protection of Views Along Empire Grade** Development within 500 feet of Empire Grade and west of the Santa Cruz city limits and the Arboretum and Botanic Garden within the UC Santa Cruz main residential	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
the campus, especially in areas valued for their visual character or quality. This impact would be potentially significant.		campus shall be subject to review by the Campus Design Advisory Board to ensure that design of new facilities shall be visually unobtrusive and not unduly interfere with existing views. Review of future development by the Campus Design Advisory Board shall occur upon initial selection of sites. Design shall comply with standards set forth in the UC Santa Cruz Campus Standards Handbook and be generally consistent with the Physical Design Framework and Physical Planning Principles and Guidelines in the 2021 LRDP. **Mitigation Measure 3.1-3c: Implement Design Measures for Protection of Views within Scenic Areas** For any development within primary campus viewsheds identified as scenic areas, UC Santa Cruz shall require that siting, development patterns, and architecture is consistent with the 2021 LRDP Physical Planning Principles and Guidelines, including those related to building height and massing, in order to ensure that the visual character and quality of scenic areas are not substantially degraded. Primary campus viewsheds include primary views of the main residential campus and on-campus viewsheds including the Great Meadow, East Meadow, and three smaller meadows (Porter, Crown, and Kerr), as well as prominent scenic views from Cowell College Plaza, the Arts area in the Academic Core, University House, the knoll at Porter College, and the field at Oakes College. Review of future developments by the Campus Design Advisory Board shall occur upon initial selection of sites. Design shall also comply with standards set forth in the UC Santa Cruz Campus Standards Handbook and be generally consistent with the Physical Design Framework.	
Impact 3.1-4: Create a New Source of Light or Glare Implementation of the 2021 LRDP would introduce new sources of light and glare associated with new buildings and facilities. Such lighting could contribute to indirect lighting and/or glare on adjacent land uses that could adversely affect daytime or nighttime views and result in additional sky glow. This impact is considered potentially significant.	PS	**Mitigation Measure 3.1-4: Minimize Light and Glare Resulting from New Development** UC Santa Cruz shall incorporate site-specific consideration of the orientation of the building, use of landscaping materials, and choice of primary façade materials to minimize potential off-site spillover of lighting and glare from new development. As part of this measure and prior to project approval, UC Santa Cruz shall require the incorporation of site- and project-specific design considerations to minimize light and glare including, but not limited to, the following: ▶ The use of non-reflective exterior surfaces and non-reflective (mirrored) glass. ▶ Safety lighting along proposed pedestrian/bicycle pathways shall be limited to non-glare, downlit, low-bollard style lights that focus illumination to the pathway surface, consistent with the exterior lighting standards identified in the UC Santa Cruz Campus Standards Handbook.	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▶ All new outdoor lighting shall utilize directional lighting methods with shielded and cutoff type light fixtures to minimize glare and upward directed lighting such that light spillover onto adjacent structures does not occur. Verification of inclusion in project design shall be provided at the time of design review. Consistent with the Illuminating Engineering Society of North America (IESNA) Lighting Handbook, installation of new lighting sources shall comply with the recommended "light trespass" standards for light spillover specific to the lighting environment in the project area (e.g., dark, low brightness, medium district brightness, and high district brightness) identified in the Illuminating Engineering Society of North America (IESNA) Lighting Handbook.	
3.2. Agriculture and Forestry Resources			
Impact 3.2-1: Convert Lands Designated as Important Farmlands to Non-Agricultural Use Implementation of the 2021 LRDP would result in the conversion of approximately 2 acres of land designated Prime Farmland on the California Department of Conservation's Farmland Mapping to non-agricultural uses. However, based on the Department of Conservation's Land Evaluation & Site Assessment (LESA) model, the 2-acre area is not considered a significant agricultural resource. In addition, the 2021 LRDP would result in the conversion of approximately 64 acres of grazing land to non-agricultural uses; however, grazing land is not considered Important Farmland and therefore its conversion to other land uses does not represent a significant environmental impact to agriculture. Therefore, the project's impact to Important Farmland is considered less than significant.	LTS	No mitigation is required.	LTS
Impact 3.2-2: Result in a Loss or Conversion of Forest Land to Non-Forest Use Implementation of the 2021 LRDP would result in the development of approximately 123 acres (of the approximately 1,000 acres within the LRDP area) of forested land cover, which would result in removal of trees that may be harvested for sale. Prior to tree removal, UC Santa Cruz would be required to secure Timber Conversion Permits (TCPs) for conversion of timberland to another use and receive approval of THPs if commercial trees are harvested. In addition to compliance with the Forest Practice Rules through Timber Harvest Plans (THPs) and TCPs, as necessary, UC Santa Cruz would retain an estimated 10 percent or greater tree cover throughout each development area, similar to historic development on-campus, such that each development area would still be considered forest land	LTS	No mitigation is required.	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
and would continue to provide forest land public benefits such as aesthetics, biodiversity, water quality, and recreation. Therefore, the project's forest resource impact is considered less than significant.			
3.3. Air Quality			
Impact 3.3-1: Construction-Generated Emissions of Criteria Air Pollutants and Precursors A quantitative analysis was performed to estimate the emissions of reactive organic gases (ROG), nitrous oxides (NO_X), and particulate matter (PM_{10} and $PM_{2.5}$) that would be generated during an average year of on-campus construction under the proposed 2021 LRDP. Emissions were assumed to result from demolition, site preparation (e.g., excavation, clearing), off-road equipment use, material and equipment delivery trips, worker commute trips, and other construction activities (e.g., building, asphalt paving, application of architectural coatings), as well as trail and roadway construction, and the occasional construction of pedestrian bridges. Construction-generated daily NO_X emissions could occasionally exceed Monterey Bay Air Resources District's (MBARD's) significance threshold of 137 lb/day due to overlapping construction activities. Thus, construction emissions would have the potential to conflict with air quality planning efforts and result in a cumulatively considerable net increase of ozone for which the project region is nonattainment under the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS). This impact would be significant.	S	**Mitigation Measure 3.3-1: Reduce Construction-Generated Emissions of NO_X** Per contract specification requirements, UC Santa Cruz shall require that the contractor(s) develop and implement a plan demonstrating that the off-road equipment used on-site to construct 2021 LRDP projects would achieve a fleet-wide average 45 percent reduction in NO_X exhaust emissions, compared to uncontrolled aggregate statewide emission rates for similar equipment. One feasible plan to achieve this reduction would include the following: ▶ At least 80 percent of diesel-powered off-road equipment operating on the project site for more than two days continuously shall be equipped with engines meeting US EPA emissions standards for Tier 3 engines or equivalent, and use of Tier 4 engines shall be encouraged; ▶ Use of renewable diesel or other zero emissions alternative (e.g., electric) construction equipment to the degree available and feasible; ▶ Plan construction projects such that multiple project components (i.e., bridge or roadway construction) will not occur on the same days; and ▶ Alternatively, if UC Santa Cruz can demonstrate through preparation of an air quality assessment report prepared by an air quality specialist that large or contemporaneous 2021 LRDP construction projects would not exceed MBARD thresholds, then the above mitigation requirements may be waived.	LTS
Impact 3.3-2: Operational Emissions of Criteria Air Pollutants and Precursors Implementation of individual projects under the 2021 LRDP would result in long-term project-generated emissions of criteria air pollutants, particularly emissions of the ozone precursor, ROG, from the use of consumer products and cleaning supplies. Incremental long-term, operational ROG and PM_{10} emissions would exceed MBARD thresholds of significance (137 lb/day and 82 lb/day, respectively). Thus, operational emissions would conflict with the air quality planning efforts and result in a cumulatively considerable net increase of ozone and ambient PM_{10} concentrations, for both of which the project region is in nonattainment under the CAAQS. This would be a potentially significant impact.	PS	**Mitigation Measure 3.3-2: Reduce Operational Emissions of ROG and PM_{10} from All Sources** The majority of ROG emissions are a result of aerosolized and evaporation of consumer products, which include cleaning solutions, personal care products, and pesticides. The calculation of ROG emissions from consumer products was based on the ability to control personal products over the use of consumer products, such as personal care products and household cleaners used off-campus. However, UC Santa Cruz is responsible for facility-related purchases, such as commercial cleaning and sanitizing solutions. Additional measures	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		should also be taken to reduce ROG emissions from other sectors, such as mobile sources, landscaping equipment, and architectural coatings. As such, UC Santa Cruz shall make every effort to reduce ROG emissions generated under the 2021 LRDP. With respect to the new construction and operations that would occur under the 2021 LRDP, UC Santa Cruz shall implement the following measures for on-campus activities: ▶ Use zero or low-VOC consumer products and cleaning supplies that exceed CARB's consumer product VOC standards (as defined in CCR Title 17, Division 3, Chapter 1, Subchapter 8.5, Articles 1 through 5), such as those using electrolyzed water, where available. ▶ Use zero-VOC architectural coatings with a VOC content no greater than 5 grams per liter. ▶ Increase the level of zero emission landscaping equipment over time, such as electric lawnmowers, leaf blowers, and chainsaws to attain 95-100 percent of landscaping equipment use on campus. ▶ Choose zero emission vehicles for all new light-duty fleet purchases. ▶ Choose zero or low emission vehicles for all new heavy-duty fleet purchases, where available and feasible. ▶ Encourage the use of zero emission vehicles by installing electric vehicle charging stations in parking facilities. ▶ Reduce campus vehicle speed limits to the extent feasible and install traffic calming or signal coordination to reduce the intensity of vehicle braking and acceleration. **Mitigation Measure 3.16-1: Implement Transportation Demand Management Program and Monitoring** *(Refer to Section 3.16, "Transportation")*	
Impact 3.3-3: Conflict with or Obstruct Implementation of an Applicable Air Quality Plan MBARD has developed its 2012-2015 Air Quality Management Plan (AQMP) to guide the region toward achieving attainment of the California 8-hour ozone standard. The plan is based on an inventory of existing emission sources as well as projections about the future level of land use development in the NCCAB. With implementation of the 2021 LRDP, on-campus improvements related to promoting pedestrian/bicycle modes of transportation and decreasing on-campus parking are	S	**Mitigation Measure 3.3-2 (above): Reduce Operational Emissions of ROG and PM_{10} from All Sources**	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
consistent with objectives of the AQMP. Further, new buildings planned for development would be consistent with the UC Sustainable Practices Policy. However, operational ROG and PM_{10} emissions resulting from implementation of the 2021 LRDP would exceed MBARD's daily emissions thresholds. For this reason, the project would conflict with MBARD's long-term air quality planning efforts to achieve and maintain attainment with the ozone and PM10 CAAQS, and this impact would be significant.			
Impact 3.3-4: Mobile-Source Carbon Monoxide (CO) Concentrations Operational mobile-source emissions of CO generated by additional traffic to and from the campus under the proposed 2021 LRDP would not violate an air quality standard or contribute substantially to an existing or projected air quality violation or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.3-5: Short-Term Construction Emissions of Toxic Air Contaminants (TACs) Construction activities would result in temporary, short-term project-generated emissions of TACs, particularly diesel PM. Construction TAC emissions would not result in a Hazard Index (HI) greater than 1.0 or in an incremental increase in cancer risk that exceeds 10 in one million. This impact would be less-than-significant.	LTS	No mitigation is required.	LTS
Impact 3.3-6: Operational Emissions of Toxic Air Contaminants The 2021 LRDP would result in additional sources of TACs (e.g., laboratories, boilers); however, the additional risks associated with these sources would not exceed MBARD thresholds of 10 in one million for cancer risk nor a HI of 1.0 for both acute and chronic exposures. Therefore, this impact would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.3-7: Exposure of Sensitive Receptors to Odors The 2021 LRDP may introduce new odor sources into the area, such as new research facilities and diesel-related exhaust from delivery trucks. The new odor sources would be similar to existing sources that operate in and around the UC Santa Cruz campus. As a result, impacts would be less than significant.	LTS	No mitigation is required.	LTS
3.4. Archaeological, Historical, and Tribal Cultural Resources			
Impact 3.4-1: Impacts to Unique Archaeological Resources Future development associated with the 2021 LRDP could be located on properties that contain known or unknown archaeological resources and ground-disturbing activities could result in discovery of or damage to yet undiscovered	PS	**Mitigation Measure 3.4-1: Identify and Protect Unknown Archaeological Resources** As early as possible in the project planning process for individual projects under the 2021 LRDP, UC Santa Cruz shall define the project's area of effect for archaeological resources. UC Santa Cruz shall determine the potential for the proposed project to result in cultural resource impacts, based on the extent of	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
archaeological resources as defined in CEQA Guidelines Section 15064.5. This would be a potentially significant impact.		ground disturbance and site modifications anticipated for the proposed project. UC Santa Cruz shall also review confidential resource records to determine whether complete intensive archaeological survey utilizing current techniques and practices, including consultation with a culturally-affiliated Native American tribe has been performed on the site and whether any previously recorded cultural resources are present. UC Santa Cruz shall implement the following steps to identify and protect archaeological resources that may be present in the project's area of effects: 1) For project sites that have not been subject to a prior complete intensive archaeological survey, UC Santa Cruz shall ensure that a complete intensive surface survey is conducted by a qualified archaeologist, who meets the Secretary of the Interior's Professional Qualification Standards in Archaeology, once the area of ground disturbance has been identified and prior to soil disturbing activities. Additionally, UC Santa Cruz shall notify the Amah Mutsun Tribal Band of the area not subject to an intensive survey and a tribal representative shall be invited to participate. 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, UC Santa Cruz 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. If the qualified archaeologist determines that the archaeological material is Native American in origin and the qualified archaeologist assigned to the surveying and monitoring process is not an authorized representative of the Amah Mutsun Tribal Band, UC Santa Cruz and/or archaeologist shall consult with the Amah Mutsun Tribal Band in the process of designing a survey and monitoring program. 2) Where native soils will be disturbed, UC Santa Cruz shall require contractor crews to attend an informal training session provided by UC Santa Cruz 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	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		and artifacts and to notify UC Santa Cruz if any are found. In the event of a discovery, UC Santa Cruz shall implement item (4), below. 3) If it is determined that a known archaeological site extends into the project's area of potential effects, UC Santa Cruz 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 Section 15064.4. This evaluation may require additional research, including subsurface testing, or avoidance measures, as described in item (5) below. If the archaeological resources is determined to be Native American in origin, and the qualified archaeologist performing the evaluation is not an authorized representative of the Amah Mutsun Tribal Band, the archaeologist shall consult and partner with the Amah Mutsun Tribal Band in the process of evaluating the significance and eligibility of the resource. If the resource does not qualify, or if no resource is present within the project's area of effect, this will be reported in the environmental document and no further mitigation will be required unless there is a discovery during construction. 4) 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. UC Santa Cruz shall contact a qualified archaeologist to provide and implement a plan for survey, subsurface investigation as needed to define 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. If the archeological resource is determined to be Native American in origin, and the qualified archaeologist performing the evaluation is not an authorized representative of the Amah Mutsun Tribal Band, the archaeologist shall consult and partner with the Amah Mutsun Tribal Band in the process of planning a survey program and evaluating the significance and eligibility of the resource. Mitigation Measure 3.4-1(2) and (3) shall also be implemented. 5) If archaeological material within the project's area of effects is determined to qualify as a historical resource or a unique archaeological resource (as defined by CEQA), UC Santa Cruz 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, the establishment of a preservation easement, or more substantial modifications where feasible that will permit avoidance or substantial preservation in place of the resource. If	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		the archeological resource is determined to be Native American in origin, and the qualified archaeologist performing the evaluation is not an authorized representative of the Amah Mutsun Tribal Band, the archaeologist shall consult and partner with the Amah Mutsun Tribal Band in the process of planning a survey program and evaluating the significance and eligibility of the resource. If avoidance or substantial preservation in place is not possible, UC Santa Cruz shall implement Mitigation Measure 3.4-1(6). 6) If avoidance or preservation in place is not possible for an archaeological site that has been determined to meet CEQA significance criteria, before the property is excavated, damaged, or destroyed, UC Santa Cruz shall retain a qualified archaeologist who meets the Secretary of the Interior's Professional Qualification Standards in Archaeology. UC Santa Cruz is aware that the Amah Mutsun Tribal Band (AMTB) maintains a staff of registered professional archaeologists and tribal monitors who engage in cultural resource management through the tribe's nonprofit organization, the Amah Mutsun Land Trust (AMLT). When selecting a qualified archaeologist for work that relates to archaeological resources on campus lands that are determined to be Native American in origin, UC Santa Cruz will include AMTB/AMLT in notifications regarding forthcoming opportunities and contracts. The qualified archaeologist, in consultation with UC Santa Cruz and Native American tribes as applicable, 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. UC Santa Cruz shall also ensure that appropriate technical analyses are performed, and a full written report prepared and filed with the California Historical Resources Information System; UC Santa Cruz shall also provide for the permanent curation of recovered materials.	
Impact 3.4-2: Substantial Adverse Change in the Significance of a Tribal Cultural Resource Future development associated with the 2021 LRDP would involve land development activities that could cause a substantial adverse change in the significance of a tribal cultural resource. Although no specific tribal cultural resources have been identified, there are eight prehistoric archaeological sites that currently exist on the main residential campus, and ground-disturbing construction activities could unearth previously unrecorded resources. This impact would be potentially significant.	PS	**Mitigation Measure 3.4-2: Protect Tribal Cultural Resources** No less than 2 weeks prior to ground disturbance within 400 feet of a known prehistoric archaeological deposit (eight prehistoric archaeological sites are currently known to exist on the main residential campus), UC Santa Cruz shall notify the Amah Mutsun Tribal Band of the potential ground disturbance. As part of the notification, a Native American monitor of the Amah Mutsun Tribal Band will be provided an opportunity to monitor during ground disturbance for potential archaeological materials and human remains within 400 feet of a known prehistoric archaeologic deposit. In addition, as described in Mitigation Measure 3.4-1(1), if a	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		previously unknown prehistoric archaeological deposit is uncovered during construction, a Native American monitor of the Amah Mutsun Tribal Band will be provided the opportunity to monitor grading within 400 feet of the find. If the find is Native American in origin, the Amah Mutsun Tribal Band shall coordinate with UC Santa Cruz regarding appropriate treatment, including preparation and implementation of a formal treatment plan. As described in Mitigation Measure 3.4-1(5), the preferred method of treatment is avoidance and preservation of the resources in place, including, but not limited to, planning and construction to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria. If avoidance or preservation is not possible, potential curation or reinterment (either on-site or at an appropriate off-site location, as designated and previously approved by the tribe), of the encountered tribal cultural resources would be coordinated and approved by the tribe.	
Impact 3.4-3: Impacts to Human Remains Although unlikely, construction and excavation activities associated with project development could unearth previously undiscovered or unrecorded human remains, if they are present. Compliance with California Health and Safety Code Sections 7050.5 and 7052 and PRC Section 5097 would make this impact less than significant.	LTS	No mitigation is required.	LTS
Impact 3.4-4: Impacts to Historical Resources The 2021 LRDP proposes general types of campus development to support projected campus population growth and to enable expanded and new program initiatives, including the renovation of some existing buildings. This could result in damage, destruction, or loss of integrity to a historic building, structure, or district, thereby resulting in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5. This would be a potentially significant impact.	PS	**Mitigation Measure 3.4-4a: Protect Cowell Lime Works Historic District** During project-specific environmental review of development under the 2021 LRDP, UC Santa Cruz shall define the project's area of effect for historic buildings and structures as early as possible. If the project is located within or adjacent to the Cowell Lime Works Historic District, UC Santa Cruz shall take the following measures into account in project design to preserve the historic visual quality of the historic district: ▶ To the greatest extent feasible, a buffer of at least 200 feet shall be maintained between the boundaries of the Cowell Lime Works Historic District and new building development that would be visible against the backdrop of historic buildings from significant campus viewpoints. ▶ Any development, including new buildings, structures, access improvements, within a 500-foot buffer or within the district boundaries shall be evaluated by an architectural historian prior to implementation and conducted in compliance with the "Secretary of the Interior's Standards for the Treatment	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings" (Weeks and Grimmer 1995). ▶ New buildings or structures within 500 feet of the district boundaries shall be subject to design review by the Design Advisory Board, to ensure that design does not interfere with the historic aspect of the district and its buildings with respect to scale, massing, and materials, such that the rural historic visual character of the district is maintained. **Mitigation Measure 3.4-4b: Protect the Potential Campus Core Discontiguous Historic District** During project-specific environmental review of development under the 2021 LRDP, UC Santa Cruz shall define the project's area of effect for historic buildings and structures as early as possible. For projects affecting any building identified as a potential contributor to the potential Campus Core discontiguous historic district, UC Santa Cruz shall implement the following procedures: ▶ For all buildings located within the potential Campus Core discontiguous historic district, projects involving interior alterations or routine maintenance work do not need review by an architectural historian. ▶ For minor exterior repairs that do not alter the visual appearance of the building-such as caused by water damage-to buildings that could be contributors to the potential Campus Core discontiguous historic district, if the repairs meet the "Secretary of the Interior's Standards for the Treatment of Historic Properties," then review by an architectural historian is not required. Buildings that contribute to the potential historic district are Classroom Unit 1, Cowell College, Cowell Student Health Center (original construction), Crown College, East Field House, Hahn Student Services, Jack Baskin Engineering Building, Kerr Hall, Kresge College, McHenry Library, Merrill College, Nat Sci 2 Annex, Nat Sci 2 Main Building, Porter College, Stevenson College, Student Music East-KZSC Radio Station, Theater Arts, Thimann Laboratories, Thimann Lecture Hall, Thimann Receiving Building, and the University House. ▶ For larger exterior repairs, building additions, or demolition of buildings that could be contributors to the potential Campus Core discontiguous historic district, UC Santa Cruz shall retain a qualified architectural historian to determine if the building, or group of buildings, could be contributors. If large repairs, alterations, or demolitions are proposed at Cowell, Crown, Merrill, Porter, or	

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		Stevenson colleges, those groups of buildings shall be evaluated for their potential to comprise separate, individual sub-districts. (Note: Kresge College is not included in this group because Kresge College has been previously evaluated at a district level; due to lack of integrity, the college is not eligible for listing on the National Register of Historic Places [NRHP] or California Register of Historical Resources [CRHR.]) The qualified architectural historian shall record the buildings on the appropriate California Department of Parks and Recreation DPR 523 forms and evaluate the buildings against NRHP and CRHR significance criteria. If the building or group of buildings does not meet the CEQA criteria for a historical resource, no further mitigation is required. If the buildings qualify as a historic resource, the architectural historian and UC Santa Cruz shall consult to consider measures that would enable the project to avoid direct or indirect impacts to the potential Campus Core discontiguous historic district or contributing building. If the project cannot avoid modifications to the building, UC Santa Cruz shall ensure that documentation and treatment shall be carried out by a qualified architectural historian, as follows: a) If the building or structure can be preserved on-site, but remodeling, renovation or other alterations are required, this work shall be conducted in compliance with the "Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings" (Weeks and Grimmer 1995). b) If a significant historic building or structure is proposed for major alteration or renovation, or to be moved and/or demolished, UC Santa Cruz shall ensure that a qualified architectural historian thoroughly documents the building and associated landscaping and setting. Documentation shall include still and video photography and a written documentary record of the building to the standards of the Historic American Building Survey (HABS) or Historic American Engineering Record (HAER), including accurate scaled mapping, architectural descriptions, and scaled architectural plans, if available. A copy of the record shall be deposited in the McHenry Library Special Collections, and with the California Historical Resources Information System. The	

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		record shall be accompanied by a report containing site-specific history and appropriate contextual information. This information shall be gathered through site-specific and comparative archival research, and oral history collection as appropriate. c) If preservation and reuse at the site are not feasible, the historical building shall be documented as described in item (b) and, when it is physically and financially feasible, it shall be moved and preserved or reused. d) If, in the opinion of the qualified architectural historian, the nature and significance of the building is such that its demolition or destruction cannot be fully mitigated through documentation, UC Santa Cruz shall reconsider project plans in light of the high value of the resource, and implement more substantial modifications, where feasible, to the proposed project that would limit the degree of modification or allow the structure to be preserved intact. These could include project redesign, relocation, or abandonment. If no such measures are feasible, the historical building shall be documented as described in item (b). ▶ For new infill construction within the potential historic district that does not involve building demolition: a) Infill projects outside Cowell, Crown, Merrill, Porter, or Stevenson colleges would not affect the potential college sub-districts or the potential Campus Core discontiguous historic district, and do not need review by an architectural historian; and b) Infill projects within Cowell, Crown, Merrill, Porter, or Stevenson College will require review by an architectural historian for elements such as form, massing, and scale, to ensure visual compatibility with the college, and the review shall be conducted in compliance with the "Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings" (Weeks and Grimmer 1995). **Mitigation Measure 3.4-4c: Conduct Project-Specific Surveys and Implement Measures to Protect Previously Unidentified Historic Resources** For areas outside the Cowell Lime Works Historic District and the potential Campus Core discontiguous historic district, as early as possible in the project planning process, UC Santa Cruz shall define the project's area of potential effect for historic structures. UC Santa Cruz shall determine the potential for the project	

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		to result in impacts to or alteration of historic structures, based on the extent of site and building modifications anticipated for the proposed project. Before altering or otherwise affecting a building or structure 50 years old or older that has not been evaluated previously, UC Santa Cruz shall retain a qualified architectural historian to record it at professional standards and assess its significance under CEQA Guidelines Section 15064.4. The evaluation process shall include the development of appropriate historical background research as context for the assessment of the significance of the structure in the history of the UC system, the campus, and the region. For historic buildings, structures or features that do not meet the CEQA criteria for historical resource, no further mitigation is required, and the impact would be less than significant. For a building or structure that qualifies for listing on the CRHR, UC Santa Cruz shall consult with the architectural historian to consider measures that would enable the project to avoid direct or indirect impacts to the building or structure. These could include preserving a building on the margin of the project site, using it "as is," or other measures that would not alter the building. If the project cannot avoid modifications to a significant building or structure, UC Santa Cruz shall ensure that documentation and treatment shall be carried out by a qualified architectural historian, as described below: a) If the building or structure can be preserved on site, but remodeling, renovation or other alterations are required, this work shall be conducted in compliance with the "Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings" (Weeks and Grimmer 1995). b) If a significant historic building or structure is proposed for major alteration or renovation, or to be moved and/or demolished, UC Santa Cruz shall ensure that a qualified architectural historian thoroughly documents the building and associated landscaping and setting. Documentation shall include still and video photography and a written documentary record of the building to the standards of the Historic American Building Survey (HABS) or Historic American Engineering Record (HAER), including accurate scaled mapping, architectural descriptions, and scaled architectural plans, if available. A copy of the record shall be deposited in the McHenry Library Special Collections, and with the California Historical Resources Information System. The record shall be accompanied by a report containing site-specific history and appropriate	

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		contextual information. This information shall be gathered through site specific and comparative archival research, and oral history collection as appropriate. c) If preservation and reuse at the site are not feasible, the historical building shall be documented as described in item (b) and, when it is physically and financially feasible, it shall be moved and preserved or reused. d) If, in the opinion of the qualified architectural historian, the nature and significance of the building is such that its demolition or destruction cannot be fully mitigated through documentation, UC Santa Cruz shall reconsider project plans in light of the high value of the resource, and implement more substantial modifications to the proposed project that would limit the degree of modification or allow the structure to be preserved intact. These could include project redesign, relocation, or abandonment. If no such measures are feasible, the historical building shall be documented as described in item (b).	
3.5. Biological Resources			
Impact 3.5-1: Result in Disturbance or Loss of Special-Status Plant Species Potential land use conversion and development as part of implementation of the 2021 LRDP could result in disturbance to or loss of several special-status plant species if they are present. Additionally, development under the 2021 LRDP could result in introduction or spread of invasive plants during vegetation removal or ground disturbance, which could result in exclusion of special-status plants. Because the loss of special-status plants could substantially affect the abundance, distribution, and viability of local and regional populations of these species, this would be a potentially significant impact.	PS	**Mitigation Measure 3.5-1a: Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey** During the early planning stages of projects under the 2021 LRDP, the following measure shall apply: ▶ A data review and biological reconnaissance survey will be conducted within a particular project site by a qualified biologist prior to project activities (e.g., ground disturbance, vegetation removal, staging, construction) and will be conducted no more than one year prior to project implementation. The qualified biologist must be familiar with the life histories and ecology of species in Santa Cruz County and must have experience conducting field surveys of relevant species or resources, including protocol-level surveys for individual species, if applicable. The data reviewed will include the biological resources setting, species tables, and habitat information in this EIR. It will also include review of the best available, current data for the area, including vegetation mapping data, species distribution/range information, CNDDB, CNPS Inventory of Rare and Endangered Plants of California, consultation with appropriate campus experts (e.g. Campus Natural Reserve Manager) to obtain information on biological resources that may not be captured in other databases, relevant Biogeographic Information and Observation System (BIOS) queries, and relevant general and regional plans. BIOS is a web-based system	LTS

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		that enables the management and visualization of biogeographic data collected by CDFW and partner organizations. The qualified biologist will assess the habitat suitability of the project site for all special-status plant and wildlife species as well as sensitive habitats identified as having potential to occur in the LRDP area (refer to Section 3.5.2, "Environmental Setting"), and will identify any wildlife nursery sites (e.g., heron rookeries, bat maternity roosts, monarch butterfly overwintering colonies, deer fawning areas) within the LRDP area and potential ESHAs within project sites that fall within the coastal zone. The qualified biologist will also conduct a preliminary delineation of sensitive habitats (e.g., wetlands, streams, seeps, sensitive natural communities, ESHAs) within the project site. The biologist will provide a report to UC Santa Cruz with evidence to support a conclusion as to whether special-status species and sensitive habitats are present or are likely to occur within the project site. ▶ If the reconnaissance survey identifies no potential for special-status plant, wildlife species, or sensitive habitats to occur, UC Santa Cruz will not be required to apply any additional mitigation measures under Impact 3.5-1 through 3.5-4. ▶ If the qualified biologist determines that there is potential for special-status species or sensitive habitats to be present within the project site, the appropriate biological mitigation measures, identified herein shall be implemented. **Mitigation Measure 3.5-1b: Conduct Special-Status Plant Surveys and Implement Avoidance Measures and Mitigation** If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for special-status plant species is present within a particular project site, the following measures shall be implemented: ▶ Prior to implementation of project activities and during the blooming period for the special-status plant species with potential to occur in a particular project site, as determined during implementation of Mitigation Measure 3.5-1a, a qualified botanist will conduct protocol-level surveys for special-status plants within the project site following survey methods from CDFW's *Protocols for Surveying and Evaluating Impacts on Special-Status Native Plant Populations and Natural Communities* (CDFW 2018 or most recent version). The qualified botanist will: 1) be knowledgeable about plant taxonomy, 2) be familiar with plants of the Santa Cruz region, including special-status plants and sensitive natural communities, 3) have experience conducting floristic botanical field	

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		surveys as described in CDFW 2018, 4) be familiar with the *California Manual of Vegetation* (Sawyer et al. 2009 or current version, including updated natural communities data at http://vegetation.cnps.org/), and 5) be familiar with federal and state statutes and regulations related to plants and plant collecting. ▶ If special-status plants are not found, the botanist will document the findings in a report to UC Santa Cruz, and no further mitigation will be required. ▶ If special-status plant species are found, the plant will be avoided completely, if feasible (i.e., project objectives can still be met). This may include establishing a no-disturbance buffer around the plants and demarcation of this buffer by a qualified biologist or botanist using flagging or high-visibility construction fencing. The size of the buffer will be determined by the qualified biologist or botanist and will be large enough to avoid direct or indirect impacts on the plant. [Table MM3.5-1, Normal Blooming Period for Special-Status Plants That are Known to Occur or May Occur within the 2021 LRDP Area can be found Section 3.5, "Biological Resources.] ▶ If special-status plants are found during special-status plant surveys and cannot be avoided, UC Santa Cruz shall, in consultation with CDFW or USFWS as appropriate depending on the particular species, develop and implement a site-specific mitigation strategy to achieve no net loss of occupied habitat or individuals. Mitigation measures shall include, at a minimum, preserving and enhancing existing populations, establishing populations through seed collection or transplantation from the site that is to be affected, and/or restoring or creating habitat in sufficient quantities to achieve no net loss of occupied habitat or individuals. Potential mitigation sites could include suitable locations within or outside of the LRDP area, with a preference for on-site mitigation. Habitat and individual plants lost shall be mitigated at a minimum 1:1 ratio, considering acreage as well as function and value. Success criteria for preserved and compensatory populations will include: ▪ The extent of occupied area and plant density (number of plants per unit area) in compensatory populations will be equal to or greater than the affected occupied habitat. ▪ Compensatory and preserved populations will be self-producing. Populations will be considered self-producing when:	

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		• plants reestablish annually for a minimum of five years with no human intervention such as supplemental seeding; and • reestablished and preserved habitats contain an occupied area and flower density comparable to existing occupied habitat areas in similar habitat types in the project vicinity. • If off-site mitigation includes dedication of conservation easements, purchase of mitigation credits, or other off-site conservation measures, the details of these measures will be included in the mitigation plan, including information on responsible parties for long-term management, conservation easement holders, long-term management requirements, success criteria such as those listed above and other details, as appropriate to target the preservation of long term viable populations. **Mitigation Measure 3.5-1c: Implement Measures to Avoid Introduction or Spread of Invasive Plant Species and Plant Pathogens** The following measures shall be implemented prior to vegetation removal and ground disturbance activities to avoid the introduction or spread of plants classified as invasive plant species by the California Invasive Plant Council and plant pathogens including Sudden Oak Death: ▶ UC Santa Cruz shall develop educational information (e.g., brochures, pamphlets) regarding invasive plants and Sudden Oak Death, the implication of the spread of invasive plants and plant pathogens, and proper sanitation practices to prevent the spread of invasive plants and plant pathogens. Construction crews and crews conducting vegetation removal will be provided with this information and instruction from a qualified professional (e.g., arborist, biologist) prior to working in infested or potentially infested areas and will be required to abide by the sanitation practices therein. ▶ Prior to work within areas with species susceptible to Sudden Oak Death, UC Santa Cruz shall retain a qualified professional (e.g., arborist, biologist) who will assess the risk of project activities and will identify and implement measures to reduce or avoid the risk of pathogen spread, including quarantine areas and proper measures for disposal of infested materials (e.g., branches, split wood, wood chips).	

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		▶ Sanitation and prevention measures implemented by UC Santa Cruz or by contractors as specified in contract specifications to reduce or avoid the risk of pathogen spread or proliferation of invasive plant species shall include, but not be limited to, the following and will be further developed and updated based on the best available science and project-specific conditions: ▪ Crews that will be working in infested or potentially infested areas will be provided with or required to carry sanitation kits. Sanitation kits will contain the following: Chlorine bleach [10/90 mixture bleach to water] or Clorox Clean-up or Lysol, scrub brush, metal scraper, boot brush, and plastic gloves. ▪ Shoes, pruning gear, and other equipment will be sanitized using the above-mentioned materials before and after working in areas with species susceptible to Sudden Oak Death. ▪ Clothing, footwear, and equipment used during project activities will be cleaned of soil, seeds, vegetation, or other debris or seed-bearing material before entering the project site or when leaving an area with infestations of invasive plants and noxious weeds. ▪ Heavy equipment and other machinery used in areas with infestations of invasive plant species or Sudden Oak Death will be inspected for the presence of invasive species before use on the project site and will be cleaned before entering the site, to reduce the risk of introducing invasive plant species or plant pathogens. ▪ Equipment will be staged in areas free of invasive plant infestations.	
Impact 3.5-2: Result in Disturbance to or Loss of Special-Status Wildlife Species and Habitat Implementation of the 2021 LRDP would include land use conversion and development activities including ground disturbance, vegetation removal, and overall conversion of wildlife habitat, which could result in disturbance, injury, or mortality of several special-status wildlife species if present, reduced breeding productivity of these species, and loss of species habitat. This would be a potentially significant impact.	PS	**Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey** **Mitigation Measure 3.5-2a: Conduct Site-Specific Habitat Suitability Analysis for California Red-Legged Frog, Obtain Incidental Take Authorization through Consultation with USFWS, Implement Minimization Measures** If it is determined through implementation of Mitigation Measure 3.5-1a that aquatic or upland habitat determined to be suitable for California red-legged frog migration, dispersal, foraging, or refuge is present within a particular project site, the following measures shall be implemented during the planning stages for each individual project under the 2021 LRDP: ▶ A qualified biologist will conduct a site-specific habitat suitability verification analysis to confirm the likelihood of the species to be present. To be	LTS

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		qualified, the biologist will: 1) be knowledgeable in California red-legged frog life history and ecology, 2) be able to correctly identify California red-legged frogs and habitats, 3) have experience conducting field surveys of relevant resources, 4) be knowledgeable about state and federal laws regarding the protection of special-status species, and 5) have experience using CDFW's CNDDB. The habitat assessment will include, but will not be limited to: ▪ Identification or verification of the vegetation communities present in the project site. ▪ Consideration of known occurrences within the LRDP area; ▪ Description of the project, including proposed project construction activities; ▪ Analysis of the type and likelihood of impacts on California red-legged frog as a result of project implementation; and ▪ Potential project modifications or additional measures that may avoid and minimize mortality, injury, and disturbance of California red-legged frog and habitat. ▶ Results of the site-specific habitat suitability verification analysis will be submitted to UC Santa Cruz for review and consideration. ▶ Based on the results of the site-specific habitat suitability verification analysis, a qualified biologist will determine if any of the following would occur: injury or mortality of California red-legged frog; or disturbance of individuals or adverse effects on California red-legged frog breeding, upland refugia, or dispersal habitat. ▪ If a qualified biologist determines that the individual project would have no substantial adverse effect on red-legged frog or its habitat and would not result in any injury or mortality, implementation of that individual project may proceed. ▪ For those areas where adverse modification of critical habitat or disturbance, injury, or mortality of California red-legged frog cannot be avoided, UC Santa Cruz shall, in consultation with USFWS, implement impact minimization for construction-related impacts (e.g., installation of exclusion fencing around the project construction site) and compensatory actions for habitat impacts, including purchase of credits at a conservation bank or creation of additional habitat at a minimum 1:1	

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		mitigation ratio, as well as adaptive management strategies to ensure long-term conservation of mitigation lands. No actions that could adversely affect California red-legged frog will be allowed if adverse effects would result, unless consultation with USFWS is completed and additional measures are implemented. To the extent the project may result in "take" of the species, UC Santa Cruz shall pursue incidental take coverage by either pursuing consultation and biological opinion under Section 7 of the federal ESA (where there is some federal nexus) or by developing a Habitat Conservation Plan (HCP), which would require authorization by USFWS under Section 10 of the ESA. Such an HCP could provide long-term conservation and incidental take coverage for species listed under ESA with potential to occur in the LRDP area: California red-legged frog and Ohlone tiger beetle. Typically, HCPs include the following: ▶ Measures that UC Santa Cruz will undertake to monitor, minimize, and mitigate for such impacts, the funding available to implement such measures, and the procedures to deal with unforeseen or extraordinary circumstances. ▶ Alternative actions to the taking analyzed by UC Santa Cruz, and the reasons why the alternatives were not adopted. ▶ Biological goals and objectives, which would define the expected biological outcome for each species covered by the HCP. ▶ Adaptive management, which includes methods for addressing uncertainty and also monitoring and feedback to biological goals and objectives. ▶ Monitoring for compliance, effectiveness, and effects. ▶ Permit duration which is determined by the time-span of the project and designed to provide the time needed to achieve biological goals and address biological uncertainty. **Mitigation Measure 3.5-2b: Conduct Preconstruction Surveys for Special-Status Amphibians and Implement Avoidance Measures** If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for California giant salamander, foothill yellow-legged frog, or Santa Cruz black salamander is present within a particular project site, the following measures shall be implemented no more than 48 hours prior to commencement of project activities (e.g., vegetation removal, ground disturbance, staging) of a project under the 2021 LRDP:	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▶ A qualified biologist familiar with the life cycle of California giant salamander, foothill yellow-legged frog, and Santa Cruz black salamander will conduct preconstruction surveys within the project site. Preconstruction surveys for special-status amphibian species will be conducted throughout the project site and a 400-foot buffer around the project site. Surveys will consist of "walk and turn" surveys of areas beneath surface objects (e.g., rocks, leaf litter, moss mats, coarse woody debris) for salamanders, and visual searches for frogs. Preconstruction surveys will be conducted within the appropriate season to maximize potential for observation for each species, and appropriate surveys will be conducted for the applicable life stages (i.e., eggs, larvae, adults). ▶ If special-status amphibians are not detected during the preconstruction survey, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and further mitigation will not be required. ▶ If special-status amphibians are detected during the preconstruction survey, UC Santa Cruz shall, in consultation with CDFW, develop and institute, at a minimum, project design modifications (e.g., specific building materials and surfacing requirements), relocation of individual animals, installation of exclusionary fencing, and/or other measures recommended by CDFW as necessary to ensure that no injury to or mortality of these species would occur. ▶ If "take" of foothill yellow-legged frog under CESA is unavoidable, UC Santa Cruz shall seek and obtain an incidental take permit from CDFW and implement any additional measures necessary to minimize, compensate for, and fully mitigate impacts on foothill yellow-legged frog. These additional measures shall include, at a minimum, some combination of the following measures: installation of exclusion fencing around project sites, purchase of credits at a conservation bank, creation of additional habitat, and/or adaptive management strategies. **Mitigation Measure 3.10-5a: Implement Procedures for Building on Karst Where Groundwater Is Encountered and Where Pressure Grouting Is Required** *(Refer to Section 3.10, "Hydrology and Water Quality")* **Mitigation Measure 3.5-2c: Conduct Preconstruction Surveys for Southwestern Pond Turtle, Implement Avoidance Measures, and Relocate Individuals** If it is determined through implementation of Mitigation Measure 3.5-1a that aquatic or upland habitat suitable for southwestern pond turtle is present or that southwestern pond turtle was otherwise determined to be historically present	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		within a particular project site, the following measures shall be implemented no more than 48 hours prior to commencement of project activities (e.g., vegetation removal, ground disturbance, staging) of a project under the 2021 LRDP: ▶ A qualified biologist familiar with the life history of southwestern pond turtle and experienced in performing surveys for southwestern pond turtle will conduct a focused survey of habitat suitable for the species within the project site. If aquatic habitat potentially suitable for the species is present within a project site (e.g., streams, ponds, drainages), upland habitat within approximately 1,600 feet of this aquatic habitat will also be surveyed. The qualified biologist will inspect the project site for southwestern pond turtles as well as suitable burrow habitat. ▶ If southwestern pond turtles are not detected during the focused survey, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and further mitigation will not be required. ▶ If southwestern pond turtles are detected, a no-disturbance buffer of at least 100 feet will be established around any identified nest sites or overwintering sites. A qualified biologist with an appropriate CDFW Scientific Collecting Permit that allows handling of reptiles will be present during initial ground disturbance activities and will inspect the project site before initiation of project activities. If southwestern pond turtles are detected, the qualified biologist will move the turtles downstream and out of harm's way. **Mitigation Measure 3.5-2d: Conduct Preconstruction Surveys for Coast Horned Lizard, Implement Avoidance Measures, and Relocate Individuals** If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for coast horned lizard (e.g., chaparral, coyote brush) is present within a particular project site, the following measures shall be implemented no more than 48 hours prior to commencement of project activities (e.g., vegetation removal, ground disturbance, staging) of a particular project under the 2021 LRDP: ▶ A qualified biologist familiar with the life history of coast horned lizard and experienced in performing surveys for the species will conduct a focused visual survey of habitat suitable for the species within the project site, which will include walking linear transects of the project site. ▶ If coast horned lizards are not detected during the focused survey, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and further mitigation will not be required.	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▶ If coast horned lizards are detected, a qualified biologist with an appropriate CDFW Scientific Collecting Permit that allows handling of reptiles will be present during initial ground disturbance activities and will inspect the project site before initiation of project activities. If coast horned lizards are detected, the qualified biologist will move the lizards into nearby habitat and out of harm's way. **Mitigation Measure 3.5-2e: Conduct Protocol-Level Surveys for Burrowing Owl, Implement Avoidance Measures, and Compensate for Loss of Occupied Burrows** If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for burrowing owl is present within a project site, the following measures shall be implemented prior to and during construction of a particular project under the 2021 LRDP: ▶ A qualified biologist will conduct focused breeding and nonbreeding season surveys for burrowing owls in areas of habitat suitable for the species identified during the reconnaissance-level survey (e.g., ruderal grassland, successional grassland, scrub habitat with sparse shrub cover) on and within 1,500 feet of the project site. Surveys will be conducted before the start of project activities and in accordance with Appendix D of the *CDFW Staff Report on Burrowing Owl Mitigation* (CDFW 2012, or most current version) (CDFW Staff Report). ▶ If no occupied burrows are found, the qualified biologist will submit a report documenting the survey methods and results to UC Santa Cruz, and no further mitigation will be required. ▶ If an active burrow is found within 1,500 feet of pending construction activities that would occur during the nonbreeding season (September 1 through January 31), UC Santa Cruz shall establish and maintain a minimum protection buffer of 165 feet around the occupied burrow throughout construction. The protection buffer may be adjusted if, in consultation with CDFW, a qualified biologist determines that an alternative buffer will not disturb burrowing owl use of the burrow because of particular site features or other buffering measures. If occupied burrows are present that cannot be avoided or adequately protected with a no-disturbance buffer, a burrowing owl exclusion plan will be developed, as described in Appendix E of the CDFW Staff Report. Burrowing owls will not be excluded from occupied burrows until the project burrowing owl exclusion plan is approved by CDFW. The exclusion plan will include a compensatory habitat mitigation plan (see below).	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▶ If an active burrow is found during the breeding season (February 1 through August 31), occupied burrows will not be disturbed and will be provided with a protective buffer at a minimum of 650 feet unless a qualified biologist verifies through noninvasive means that either: (1) the birds have not begun egg laying, or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. The size of the buffer may be adjusted depending on the time of year and level of disturbance as outlined in the CDFW Staff Report. The size of the buffer may be reduced if a broad-scale, long-term, monitoring program acceptable to CDFW is implemented so that burrowing owls are not adversely affected. Once the fledglings are capable of independent survival, the owls can be evicted and the burrow can be destroyed per the terms of a CDFW-approved burrowing owl exclusion plan developed in accordance with Appendix E of CDFW Staff Report. ▶ If burrowing owls are evicted from burrows and the burrows are destroyed by implementation of project activities, UC Santa Cruz will mitigate the loss of occupied habitat in accordance with guidance provided in the CDFW Staff Report, which states that permanent impacts on nesting, occupied and satellite burrows, and burrowing owl habitat (i.e., grassland habitat with suitable burrows) will be mitigated such that habitat acreage and number of burrows are replaced through permanent conservation of comparable or better habitat with similar vegetation communities and burrowing mammals (e.g., ground squirrels) present to provide for nesting, foraging, wintering, and dispersal. UC Santa Cruz will retain a qualified biologist to develop a burrowing owl mitigation and management plan that incorporates the following goals and standards: ▪ Mitigation lands will be selected based on comparison of the habitat lost to the compensatory habitat, including type and structure of habitat, disturbance levels, potential for conflicts with humans, pets, and other wildlife, density of burrowing owls, and relative importance of the habitat to the species throughout its range. ▪ If feasible, mitigation lands will be provided adjacent or proximate to the project site so that displaced owls can relocate with reduced risk of injury or mortality. Feasibility of providing mitigation adjacent or proximate to the project site depends on availability of sufficient habitat to support displaced owls that may be preserved in perpetuity.	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▪ If habitat suitable for burrowing owl is not available for conservation adjacent or proximate to the project site, mitigation lands can be secured off-site and will aim to consolidate and enlarge conservation areas outside of planned development areas and within foraging distance of other conservation lands. Mitigation may be also accomplished through purchase of mitigation credits at a CDFW-approved mitigation bank, if available. Alternative mitigation sites and acreages may also be determined in consultation with CDFW. ▪ If burrowing owl habitat mitigation is completed through permittee-responsible conservation lands, the mitigation plan will include mitigation objectives, site selection factors, site management roles and responsibilities, vegetation management goals, financial assurances and funding mechanisms, performance standards and success criteria, monitoring and reporting protocols, and adaptive management measures (e.g., measures required if performance standards and success criteria are not met). Success will be based on the number of adult burrowing owls and pairs using the site and if the numbers are maintained over time. Measures of success, as suggested in the CDFW Staff Report, will include site tenacity, number of adult owls present and reproducing, colonization by burrowing owls from elsewhere, changes in distribution, and trends in stressors. **Mitigation Measure 3.5-2f: Conduct Focused Surveys for Special-Status Birds, Nesting Raptors, and Other Native Nesting Birds and Implement Protective Buffers** If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for nesting birds is present within a project site, the following measures shall be implemented prior to and during construction of a project under the 2021 LRDP: ▶ To minimize the potential for loss of special-status bird species, raptors, and other native birds, project activities (e.g., tree removal, other vegetation removal, ground disturbance, staging) will be conducted during the nonbreeding season (approximately September 1-January 31, as determined by a qualified biologist), if feasible. If project activities are conducted during the nonbreeding season, no further mitigation will be required. ▶ Within 14 days before the onset of project activities during the breeding season (approximately February 1 through August 31, as determined by a qualified biologist), a qualified biologist familiar with birds of California and with experience conducting nesting bird surveys will conduct focused surveys	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		for special-status birds, other nesting raptors, and other native birds and will identify active nests within 0.5 mile of the project site. ▶ Because the nests of olive-sided flycatcher, yellow warbler, and yellow-breasted chat are small and difficult to find, occupancy of habitat suitable for these species (i.e., riparian woodland) for these species will be determined by a qualified biologist familiar with the life history of olive-sided flycatcher, yellow warbler, and yellow-breasted chat and with experience identifying the calls of these species. If olive-sided flycatcher, yellow warblers, or yellow-breasted chats are observed calling, exhibiting territorial displays, carrying nest materials, carrying prey, or other signs of breeding behavior, the habitat will be considered occupied. This protocol for determining occupancy of a nest may be extended to other bird species with nests that are difficult to locate at the discretion of the qualified biologist. ▶ Impacts on nesting birds will be avoided by establishing appropriate buffers around active nest sites identified during focused surveys to prevent disturbance to the nest. Project activity will not commence within the buffer areas until a qualified biologist has determined that the young have fledged, the nest is no longer active, or reducing the buffer will not likely result in nest abandonment. An avoidance buffer of a minimum of 0.25 mile will be implemented for American peregrine falcon, bald eagle, golden eagle, and white-tailed kite, in consultation with CDFW. For other species, a qualified biologist will determine the size of the buffer for non-raptor nests after a site- and nest-specific analysis. Buffers typically will be 500 feet for raptors (other than special-status raptors) and 100 feet for non-raptor species. Factors to be considered for determining buffer size will include presence of natural buffers provided by vegetation or topography, nest height above ground, baseline levels of noise and human activity, species sensitivity, and proposed project activities. The size of the buffer may be adjusted if a qualified biologist, determines that such an adjustment would not be likely to adversely affect the nest. Any buffer reduction for a special-status species will require consultation with CDFW. Periodic monitoring of the nest by a qualified biologist during project activities will be required if the activity has potential to adversely affect the nest, the buffer has been reduced, or if birds within active nests are showing behavioral signs of agitation (e.g., standing up from a brooding position, flying off the nest) during project activities, as determined by the qualified biologist.	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▶ Removal of bald eagle and golden eagle nests is prohibited regardless of the occupancy status under the federal Bald and Golden Eagle Protection Act. If bald eagle or golden eagle nests are found during focused surveys, then the nest will not be removed. **Mitigation Measure 3.5-2g: Limit Human Disturbance of Cave Ecosystems** UC Santa Cruz shall continue to limit visitation of caves on campus and discourage activities by members of the public that could jeopardize the physical integrity, condition, or scientific value of the caves, through exclusion of access to the caves with bat-friendly fencing (i.e., fencing that allows unimpeded ingress and egress by bats), appropriate signage and educational literature, Campus Natural Reserve website information, or other appropriate measures. **Mitigation Measure 3.5-2h: Conduct Focused Surveys for Monarch Overwintering Colonies and Implement Avoidance Measures** If it is determined through implementation of Mitigation Measure 3.5-1a that a monarch overwintering colony or suitable overwintering habitat is present within a particular project site, the following measures shall be implemented: ▶ To minimize the potential for loss of monarch overwintering colonies, project activities that include vegetation removal within suitable overwintering habitat (e.g., coniferous forest, eucalyptus forest) will be conducted from April through September to avoid the overwintering season (October through March), if feasible. If project activities are conducted outside of the overwintering season, no further mitigation will be required. ▶ Within 14 days before the onset of project activities that include vegetation removal between October 1st and March 31st, a qualified biologist familiar with monarchs and monarch overwintering habitat will conduct focused surveys for monarch colonies within habitat suitable for the species in the project site and will identify any colonies found within the project site. ▶ Monarch overwintering colonies that are identified within a project site will be demarcated with flagging or high-visibility construction fencing to prevent removal of the stand of trees containing the overwintering colony and encroachment by heavy machinery, vehicles, or personnel. Monarch overwintering colonies shall be protected throughout the duration of their presence within a project site. ▶ If modification or removal of a where overwintering monarchs have been identified overwintering colony is required for project implementation, and	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		the project cannot be redesigned to avoid modification or removal of the stand, then UC Santa Cruz will prepare and implement a site-specific plan for the stand with the goal of maintaining habitat function for the monarch overwintering colony, following recommendations from *Protecting California's Butterfly Groves Management Guidelines for Monarch Butterfly Overwintering Habitat* (Xerces 2017). Examples of management strategies that could be considered include: ▪ remove or trim hazard trees; ▪ selectively remove or trim of trees to create a heterogeneous habitat that provides access to sunlight and shade for monarchs; ▪ maintain suitable wind protection in the stand; and ▪ replace removed trees with native trees in strategic locations to provide additional wind protection. **Mitigation Measure 3.5-2i: Conduct Site-Specific Habitat Suitability Analysis for Ohlone Tiger Beetle, Obtain Incidental Take Authorization through Consultation with USFWS, Implement Minimization Measures** If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for Ohlone tiger beetle is present within a particular project site (i.e., grassland or coastal prairie with Watsonville soils, Figure 3.5-8), the following measures shall be implemented during the planning stages of a project under the 2021 LRDP: ▶ A qualified biologist will conduct a site-specific habitat suitability verification analysis within a project site to determine the likelihood of the species to be present. To be qualified, the biologist will: 1) be knowledgeable in Ohlone tiger beetle life history and ecology, 2) be able to correctly identify Ohlone tiger beetles and habitats, 3) have experience conducting field surveys of relevant resources, 4) be knowledgeable about state and federal laws regarding the protection of special-status species, and 5) have experience using CDFW's CNDDB. The habitat assessment will include, but will not be limited to: ▪ Identification or verification of the vegetation communities present in the project site. ▪ Consideration of known occurrences within the LRDP area; ▪ Description of the project, including proposed project construction activities;	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▪ Analysis of the type and likelihood of impacts on Ohlone tiger beetle as a result of project implementation; and ▪ Potential project modifications or additional measures that may avoid and minimize mortality, injury, and disturbance of Ohlone tiger beetle and habitat. ▶ Results of the site-specific habitat suitability verification analysis will be submitted to UC Santa Cruz for review and consideration. ▶ Based on the results of the site-specific habitat suitability verification analysis, a qualified biologist will determine if any of the following would occur: loss of habitat function for Ohlone tiger beetle; injury or mortality of Ohlone tiger beetle; or disturbance of Ohlone tiger beetle that could substantially disrupt essential behavior patterns (e.g., breeding, feeding, or sheltering) to such an extent that injury or mortality is likely. ▪ If a qualified biologist determines that the individual project would have no substantial adverse effect on Ohlone tiger beetle or its habitat and would not result in any injury or mortality, implementation of that individual project may proceed. ▪ For those areas where disturbance, injury, or mortality of Ohlone tiger beetle cannot be avoided, UC Santa Cruz shall, in consultation with USFWS, implement impact minimization (e.g., preconstruction surveys and biological monitoring) and compensatory actions, including purchase of credits at a conservation bank, creation of additional habitat, and adaptive management strategies. No actions that could adversely affect Ohlone tiger beetle will be allowed if adverse effects would result, unless consultation with USFWS is completed and additional measures, as required by USFWS, are implemented. To the extent the project may result in "take" of the species, UC Santa Cruz may pursue incidental take coverage either by pursuing consultation and biological opinion under Section 7 of the federal ESA (where there is some federal nexus) or by developing an HCP, as described in Mitigation Measure 3.5-2a, which would require authorization by USFWS under Section 10 of the ESA. Such an HCP would provide incidental take coverage for species listed under ESA with potential to occur in the LRDP area: California red-legged frog and Ohlone tiger beetle. Typically, HCPs include the following elements, among others:	

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		▶ Measures that UC Santa Cruz will undertake to monitor, minimize, and mitigate for such impacts, the funding available to implement such measures, and the procedures to deal with unforeseen or extraordinary circumstances. ▶ Additional measures that USFWS may require. ▶ Biological goals and objectives, which would define the expected biological outcome for each species covered by the HCP. ▶ Adaptive management, which includes methods for addressing uncertainty and also monitoring and feedback to biological goals and objectives. ▶ Monitoring for compliance, effectiveness, and effects. ▶ Permit duration which is determined by the time-span of the project and designed to provide the time needed to achieve biological goals and address biological uncertainty. **Mitigation Measure 3.5-2j: Conduct Focused American Badger Survey and Establish Protective Buffers** If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for American badger is present within a particular project site, the following measures shall be implemented: ▶ Within 30 days before commencement of project activities, a qualified wildlife biologist with familiarity with American badger and experience using survey methods for the species will conduct focused surveys of habitat suitable for the species within the project site to identify any American badger dens. ▶ If occupied dens are not found, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and further mitigation will not be required. ▶ If occupied dens are found, impacts on active badger dens will be avoided by establishing exclusion zones around all active badger dens, the size of which will be determined by the qualified biologist. No project activities (e.g., vegetation removal, ground disturbance, staging) will occur within the exclusion zone until denning activities are complete or the den is abandoned, as confirmed by a qualified biologist. The qualified biologist will monitor each den once per week to track the status of the den and to determine when it is no longer occupied. When it is no longer occupied, project activities within the exclusion zone may occur.	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Mitigation Measure 3.5-2k: Conduct Focused Noninvasive Surveys for Mountain Lion Dens and Implement Avoidance Measures If it is determined through implementation of Mitigation Measure 3.5-1a that den habitat potentially suitable for mountain lion is present within a particular project site (e.g., caves, other large natural cavities, thickets) or signs of mountain lion activities are observed (e.g., tracks, scat, carcasses or bones of prey species), the following measures shall be implemented to avoid take of mountain lions or destruction of den habitat: ▶ Within 30 days before commencement of project activities, a qualified wildlife biologist with familiarity with mountain lion and experience using survey methods for the species will conduct focused surveys of habitat suitable for the species within the project site to identify any potential mountain lion dens. Potential mountain lion dens will include caves, large natural cavities within rocky areas, or thickets deemed appropriate for use by mountain lions based on size and other characteristics (e.g., proximity to human development, surrounding habitat). The qualified wildlife biologist will also survey for signs of mountain lion (e.g., tracks, scat, prey items) in the vicinity of the cave, cavity, or thicket to help determine whether the den may be occupied by mountain lions. If the start of project activities lapses and more than 30 days pass since the survey was completed, an additional survey shall be conducted. ▶ If no potential dens are found, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and no further mitigation will be required. ▶ If potential dens are found, further investigation will be required to determine if the den is being used by a mountain lion or another carnivore species (e.g., coyote [Canis latrans], bobcat [Lynx rufus], gray fox [*Urocyon cinreoargenteus*]). Survey methods will include the use of trail cameras, track plates, hair snares, or other noninvasive methods. Surveys using these noninvasive methods will be conducted for three days and three nights to determine whether the den is occupied by mountain lions. ▪ If the den is determined to be unoccupied by any carnivore species, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and no further mitigation will be required.	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▪ If the den is determined to be unoccupied by mountain lion, but is occupied by another carnivore species, the den will not be disturbed while the young of any species are dependent on the den for shelter. ▪ If the den is determined to be occupied by mountain lion, a no-disturbance buffer of at least 2,000 feet will be established around the occupied den within which no project activities will occur, and UC Santa Cruz will notify and consult with CDFW to identify additional adequate seasonal restrictions and/or no disturbance buffers to avoid disturbance, injury, or mortality of mountain lion. **Mitigation Measure 3.5-2l: Conduct Focused Surveys for Ringtail** If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for ringtail is present within a particular project site (e.g., forest or chaparral habitat within 0.6 mile of a permanent water source), the following measures shall be implemented: ▶ To minimize the potential for loss of ringtail and active ringtail dens, project activities (e.g., tree removal, other vegetation removal, ground disturbance, staging) within potentially suitable ringtail habitat will be conducted outside of the ringtail breeding season (not well defined, but likely approximately March 1 to July 31), if feasible. ▶ Within seven days before initiation of project activities within potentially suitable ringtail habitat, a qualified biologist with familiarity with ringtail and experience conducting ringtail surveys will conduct a focused survey for potential ringtail dens (e.g., hollow trees, snags, rock crevices) within the project site. The qualified biologist will identify sightings of individual ringtails, as well as potential dens. ▶ If individuals or potential or occupied dens are not found, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and further mitigation will not be required. ▶ If ringtails are identified or if potential dens are located, an appropriate method will be used by the qualified wildlife biologist to confirm whether a ringtail is occupying the den. This may include use of remote field cameras, track plates, or hair snares. Other devices, such as a fiber optic scope, may be utilized to determine occupancy. ▪ If no ringtail occupies the potential den, the entrance will be temporarily blocked so that no other animals occupy the project site during project	

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		activities, but only after it has been fully inspected. The blockage will be removed once the project activities are completed. ▪ If a den is found to be occupied by a ringtail, a no-disturbance buffer will be established around the occupied den. The no-disturbance buffer will include the den tree (or other structure) plus a suitable buffer as determined by the biologist in coordination with CDFW. Project activities in the no-disturbance buffer will be avoided until the den is unoccupied as determined by the qualified wildlife biologist in coordination with CDFW. **Mitigation Measure 3.5-2m: Conduct Focused Surveys for San Francisco Dusky-Footed Woodrat, Implement Avoidance Measures, or Relocate Nests** If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for San Francisco dusky-footed woodrat is present within a particular project site, the following measures shall be implemented: ▶ Within seven days before initiation of project activities, a qualified biologist with familiarity with woodrats and experience conducting woodrat surveys will conduct a focused survey for San Francisco dusky-footed woodrat nests within the project site. ▶ If no woodrat nests are found during the focused survey, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and no further mitigation will be required. ▶ If woodrat nests are detected within the project site, the qualified biologist will determine whether the nest is active. The status of a nest is typically determined through the presence of large amounts of scat. If active woodrat nests are present that can be avoided, the perimeter of these nests will be demarcated with high-visibility construction fencing to prevent accidental encroachment by vehicles, equipment, or personnel. ▶ If active woodrat nests within a project site are detected that cannot be avoided, and project activities are planned to occur during the woodrat breeding season (April through June), these active nests must be avoided until the end of the breeding season. ▶ If active woodrat nests within a project site cannot be avoided, and project activities are planned to occur outside of the woodrat breeding season, a qualified biologist in consultation with CDFW will dismantle the woodrat nest by hand, removing the materials layer by layer to allow adult woodrats to escape. If young are discovered during the disassembling process, the	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		qualified biologist will leave the area for at least 24 hours to allow the adult woodrats to relocate their young on their own. ▶ When the disassembly process is completed, the nest materials will be collected and moved to another suitable nearby location to allow for nest reconstruction. **Mitigation Measure 3.5-2n: Conduct Focused Bat Surveys and Implement Avoidance Measures** If it is determined through implementation of Mitigation Measure 3.5-1a that suitable roost habitat for pallid bat, Townsend's big-eared bat, and western red bat is present within a particular project site, the following measures shall be implemented: ▶ In the early planning stages of individual projects under the 2021 LRDP, a qualified biologist with familiarity with bats and bat ecology, and experienced in conducting bat surveys will conduct surveys for bat roosts in suitable habitat (e.g., large trees, crevices, cavities, exfoliating bark, bridges, unoccupied buildings) within and adjacent to the particular project site. ▶ If no evidence of bat roosts is found, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and no further study will be required. ▶ If evidence of bat roosts is observed, the species and number of bats using the roost will be determined. Bat detectors shall be used if deemed necessary to supplement survey efforts by the qualified biologist. ▶ A no-disturbance buffer of 250 feet will be established around active pallid bat, Townsend's big-eared bat, or western red bat roosts, and project activities will not occur within this buffer until after the roosts are unoccupied. ▶ If roosts of pallid bat, Townsend's big-eared bat, or western red bat are determined to be present and must be removed, the bats will be excluded from the roosting site before the tree, building, or other structure is removed. A program addressing compensation, exclusion methods, and roost removal procedures will be developed in consultation with CDFW before implementation. Exclusion methods may include use of one-way doors at roost entrances (bats may leave but not reenter) or sealing roost entrances when the site can be confirmed to contain no bats. Exclusion efforts may be restricted during periods of sensitive activity (e.g., during hibernation or while females in maternity colonies are nursing young). The loss of each roost (if any) will be replaced in consultation with CDFW and may require construction and	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		installation of bat boxes suitable to the bat species and colony size excluded from the original roosting site. If determined necessary during consultation with CDFW, replacement roosts will be implemented before bats are excluded from the original roost sites. Once the replacement roosts are constructed and it is confirmed that bats are not present in the original roost site by a qualified biologist, the roost tree, building, or other structure may be removed.	
Impact 3.5-3: Result in Degradation or Loss of Riparian Habitat or Other Sensitive Natural Communities Implementation of projects under the 2021 LRDP would include potential land use conversion and development activities including ground disturbance, vegetation removal, and land development, which could result in the degradation or loss of riparian habitat, other sensitive natural communities, or ESHAs, or the reduction in the function of these habitats, if present. This would be a potentially significant impact.	PS	**Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey** **Mitigation Measure 3.5-1c: (above) Implement Measures to Avoid Introduction or Spread of Invasive Plant Species and Plant Pathogens** **Mitigation Measure 3.5-3a: Conduct Protocol-Level Surveys for Sensitive Natural Communities and Riparian Habitat and Implement Avoidance Measures** If it is determined through implementation of Mitigation Measure BIO-3.5-1a that sensitive natural communities or riparian habitat may be present within a particular project site, the following measures shall be implemented before implementation of project activities: ▶ A qualified botanist will perform a protocol-level survey of the project site for sensitive natural communities and sensitive habitats (including riparian habitat and ESHAs) following the CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018). Sensitive natural communities will be identified using the best available and current data, including keying them out using the most current edition of A Manual of California Vegetation (including updated natural communities data at http://vegetation.cnps.org/), or referring to relevant reports (e.g., reports found on the VegCAMP website). ▶ Before implementation of project activities, development setbacks will be established around all sensitive habitats identified during surveys, and these setbacks will be flagged or fenced with brightly visible construction flagging and/or fencing under the direction of the qualified biologist and no project activities (e.g., vegetation removal (including herbicide application), ground disturbance, staging) will occur within these areas. Setback distances will be dependent on various factors (e.g., presence of special-status wildlife or plant species) and determined by a qualified biologist in consultation with the appropriate agency (e.g., CDFW, CCC), but will generally be at minimum of 50 feet. Foot traffic by personnel will also be limited in these areas to prevent the	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		introduction of invasive or weedy species or inadvertent crushing of plants. Periodic inspections during construction will be conducted by the monitoring biologist to maintain the integrity of exclusion fencing/flagging throughout the period of construction involving ground disturbance. ▶ If sensitive natural communities are identified within a project site that cannot be avoided, Mitigation Measure 3.5-3b shall apply. ▶ If project implementation cannot avoid and thus may adversely affect the bed, bank, channel, or associated riparian habitat subject to CDFW jurisdiction under California Fish and Game Code Section 1602, Mitigation Measure 3.5-3c shall apply. **Mitigation Measure 3.5-3b: Compensate for Unavoidable Loss of Sensitive Natural Communities** If after implementation of Mitigation Measure 3.5-3a sensitive natural communities are determined to be present within a particular project site and these habitats cannot be avoided, the following measures shall be implemented: ▶ Compensate for unavoidable loss of any sensitive natural community habitat function such that no net loss of habitat function occurs by: ▪ restoring sensitive natural community habitat function within the project site (e.g., using locally collected seed or cuttings); ▪ restoring degraded sensitive natural communities outside of the project site at a sufficient ratio to offset the loss of habitat function (at least 3:1 for coastal prairie and at least 1:1 for other sensitive natural communities); or ▪ preserving existing sensitive natural communities of equal or better value to the sensitive natural community affected through a conservation easement at a sufficient ratio to offset the loss of habitat function (at least 3:1 for coastal prairie and at least 1:1 for other sensitive natural communities). ▶ Prepare and implement a Compensatory Mitigation Plan that includes the following: ▪ For preserving existing habitat outside of the project site in perpetuity, the Compensatory Mitigation Plan will include a summary of the proposed compensation lands (e.g., the number and type of credits, location of mitigation bank or easement), parties responsible for the	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		long-term management of the land, and the legal and funding mechanism for long-term conservation (e.g., holder of conservation easement or fee title). UC Santa Cruz will provide evidence in the plan that the necessary mitigation has been implemented or that UC Santa Cruz has entered into a legal agreement to implement it and that compensatory habitat will be preserved in perpetuity. ▪ For restoring or enhancing habitat within the project site or outside of the project site, the Compensatory Mitigation Plan will include a description of the proposed habitat improvements, success criteria that demonstrate the performance standard of maintained habitat function has been met, legal and funding mechanisms, and parties responsible for long-term management and monitoring of the restored or enhanced habitat. ▪ Success criteria required to maintain habitat function for preserved and compensatory populations would include: • The extent of occupied area and density of plants associated with the sensitive natural community (number of plants per unit area) in compensatory habitats would be equal to or greater than the affected occupied habitat. • Compensatory and preserved sensitive natural communities would be self-producing. Populations would be considered self-producing when: • Plants associated with sensitive natural communities reestablish annually for a minimum of five years with no human intervention such as supplemental seeding; and • Reestablished and preserved habitats contain an occupied area and density comparable to existing occupied habitat areas in similar habitat types in the project vicinity. ▶ Impacts on sensitive natural communities considered ESHAs within the coastal zone will require a coastal development permit pursuant to the CCA and compliance with any requirements therein. **Mitigation Measure 3.5-3c: Compensate for Unavoidable Loss of Riparian Habitat** If after implementation of Mitigation Measure 3.5-3a riparian habitat is determined to be present within a particular project site and the habitat cannot be avoided, the following measures shall be implemented:	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▶ A Streambed Alteration Notification will be submitted to CDFW, pursuant to Section 1602 of the California Fish and Game Code. If proposed project activities are determined to be subject to CDFW jurisdiction, UC Santa Cruz will abide by the measures to protect fish and wildlife resources required by any executed agreement prior to any vegetation removal or activity that may affect the resource. Measures to protect fish and wildlife resources shall include, at a minimum, a combination of the following mitigation. ▶ UC Santa Cruz will compensate for the loss of riparian habitat such that no net loss of habitat function and values occurs by: ▪ restoring riparian habitat function and value within the project site; ▪ restoring degraded riparian habitat outside of the project site; ▪ purchasing riparian habitat credits at a CDFW-approved mitigation bank; or ▪ preserving existing riparian habitat of equal or better value to the affected riparian habitat through a conservation easement at a sufficient ratio to offset the loss of riparian habitat function (at least 1:1). ▶ UC Santa Cruz will prepare and implement a Compensatory Mitigation Plan that will include the following: ▪ For preserving existing riparian habitat outside of the project site in perpetuity, the Compensatory Mitigation Plan will include a summary of the proposed compensation lands (e.g., the number and type of credits, location of mitigation bank or easement), parties responsible for the long-term management of the land, and the legal and funding mechanism for long-term conservation (e.g., holder of conservation easement or fee title). UC Santa Cruz will provide evidence in the plan that the necessary mitigation has been implemented or that UC Santa Cruz has entered into a legal agreement to implement it and that compensatory habitat will be preserved in perpetuity. ▪ For restoring or enhancing riparian habitat within the project site or outside of the project site, the Compensatory Mitigation Plan will include a description of the proposed habitat improvements, success criteria that demonstrate the performance standard of maintained habitat function has been met, legal and funding mechanisms, and	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		parties responsible for long-term management and monitoring of the restored or enhanced habitat. ▪ Compensatory mitigation may be satisfied through compliance with permit conditions, or other authorizations obtained by UC Santa Cruz (e.g., Lake and Streambed Alteration Agreement), if these requirements are equally or more effective than the mitigation identified above. ▶ Impacts on riparian habitat considered an ESHA within the coastal zone will require a coastal development permit pursuant to the CCA and compliance with any requirements therein.	
Impact 3.5-4: Result in Degradation or Loss of State or Federally Protected Wetlands Implementation of projects under the 2021 LRDP would include potential land use conversion and development activities including ground disturbance, vegetation removal, and land development, which could result in inadvertent alteration of wetland hydrology, removal of wetland vegetation, or inadvertent fill or dredging of wetlands. This would be a potentially significant impact.	PS	**Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey** **Mitigation Measure 3.5-4: Identify State or Federally Protected Wetlands, Implement Avoidance Measures, and Obtain Permits for Unavoidable Impacts on Wetlands** If it is determined through implementation of Mitigation Measure BIO-3.5-1a that state or federally protected wetlands may be present within a particular project site, the following measures shall be implemented before implementation of project activities: ▶ UC Santa Cruz will retain a qualified biologist, hydrologist, or wetland ecologist to prepare a formal delineation of the boundaries of state or federally protected wetlands within the project site (including 1602 jurisdictional waterways) according to methods established in the USACE wetlands delineation manual (Environmental Laboratory 1987) and the Arid West regional supplement (USACE 2008). The qualified biologist will also delineate the boundaries of wetlands that may not meet the definition of waters of the United States, but would qualify as waters of the state, according to the state wetland procedures (SWRCB 2019). This delineation report will be submitted by UC Santa Cruz to USACE and a preliminary jurisdictional determination will be requested. ▶ If state or federally protected wetlands are determined to be present within a project site that can be avoided, the qualified biologist will establish a buffer around wetlands and mark the buffer boundary with high-visibility flagging, fencing, stakes, or clear, existing landscape demarcations (e.g., edge of a roadway). The buffer will be a minimum width of 25 feet but may be larger if deemed necessary. The appropriate size and shape of the buffer zone will be	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		determined in coordination with the qualified biologist and will depend on the type of wetland present (e.g., stream, seep, pond), the timing of project activities (e.g., wet or dry time of year), whether any special-status species may occupy the wetland and the species' vulnerability to the project activities, environmental conditions and terrain, and the project activity being implemented. Project activities (e.g., ground disturbance, vegetation removal, staging) will be prohibited within the established buffer. The qualified biologist will periodically inspect the materials demarcating the buffer to confirm that they are intact and visible, and wetland impacts are being avoided. ▶ If it is determined that fill of waters of the United States would result from project implementation, authorization for such fill will be secured from USACE through the Section 404 permitting process. Any waters of the United States that would be affected by the project will be replaced or restored on a no-net-loss basis in accordance with the applicable USACE mitigation guidelines in place at the time of construction. In association with the Section 404 permit (if applicable) and prior to the issuance of any grading permit, Section 401 Water Quality Certification from the Central Coast RWQCB will be obtained. For impacts on waters of the state that may not be covered by the 401 Water Quality Certification, UC Santa Cruz will secure Waste Discharge Requirements, which are described in Section 3.10, "Hydrology and Water Quality." ▶ If it is determined that disturbance or fill of state protected streams or riparian habitat cannot be avoided, UC Santa Cruz will notify CDFW before commencing activity that may divert the natural flow or otherwise alter the bed, bank, or riparian corridor of any 1602 jurisdictional waterway. If project activities trigger the need for a Streambed Alteration Agreement, the proponent will obtain an agreement from CDFW before the activity commences. The applicant will conduct project construction activities in accordance with the agreement, including implementing reasonable measures in the agreement necessary to protect the fish and wildlife resources, when working within the bed or bank of waterways or in riparian habitats associated with those waterways. These measures may include but not be limited to demarcation of the construction area, biological monitoring, environmental awareness training for construction crews, and compensatory measures (e.g., restoration, long-term habitat management).	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▶ Impacts on wetlands considered ESHAs within the coastal zone (if any) will require a coastal development permit pursuant to the CCA and compliance with any requirements therein.	
Impact 3.5-5: Interfere with Wildlife Movement Corridors or Impede the Use of Wildlife Nurseries Implementation of projects under the 2021 LRDP would include potential land use conversion and development activities including ground disturbance, vegetation removal, and land development, which could result in adverse effects on resident or migratory wildlife corridors through habitat fragmentation, degradation of aquatic habitat (e.g., streams), or blockage of important wildlife migration paths. These activities could also disturb wildlife nursery sites or degrade essential nursery habitat components. Impacts on movement corridors, habitat connectivity, and wildlife nursery sites would be potentially significant.	PS	**Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey** **Mitigation Measure 3.5-3a (above): Conduct Protocol-Level Surveys for Sensitive Natural Communities and Riparian Habitat and Implement Avoidance Measures** **Mitigation Measure 3.5-3b (above): Compensate for Unavoidable Loss of Sensitive Natural Communities** **Mitigation Measure 3.5-3c (above): Compensate for Unavoidable Loss of Riparian Habitat** **Mitigation Measure 3.5-4 (above): Identify State or Federally Protected Wetlands, Implement Avoidance Measures, and Obtain Permits for Unavoidable Impacts on Wetlands** **Mitigation Measures 3.5-5a: Utilize Wildlife-Friendly Building and Fencing Designs** The following measures shall be implemented during the early planning stages of projects under the 2021 LRDP: ▶ Buildings and other permanent structures that would be constructed during implementation of projects under the 2021 LRDP shall be designed to minimize impacts on wildlife, including disruption to wildlife movement, bird strikes, and wildlife entanglement. ▪ Building design shall utilize guidelines regarding building height, materials, external lighting, and landscaping provided in the American Bird Conservancy's "Bird Friendly Building Design" (American Bird Conservancy 2015) or other appropriate resources (e.g., International Dark Sky Association). UC Santa Cruz shall require review of the design plans by a qualified biologist, who will determine whether the plans are sufficient to reduce the likelihood of bird strikes or recommend additional measures. ▪ Fencing associated with new development under the 2021 LRDP will utilize wildlife-friendly fencing design to minimize the risk of entanglement or impalement of wildlife. UC Santa Cruz will require the review of fencing design by a qualified biologist prior to installation. The fencing design shall meet, but not be limited to the following standards:	LTS

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		• Minimize the chance of wildlife entanglement by avoiding barbed wire, loose or broken wires, or any material that could impale, snag, or entrap a leaping animal (e.g., wrought iron fencing with spikes). • Allow wildlife to jump over easily without injury. Typically, fences should be no more than 40 inches high on flat ground to allow adult deer to jump over. The determination of appropriate fence height will consider slope, as steep slopes are more difficult for wildlife to pass. • Allow smaller wildlife to pass under easily without injury or entrapment. **Mitigation Measure 3.5-5b: Retain Wildlife Nursery Habitat and Implement Buffers to Avoid Wildlife Nursey Sites** If it is determined through implementation of Mitigation Measure 3.5-1a that wildlife nursery sites are present within a particular project site, the following measures shall be implemented prior to and during construction of a project: ▶ A qualified biologist will identify the important habitat features of the wildlife nursery and, prior to commencement of project activities (e.g., ground disturbance, vegetation removal, staging), will mark these features for avoidance and retention during project implementation to maintain the function of the nursery habitat. ▶ A no-disturbance buffer will be established around the nursery site if project activities are required while the nursery site is active/occupied. The appropriate size and shape of the buffer will be determined by a qualified biologist, based on potential effects of project-related habitat disturbance, noise, visual disturbance, and other factors, but will typically be a minimum of 100 feet. No project activity will commence within the buffer area until a qualified biologist confirms that the nursery site is no longer active/occupied. Monitoring of the effectiveness of the no-disturbance buffer around the nursery site by a qualified biologist during and after project activities will be required. If project activities cause agitated behavior of the individual(s), the buffer distance will be increased, or project activities modified until the agitated behavior stops. The qualified biologist will have the authority to stop any project activities that could result in potential adverse effects to wildlife nursery sites.	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Impact 3.5-6: Conflict with Local Policies and Ordinances There are several policies in the City of Santa Cruz 2030 General Plan and the County of Santa Cruz General Plan and Local Coastal Program (LCP) that protect biological resources. UC Santa Cruz is not subject to local governments' regulations; however, mitigation measures identified under Impacts 3.5-1, 3.5-2, 3.5-3, 3.5-4, and 3.5-5 would reduce impacts on resources protected by local policies to less than significant. Therefore, the impact related to potential conflict with local policies or ordinances protecting biological resources would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.5-7: Conflict with the Provisions of an Adopted Habitat Conservation Plan or Natural Community Conservation Plan The Ranch View Terrace HCP plan area is located within the lower campus portion of the LRDP area. The HCP plan area includes two preserves: IAA and IAD. Development of IAD would result in a conflict with the provisions of the adopted HCP and incidental take permit granted by U.S. Fish and Wildlife Service (USFWS). This would be a potentially significant impact.	PS	**Mitigation Measure 3.5-7: Establish Alternative Preserves to Replace Inclusion Area D, and Amend the Ranch View Terrace HCP with Approval from USFWS** The following measures shall be implemented prior to any development activities within IAD: ▶ UC Santa Cruz shall, in consultation with USFWS, seek an amendment to the Ranch View Terrace HCP to accommodate replacement of IAD with replacement habitat that may be suitable, created, or restored for Ohlone tiger beetle. ▶ In consultation with USFWS, UC Santa Cruz will determine whether a new preserve(s) could be established to replace IAD. New proposed preserves will be characterized by equal (12.5 acres) or greater size, and better habitat (e.g., intact coastal prairie, Watsonville loam soils, bare soil available, presence of Ohlone tiger beetle) than IAD. ▶ If USFWS concurs that replacement of IAD is appropriate, the Ranch View Terrace HCP will be amended to exclude IAD. Any new preserve(s) would be managed through yearly monitoring and vegetation management activities with the objective of fostering occupation by Ohlone tiger beetle. ▶ If USFWS does not concur that replacement of IAD is appropriate, the existing incidental take permit and associated measures in the Ranch View Terrace HCP will apply, and no development will occur within IAD. ▶ As noted in Mitigation Measures 3.5-2a and 3.5-2i, UC Santa Cruz may elect to pursue a comprehensive HCP, which shall be accomplished either by amending the Ranch View Terrace HCP or by incorporating and replacing the existing Ranch View Terrace HCP.	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
3.6. Energy			
Impact 3.6-1: Result in Unnecessary, Inefficient, and Wasteful Use of Energy Implementation of the 2021 LRDP would increase electricity and natural gas consumption in the LRDP area relative to existing conditions during construction, as well as long-term operation of the main residential campus and Westside Research Park. The 2021 LRDP is committed to meeting the UC Sustainable Practices Policy and the UC Santa Cruz Campus Standards Handbook (including achievement of LEED Silver standards at minimum) in all new/renovated facilities, which is designed to reduce the wasteful use of materials (through recycling building materials) and increase building energy efficiency (i.e., 60 percent more efficient than the 1999 Energy Benchmarks). Therefore, implementation of the 2021 LRDP would not result in wasteful, inefficient, and unnecessary consumption of energy, and impacts would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.6-2: Conflict, or Create an Inconsistency, with any Applicable Plan, Policy, or Regulation Adopted for the Purpose of Avoiding or Mitigating Environmental Effects Related to Energy Campus development under the 2021 LRDP would be required to comply with increasingly stringent building and vehicle efficiency standards that would reduce energy consumption to be consistent with applicable plans, policies, and regulations. New development under the 2021 LRDP would also include design features that would reflect UC Santa Cruz's goal to meet the UC Carbon Neutrality Initiative, as written into the UC Sustainable Practices Policy Green Building and Climate Action targets. Thus, this impact would be less than significant.	LTS	No mitigation is required.	LTS
3.7. Geology and Soils			
Impact 3.7-1: Increase the Risk of Exposure of People or Buildings to Seismic Ground Shaking The LRDP area is in a seismically active region that includes several active earthquake faults of local and regional significance. All structures proposed to be constructed or redeveloped would be required to comply with regulatory mandates in the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook to ensure that new and modified buildings and infrastructure would be capable of withstanding anticipated levels of ground shaking. For this reason, the potential impact related to ground shaking would be less than significant.	LTS	No mitigation is required.	LTS

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Impact 3.7-2: Increase the Risk of Exposure of People or Buildings to Seismic-Related Ground Failure, Including Liquefaction Development and redevelopment per the 2021 LRDP could occur on a geologic unit or soil that could become unstable. In addition, ground failure could be triggered by seismic shaking and could result in on- or off-site landslides, lateral spreading, or liquefaction, creating potential risks to life or property. All structures proposed to be constructed or redeveloped would be required to comply with the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook, to ensure that all new and modified structures would be capable of withstanding anticipated levels of ground shaking. For this reason, the potential impact related to ground failure and liquefaction would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.7-3: Result in Substantial Erosion or Loss of Topsoil during Construction, Operations, or Maintenance Development and redevelopment project construction, operations, and maintenance under the 2021 LRDP may involve vegetation removal, clearing, and grading of soils, all of which could result in erosion and loss of topsoil, particularly if soils are exposed to wind or stormwater during construction. However, through compliance with all required regulations, such as SWRCB General Permit for Discharges of Stormwater Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ) and the Statewide Phase II MS4 Permit, the impact related to substantial erosion or loss of topsoil during construction would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.7-4: Increase the Risk of Exposure of People or Buildings to Expansive or Otherwise Unstable Soils The LRDP area includes soils with high shrink-swell potential. Development and redevelopment projects within the LRDP area on these soils could result in shrinking and swelling of soils, which can cause damage to foundations. However, all structures constructed or redeveloped would be required to comply with the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook, which require site-specific geotechnical studies and soil engineering reports to address potential risk associated with expansive or unstable soils. Because project-specific design requirements and conditions of approval would be incorporated for all development pursuant to the 2021 LRDP, the potential for structural damage due to shrinking and swelling of soils would be less than significant.	LTS	No mitigation is required.	LTS

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Impact 3.7-5: Increase the Risk of Exposure of People or Buildings to Unstable Conditions Due to Karst Topography, Including Subsidence or Collapse The LRDP area includes karst topography, which is characterized by irregular surfaces resulting from subsidence or collapse of the bedrock and sediment into subterranean cavities that have developed within the marble bedrock. Future development per the 2021 LRDP could result in construction of facilities on sites underlain by dolines or sinkholes, both of which are a characteristic of karst topography, that are filled with soft soil that lead to settling or collapse beneath facilities. However, all structures constructed or redeveloped would be required to comply with the California Building Code (CBC), UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook, which require site-specific geotechnical studies and soil engineering reports to address potential karst hazard risks. Because project-specific design requirements and conditions of approval would be incorporated for all development pursuant to the 2021 LRDP, the potential for structural damage due to karst topography would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.7-6: Directly or Indirectly Destroy Unique Paleontological Resources Development under the 2021 LRDP could result in the disturbance of paleontologically sensitive formations, which could result in the potential disturbance of paleontological resources. Potential fossil-bearing formations in the LRDP area include marine formations (Santa Margarita sandstones, Santa Cruz mudstone, and Quaternary marine terrace deposits) and sedimentary formations (Quaternary non-marine terrace deposits and doline deposits). A potentially significant impact on paleontological resources could result if an inadvertent discovery is made during ground-disturbing activities associated with development and redevelopment projects under the 2021 LRDP.	PS	**Mitigation Measure 3.7-6: Treatment of Paleontological Resources** For development within the potential fossil-bearing formations in the LRDP area, namely marine formations of Santa Margarita sandstones, Santa Cruz mudstone, and Quaternary marine terrace deposits, and sedimentary formations of Quaternary non-marine terrace deposits and doline deposits, UC Santa Cruz shall require, as part of contract specifications, that the contractor provide a paleontological resources awareness training program to all construction personnel active on the project site during earth moving activities. The first training will be provided prior to the initiation of ground disturbing activities. The training will be developed and conducted in coordination with a qualified paleontologist. The program will include relevant information regarding fossils and fossil-bearing formations that may be encountered. The training will also describe appropriate avoidance and minimization measures for resources that have the potential to be located on the project site. If any paleontological resources are encountered during ground-disturbing activities, the contractor shall ensure that activities in the immediate area of the find are halted and that UC Santa Cruz is informed. UC Santa Cruz shall retain a qualified paleontologist to evaluate the discovery and recommend appropriate treatment options pursuant to guidelines developed by the Society of Vertebrate Paleontology, including development and implementation of a paleontological resource impact mitigation program by a qualified paleontologist for treatment of	LTS

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		the particular resource, if applicable. These measures may include, but not be limited to the following: ▶ salvage of unearthed fossil remains and/or traces (e.g., tracks, trails, burrows); ▶ screen washing to recover small specimens; ▶ preparation of salvaged fossils to a point of being ready for curation (e.g., removal of enclosing matrix, stabilization and repair of specimens, and construction of reinforced support cradles); and ▶ identification, cataloging, curation, and provision for repository storage of prepared fossil specimens.	
3.8. Greenhouse Gas Emissions and Climate Change			
Impact 3.8-1: Generate Greenhouse Gas Emissions that May Have a Significant Impact on the Environment The 2021 LRDP would increase development and population within the main residential campus and Westside Research Park. This increase in development along with the implementation of design features, programs, and other measures would result in annual emissions of 26,769 $MTCO_2e$ per year in 2040. This amount is below existing conditions, and would therefore result in a less-than-significant impact under the net zero threshold. However, when applying the more conservative "state target" threshold, this reduction is equivalent to 46 percent below the campus's 1990 levels by 2040, which is not consistent with the interpolated target to reduce statewide GHG emissions by 60 percent below 1990 levels by 2040. Therefore, the 2021 LRDP contribution to climate change from GHG emissions would be significant.	S	**Mitigation Measure 3.8-1: Reduce Annual Greenhouse Gas Emissions** UC Santa Cruz shall commit to reducing annual GHG emissions by at least 6,907 $MTCO_2e$ by 2040. This reduction shall be achieved through the combination of on-campus GHG reduction projects and, if necessary, purchase of carbon offsets. *On-Campus or Other Regional Lands Reductions* UC Santa Cruz shall prioritize GHG reductions through on-campus GHG-reduction projects and actions or at other university-owned properties in the region. UC Santa Cruz could also pursue joint GHG-reduction efforts with other local/regional agencies (e.g., City and County of Santa Cruz.) Reductions in GHG emissions shall be achieved through the combination of any of the following: 1. Replanting removed trees or planting equivalent new trees displaced by construction at a 1:1 ratio and ensuring the continued health of the replanted trees. A 100 percent replanting rate would offset 2,160 $MTCO_2e$ per year by 2040. Tree planting at a higher rate would provide further GHG reductions. 2. Reducing new non-fleet mobile source emissions from commuting, vendor trips, and delivery trips by 2040. A 10 percent reduction in anticipated emissions from these sources would reduce emissions by 1,083 $MTCO_2e$ per year in 2040. These reductions can be achieved through an enhanced Transportation Demand Management Program (see Mitigation Measure 3.16-2). This program would include parking management, expanded vanpool program, improved transit service, and increased telecommuting. 3. Requiring renewable diesel or other zero carbon emissions alternatives to be used in place of conventional diesel use in equipment for all construction	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		activity, even those occurring after this 2021 LRDP plan period. A 100-percent renewable diesel construction fleet would reduce emissions in 2040 by 942 $MTCO_2e$ per year. 4. Reducing waste and increasing recycling and composting within the LRDP area as part of UC Santa Cruz's Zero Waste goal under UCOP's Sustainable Practices Policy, including additional on-campus education and opportunities for waste recycling. 5. Pursuing innovative on-site wastewater treatment alternatives, such as waste-to-energy projects, that reduce N_2O and CH_4 process emissions compared to those generated at off-site wastewater treatment. 6. Pursuing electrification of existing buildings and requiring that all new buildings be electric only. 7. Any other on-campus or regional projects or measures identified during the course of the 2021 LRDP that would effectively and quantifiably reduce emissions. *Acquire Carbon Offset Credits in Conformance with CARB Guidance that are Demonstrably Real, Permanent, Additional, Quantifiable, Verifiable, and Enforceable* As part of this mitigation measure, UC Santa Cruz would make the following separate, though overlapping, GHG emission reduction commitments: (1) UC Santa Cruz will maintain compliance with carbon offset accreditation requirements under CARB's Cap-and-Trade program, and (2) per existing UC Policy, UC Santa Cruz's GHG emissions shall, commencing in 2025, be entirely carbon neutral. Compliance with CARB's Cap-and-Trade Program: Any carbon offset credits obtained for the purpose of compliance with CARB's Cap-and-Trade program shall be purchased from an accredited carbon credit market. Based on the current program as of January 2021, such offset credits (or California Carbon Offsets) shall be registered with, and retired by an Offset Project Registry, as defined in 17 California Code of Regulations § 95802(a), that is approved by CARB, such as, but not limited to, Climate Action Reserve (CAR), American Carbon Registry, and Verra (formerly Verified Carbon Standard), that is recognized by The Climate Registry, a non-profit organization governed by U.S. states and Canadian provinces and territories. Compliance with UC Policy: Compliance with UC's policies for carbon neutrality by 2025 and UC's own policy to reduce Scope 1, 2, and transportation-related Scope 3 emissions below 1990 levels pursuant to AB 32	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		will be accomplished through reductions in direct emissions, the purchase of renewable electricity, and the purchase of carbon offset credits. UC Santa Cruz will purchase voluntary carbon offset credits as the final action to reach the GHG emission reduction targets. Internal guidelines will be developed per the UC Carbon Neutrality Initiative to ensure that any use of offsets for this purpose will derive from verified GHG emissions reductions resulting from actions that align, as much as possible, with UC's research, teaching, and public service mission. To demonstrate that the carbon offset credits provided are real, permanent, additional, quantifiable, verifiable, and enforceable, as those terms are defined in 17 California Code of Regulations § 95802(a), UC Santa Cruz shall prepare an annual report documenting the protocol used to verify those credits and submit that report for approval to a CARB-accredited third-party verification entity. If the verification entity finds that any credits purchased did not meet these criteria, UC shall purchase alternative credits and submit a follow-up report to the verification entity for concurrence. All carbon offsets purchased will be reported publicly and tracked through the Climate Registry as required by UC policy. For any remaining emissions not achieved through on-campus reduction efforts, as outlined above, UC Santa Cruz shall ensure that the remaining emissions reductions are taking place and on the trajectory toward meeting the target of reducing annual GHG emissions by at least 6,907 $MTCO_2e$ by 2040 and shall conduct an annual review of emissions reductions. To achieve any remaining GHG emissions reductions, voluntary carbon offsets shall be purchased.	
Impact 3.8-2: Conflict with an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases Implementation of the 2021 LRDP would achieve targets established in the UC Sustainable Practices Policy through anticipated planning and policy actions. As achievement of the Sustainable Practices Policy would meet or exceed statewide targets for 2030 and not impede the ability of UC Santa Cruz to achieve statewide 2050 targets, the 2021 LRDP would not conflict with an applicable plan, policy, or regulations intended to reduce GHG emissions. A less-than-significant impact would occur.	LTS	No mitigation is required.	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
3.9. Hazards and Hazardous Materials			
Impact 3.9-1: Create a Significant Hazard Through the Routine Transport, Use, or Disposal of Hazardous Materials Construction and operation of development under the 2021 LRDP would involve the transport, use, and disposal of hazardous materials to and from the UC Santa Cruz campus. With adherence to existing regulations and compliance with safety standards, the impact from hazardous materials transport, use and disposal would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.9-2: Result in the Release of Hazardous Materials from a Site of Known or Potential Contamination Due to the proximity of documented contamination sites and proximity of public roadways, there is potential for contamination to be encountered during construction. Because the LRDP area could contain undocumented contamination that has not been characterized or remediated, this would be a potentially significant impact.	PS	**Mitigation Measure 3.9-2a: Conduct Preliminary Site Investigation** During project planning, the Environmental Health and Safety (EH&S) Department shall be consulted in order to identify if any past contamination, underground storage tanks (USTs), aboveground storage tanks (ASTs), or other contamination could potentially occur in areas to be disturbed for project construction. EH&S will consider the cases on file at the County of Santa Cruz EHS and information on historical uses in the area to be impacted such as old maps and photos. If EH&S determines that there is no or minimal potential for contamination to occur on site, no additional mitigation is necessary. If it is determined that contamination has the potential to exist on a project site, Mitigation Measure 3.9-2b shall be implemented. **Mitigation Measure 3.9-2b: Conduct Site-Specific Investigation and Prepare Work Plan** Where initial investigations indicate the potential for contamination, UC Santa Cruz shall conduct soil sampling within the boundaries of the project site prior to initiation of grading or other groundwork. This investigation will follow the American Society for Testing and Materials standards for preparation of a Phase II Environmental Site Assessment (ESA) and/or other appropriate testing guidelines. If the results indicate that contamination exists at levels above regulatory action standards, then the site will be remediated in accordance with recommendations made by applicable regulatory agencies, including County of Santa Cruz Environmental Health Services (EHS), Regional Water Quality Control Board (RWQCB), and Department of Toxic Substances Control (DTSC). The agencies involved shall depend on the type and extent of contamination. Based on the results and recommendations of the investigation described above, UC Santa Cruz shall prepare a work plan that identifies any necessary remediation activities, including excavation and removal of on-site contaminated soils, and	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		redistribution of clean fill material within the project site. The work plan shall include measures that ensure the safe transport, use, and disposal of contaminated soil removed from the project site. **Mitigation Measure 3.9-2c: Prepare and Implement Hazardous Materials Contingency Plan** Prior to initiation of grading or other ground disturbance, UC Santa Cruz shall provide a hazardous materials contingency plan to EH&S and County of Santa Cruz EHS, as appropriate. The plan will describe the necessary actions that would be taken if evidence of contaminated soil or groundwater is encountered during construction. The contingency plan shall identify conditions that could indicate potential hazardous materials contamination, including soil discoloration, petroleum or chemical odors, and presence of underground storage tanks or buried building material. If at any time during the course of construction, evidence of soil and/or groundwater contamination with hazardous material is encountered, UC Santa Cruz shall immediately halt construction and contact EH&S and County of Santa Cruz EHS. Work shall not be resumed until the discovery has been assessed/treated appropriately (through such mechanisms as soil or groundwater sampling and remediation if potentially hazardous materials are detected above threshold levels) to the satisfaction of County of Santa Cruz EHS, RWQCB, and DTSC (as applicable). The hazardous materials contingency plan, and obligations to abide by and implement the plan, shall be incorporated into the construction and contract specifications of the project. **Mitigation Measure 3.9-d: Require Minimization of Hazards during Demolition** Prior to demolition of existing structures, in order to minimize potential for accidental release of hazardous materials during demolition, UC Santa Cruz shall complete the following: ▶ Locate and dispose of potentially hazardous materials in compliance with all applicable federal, state, and local laws. This shall include: 1) identify locations that could contain hazardous residues; 2) remove plumbing fixtures known to contain, or potentially containing, hazardous materials; 3) determine the waste classification of the debris; 4) package contaminated items and wastes; and 5) identify disposal site(s) permitted to accept such wastes.	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▶ Provide written documentation to the appropriate County department and MBARD that asbestos testing and abatement consistent with MBARD Rule 424, as appropriate, has occurred in compliance with applicable federal, state, and local laws. ▶ Provide written documentation to the appropriate County department and MABRD that lead-based paint testing and abatement, as appropriate, has been completed in accordance with applicable state and local laws and regulations. Abatement shall include the removal of lead contaminated soil (considered soil with lead concentrations greater than 400 parts per million in areas where children are likely to be present). If lead-contaminated soil is to be removed, UC Santa Cruz shall submit a soil management plan to County of Santa Cruz EHS.	
Impact 3.9-3: Result in Handling of Hazardous or Acutely Hazardous Materials within 0.25 Mile of an Existing School Although hazardous materials and waste could be handled within 0.25 mile of an existing or proposed school as a result of implementation of the 2021 LRDP, the handling, storage, and disposal of hazardous materials would be subject to campus safety programs and procedures. This impact would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.9-4: Impair Implementation of, or Physically Interfere with, an Adopted Emergency Response Plan or Emergency Evacuation Plan Implementation of the 2021 LRDP would not interfere with an adopted emergency response or evacuation plan, but construction activities for projects under the 2021 LRDP could result in short-term, temporary impacts to street traffic because of roadway improvements and potential extension of construction activities into the right-of-way. This could result in a reduction in the number of lanes or temporary closure of certain street segments. Any such impacts would be limited to the construction period and would affect only adjacent streets or intersection. This would be a potentially significant impact.	PS	**Mitigation Measure 3.9-4: Prepare and Implement Site-Specific Construction Traffic Management Plans** UC Santa Cruz shall prepare and implement site-specific construction traffic management plans for any construction effort that would require work within existing roadways. To the extent feasible, the campus shall maintain at least one unobstructed lane in both directions on campus roadways during construction activities. At any time only a single lane is available due to construction-related road closures, the campus shall provide a temporary traffic signal, signal carriers (i.e., flag persons), or other appropriate traffic controls to allow travel in both directions. If construction activities require the complete closure of a roadway, the campus shall provide appropriate signage indicating alternative routes. If simultaneous construction activities occur close to one another, UC Santa Cruz shall require that simultaneous road closures not occur within 1,000 feet of each other. To ensure adequate access for emergency vehicles when construction projects would result in temporary lane or roadway closures, the campus shall inform emergency services, including the UC Santa Cruz Police Department (UCPD) and Santa Cruz Fire	LTS

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		Department (SCFD) of the closures and alternative travel routes. During National Weather Service Red Flag Warnings and Fire Weather Watches, the UCPD and SCFD shall be consulted to determine if any changes to road closures are necessary while these fire hazard conditions are in effect.	
3.10. Hydrology and Water Quality			
Impact 3.10-1: Violate Any Waste Discharge Requirements That Would Substantially Degrade Surface or Groundwater Quality UC Santa Cruz does not discharge wastewater directly to any receiving water bodies; therefore, its wastewater is not subject to wastewater discharge requirements. Wastewater generated on the main residential campus and Westside Research Park is discharged to the City of Santa Cruz sewer system and is treated at the City's wastewater treatment plant. Therefore, implementation of the 2021 LRDP would result in a less-than-significant impact.	LTS	No mitigation is required.	LTS
Impact 3.10-2: Water Quality Impacts Related to Construction Activities Construction activities associated with implementation of the 2021 LRDP would expose bare soil to rainfall and stormwater runoff, which could accelerate erosion and result in sedimentation of stormwater and, eventually discharge to receiving waterbodies. Construction-related projects in the LRDP area would be required to comply with the State Water Resources Control Board 2009-0009-DWQ Construction General Permit (CGP). Compliance with the CGP requires development of a Storm Water Pollution Prevention Plan (SWPPP) for projects disturbing 1 acre or more and the Campus Standards Handbook requires preparation of an Erosion Control and Sediment Control Plan for projects less than 1 acre. Compliance with the CGP and the Campus Standards Handbook would minimize erosion and sedimentation during construction. In addition, the design and operation of each new facility would adhere to UC Santa Cruz Post-Construction Stormwater Management Requirements (UC Santa Cruz Post-Construction Requirements). This program exists to ensure compliance with Central Coast Regional Water Quality Control Board Resolution R3-2013-0032. applicable laws and implementation of BMPs on the ground during construction. Therefore, implementation of the 2021 LRDP would not be expected to contribute substantial loads of sediment or other pollutants to stormwater or receiving waterbodies and would result in a less-than-significant impact.	LTS	No mitigation is required.	LTS

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Impact 3.10-3: Alteration of Drainage Patterns and Increased Runoff Development under the 2021 LRDP could alter drainage patterns, and increase the rate or amount of surface runoff, which could result in substantial siltation or erosion on or off site, and increase the amount of urban pollutants in storm water runoff, which could affect water quality. However, there are several layers of regulatory compliance and programmatic elements in place for new campus development that are designed to reduce runoff, peak flows and impacts to water quality and therefore, implementation of the 2021 LRDP would result in a less-than-significant impact.	LTS	No mitigation is required.	LTS
Impact 3.10-4: Flood-Related Impacts Development under the 2021 LRDP could alter drainage patterns in the LRDP area and would increase the rate or amount of surface runoff, which could exceed the capacity of storm water drainage systems, resulting in flooding on or off site. However, regulatory compliance and programmatic elements in place for new development in the LRDP area are designed to reduce runoff, peak flows and impacts to water quality and, therefore, implementation of the 2021 LRDP would result in a less-than-significant impact.	LTS	No mitigation is required.	LTS
Impact 3.10-5: Impacts to Karst Aquifer Supply, Recharge and Groundwater Quality Potential impacts on groundwater that could result under the 2021 LRDP include: 1) reduced spring flows and lowering of aquifer water levels as a result of a reduction in recharge due to increased impervious surfaces, and as a result of potential groundwater extraction in the event that groundwater pumping is implemented to reduce demand for water from the City's water supply, and 2) impacts to groundwater quality from contaminated surface runoff. Impacts associated with new development on the karst aquifer would be potentially significant.	PS	**Mitigation Measure 3.10-5a: Procedures for Building on Karst Where Groundwater is Encountered and Where Pressure Grouting is Considered** For projects involving construction on karst as determined by the geotechnical investigation, if 1) groundwater is encountered beneath the building site, and 2) the proposed building foundation design includes pressure grouting, UC Santa Cruz shall complete a dye tracing study to confirm potential hydrologic connectivity of the building site with springs around the campus or campus wells. If the study confirms the building site to be hydrologically linked to springs and/or wells in the karst system, then alternative building foundation designs will be implemented. **Mitigation Measure 3.10-5b: On-Going Groundwater Level and Spring Flow Monitoring** If the existing well WSW#1 or a new groundwater well is used for extraction, UC Santa Cruz shall perform monitoring of water levels within that well and any other campus wells completed in the karst aquifer on a continuous basis when groundwater pumping occurs. UC Santa Cruz shall also conduct, at a minimum, monthly flow monitoring of those springs in the vicinity of the LRDP area shown to be connected to the well via a dye tracing study or other applicable testing method for the duration of groundwater pumping to determine whether there is any long-term decline in water levels or spring discharge. Monitoring of the springs shall also include an assessment of surface water resources (i.e., habitats, plant species, and wildlife species) for a distance of 500 feet downgradient from the daylighting of connected springs at least 30 days	LTS

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		prior to and after groundwater pumping to determine if there are any adverse changes (i.e., reduction in ordinary high water mark, changes in plant or wildlife species assemblages such that a species is no longer present, or reduction in plant cover) in the condition of these resources that may be directly attributed to changes in spring discharge as a result of groundwater pumping. If monitoring of water levels and spring flows indicates that UC Santa Cruz extraction of groundwater is contributing to a net deficit in aquifer volume, as indicated by a substantial decrease in average base flow water levels in any monitored wells or a substantial reduction of base flows in monitored springs, the campus will terminate or reduce its use of groundwater from the aquifer. A substantial decrease shall constitute observations of a continual decreasing trend in base groundwater water levels over a 3-5 year period coupled with a decrease in spring base flow conditions, beyond the standard deviation for any given spring, for a corresponding water year type. The average base water levels and base flows in springs will be defined through a statistical analysis of historic data, grouped by water year types. As new monitoring data becomes available, UC Santa Cruz will continually update the statistical analysis.	
3.11. Land Use and Planning			
Impact 3.11-1: Conflict with Applicable Land Use Plans, Policies, or Existing Zoning Adopted for the Purposes of Avoiding or Mitigating an Environmental Effect Implementation of the 2021 LRDP would not conflict with existing land use, policies, or zoning adopted for the purpose of avoiding or mitigating an environmental effect. Consistency with the Ranchview Terrace HCP is primarily addressed in Section 3.5, Biological Resources. Because the UC holds jurisdiction over campus-related projects, projects carried out by UC Santa Cruz would be consistent with the 2021 LRDP. Therefore, impacts associated with land use plans, policies, or zoning would be less than significant.	LTS	No mitigation is required.	LTS
3.12. Noise			
Impact 3.12-1: Generate Substantial Temporary Construction Noise Implementation of the 2021 LRDP would result in construction activities associated with the development of on-campus facilities to accommodate future growth in support of the UC Santa Cruz's academic mission. Although construction activities would be intermittent and temporary, construction noise could reach high levels at nearby noise-sensitive land uses, resulting in human disturbance. Therefore, this impact would be significant.	S	**Mitigation Measure 3.12-1: Implement Construction Noise Reduction Measures** As part of construction of new/renovated facilities associated with 2021 LRDP implementation, UC Santa Cruz shall implement or incorporate the following noise reduction measures into construction specifications for the contractor(s) to implement during project construction:	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▶ All construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturer recommendations. Equipment engine shrouds shall be closed during equipment operation. ▶ Where available and feasible, construction equipment with back-up alarms shall be equipped with either audible self-adjusting backup alarms or alarms that only sound when an object is detected. Self-adjusting backup alarms shall automatically adjust to 5 A-weighted decibels (dBA) over the surrounding background levels. All non-self-adjusting backup alarms shall be set to the lowest setting required to be audible above the surrounding noise levels. ▶ All construction equipment and equipment staging areas shall be located as far as feasible from nearby noise-sensitive land uses and, when feasible, staging areas shall be located such that existing or constructed noise attenuating features (e.g., temporary noise wall or blankets) block line-of-sight between affected noise-sensitive land uses and construction staging areas. ▶ Individual operations and techniques shall be replaced with quieter procedures (e.g., using welding instead of riveting, mixing concrete off-site instead of on-site) where feasible, and shall be consistent with building codes and other applicable laws and regulations. ▶ Stationary noise sources such as generators or pumps shall be located as far away from noise-sensitive uses as feasible. ▶ No less than 1 week prior to the start of construction activities at a particular location, notification shall be provided to nearby off-campus, noise-sensitive land uses (e.g., residential uses, elementary schools) that are located within 690 feet of the construction site and where projected construction noise levels are anticipated to exceed acceptable daytime L_{max} noise standards. ▶ When construction would occur within 140 feet of on-campus housing or 690 feet of off-campus noise-sensitive uses (e.g., residences, elementary schools, churches) and may result in temporary noise levels in excess of established standards at the exterior of the adjacent noise-sensitive structure, temporary noise barriers (e.g., noise-insulating blankets or temporary plywood structures) shall be erected, if deemed to be feasible and effective, between the noise source and sensitive receptor such that construction-related noise levels are reduced to acceptable noise levels at the receptor.	

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		▶ Loud construction activity (i.e., construction activity such as jackhammering, concrete sawing, asphalt removal, and large-scale grading operations) shall not be scheduled during the Campus's finals week. ▶ When construction of a project requires material hauling, a haul route plan shall be prepared for the project, for review and approval by UC Santa Cruz, that designates haul routes as far as feasible from sensitive receptors. ▶ The contractor shall designate a disturbance coordinator and post that person's telephone number conspicuously around the construction site, as well as provide it to nearby residences. The disturbance coordinator shall receive all public complaints and be responsible for determining the cause of the complaint and implementing any feasible measures to alleviate the problem. ▶ Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 8:00 a.m. and 10:00 p.m., when feasible. For any construction activity that must extend beyond the daytime hours of 8:00 a.m. and 10:00 p.m. and occurs within 440 feet of an on-campus residential building or 1,225 feet of an off-campus sensitive land use, UC Santa Cruz shall require the use of one or more of the following or equivalent measures to reduce interior noise levels to less than 45 dB L_{eq} at the nearest receptor: ▪ Use of noise-reducing enclosures around stationary noise-generating equipment (e.g., concrete mixers, generators, compressors). ▪ Installation of temporary noise curtains installed as close as possible to the boundary of the construction site within the direct line of sight path of the nearby sensitive receptor(s). The curtains shall consist of durable, flexible composite material featuring a noise barrier layer bounded to sound-absorptive material on one side. The noise barrier layer shall consist of rugged, impervious, material with a surface weight of at least one pound per square foot. ▪ Retain a qualified noise specialist to develop a noise monitoring plan and conduct noise monitoring to ensure that noise reduction measures are achieved the necessary reductions such that levels at the receiving land uses do not exceed exterior noise levels of 45 dBA L_{eq} for construction activity occurring during noise-sensitive nighttime hours. ▪ If restricting construction activities to daytime hours (8 a.m. to 10 p.m.) is infeasible and the application of all feasible mitigation, as listed above,	

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		does not successfully reduce interior noise levels to lower than 45 dB L_{eq} at the nearest residential noise-sensitive receptor, UC Santa Cruz will offer hotel accommodations to residents who would temporarily be exposed to nighttime interior noise levels that exceed the interior noise standard of 45 L_{eq}. Alternative overnight accommodations should be in a location that is not adversely affected by nighttime construction noise.	
Impact 3.12-2: Generate Substantial Temporary (Construction) Vibration Levels Implementation of the 2021 LRDP would include construction activities that may require the use of vibration-generating equipment. If pile driving would be required during construction of future projects, nearby sensitive receptors could be exposed to levels of ground vibration resulting in structural damage and/or human disturbance. Therefore, this impact would be significant.	S	**Mitigation Measure 3.12-2a: Implement Measures to Reduce Ground Vibration** For any future construction activity that would involve construction activities within 75 feet of an existing sensitive land use or occupied building, the following measures shall be implemented: ▶ Earthmoving and ground-impacting operations shall be phased so as not to occur simultaneously in areas close to sensitive receptors (i.e., within 75 feet). The total vibration level produced could be significantly less when each vibration source is operated at separate times. ▶ In the event that simultaneous earthmoving and ground-impacting operations in close proximity to sensitive receptors (i.e., within 75 feet) cannot be avoided, no such construction activities shall be undertaken without prior approval from UC Santa Cruz. Prior to the commencement of such activities, the contractor shall apply for and obtain an exemption from UC Santa Cruz. The application for exemption shall be submitted to UC Santa Cruz and shall include the following information: ▪ Explanation as to why operating earthmoving and ground-impacting operations in close proximity to sensitive receptors (i.e., within 75 feet) at separate times is not feasible. ▪ Dates and times that the simultaneous earthmoving and ground-impacting operations construction activities would occur. ▪ Distance from sensitive receptors at which simultaneous earthmoving and ground-impacting operations construction activities would occur. ▪ Identify the on- and off-site sensitive receptors and structures that could be exposed to levels of ground vibration that could exceed applicable thresholds and apply Mitigation Measure 3.12-2b if applicable. ▶ Rubber-tired equipment shall be used, where feasible, instead of tracked equipment.	LTS

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		▶ Where there is flexibility in the location of use of heavy-duty construction equipment, the equipment shall be operated as far away (up to 250 feet) from vibration-sensitive sites. **Mitigation Measure 3.12-2b: Develop and Implement a Vibration Control Plan** To assess and, when needed, reduce vibration and noise impacts from construction activities, the following measures shall be implemented: ▶ A vibration control plan shall be developed prior to initiating any construction activities within 50 feet of a sensitive use (75 feet if vibratory equipment is required) and within 125 feet of a structure with laboratory or other similarly sensitive equipment (235 feet if vibratory equipment is required). Applicable elements of the plan shall be implemented before, during, and after construction activities. The plan will include measures sufficient to reduce vibration at sensitive receptors to levels below applicable thresholds (i.e., 0.2 in/sec PPV for building structural damage, 80 VdB for human disturbance and 65 VdB for sensitive equipment). Items that will be addressed in the plan may include, but are not limited to, the following: ▪ Pre-construction surveys shall be conducted to identify any pre-existing structural damage to buildings that may be affected by project-generated vibration. ▪ Identification of minimum setback requirements for different types of ground-vibration-producing activities (e.g., use of a vibratory roller) for the purpose of preventing damage to nearby structures and preventing adverse effects on people. Factors to be considered include the nature of the vibration-producing activity, local soil conditions, and the fragility/resiliency of the nearby structures. Initial setback requirements can be reduced if a project- and site-specific analysis is conducted by a qualified geotechnical engineer or ground vibration specialist that indicates that no structural damage to buildings or structures would occur. ▪ Identification of vibration-sensitive equipment and existing vibration control measures for the identified equipment. If, upon evaluation and prior to construction, vibration levels at the nearby equipment would exceed 65 VdB, UC Santa Cruz shall either provide additional vibration dampening (e.g., mounting) for the equipment or relocate the	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		equipment to another suitable location on campus until construction vibration would decrease to below 65 VdB. ▪ Vibration levels shall be monitored and documented at the nearest sensitive land use within the aforementioned distances to document that applicable thresholds are not exceeded. Recorded data shall be submitted on a twice-weekly basis to UC Santa Cruz. If it is found at any time that thresholds are exceeded, construction activities shall cease in that location, and methods shall be implemented to reduce vibration to below applicable thresholds, or an alternative pile installation method shall be used at that location.	
Impact 3.12-3: Generate Substantial Long-Term Stationary Noise The new buildings and facilities constructed as part of the 2021 LRDP may result in increased noise levels as a result of new stationary noise sources and equipment (e.g., HVAC units, backup generators), and other new sources such as gathering spaces, loading docks, corporation yards, and parking lots. Depending on the distance to noise-sensitive receptors, intervening shielding, and noise-reduction features incorporated in the project, noise levels associated with new stationary noise sources could result in the exceedance of exterior noise limits at existing noise-sensitive land uses, resulting in disturbance to human activities during the daytime or sleep disruption at night. Therefore, this impact would be significant.	S	**Mitigation Measure 3.12-3a: Implement Noise Reduction Measures to Reduce Long-Term Noise Impacts from Loading Dock Activity** To minimize noise levels generated by loading docks and delivery activity to levels that do not exceed the daytime standard of 70 dB L_{max} or nighttime standard of 65 dB L_{max}, the following measures shall be implemented for construction projects that include loading docks: ▶ New loading docks only used during daytime hours (8 a.m. to 10 p.m.) shall be located at least 320 feet from all residential receptors, and new loading docks used during daytime and nighttime hours shall be located at least 560 feet from all residential receptors. If this is not feasible, UC Santa Cruz shall reduce the noise level at all residential receptors to 70 dB L_{max} during daytime hours and 65 dB L_{max} during nighttime hours by incorporating one or more of the following mitigation strategies, the effectiveness of which shall be determined on a project-level basis by an acoustical professional: ▪ Design and build sound barriers near loading docks and delivery areas that block the line of sight between truck activity areas and residential land uses. Sound barriers may consist of a wall, earthen berm, or combination thereof. ▪ Constructing loading dock pits that are below grade relative to the surrounding parking area or placing loading docks on the side of a building that does not directly face noise-sensitive receptors. ▪ Incorporate a setback distance from loading docks to noise-sensitive receptors, and prohibit truck travel and activity within the setback area by posting signs and/or by installing gates that restrict truck access	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Mitigation Measure 3.12-3b: Implement Noise Reduction Measures to Reduce Long-Term Noise Impacts from Corporation Yard Activity To minimize noise levels generated by corporation yard activity to levels that do not exceed the daytime standard of 70 dB L_{max} or nighttime standard of 65 dB L_{max}, the following measures shall be implemented for the construction of new corporation yards: ▶ New corporation yards only used during daytime hours (8 a.m. to 10 p.m.) shall be located at least 320 feet from all residential receptors, and new corporation yards used during daytime and nighttime hours shall be located at least 560 feet from all residential receptors. If this is not feasible, UC Santa Cruz shall reduce the noise level at all residential receptors to 70 dB L_{max} during daytime hours and 65 dB L_{max} during nighttime hours by incorporating one or more of the following mitigation strategies, the effectiveness of which shall be determined on a project-level basis by an acoustical professional: ▪ Design and build sound barriers around corporation yards that block the line of sight between truck activity areas and residential land uses. Sound barriers may consist of a wall, earthen berm, or combination thereof. ▪ Incorporate a setback distance from corporation yards to noise-sensitive receptors, and prohibit travel and activity of trucks or other heavy equipment within the setback area by posting signs and/or by installing gates that restrict truck access.	
Impact 3.12-4: Generate a Substantial Increase in Permanent (Traffic) Noise Levels Population growth and development associated with implementation of the 2021 LRDP would increase traffic within and outside UC Santa Cruz main residential campus and Westside Research Park. However, project-generated traffic volumes would not be at levels high enough to cause substantial increases in traffic noise (i.e., 5 dB increase in traffic-related noise, where the post-project noise level would remain equal to or lower than 60 dB L_{dn}, and a 3 dB increase in traffic-related noise where the post-project noise level would exceed 60 dB L_{dn}). This impact would be less than significant.	LTS	No mitigation is required.	LTS
3.13. Population and Housing			
Impact 3.13-1: Directly or Indirectly Induce Substantial Unplanned Population Growth and Housing Demand Implementation of the 2021 LRDP would allow physical development to accommodate projected increases in student enrollment, UC Santa Cruz faculty/staff,	S	UC Santa Cruz is planning to provide at least 8,500 student housing beds and 558 employee residences under the 2021 LRDP. Additional beds and residences are expected to be provided under the 2005 LRDP as part of the Kresge Housing and Student Housing West projects (see Chapter 4, Cumulative Impacts). As a result	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
non-UC employees, and on-campus faculty/staff families/dependents, up to the levels anticipated when the campus was founded. To account for projected increases in the total on-campus population, the 2021 LRDP would provide additional housing on the main residential campus and potentially at the Westside Research Park. Up to 28,000 students (baseline plus project) would be accommodated by the plan, and this is consistent with regional growth projections. The 2021 LRDP sets aside an adequate amount of land for housing to accommodate 100 percent of the increase in student enrollment above 19,500 and for 25 percent of the increase in the number of employees, based on demand. Existing data on vacancy rates, as well as planned development nearby, suggest that housing is generally available or planned to be available within the county and city of Santa Cruz to accommodate the additional students, faculty/staff, and non-UC employees for whom on campus housing would not be accommodated. However, other data, such as affordability, suggest a tighter housing market. Further, due to the recent (summer 2020) loss of homes associated with the CZU Lightning Complex fire, the availability of housing has tightened. Therefore, the total on-campus population increase accommodated by the 2021 LRDP may directly or indirectly induce substantial housing demand in the region. This impact would be significant.		and in consideration of the 2021 LRDP objectives, no feasible mitigation measures are available to reduce the anticipated impact. However, with incorporation of cumulative projects on and off campus, UC Santa Cruz anticipates that it will be able to provide housing to all students projected under the 2021 LRDP, and the impact associated with student housing demand is expected to be less than significant.	
3.14. Public Services			
Impact 3.14-1: Impacts on Fire Facilities The increase in campus population under the 2021 LRDP would increase the demand for on-campus and off-campus fire services. To address impacts of the increased population on campus, as part of the 2021 LRDP, UC Santa Cruz could either modernize and upgrade the existing SCFD Station 4 or construct a new facility on-campus under the 2021 LRDP within the Facilities and Operations land use designation, as warranted by additional development (either height or intensity of on-campus development). The facility would be placed on an area designated for this use in the 2021 LRDP, and the impacts of development under the 2021 LRDP are addressed throughout this EIR. Impacts associated with increases in population living off-campus would be addressed through development impact fees collected by those jurisdictions, as called for in their respective fee programs. In general, impacts would be less than significant, however due to timing considerations related to the availability of on-campus fire equipment (and associated fire facility) to serve taller/larger on-campus facilities included as part of the 2021 LRDP, impacts are considered significant.	S	**Mitigation Measure 3.14-1: Require Acquisition of New Fire Equipment and Construction/Expansion of On-Campus Fire Station to Meet Fire Access Requirements** During the design and planning of individual on-campus structures under the 2021 LRDP, UC Santa Cruz in coordination with SCFD shall determine if proposed development would exceed the height of existing on-campus response vehicles of the existing fire station. If it is determined that proposed development would exceed height capacity of existing on-campus response vehicles, UC Santa Cruz shall initiate the design and planning of a new on-campus fire station that can accommodate the required response vehicle(s) and adequately serve the development. Prior to operation of the on-campus development that would trigger the need for additional fire protection facilities, UC Santa Cruz shall initiate operation of the new on-campus fire station in cooperation with the City and pursuant to existing agreements related to fire protection service provided by SCFD.	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Impact 3.14-2: Impacts on Police Facilities The increase in population under the 2021 LRDP would increase demand for on-campus and off-campus police services. UC Santa Cruz PD would need additional sworn officers, dispatchers, and support staff, to meet the increased demand for services, but would not require the construction of new or additional police facilities. Funding and planning for additional staff members is carried out through UC Santa Cruz's capital planning process. The projected demand for off-campus police services would be distributed across various surrounding communities. The collection of development impact fees and tax revenue for increases in the demand for public services, including police facilities off-site, would ensure that the level of police protection services would be maintained. Therefore, this impact would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.14.3: Impacts on School Facilities The increase in campus population, particularly faculty and staff (who may have children) that is expected to occur under the 2021 LRDP could result in increased enrollment at area schools. However, adequate existing capacity coupled with projections of decreased enrollment in Santa Cruz City Schools (SCCS) suggests that additional students can be accommodated in existing classrooms. No new facilities would be needed. Therefore, this impact would be less than significant.	LTS	No mitigation is required.	LTS
3.15. Recreation			
Impact 3.15-1: Impacts on Campus Recreation Facilities The increase in campus population under the 2021 LRDP would increase demand for on-campus recreation facilities. However, UC Santa Cruz has an adequate amount of recreation facilities to serve existing and future campus populations under the 2021 LRDP, and maintenance of existing on-campus recreation facilities would continue to occur to offset demand for recreation facilities. Therefore, this impact would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.15-2: Impacts on Off-Campus Recreation Facilities The increase in campus population under the 2021 LRDP could increase demand for off-campus recreation facilities. This would be particularly the case for an increase in the number of students/employees who live off campus. However, any necessary recreational facility improvements as a result of substantial deterioration of existing facilities or requirements for new facilities within neighboring communities related to new UC Santa Cruz-related population growth would be addressed through development impact fees of the respective community, such as	LTS	No mitigation is required.	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
fees charged by the County and the City of Santa Cruz. In addition, the amount of recreation facilities on-campus is adequate to accommodate the increase in population under the 2021 LRDP and would help offset the demand for off-campus facilities. Therefore, this impact would be less than significant.			
3.16. Transportation			
Impact 3.16-1: Conflict with a Program, Plan, Ordinance, or Policy Addressing Roadway, Transit, Bicycle, and Pedestrian Facilities The 2021 LRDP includes on-campus improvements to transit service and infrastructure, off-campus transit service, and the on-campus roadway, bicycle and pedestrian network. These improvements are consistent with relevant non-university plans related to circulation, including the 2040 Regional Transportation Plan (RTP), the City of Santa Cruz General Plan, and the Santa Cruz County General Plan. Therefore, the 2021 LRDP would not conflict with relevant programs, plans, ordinances or policies addressing transit, roadway, bicycle or pedestrian facilities. This would be a less-than-significant impact.	LTS	No mitigation is required.	LTS
Impact 3.16-2: Conflict or Be Inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b) Related to Vehicle Miles Traveled (VMT) Implementation of the 2021 LRDP would reduce total campus VMT per capita and residential VMT per campus resident compared to baseline conditions. Residential VMT per campus resident would be below the significance threshold of 15 percent below baseline VMT per campus resident. However, commuter VMT per worker would increase relative to baseline conditions and would not meet the significance threshold of 15 percent below baseline commuter VMT per employee. Therefore, this impact would be significant.	S	**Mitigation Measure 3.16-2: Implement Transportation Demand Management (TDM) Program and Monitoring** UC Santa Cruz shall prepare and implement a TDM program as part of the 2021 LRDP that will adaptively manage campus-related VMT. At a minimum, the TDM program shall include the following: ▶ performance standards that are deemed sufficient to demonstrate annually that UC Santa Cruz will reduce the total campus VMT per capita to 15 percent below baseline campus average and the total employment VMT per employee to 15 percent below the countywide average; ▶ parking management strategies that reduce the per student/faculty/staff parking rates to reduce travel and associated VMT; ▶ campus features and TDM measures that will be used to achieve the performance standard commitments; and ▶ a monitoring and reporting program. UC Santa Cruz shall initiate preparation of the TDM program within three months of adoption of the 2021 LRDP and shall adopt and initiate program implementation within one academic year of LRDP adoption. This mitigation measure is in alignment with the goals outlined in the UC Santa Cruz 2017-22	LTS

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Campus Sustainability Plan, including reducing commute VMT by five percent and reducing per capita parking demand by ten percent by 2022. <u>Performance Standard</u> The TDM Program is intended to reduce the total daily VMT per capita to 15 percent below the baseline campus average and the employment VMT per employee to 15 percent below the countywide average. To accurately monitor performance, the TDM Program will develop specific VMT thresholds (i.e., VMT per capita and VMT per employee) and new baseline conditions to measure VMT thresholds against, based on the same methodology and data sources proposed for the monitoring component of the TDM program by which UC Santa Cruz may adaptively manage campus VMT. For example, if 10 percent of UC Santa Cruz employees were to work remotely, the overall target VMT and VMT per employee would be achieved (i.e., a 2-percent reduction in overall VMT). The VMT metrics presented in this chapter were developed using the SCC Travel Model, while the annual monitoring would occur using data collection. Based on current technologies, the campus' VMT performance could be most effectively monitored by using hose counts to measure the number of trips and anonymous cell phone data, which is "big data" that aggregates trip data using cellphones and navigation divides, to determine trip lengths. Since current technologies, including anonymous cell phone data, do not allow the tracking of employment trip lengths separately from the trip lengths generated by other campus uses (i.e., residential trips), the TDM Program shall develop a performance standard for the employment VMT threshold that is a weighted average of VMT generated by campus commuters and other campus users. <u>TDM Program Elements</u> A reduction in daily trips and VMT could be achieved through a significantly enhanced and robust TDM program. For the campus, the TDM program includes both campus features proposed as part of the 2021 LRDP and additional programmatic TDM elements that would support employment (faculty, staff, and student) trip reductions, as outlined below, such as employee housing, additional transit, and parking management tools. The campus would have the flexibility to manage implementation of TDM measures as long as the campus is meeting the VMT performance standards. If the campus is not meeting its performance standard, it would need to evaluate the effectiveness of TDM program and implement additional TDM elements to achieve the performance standards. Potential TDM measures may include, but are not limited to:	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Implementation Level 1 ▶ Work with appropriate agencies to implement an intelligent transportation system (ITS) program for the Campus Transit system to provide real-time vehicle location and time-to-arrival information at major on-campus shuttle bus stops. ▶ Encourage SCMTD to implement ITS program for campus routes to provide real-time vehicle location and time-to-arrival information at major SCMTD bus stops on- and off-campus (*project is currently in development with delivery planned for 2021*). ▶ Continue to expand Commuter Vanpool program. ▶ Expand Bike Shuttle hours of operations, routes and increase frequency of service, as needed. ▶ Improve transit service between Coastal Science Campus, Westside Research Park, and the main residential campus. ▶ Work with local agencies to provide additional secure bike parking and/or "bike stations" at or near off-campus transit stops. ▶ Where feasible, implement a 4-day/10-hour or 9-day/80-hour work schedule option for staff. ▶ Where feasible, promote increased use of telecommuting options for students, staff, and faculty. ▶ Replace monthly/annual parking fee with "pay at exit" use-based, daily or other alternative, dynamic payment mechanisms and parking fee policies that encourage off-peak travel. Implementation Level 2 ▶ Implement reduced on-campus parking fees for arrivals and departures occurring during off-peak hours, to better manage existing and reduce the need for new parking. ▶ Work with local agencies to implement a series of off-campus bike circulation improvements (bike boulevards, secure bike parking at major transit stops, etc.). ▶ Work with appropriate agencies to identify and develop a Westside Santa Cruz multi-modal hub, to connect Westside shuttle service with expanded automobile and bike parking and (ultimately) regional access via the adjoining rail right-of-way.	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▶ Work with appropriate agencies to identify and develop remote Park & Ride facilities with transit service. ▶ Explore opportunities to construct new student/staff housing along off-campus transit corridors, including the RTC mass transit rail-trail corridor. <u>Potential VMT Reduction by Program Measure</u> **Employee Housing** – The 2021 LRDP identifies sites with capacity to house as many as 25 percent of new employees, based on demand associated with the 2021 LRDP. Employee housing would be predominantly located near the main entrance to the campus at Bay and High Streets and at Westside Research Park to make trips to services such as grocery stores and schools as convenient as possible for employees and their families. Inclusion of support uses such as child-care, small park spaces, and community-use rooms located on-campus could also help reduce the number of trips taken by employees. The California Air Pollution Control Officers Association (CAPCOA) conducted a study to quantify greenhouse gas (GHG) mitigation measures, which also assess how certain policies/actions can reduce VMT, and subsequently reduce GHG. Per CAPCOA, land use/location measures could reduce VMT by up to 5 percent for a suburban development. **Telecommuting** - Continue to allow and encourage employees to telecommute when possible. Specifically, shift work schedules such that travel occurs outside of peak congestion periods so that employees do not drive longer routes to avoid traffic or providing opportunities for employees to work from home one or a few days a week can reduce travel to the campus. While schedule shifts would still result in commute trips to campus, they could encourage use of transit by moving trips to times of day when buses are less crowded and/or allow commuters to travel outside of peak commute periods where people may choose longer routes to avoid traffic. Telecommuting is an easy and low-cost way to reduce VMT and GHG. Per CAPCOA, alternative work schedules and telecommuting could reduce work VMT by up to 5.5 percent. **Additional Transit** - Add express service from major regional destinations or provide fair share contribution to regional mass transit improvements. Add select long-distance bus service to/from campus. Per CAPCOA, transit system improvements could reduce VMT by up to 10 percent, which is also consistent with the campus' Sustainability Plan. **TDM Program Expansion** - Expand TDM programs and prioritize investments in transportation programs before constructing on-campus parking facilities, such as implementing multimodal transit hubs and working with partner agencies to	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		increase transit and active transportation connectivity to the campus. Provide additional subsidies for transit use by commuters. Provide additional subsidized commuter vanpool routes to locations with concentrated employee residences, real-time ride matching, and reserved carpool and vanpool parking spaces. Per CAPCOA, a commute trip reduction program could reduce work VMT anywhere from 1 percent to 21 percent, depending on if it is voluntary or required. **Parking Management Tools** - Improve parking management and enforcement system. Establish "no net new commuter parking" and other parking management or eligibility policies. Per CAPCOA, parking policy/pricing could reduce VMT by up to 20 percent. Each of the TDM strategies can be combined with others to increase the effectiveness of vehicle trip and VMT reduction; however, the interaction between the various strategies is complex. Generally, with each additional measure implemented the incremental benefit of vehicle trip and VMT reduction may be less than the benefit that measure would have if it was considered on its own.[3] Thus, overall, the TDM measures could reduce VMT by up to an additional 15 percent, given the land use context and anticipated effectiveness of the TDM measures. <u>Annual Monitoring Program</u> Starting in the next full academic year after adoption and initiation of a TDM Program implementation, including establishment of baseline data, UC Santa Cruz shall conduct cordon counts at the two campus entrances for at least two weeks, on the fourth week of fall and spring quarters, and other methods to quantify mode choice and trip length, to determine whether the campus is achieving a 15 percent reduction in the per capita VMT over baseline to a maximum of 7.7 VMT per capita. A big data service could be used, to estimate the VMT generated by the campus during the same academic year as the cordon count data collected or other methods such as a mandatory employee travel survey. As noted earlier, the VMT generated by employees cannot be measured separately, so a ratio will be applied to estimate the VMT generated by employees, if big data is only used. An annual monitoring report shall be developed to describe: (a) specific steps taken to implement the TDM program; (b) results of the annual cordon counts and other data collected, including the methodology used to calculate VMT; (c)	

[3] For example, a theoretical TDM measure A and B may have an effectiveness of 10 percent each when they are considered on their own. However, if the two measures are combined, the reduction may only be 15 percent and not the 20 percent expected by adding the two measures together.

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		findings regarding whether the campus has met the VMT performance standard; and (d) an outline of additional TDM measures (i.e., a corrective action plan) to be implemented in subsequent years should the VMT performance standard of at least 15 percent below baseline VMT levels is not reached.	
Impact 3.16-3: Substantially Increase Hazards Due to a Geometric Design Feature (e.g., Sharp Curves or Dangerous Intersections) or Incompatible Uses (e.g., Farm Equipment) The development associated with the 2021 LRDP would be subject to, and constructed in accordance with the UC Facilities Manual, and all applicable industry standard roadway design and safety guidelines. Therefore, the 2021 LRDP would not substantially increase hazards due to a geometric design feature or incompatible uses. This impact would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.16-4: Result in Inadequate Emergency Access Implementation of the 2021 LRDP would not result in inadequate emergency access. Future roadway modifications would be designed in a manner consistent with applicable regulations, including those related to roadway widths and turning radii. In addition, UC Santa Cruz would coordinate with other agencies, as appropriate and consistent with the 2021 LRDP and per City/County policies, to ensure the safe transition between UC Santa Cruz facilities and other infrastructure. This would be a less-than-significant impact.	LTS	No mitigation is required.	LTS
3.17. Utilities and Service Systems			
Impact 3.17-1: Impacts on Water Supply Implementation of the 2021 LRDP would generate an additional demand for water; while there would be adequate water supply from the City's existing water sources in normal water years, during single and multiple dry water year conditions, there would be a substantial gap between demand and available supplies, which would require the City to secure a new water source. This impact would be significant.	S	**Mitigation Measure 3.17-1a: Require Implementation of Measures Consistent with City Drought Measures** If and when the City of Santa Cruz implements drought emergency management measures, UC Santa Cruz shall implement the following measures for the duration of the drought emergency: ▶ Reduce use of potable water for irrigation of campus landscaping, including the Arboretum, in accordance with reductions required by the City for similar users; ▶ Utilize water from the existing supply well in Jordan Gulch. UC Santa Cruz shall implement a program of monitoring flow at downgradient springs during the time when the well is being used; ▶ Require academic/administrative water use on campus be reduced, consistent or in excess of the City's target for business facilities; and	SU

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		▶ Require residential water use on campus be reduced, consistent or in excess of the City's target for multifamily residential facilities. **Mitigation Measure 3.17-1b: Evaluation and Implementation of Additional Water Conservation Measures** Within one year following approval of the 2021 LRDP, UC Santa Cruz shall consult with the City of Santa Cruz regarding the appropriate scope of and initiate an engineering audit of campus water use, similar to the previous audit completed in 2007. The audit will assess existing campus water uses, identify additional options for reducing water consumption, prioritize feasible improvements based on the amount of potential water savings and cost effectiveness (and in light of measures already completed by UC Santa Cruz), and recommend top priority measures for implementation within the succeeding five years, and lower priority measures for potential subsequent implementation. The audit will include, but will not be limited to the following: ▶ An inventory of plumbing fixtures in non-housing facilities on campus, which will identify the number and locations of fixtures and identify those that do not meet current campus standards for water efficiency; ▶ An inventory of irrigation systems on the campus, including identification of systems that are not metered, the methods used to control the irrigation schedule, and potential for improvement; ▶ An inventory of locations on campus where buildings and irrigation are on the same meter; ▶ An analysis of potential water conservation measures for the campus cooling water system; and ▶ Identification of landscaped areas on campus that have plants that are high water-use. Following completion of the audit, UC Santa Cruz shall implement measures determined in cooperation with the City of Santa Cruz to address issues identified in the audit. In addition, UC Santa Cruz shall also provide an internal audit every five years with an external audit every ten years on the level of implementation of identified measures, as well as identifying and requiring implementation (where feasible) of potential new technologies or measures from other regional/local studies that could be implemented moving forward. As part of this effort, UC Santa Cruz shall consider necessary updates to the UC Santa Cruz Water Action Plan and coordinate with relevant campus departments.	

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Impacts	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Impact 3.17-2: Require Construction of New/Expanded Water Infrastructure Implementation of the 2021 LRDP could require new water connections or expanded water conveyance systems. However, the construction of new or expanded water infrastructure are comprehensively analyzed in this EIR. This impact is considered less than significant.	LTS	No mitigation is required.	LTS
Impact 3.17-3: Require Construction of New/Expanded Wastewater Infrastructure to Comply with Applicable Wastewater Treatment Requirements Implementation of the 2021 LRDP would not exceed the available capacity of existing wastewater infrastructure nor would it require the construction or expansion of wastewater treatment facilities or conveyance systems that could cause significant environmental effects. This impact would be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.17-4: Impacts to Solid Waste Facilities and Compliance with Regulations Related to Solid Waste Implementation of the 2021 LRDP would increase solid waste generation at the main residential campus and Westside Research Park. However, adequate landfill capacity is available at local landfills to accommodate additional solid waste generated by the project. Compliance with the UC Sustainable Practices Policy would continue to reduce landfill disposal of solid waste, consistent with CIWMA, AB 341, SB 1374, AB 1826, and SB 1383. This impact would therefore be less than significant.	LTS	No mitigation is required.	LTS
Impact 3.17-5: Require Relocation or Construction of New Electricity, Natural Gas, or Telecommunications Facilities, the Construction of which Would Result in Significant Environmental Impacts New energy facilities may be required as part of 2021 LRDP development. However, the impacts associated with new infrastructure are evaluated as part of the overall 2021 LRDP development. New facilities would be constructed to serve proposed development and any relocated facilities would be coordinated with PG&E in order to ensure no interruption of service. Thus, this impact would be less than significant.	LTS	No mitigation is required.	LTS
3.18. Wildfire			
Impact 3.18-1: Compatibility with Adopted Emergency Response and Evacuation Plans UC Santa Cruz has an adopted Emergency Operations Plan (EOP), which comprises the entirety of emergency planning activities that govern emergency response and evacuation on the main residential campus and the Westside Research Park and would also encompass new development under the 2021 LRDP. Implementation of the 2021 LRDP would not interfere with an adopted emergency response or evacuation plan, but construction activities for projects under the 2021 LRDP could result in short-	S	**Mitigation Measure 3.9-4: Prepare and Implement Site-Specific Construction Traffic Management Plans** *(Refer to Section 3.9-4, "Hazards and Hazardous Materials")*	LTS

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term, temporary impacts on street traffic because of roadway improvements and potential extension of construction activities into the right-of-way. This could result in a reduction in the number of lanes or temporary closure of certain street segments. Any such impacts would be limited to the construction period and would affect only adjacent streets or intersection. This would be a significant impact.			
Impact 3.18-2: Wildfire Risk Associated with New Development and Land Use Patterns Implementation of the 2021 LRDP would place new development within the north campus, and along the margins of existing development on the central and lower campus. The UC Santa Cruz EOP outlines evacuation procedures for building emergencies and campus-wide emergencies, and the UC Santa Cruz OES also maintains an ongoing schedule of inspections for all buildings to ensure that fire hazards are mitigated and also conducts plan reviews and inspections of building construction and renovation activities. However, in the absence of an adopted Vegetation Management Plan, the wildfire risk associated with placing new development in close proximity to an HFHSZ and proposed changes in land use under the 2021 LRDP would be significant.	S	**Mitigation Measure 3.18-2: Prepare Campus-Wide Vegetation Management Plan** Upon approval of the 2021 LRDP and certification of the EIR, UC Santa Cruz shall initiate preparation and, within 2 years, begin implementation of a campus-wide vegetation management plan. The campus-wide vegetation management plan shall identify fire hazard areas consistent with California Government Code Sections 51179 and 51182, and implement a policy framework for managing fuel loads and maintaining defensible space consistent with Public Resources Code Section 4291. Policies and implementation actions that shall be considered as part of the plan will include, but are not limited to: ▶ vegetation management techniques for fire hazard mitigation, including thinning, pruning, removing or otherwise altering vegetation to reduce the potential for ignitions and to modify potential fire behavior; different vegetation management techniques shall be identified, depending on vegetation type, location, condition, and configuration; ▶ Treatment actions will be limited to eradication or control of invasive plants, removal of uncharacteristic fuel loads (e.g., removing dead or dying vegetation), trimming of woody species as necessary to reduce ladder fuels, and select thinning of vegetation to restore densities that are characteristic of healthy stands of the vegetation types present in the LRDP area; ▶ vegetation management and maintenance standards for dominant vegetation types in the LRDP area, specific recommendations for key wildfire risk areas, and the procedures for identifying and planning annual vegetation treatment operations; ▶ fuel management requirements, including clearing vegetation within 100 feet of structures, removing trees and branches that extend within 100 feet of a chimney/stovetop outlet, clearing roofs of vegetative debris, and maintaining vegetation adjacent to overhanging of a building; ▶ best management practices implemented to avoid and/or minimize impacts associated with soil erosion, biological resources, and water quality, including	LTS

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		the use of fire resistant/drought tolerant landscaping within 100 feet of new/modified structures within high or very high fire hazard zones; and ▶ building construction requirements for new development located in HFHSZs, including fire- or flame-resistant roofing material, roof vent coverings/screens, exterior siding, skylights, windows, doors, and decks, consistent with California Fire Code Chapter 49. As part of this effort, UC Santa Cruz shall also consider and incorporate actions/strategies included as part of the CAL FIRE California Vegetation Treatment Program.	

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1 INTRODUCTION

This chapter summarizes the purpose of this environmental impact report (EIR) for the University of California, Santa Cruz (UC Santa Cruz) 2021 Long Range Development Plan (2021 LRDP). It also describes the intended uses of the EIR, addresses the procedures that are to be followed according to the California Environmental Quality Act (CEQA), presents summaries of the 2021 LRDP and of the agency and public comments received during the public review period for the notice of preparation (NOP) of an EIR, and describes the scope and organization of this EIR.

The UC Santa Cruz 2021 LRDP (2021 LRDP) is the proposed project under CEQA. It has been prepared to guide the physical development necessary to achieve UC Santa Cruz's mission through 2040 and would replace the previous LRDP (2005 LRDP) that is currently being implemented within the LRDP area. The 2021 LRDP establishes a land use framework for academic and administrative space needs, housing, open space, circulation, and other land uses that ultimately facilitate the appropriate siting of capital projects.

1.1 PURPOSE AND INTENDED USES OF THIS EIR

This EIR has been prepared under the direction of the Board of Regents of the University of California (the Regents) in accordance with the requirements of CEQA (Public Resources Code [PRC] Section 21000 et seq.) and the State CEQA Guidelines (California Code of Regulations [CCR], Title 14, Section 15000 et seq.). The Regents are serving as the lead agency under CEQA for consideration of certification of this EIR and potential approval of the 2021 LRDP; State CEQA Guidelines Section 15367 defines the lead agency as the agency with principal responsibility for carrying out and approving a project. UC Santa Cruz is part of the University of California (UC), a constitutionally created entity of the State of California, with "full powers of organization and government" (Cal. Const. Art. IX, Section 9). As a constitutionally created State entity, UC Santa Cruz considers and provides authority for all land use decisions on property owned or controlled by UC Santa Cruz that are in furtherance of UC Santa Cruz's education purposes.

According to CEQA, if the lead agency determines that the project may have a significant effect on the environment, the lead agency shall prepare an EIR (State CEQA Guidelines Section 15064[f][1]). An EIR is an informational document used to inform public agency decision makers and the general public of the significant environmental effects of a project, identify possible ways to mitigate or avoid the significant effects, and describe a range of reasonable alternatives to the project that could feasibly attain most of the basic objectives of the project while substantially lessening or avoiding any of the significant environmental impacts. Public agencies are required to consider the information presented in the EIR when determining whether to approve a project.

CEQA requires that public agencies consider the environmental effects of projects over which they have discretionary authority before they take action on those projects (PRC Section 21002.1). CEQA also requires that each public agency avoid or mitigate to a less-than-significant level, wherever feasible, the significant environmental effects of projects it approves or implements. If implementing a project would result in significant and unavoidable environmental impacts (i.e., significant effects that cannot be feasibly mitigated to a less-than-significant level), the project can still be approved, but the lead agency must prepare and issue a "statement of overriding considerations," explaining in writing the specific economic, social, or other considerations that make those significant effects acceptable (PRC Section 21002; State CEQA Guidelines Section 15093).

An LRDP is defined by statute (Public Resources Code Section 21080.09) as a "physical development and land use plan to meet the academic and institutional objectives for a particular campus or medical center of public higher education." All UC campuses are required to prepare an LRDP to guide physical campus development. The 2021 LRDP establishes a land use framework for academic and administrative space needs, housing, open space, circulation, and other land uses that ultimately facilitate the appropriate siting of capital projects. UC Santa Cruz has commissioned this EIR evaluating the environmental effects of the 2021 LRDP for the following purposes:

- to satisfy the requirements of CEQA, the State CEQA Guidelines, and the University of California Guidelines for the Implementation of CEQA;

- to inform the general public, local community, responsible and interested public agencies, and the Regents of the nature of the proposed project, its potential significant environmental effects, measures to mitigate those effects, and alternatives to the proposed project;
- to enable the Regents to consider the environmental consequences of approving the 2021 LRDP;
- to provide a basis for tiering subsequent environmental documents from the 2021 LRDP EIR pursuant to the State CEQA Guidelines Sections 15152, 15168(c) and 15183.5; and
- for consideration by responsible agencies in issuing permits and approvals for projects under the 2021 LRDP and other actions.

1.1.1 Responsible and Trustee Agencies

Under CEQA, responsible agencies are State and local public agencies, other than the lead agency, that have the discretionary authority over a project or a portion of it. Trustee agencies are State agencies with legal jurisdiction over natural resources affected by a project that are held in trust for the people of the state of California.

The agencies listed below may have responsibility for or jurisdiction over implementation of elements of the project. The list of agencies also identifies potential permits and other approval actions that may be required before implementation of certain project elements. The list is not intended to imply that specific permits would be required or that specific actions would occur; rather, it identifies agencies that *may* have responsibilities related to project components and the potential associated reasons. Chapter 3 of this EIR provides detailed analysis that explores further the potential for the need for responsible agency action.

This EIR is expected to be used to satisfy the CEQA requirements of the listed responsible and trustee agencies. Further, this analysis is anticipated to provide useful information for any federal agency that may issue a permit in support of the 2021 LRDP.

STATE

- California Coastal Commission (responsible agency)—to comply with the California Coastal Act for any development within the Coastal Zone
- California Department of Fish and Wildlife (responsible and trustee agency)—to comply with the California Endangered Species Act for potential take of State-listed species and to comply with the California Fish and Game Code with respect to work within a river, stream, lake, or its tributaries
- California Department of Forestry and Fire Protection (responsible agency)—to comply with the California Forest Practice Act for potential removal/harvesting of trees
- California Department of Transportation (Caltrans) (responsible agency)—to authorize temporary access for construction within Caltrans rights-of-way
- Central Coast Regional Water Quality Control Board (responsible agency)—to issue waste discharge requirements for impacts on waters of the state and approve a stormwater pollution prevention plan for construction/operation
- State Water Resources Control Board (responsible agency)—to authorize coverage under Construction General and Industrial Storm Water permits

LOCAL

- Monterey Bay Air Resources District (responsible agency)—to comply with stationary source permitting requirements (e.g., Authority to Construct and Permit to Operate)
- City of Santa Cruz (responsible agency)—to authorize approval of roadway, bike path, utility, and sidewalk improvements within City-owned right-of-way
- County of Santa Cruz (responsible agency)—to authorize approval of roadway, bike path, utility, and sidewalk improvements within County-owned right-of-way

FEDERAL

In addition, this EIR may be used to provide environmental information for the following federal agencies in any permitting actions they may take on the project:

- U.S. Army Corps of Engineers—to comply with Clean Water Act Section 404 requirements related to any impacts on waters of the United States
- U.S. Fish and Wildlife Service—to comply with the federal Endangered Species Act for any take of listed species

1.2 LRDP BACKGROUND

Each campus in the UC system prepares an LRDP to guide campus development in anticipation of potential growth of student enrollment and new university-added programs. For UC Santa Cruz's campus, which includes the main residential campus and the Westside Research Park, the 2021 LRDP proposes a land use plan to support potential growth predominantly through redevelopment of existing facilities and construction on previously developed land. UC Santa Cruz anticipates that under the 2021 LRDP, the on-campus population could grow from an estimated 18,518 full-time equivalent (FTE) students to a potential enrollment of 28,000 FTE students (three-quarter average) by the 2040–2041 academic year. UC Santa Cruz faculty and staff are also anticipated to increase from approximately 2,800 FTE to approximately 5,000 FTE in the same timeframe. To accommodate the increased campus population, the 2021 LRDP proposes the renovation of existing facilities and the construction of an additional 3.1 million assignable square feet of academic and support building space. The 2021 LRDP does not include planning for the third UC Santa Cruz property in Santa Cruz, the Coastal Science Campus, which is governed by a separate Coastal Long Range Development Plan. It also does not include planning for remote satellite campuses in Scotts Valley, Santa Clara, and Marina.

The 2021 LRDP proposes to accommodate 100 percent of the increase in students beyond approximately 19,500 FTE students and up to 25 percent of the additional 2,200 FTE faculty/staff members in on-campus housing. It would accommodate an estimated 17,783 students in campus housing, compared to existing on-campus housing capacity of an estimated 9,283 students.

Much like a city or county general plan, the 2021 LRDP does not mandate growth or the provision of new facilities. Varying factors affect whether campus population levels may increase, decrease, or remain unchanged. The 2021 LRDP provides a guide to the land development patterns and associated physical infrastructure that could be built to support a forecasted level of enrollment and employment growth. Its approval does not constitute a commitment to any specific project, construction schedule, or funding priority, nor does it constitute a commitment by UC Santa Cruz to enrollment growth or a certain amount of development.

Further, the 2021 LRDP does not sunset, and there is no set timeframe for when a new LRDP would be needed. However, for analytical purposes, this EIR assumes that the forecasted student and faculty/staff growth would occur by the 2040-2041 academic year, along with development of related facilities and housing. This EIR uses the 2018-2019 academic year as the baseline year to reflect existing environmental conditions unless otherwise specified and explained in relation to a specific topic. This approach is consistent with the CEQA guideline recommendation that the date when the NOP is issued should normally constitute the date of the baseline conditions against which project conditions should be compared. At the time when the NOP was issued for the 2021 LRDP EIR, the 2018-2019 academic year represented the most complete and accurate data regarding the campus population.

1.3 PLANNING PROCESS

The Regents adopted the most recent LRDP for UC Santa Cruz, the 2005 LRDP, and certified its EIR at its September 19–21, 2006, meetings. LRDPs do not expire and remain in effect until updated or replaced. The 2005 LRDP requires updating to reflect new growth projections and plans. The 2021 LRDP builds on prior Campus planning efforts with projections for potential population growth and land use designations for new initiatives. The 2021 LRDP would accommodate growth in UC Santa Cruz's student, faculty, and staff campus population while supporting the academic program, enriching community life, and creating a sustainable future.

The first stage of the 2021 LRDP planning process involved conducting stakeholder interviews, gathering data, and setting goals. More specifically, this stage involved the establishment of the Community Advisory Group (composed of community members and local government representatives and staff), the 2021 LRDP Planning Committee (composed of staff, faculty, study, and community representatives), and expert work groups (composed of staff, faculty, and local government experts) and the participation of the community at open houses in Santa Cruz, Capitola, and Watsonville; at Santa Cruz neighborhood meetings; and in individual stakeholder interviews and focus groups. Individuals were encouraged to provide feedback online using the visioning tool available on the UC Santa Cruz 2021 LRDP website: https://lrdp.ucsc.edu/2040/resources.html. This process led to development of three land use scenarios of the 2021 LRDP. Additional technical analysis from the Community Advisory Group, the 2021 LRDP Planning Committee, and expert work groups and feedback from individuals who used the online feedback tool led to development of two land use map variations. Another round of technical analysis involving these groups and feedback obtained through community workshops led to the creation of the proposed land use map. Following these community workshops, the public draft 2021 LRDP was developed.

The following list provides approximate dates of these planning efforts:

- fall 2017: LRDP scenarios development
- spring 2018: LRDP community open forums
- winter 2018: LRDP online visioning activity initiated
- winter 2018: public survey test scenarios
- spring 2020: proposed land use map development

Land use planning workshops open to the public were held on October 21, 22, and 24, 2019. These workshops focused on obtaining feedback on land use map variations, housing, circulation, campus and community amenities, and sustainability. At three open houses—two on December 2 and one on December 3, 2019—the public was invited to see a presentation on the proposed land use map and provide feedback.

Many public comments during the planning efforts mentioned the potential level of growth on campus, including projected increases in student enrollment, and potential development locations as key concerns. Comments regarding housing location indicated a desire to avoid housing within the central portion of the main residential campus to maintain the existing level of open space. After consideration of these comments, UC Santa Cruz revised the proposed land use scenario and refocused potential development under the 2021 LRDP to areas adjacent to existing development. Additional comments during the planning process indicated a desire for more student services/amenities in the 2021 LRDP. UC Santa Cruz has continued to evaluate campus land options for additional services and amenities to serve the campus population.

After a 38-day NOP and scoping period from February through April 2020, UC Santa Cruz carefully reviewed all the agency and public comments to consider 2021 LRDP planning revisions and environmental issues for the 2021 LRDP EIR. Included in the scoping comments were requests for consideration of a lesser degree of development and student enrollment, analysis of potential impacts on the City of Santa Cruz (including city utilities and residents), increasing student housing on campus, an assessment of potential emissions (air quality and greenhouse gas) associated with 2021 LRDP development, and the need to evaluate potential impacts on visual resources (See Appendix B). These scoping comments are addressed in the impact analyses and the alternatives section of this EIR. In addition, after the scoping period, UC Santa Cruz continued to consult with commenting and other agencies, including the City of Santa Cruz, County of Santa Cruz, Caltrans, Santa Cruz County Regional Transportation Commission, the California Department of Forestry and Fire Protection, and the United States Fish and Wildlife Service. Ongoing consultation with these agencies assisted with refining the baseline conditions, developing the impact methodology, and projecting the cumulative conditions in this EIR.

1.3.1 Relationship with Other Campus Planning Efforts

The 2021 LRDP represents one of many planning efforts by UC Santa Cruz but serves as an overall umbrella of campus planning and development activities. It provides a guide to the land development patterns and associated physical infrastructure that could be built to support a forecasted level of enrollment and growth. Of the other campus planning efforts conducted by UC Santa Cruz, four types of campus planning efforts (strategic academic planning, capital financial planning, the physical design framework, and sustainability planning) are closely related to the 2021 LRDP, and the 2021 LRDP is generally consistent with these planning efforts. The four types of planning documents are described below.

STRATEGIC ACADEMIC PLAN

UC Santa Cruz's *Strategic Academic Plan and Implementation Playbook* identifies design principles and links each to a concrete goal tied to a menu of possible initiatives and outcomes to help ensure that the vision of UC Santa Cruz for its future can be made real. The strategic goals are direction-setting, outcome-based aspirations, whereas the initiatives are concrete steps taken in pursuit of a goal (UC Santa Cruz 2018).

The plan identifies the following five design principles to advance the institutional values of UC Santa Cruz and help facilitate a shared understanding of how particular initiatives have been prioritized:

- drive research and creative work that transform our world;
- create enriching experiential learning and research opportunities for students;
- engage and support a diverse faculty, staff, and student body;
- support generative interdisciplinary connections to research and teaching; and
- expand excellence in innovation in areas distinctive to UC Santa Cruz, such as social justice, diversity, and sustainability.

The plan describes the three academic priority areas identified by UC Santa Cruz: Earth Futures, Justice in a Changing World, and Digital Interventions. Identifying the three areas will help the UC Santa Cruz prioritize funding and development through 2023. Briefly stated, Earth Futures relates to taking a long view of the earth and humanity, Justice in a Changing World focuses on how UC Santa Cruz can serve justice in the world, and Digital Interventions relates to how the digital world interacts with and shapes our lives.

The plan also focuses on identifying and making recommendations for reducing or eliminating the most immediate barriers to research, teaching, and learning.

CAPITAL FINANCIAL PLAN

Capital planning is an ongoing and iterative process that evaluates the capital funding needs identified by academic plans (such as the strategic academic plan) and land use plans (such as LRDPs) and assesses alternatives to meet such needs in the context of anticipated capital resources. Such planning occurs at the UC level and at the individual campuses. The *University of California Capital Financial Plan*, updated annually, identifies all prospective projects, budget estimates, and anticipated fund sources for the 10 UC campuses and the medical centers associated with them. The current plan addresses the 2019–2025 timeframe (UC 2019).

UC Santa Cruz's *Capital Financial Plan* is also updated annually. It is a proposed 10-year budget and schedule for all projects over $750,000 (UC Santa Cruz 2017).

Capital planning anticipates investments necessary to provide new facilities and infrastructure and to maintain the quality of campus assets. Specific types of improvements include:

- teaching, research, student services, and administrative facilities;
- student housing and other student life activity centers and programs;

- utility infrastructure, including water, sewer, building heating and cooling, telecommunications, and other systems;
- energy conservation projects; and
- roadways, bike paths, and public spaces.

PHYSICAL DESIGN FRAMEWORK

The *University of California, Santa Cruz Physical Design Framework* describes a vision for adding facilities in response to evolving teaching and research needs concurrent with UC Santa Cruz reviewing aging infrastructure; ensuring that new buildings are in harmony with the natural environment and with several generations of earlier buildings; providing a variety of attractive public spaces; and accomplishing all of this within the financial constraints of a public university, in an environment of increasingly stringent regulations, and with an evolving awareness of the need to minimize the institution's carbon footprint (UC Santa Cruz 2010).

The framework identifies five unifying concepts, including using different approaches to development in the different major landscape types, building in clusters, and using a "ladder" roadway system that conforms as closely as possible to existing topography and that reflects the distinctive physical structure of the campus and its historic pattern of development. It also presents planning and design guidelines related to land, buildings, roads and paths, and infrastructure.

The framework is used by UC Santa Cruz campus planners, architects, and others to guide the effective incorporation of these concepts into projects that modify the built environment of the campus. With respect to the 2021 LRDP, the framework provides more specific direction for site planning, landscape design, and architecture for future development identified by the 2021 LRDP.

SUSTAINABILITY ACTIONS AND PLANS

Consistent with the UC's and UC Santa Cruz's focus on sustainability, including implementation of the UC Sustainable Practices Policy, UC Santa Cruz has implemented and is continuing to implement a number of energy conservation and sustainability initiatives throughout the campus. As part of this effort, UC Santa Cruz is currently implementing its 2017–2022 Campus Sustainability Plan (UC Santa Cruz 2019).

The UC Santa Cruz Sustainability Office strives to foster a culture of sustainability on campus by pursuing the following goals: institutionalize sustainability, improve environmental performance through the Campus Sustainability Plan, create centralized communication and promote successes, promote a culture of inclusive sustainability, and integrate sustainability into the classroom.

Campus programs encourage faculty, staff, and students to reduce water consumption and waste generation, among other environmental sustainability actions. The comprehensive Campus Sustainability Plan identifies goals, strategies, and actions to increase sustainability in the areas of learning and culture, materials management and food systems, natural environment and infrastructure, and climate and energy. A progress report presents updates on all the annual actions pursued during the first 2 years of the 5-year sustainability plan.

For further information regarding UC Santa Cruz sustainability planning efforts, refer to Section 3.6, "Energy"; Section 3.8, "Greenhouse Gas Emissions and Climate Change"; and Section 3.17, "Utilities and Service Systems."

2008 COMPREHENSIVE SETTLEMENT AGREEMENT

Although not a campus plan, a Comprehensive Settlement Agreement (CSA) was entered into in 2008 by UC Santa Cruz, the City of Santa Cruz, the County of Santa Cruz, and a variety of other parties to resolve several lawsuits challenging the 2005 LRDP EIR. (See *City of Santa Cruz et. al. v. Regents of the University of California et. al*. Santa Cruz County Superior Court Case No. CV155571, consolidated with Case No. CV155583.) Among other things, the CSA addressed enrollment, capping on-campus three-quarter average undergraduate enrollment at 17,500 FTE and projecting a total on-campus 3-quarter average enrollment (undergraduate and graduate) of 19,480 FTE by the 2020-

2021 academic year. The CSA required UC Santa Cruz to provide 7,125 beds for enrollment up to 15,000 FTE and beds for 67 percent of new student enrollment above 15,000 FTE. The CSA also required UC Santa Cruz to apply to the Santa Cruz County Local Area Formation Commission (LAFCO) for a Sphere of Influence amendment for extraterritorial water and sewer services for the north campus subarea, which UC Santa Cruz did in 2008, but provided that UC Santa Cruz's application to LAFCO was not an admission that UC Santa Cruz is subject to LAFCO jurisdiction and did not change the underlying agreements between the City and UC Santa Cruz. To date, UC Santa Cruz has complied with its obligation under the CSA. Refer to Chapter 2, "Project Description," for further information regarding existing on-campus housing and student enrollment. The CSA is in effect until the Regents approve a new LRDP.

This EIR discloses and analyzes the impacts of the 2021 LRDP as compared to baseline conditions with regard to physical development and enrollment, but does make reference to the CSA in some discussions.

1.4 EIR PROCESS

CEQA requires an early and open process for determining the scope of issues that should be addressed in the EIR. The NOP provides formal notification to all federal, state, regional, and local agencies involved with funding or approval of the project, and to other interested organizations and members of the public, that an EIR will be prepared for the project. The NOP is intended to encourage interagency communication concerning the proposed project and to provide sufficient background information about the proposed project so that agencies, organizations, and individuals can respond with specific comments and questions on the scope and content of the EIR.

In accordance with PRC Section 21092 and State CEQA Guidelines Section 15082, a NOP was prepared and circulated on February 25, 2020, for a 30-day period of public and agency comment. The original public review period was scheduled to end on March 25, 2020, but was extended to March 30, 2020, to close during the first day of spring quarter at UC Santa Cruz. In light of concerns regarding COVID-19 and the resulting restrictions for public gatherings, this deadline was later extended to April 8, 2020. The NOP was submitted to the State Clearinghouse and the clerk-recorder for Santa Cruz County. A copy of the NOP is provided in Appendix A; the written comments received during the NOP comment period are provided in Appendix B. Comments received during public review of the NOP and at the public scoping meeting are summarized in a table at the beginning of Appendix B. A summary of the relevant NOP comments is provided at the beginning of each topical section in Chapter 3. The NOP is also available on the project website: https://lrdp.ucsc.edu.

During the public review period for the NOP, two public scoping sessions were held on March 12, 2020, from noon to 2:00 p.m. and from 6:00 p.m. to 8:00 p.m. A third scoping session was also held on April 1, 2020, from 6:00 p.m. until 8:00 p.m. Because of concerns regarding COVID-19, the sessions were not held in person. Instead, they were held in a virtual format using a live video feed. Recorded sessions are available for viewing at https://video.ibm.com/recorded/128318905This Draft EIR is being circulated for a 60-day period of review (15 days longer than required under the State CEQA Guidelines) and comment by the public, agencies, organizations, and other interested parties beginning on Thursday, January 7, 2021 and ending on Monday, March 8, 2021. As a result of the expanding outbreak of COVID-19 and resulting restrictions placed on in-person gatherings throughout California, in consultation with UC Office of the President, UC Santa Cruz will host an online public session to receive comments on the Draft EIR, rather than an in-person event. The online public session will be hosted on Wednesday, February 3, 2021 and Thursday, February 4, 2021 from 5:00 p.m. to 7:00 p.m. and conducted online. To obtain information about how to attend the live public session, visit the participation section of project web site: https://lrdp.ucsc.edu.

The Draft EIR is available to review online at: https://lrdp.ucsc.edu.

Due to the COVID-19 pandemic, hard copies will not be available to review in person at the library. Please contact Erika Carpenter at escarpen@ucsc.edu or at (831) 212-0187 if you would like to receive a USB/flash drive of the Draft EIR. The public review period will conclude at 5:00 p.m. on Monday, March 8, 2021. All comments on the Draft EIR should be addressed to:

Erika Carpenter
Senior Environmental Planner
Physical Planning, Development, and Operations
University of California, Santa Cruz
1156 High Street
Santa Cruz, CA 95064
Email: eircomment@ucsc.edu

After close of the public comment period, responses to written and oral comments on environmental issues will be prepared. Consistent with State CEQA Guidelines Section 15088(b), commenting agencies will be provided a minimum of 10 days to review the proposed responses to their comments before any action is taken on the Final EIR or project. The Final EIR (consisting of this Draft EIR and the response to comments document) will then be considered for certification (in accordance with State CEQA Guidelines Section 15090) and approval by the Regents. If the Regents find that the Final EIR is "adequate and complete," they may certify the Final EIR in accordance with CEQA.

CEQA requires that when a public agency approves a project covered by an EIR, the public agency must adopt a reporting or monitoring program for the measures it has adopted or made a condition of the project approval to mitigate significant adverse effects on the environment. The reporting or monitoring program must be designed to ensure compliance during project implementation. The mitigation monitoring and reporting program for the project will be prepared and considered by the Regents in conjunction with the Final EIR review.

1.5 SCOPE OF THIS DRAFT EIR

This EIR is a program EIR, which is defined in Section 15168 of the State CEQA Guidelines as an EIR that addresses "a series of actions that can be characterized as one large project and are related:

(1) Geographically,

(2) As logical parts in the chain of contemplated actions,

(3) In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, or

(4) As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.

A program EIR can be used as the basic, general environmental assessment for an overall program of projects developed over a multiyear planning horizon; therefore, it is an appropriate review document for the 2021 LRDP. A program EIR has several advantages. For example, it provides a basic reference document to avoid unnecessary repetition of facts or analysis in subsequent project-specific assessments. It also allows the lead agency to consider the broad, regional impacts of a program of actions before its adoption and eliminates redundant or contradictory approaches to the consideration of regional and cumulative impacts.

A Program EIR is the first tier of environmental analysis. Consistent with CEQA, specifically Section 15168(c) of the State CEQA Guidelines, subsequent projects that are proposed consistent with the 2021 LRDP will be reviewed using an environmental checklist to determine whether they are within the scope of the Program EIR. If no new significant effects would occur, the subsequent project is considered to be within the scope of the Program EIR, and additional environmental analysis is not required. If significant environmental impacts would occur that were not considered in the Program EIR, an additional CEQA document (subsequent or supplemental EIR or a mitigated negative declaration) would be prepared by UC Santa Cruz, tiering from the Program EIR and focusing on addressing those additional significant effects.

1.6 ORGANIZATION OF THIS DRAFT EIR

This Draft EIR is organized into the following chapters:

- The **Executive Summary** provides an overview of the environmental evaluation, including impact conclusions and recommended mitigation measures.
- **Chapter 1, "Introduction,"** describes the purpose and intended uses of this EIR; identifies responsible and trustee agencies; presents background on the 2021 LRDP and on the planning, EIR, and NOP processes; and describes the scope and organization of this EIR.
- **Chapter 2, "Project Description,"** describes the location of the project, the project background, existing conditions on the project site, and the nature and location of specific elements of the proposed project.
- **Chapter 3, "Environmental Setting, Impacts, and Mitigation Measures,"** includes a topic-by-topic analysis of environmental impacts that would or could result from project implementation. The analysis is organized in 18 topical sections. Each section includes a discussion of the environmental and regulatory setting, an impact analysis, and a discussion of mitigation measures.
- **Chapter 4, "Cumulative Impacts,"** provides information regarding the potential cumulative impacts that would result from implementation of the project together with other past, present, and probable future projects.
- **Chapter 5, "Other CEQA Considerations,"** includes a discussion of growth inducement and unavoidable adverse impacts.
- **Chapter 6, "Alternatives,"** describes feasible alternatives to the proposed project, including the No-Project Alternative, and describes the consequences of implementing these alternatives.
- **Chapter 7, "List of Preparers,"** identifies the preparers of this Draft EIR.
- **Chapter 8, "References,"** lists all the resources cited in this Draft EIR.
- **Chapter 9, "List of Abbreviations,"** defines terms used throughout this Draft EIR.

The **appendices** contain a number of reference items providing support and documentation of the analyses performed for this report.

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2 PROJECT DESCRIPTION

2.1 INTRODUCTION

The University of California, Santa Cruz (UC Santa Cruz or Campus) is one of 10 campuses in the University of California (UC) system. In support of its continued mission to provide a diverse array of leading academic programs and research, UC Santa Cruz has prepared a long range development plan (LRDP or plan) to guide the physical development necessary to achieve the Campus's mission through 2040. The 2021 LRDP (proposed project) establishes a land use framework for academic, research and administrative space needs, housing, open space, circulation, and other land uses that ultimately facilitate the appropriate siting of capital projects. All UC campuses are required to prepare an LRDP to guide physical campus development. An LRDP is defined by statute (Public Resources Code Section 21080.09) as a "physical development and land use plan to meet the academic and institutional objectives for a particular campus or medical center of public higher education." The University of California Board of Regents (Regents) adopted the existing UC Santa Cruz LRDP in September 2006 (referred to as the 2005 LRDP), and the 2005 LRDP has served as the guide for campus growth and development since its adoption.

Once approved, the proposed 2021 LRDP would replace the 2005 LRDP and would guide campus development and growth to support the academic mission of UC Santa Cruz through 2040. The 2021 LRDP campus population forecast is 28,000 full-time-equivalent (FTE) students[1] and 5,000 FTE faculty and staff.[2] To accommodate the projected increase in campus population, the 2021 LRDP provides for 8,500 student housing beds, approximately 550 employee housing units, and approximately 3.1 million assignable square feet (asf) of academic and support building space. The 2021 LRDP land use plan supports potential growth on the UC Santa Cruz main residential campus and the Westside Research Park, located at 2300 Delaware Avenue in the city of Santa Cruz.

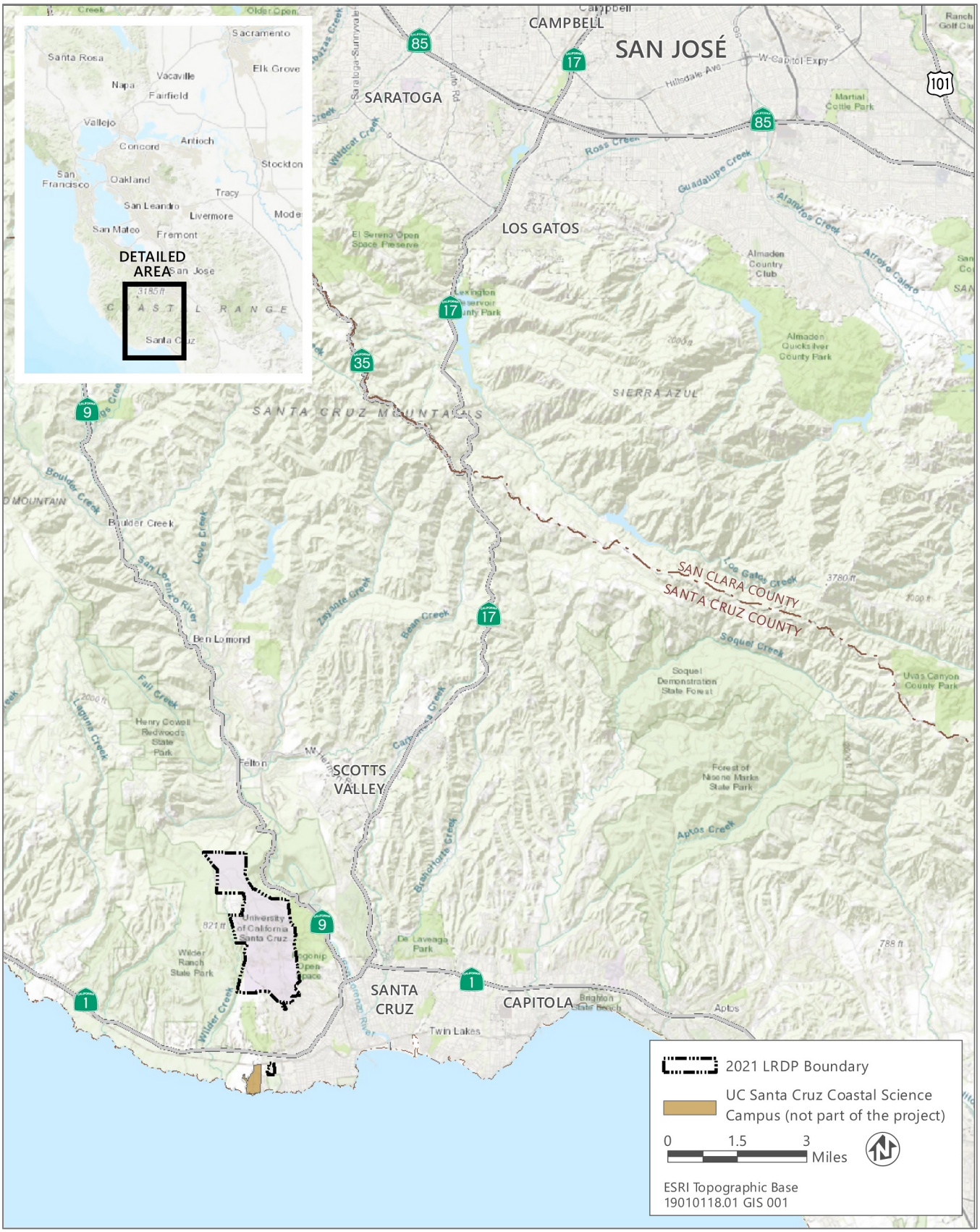
This chapter presents a detailed description of the draft UC Santa Cruz 2021 LRDP, which would serve as the physical development and land use plan for the campus for approximately the next 20 years. For purposes of the California Environmental Quality Act (CEQA), the 2021 LRDP is the proposed project (or project). This chapter describes the project's location, setting, goals and objectives, and elements.

2.2 PROJECT LOCATION AND SETTING

The 2021 LRDP would guide physical campus growth and development at two of the three UC Santa Cruz campus properties located within the city of Santa Cruz: (1) the UC Santa Cruz main residential campus and (2) the Westside Research Park (Figure 2-1). Together, the main residential campus and Westside Research Park constitute the plan area for the 2021 LRDP, as shown in Figure 2-2, and are described in further detail below. The third UC Santa Cruz property, the Coastal Science Campus, is a 100-acre property on the west side of the city and is governed by a separate Coastal Long Range Development Plan that was adopted by the Regents and certified by the California Coastal Commission in 2008. Because of this, the Coastal Science Campus is not a part of the 2021 LRDP and is not included in the plan area. In addition, the LRDP area does not include the Scotts Valley Center, the Silicon Valley remote satellite campus, nor the UC Monterey Bay Education, Science, and Technology Center (MBEST), which was transferred to UC Santa Cruz by the U.S. Army and is located approximately 26 miles south of the main residential campus.

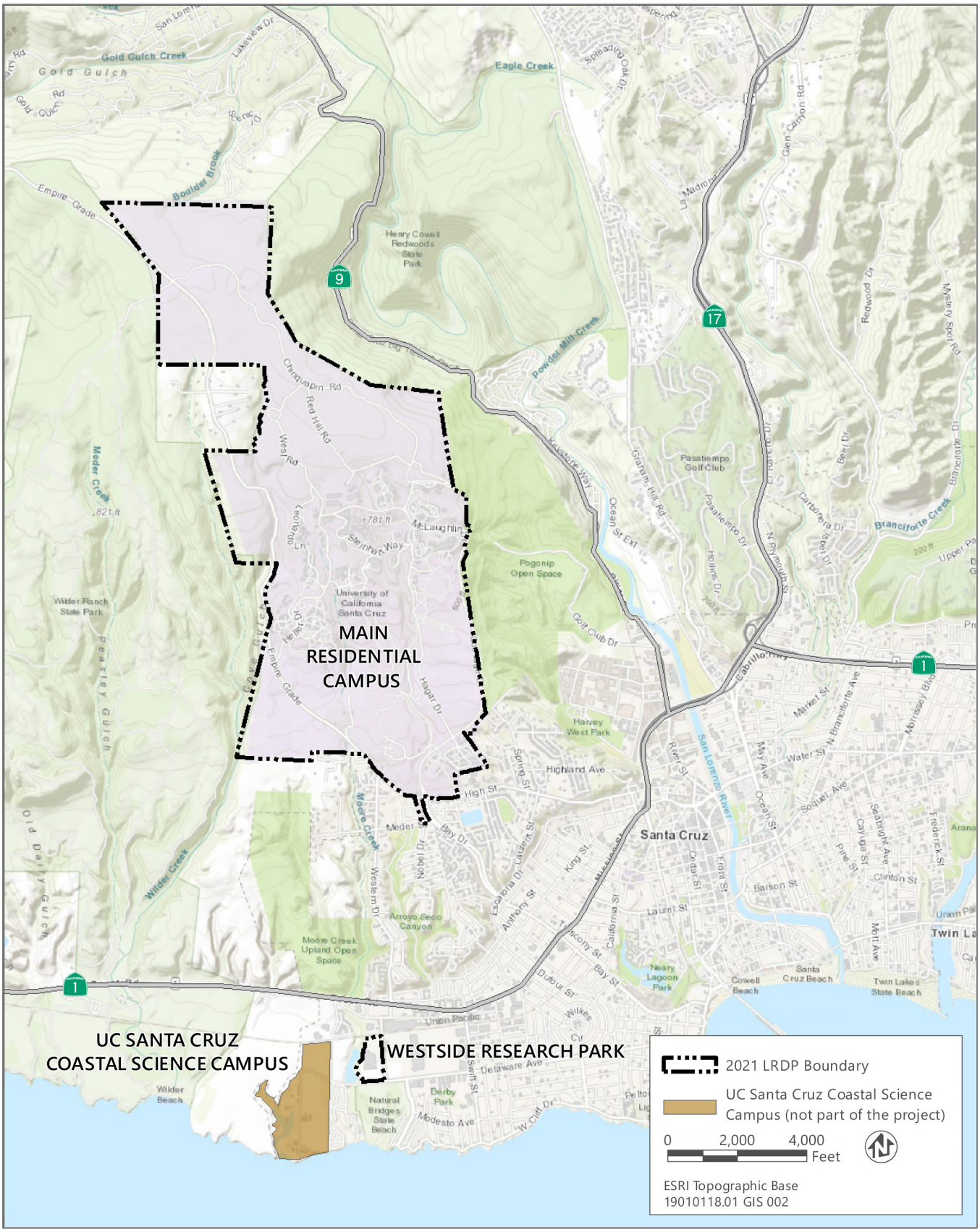
[1] An FTE student is a three-quarter average (Fall, Winter, and Spring quarters) measure of (1) an undergraduate student who enrolls for 45 credit hours per academic year; or (2) a graduate student (master's level or doctoral student not yet advanced to candidacy) enrolled in 36 hours per year; or (3) a graduate doctoral student who has been advanced to candidacy. The LRDP campus population forecast accounts for students studying at the main residential campus and the Westside Research Park.

[2] An FTE faculty/staff member is defined as the three-quarter average (Fall, Winter, and Spring quarters) of one on-campus position, continuously filled for the entire period and which may be comprised of a combination of part-time positions or one full-time position.



Source: Data downloaded from Santa Cruz County in 2019

Figure 2-1 Regional Location



Source: Data downloaded from Santa Cruz County in 2019

Figure 2-2 Project Location and Plan Area

2.2.1 Main Residential Campus

The main residential campus (approximately 2,000 acres in size) is located in Santa Cruz County, along the northern coast of the Monterey Bay, approximately 70 miles south of the city/county of San Francisco, 30 miles southwest of the city of San Jose, and 30 miles north of the city of Monterey. Approximately 53 percent of the main residential campus is located within the city of Santa Cruz with the remaining acreage located within unincorporated Santa Cruz County. The surrounding area includes open space/natural areas to the east and west of the campus, with residential uses located to the southeast, south, and southwest, and rural residential uses to the north of the campus boundary. The campus is surrounded by the Wilder Ranch State Park to the west, rural residential land (including the Cave Gulch neighborhood) to the north, Pogonip City Park with residential and some commercial development to the east, and primarily residential development with the Westlake Elementary School and two churches to the south.

The main residential campus generally consists of a series of relatively level marine terraces separated by steep slopes with an overall elevation change of approximately 900 feet from south to north. The central and lower portions of the main residential campus are divided into thirds by two steep north-south-trending drainages (Jordan Gulch to the east and Moore Creek to the west) and their tributaries. These and other drainages (e.g., Cave Gulch and Wilder Creek) have formed ravines (as much as 70 feet deep and 350 feet wide) in certain areas of the campus. The campus landscape is also similarly varied. The main entrance to the campus contains expansive meadows, and the lower campus areas transition from redwood forests within the central campus to chaparral and mixed evergreen forests as the elevation increases.

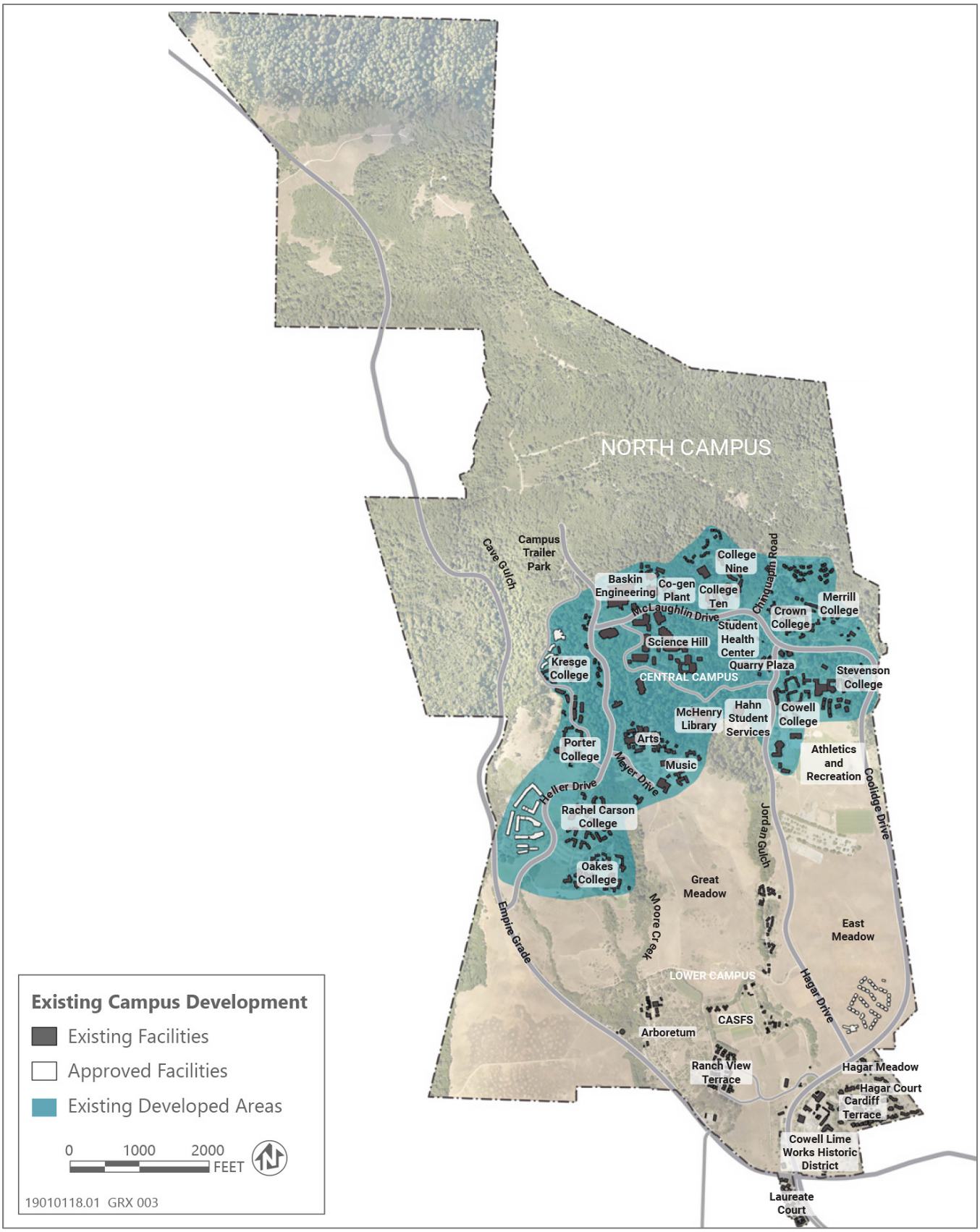
The main residential campus is composed of three primary subareas: the north campus, which extends from the developed central campus subarea to the northern property line; the central campus, which extends roughly from the East and West Remote Parking Lots northward to the Crown and Merrill Colleges on the east and to the North Remote Parking Lot on the west; and the lower campus, which extends from the southern property line and main campus entrance northward to the East Remote Parking Lot on the east (Figure 2-3) and west campus entrance.

The north campus subarea is largely undeveloped at this time except for recreational trails, unpaved service roads, and infrastructure related to water storage. This subarea is characterized by a mix of evergreen forests and some grasslands and includes the sites of long-term outdoor research projects.

Within the central campus subarea, existing development includes a series of clustered buildings nestled in the redwood forests and at the periphery of the meadows, referred to as the campus core. Campus development is generally clustered into several nodes, allowing for the retention of the existing redwood forest and meadows of the campus. The campus core includes the Science and Engineering area ("Science Hill") near the intersection of Heller and McLaughlin Drives, Social Sciences 1 and 2 within Colleges 9 and 10 located along McLaughlin Drive, the Arts area near the intersection of Heller Drive and Meyer Drive, the Quarry Plaza area at the intersection of Hagar Drive and Steinhart Way, the central McHenry Library, and the Hahn Student Services area. Additional facilities located in the campus core are essential campus support facilities, including the campus Central Heating Plant in the northeastern corner of Science Hill, the campus fire station northwest of Crown College, and the Core West Parking Structure off Heller Drive near McLaughlin Drive. Also located in the campus core is the Student Health Center, which is located on McLaughlin Drive across from Colleges Nine and Ten.

The West Field House and West Remote parking lot are located near Oakes College off Heller Drive. On the east side of the central campus subarea is the campus's main cluster of physical education and recreation facilities, including East Field, lower East Field, East Field House, tennis courts, a swimming pool, and other recreation facilities, as well as the East Remote parking lot.

The 10 residential colleges that are an essential part of the undergraduate experience at UC Santa Cruz are also located in the central campus subarea. The residential colleges are arranged in an arc around the campus core. Geographically, the colleges are generally clustered in two locations: the East Colleges located to the east and north of the campus core area (Cowell, Stevenson, Merrill and Crown Colleges, and Colleges Nine and Ten) and the West Colleges, located west of the campus core area (Kresge, Porter, Oakes, and Rachel Carson Colleges). Each college consists of instructional space (classrooms, libraries, conference rooms, and study and lab space), administrative space, residential facilities (residence halls or apartments), academic office, academic support, food and laundry facilities, and indoor and outdoor gathering and recreational areas.



Source: UC Santa Cruz 2020

Figure 2-3 Subareas of Main Residential Campus

Additional housing facilities located in the central campus subarea include the Campus Trailer Park, located at the northern end of Heller Drive and Graduate Student Housing, off Heller Drive near Baskin Engineering Building. The Family Student Housing complex, which is currently planned for redevelopment under the 2005 LRDP, is located west of Heller Drive.

The lower campus subarea is characterized by open meadows and grasslands, the Cowell Lime Works Historic District, and some low-density development. Existing development within the lower campus subarea includes the campus's main entrance at Bay Drive and High Street, which is developed and includes a public information kiosk, and historic structures associated with the Cowell Lime Works Historic District, including the Cook House (Admissions Office), the Barn Theatre, cooperage, the hay barn, and other buildings and structures from the 19th century. In addition, a number of campus support facilities, including the UC Santa Cruz Emergency Operations Center, the Physical Plant, the Fleet Operations/Central Garage, and administrative offices, are located in this area. Some campus support facilities in the lower campus subarea are also located in historic ranch buildings of the Cowell Lime Works District. Four on-campus faculty housing complexes—Hagar Court, Hagar Meadow, Cardiff Terrace, and Laureate Court—are also located in the lower campus subarea. Ranch View Terrace, an additional employee housing complex, is located west of the main entrance area.

Other facilities in the lower campus subarea include those associated with the Arboretum, located off Empire Grade; the Center for Agroecology and Sustainable Food Systems (CASFS), located off Hagar Drive; and the Village. The Arboretum and Botanic Garden is an approximately 75-acre area developed with a series of display gardens that house a variety of native and nonnative plant collections. Other facilities at the Arboretum and Botanic Garden include greenhouses, interpretive kiosks, buildings for storage and visitor services, outdoor areas for storage of landscaping materials, and the California Conservation Gardens. The CASFS is located on approximately 30 acres adjacent to the Arboretum and Botanic Garden. It uses this land to implement its research, education, and outreach programs in sustainable agriculture, organic food, and resource-conserving farming techniques. The Village, home to the Program in Community and Agroecology, is a complex of 17 modular units, located in an old quarry (Lower Quarry) adjacent to Hagar Drive, that provides housing for 153 undergraduate students.

2.2.2 Westside Research Park

The 18-acre Westside Research Park is located at 2300 Delaware Avenue on the west side of Santa Cruz within the coastal zone.[3] The surrounding area includes a mix of industrial, commercial, and housing uses and natural areas. The site is surrounded by the Natural Bridges State Park to the south; vacant land to the east designated industrial in the *City of Santa Cruz General Plan*; a vacant office building to the north; and Antonelli Pond to the west, which is designated as a Natural Area in the *City of Santa Cruz General Plan*. Properties to the west and north are zoned Flood Plain, Park, Public Facility, Low Density Residential and Industrial per the *City of Santa Cruz Zoning Map*. Properties to the west are zoned Park, Single Family Residential, and General Industrial. The UC Santa Cruz Coastal Science Campus is located approximately 800 feet to the west.

The Westside Research Park was developed in 1980 and first occupied by UC Santa Cruz in 2004. It comprises three buildings, which total 126,000 square feet, and 62,000 square feet of mechanical yards. The site also includes parking and other facilities (e.g., outdoor storage space, parcourse, courtyard, paths, and tennis courts). In all, the Westside Research Park site has approximately 800,000 square feet of existing improvements. The Westside Research Park is currently used by UC Santa Cruz for administrative and academic uses.

[3] Per Public Resources Code Section 30103(a), the coastal zone consists of the land and water area of the State of California that extends inland approximately 1,000 yards from the mean high tide line of the ocean. Any development within the coastal zone is subject to the California Coastal Act (Public Resources Code Section 30000 et seq.), including permitting requirements.

2.3 ACCESS AND CIRCULATION

2.3.1 Main Residential Campus

The main residential campus has two entrances: a main entrance located at the intersection of High and Bay Streets, and a west entrance located at the intersection of Empire Grade and Heller Drive. The roadway system that serves on-campus facilities is organized in a loop, composed of Coolidge and Hagar Drives, running north-south on the east side of the campus; McLaughlin Drive, running east-west through the campus core area; and Heller Drive, running roughly north-south on the west side of the campus. Parking is provided in more than 76 separate surface lots and one garage (Core West Parking Garage). Approximately 78 percent of parking spaces are for commuters and are concentrated in six large lots and the Core West Parking Garage. The remaining parking lots support a mix of commuter, visitor, and reserve spaces. The East Remote and West Remote parking lots are primarily for student commuters and collect vehicular traffic at the campus periphery near campus shuttle stops on Hagar Drive and Heller Drive, respectively. Staff commuter parking is located primarily within the academic core in the Core West Parking Garage, Arts and Hahn Student Services areas. Other large parking lots at Oakes and North Remote are accessed by Heller Drive and accommodate both students and staff.

In addition to the main public roadways, the campus is traversed by a series of paved and unpaved service roads, pedestrian paths and bridges, designated trails, and ad hoc trails. Several unpaved service roads are located in the north campus subarea, including Chinquapin Road, Fuel Break Road, and Red Hill Road. The Cowell Wilder Regional Trail extends across the north campus subarea via Chinquapin Road, linking the Pogonip City Park to the east with Wilder Ranch State Park to the west. The U-Con Trail, a short segment of the Cowell Wilder Regional Trail, connects the northernmost end of Pogonip City Park and Wilder Ranch State Park to Chinquapin Road.

2.3.2 Westside Research Park

Site access to the Westside Research Park is currently provided via multiple driveways along Natural Bridges Drive and Delaware Avenue. On-site vehicle parking is accommodated by two existing surface parking lots.

2.4 PLANNING CONTEXT

2.4.1 Campus History

In 1961, the historic Cowell Ranch, a site that had a long history of rural industry, including logging, lime manufacture, and cattle ranching, was chosen as the site for UC Santa Cruz. The campus's first LRDP (September 1963) established the general framework for the development of the campus, with construction starting in 1964. The 1963 LRDP responded to the challenges presented by UC Santa Cruz's collegiate structure and the large, geographically diverse site by providing for a moderately dense cluster of academic and research facilities in a central core area encircled by self-contained colleges and schools (the "Academic Core"). As noted in the plan, "the intent is to combine the advantages of a small college with the facilities of a great university.... [T]he opportunity seems great to combine patterns of learning and living, as well as to make use of new methods of instruction, study, and communications" (UC Santa Cruz 1963).

In addition to an ambitious academic vision, a commitment to environmental stewardship has simultaneously guided the planning and development of the campus over the years. This includes protecting the diverse natural resources of the campus by clustering development in designated areas; sensitively siting new buildings to reduce effects on the natural environment, including the redwood forests, scenic viewsheds, and biological habitats, and on the cultural resources present on the campus; and, over time, concentrating academic and administrative functions in a central core area.

As a result of these planning principles and policies, the primary focus of campus development has been concentrated in the central campus subarea, with clusters of development around the periphery and low-density clusters in the lower campus subarea.

2.4.2 LRDP Planning Process

UC Santa Cruz began the planning process for the 2021 LRDP in fall 2017 by conducting a series of meetings and interviews with campus and community stakeholders. The planning process was steered by the LRDP Planning Committee, made up of students, staff, faculty, and community members. Expert workgroups engaged and provided feedback on planning efforts at critical milestones in the areas of Ecology and the Environment, Housing and Student Life, Infrastructure and Sustainability, and Transportation. UC Santa Cruz also engaged regularly with a Community Advisory Group, consisting of city, county, and community representatives, to maintain an ongoing exchange of ideas and information and explore common goals to issues that confront both UC Santa Cruz and the surrounding community.

In spring 2018, public workshops were held on the campus and in the community, focusing on current concerns around the topics of housing, water, transportation, infrastructure, and sustainability. At these workshops, UC Santa Cruz shared current planning efforts and sought feedback to help shape the approach to the 2021 LRDP. In fall 2018, three initial land use scenarios were developed and UC Santa Cruz obtained feedback from the campus community and the broader Santa Cruz community through a public survey and an online visioning activity. UC Santa Cruz refined the 2021 LRDP land use scenarios based on this feedback and held community and campus workshops during the month of October 2019 to receive feedback on two variations of the proposed land use scenario. Breakout stations were included to discuss concerns and exchange ideas about circulation, housing, sustainability, and campus and community amenities. Following the October 2019 community meetings, UC Santa Cruz met with various campus stakeholders and prepared a preferred land use scenario, which incorporated the interests of both on- and off-campus participants. In December 2019, UC Santa Cruz held two off-campus and one on-campus workshops to present the draft preferred land use map. Throughout the entire public outreach process, UC Santa Cruz has made major and minor revisions to the 2021 LRDP land use plan and has issued a series of land use maps with each successive version to provide an overview of the updated planning effort.

2.5 2021 LRDP GOALS AND OBJECTIVES

The overall objective of the 2021 LRDP is to guide the physical planning and development of the plan area in support of the teaching, research, and public service missions of UC Santa Cruz and the broader UC system. Four key considerations have informed the 2021 LRDP goals: supporting the academic mission, guiding campus evolution and integrity, recognizing and connecting to the local and regional context, and establishing a framework of planning resilience and long-term sustainability. UC Santa Cruz has identified the following 2021 LRDP objectives to guide implementation of the 2021 LRDP:

- Expand campus facilities and infrastructure to allow for projected increases in student enrollment through 2040 based on statewide public educational needs and to support the academic mission, including housing for 100 percent of the additional FTE students (above the 2005 LRDP total of 19,500 FTE students) in both colleges and student housing developments, and commensurate academic and support space.
- Ensure compact and clustered development of academic, administrative, and support facilities in the academic core and student housing and colleges around the periphery to facilitate shared resources, provide convenient access, and promote pedestrian circulation.
- Provide for establishment of two new college pairs at the main residential campus to provide academic services and a close-knit intellectual and social environment.

- Protect, to the extent feasible, existing campus open spaces in the built environment, including areas designated as Natural Space to maintain an interconnectedness between natural resources, wildlife corridors and critical scenic viewsheds, and areas designated as Outdoor Research and Natural Reserve to protect natural features and processes for teaching and learning and to support dedicated outdoor research programs.
- Provide spaces for events and academic facilities to allow the campus to function as a center for public cultural life in the region through public programs, events, and services.
- Increase on-campus housing opportunities for faculty and staff at the main residential campus and the Westside Research Park, to allow up to 25 percent of the increase in faculty and staff, based on demand, to be housed on campus.
- Recognize, to the extent feasible, UC Santa Cruz and regional histories within the campus, including protecting tribal cultural resources and maintaining the integrity of existing historic structures and enhancing the Cowell Lime Works Historic District as a campus gateway.
- Develop an improved, more efficient roadway network to support transit with peripheral parking and mobility hubs.
- Promote Transportation Demand Management (TDM) and provide infrastructure to optimize trip- and vehicle-miles-travelled-reduction benefits and efficiency of transit, bike, and pedestrian access to, from, and within the campus to reduce the use of single-occupancy vehicles.
- Foster long-term physical and social resilience, including a response to climate change through climate resiliency and adaptation strategies and integrating sustainability leadership into campus teaching, learning, research, design, and operations.
- Respect and reinforce the Physical Planning Principles and Guidelines to maintain the unique character of the UC Santa Cruz campus.

2.6 2021 LRDP COMPONENTS

2.6.1 Basis for Planning

As stated above, the overall objective of the 2021 LRDP is to support the teaching, research, and public service missions of UC Santa Cruz. The plan's growth assumptions are based on overall UC and campus population projections, demonstrated need for additional public university capacity in California, and an understanding of campus needs and goals beyond the enrollment level of 19,500 FTE students planned for under the 2005 LRDP. However, the 2021 LRDP does not commit UC Santa Cruz to any specific enrollment level, campus population, or development. The 2021 LRDP planning effort addresses anticipated growth in on-campus student population from an estimated 18,518 FTE students (three-quarter average) for the 2018–2019 academic year to a potential enrollment of 28,000 FTE students (three-quarter average) by the 2040–2041 academic year. UC Santa Cruz faculty and staff are also anticipated to increase from approximately 2,800 FTE (three-quarter average) to approximately 5,000 FTE (three-quarter average) in the same timeframe. UC Santa Cruz plans to provide on-campus housing for 100 percent of the increase in student enrollment beyond 19,500 FTE students and up to 25 percent of the additional anticipated 2,200 FTE faculty/staff members. The relationship between existing and approved housing, and the total amount of housing that would be provided on campus, is discussed further in Section 2.6.4. To accommodate the increased campus population, the 2021 LRDP proposes the renovation of existing facilities and the construction of an additional 3.1 million asf of academic and support building space.

2.6.2 Description of the Plan

The 2021 LRDP embraces a compact academic core with housing around the periphery. Employee housing would be strategically located to allow access to community resources. An enhanced historic district at the entrance to the main residential campus would provide an improved community interface. Designated reserve areas would be set

aside for ecological, cultural, and educational uses, and natural space would protect wildlife corridors and scenic views. To improve circulation, the 2021 LRDP includes an improved and more efficient roadway network and enhanced alternative transportation strategies throughout the main residential campus. Finally, the 2021 LRDP plans for the Westside Research Park to be developed with mixed-use academic, research, and housing on the west side of Santa Cruz.

2.6.3 Campus Enrollment and Population

The on-campus population at both the main residential campus and the Westside Research Park comprises undergraduate and graduate/professional students, faculty, staff, dependents living in employee or student family housing, non-UC employees working on campus (e.g., consultants, employees of private businesses), visitors, and construction workers. Some of this population resides on campus, while the majority is present only during the daytime. As shown in Table 2-1 and described below, under the 2021 LRDP the total on-campus population, including dependents and non-UC employees, could grow from approximately 22,344 persons (2018–2019 academic year) to an estimated total on-campus population of approximately 35,230 persons in 2040-2041, an increase of 12,830 persons.

Table 2-1 Existing and Potential FTE Campus Enrollment and Population

Population	Existing Condition (2018–2019)	Potential 2021 LRDP Population (2040-2041)	Net New Compared to 2018–2019
Students[1]	18,518[1]	28,000	9,482
Faculty and staff	2,800[2]	5,000	2,200
Non-UC employees	640	990	350
Other daily populations	386[3]	1,240	798
Total	**22,344**	**35,230**	**12,830**

Notes: FTE = full-time equivalent; LRDP = Long Range Development Plan; UC = University of California.

[1] Fall-Winter-Spring (FWS) three-quarter-average on-campus enrollment FTE of UC Santa Cruz-based student population in the 2018-2019 academic year.

[2] The 2,800 FWS three-quarter-average on-campus employee FTE represents 3,657 headcount employees.

[3] Other daily population is estimated based on 270 homes for faculty and staff located at Phase 1 of Ranch View Terrace, Laureate Court, Cardiff Terrace, Hagar Meadows Townhomes, and Hagar Court, and an average household size of 2.43 persons for the city of Santa Cruz (California Department of Finance 2019).

Source: UC Santa Cruz 2020.

STUDENTS

As shown in Table 2-1, on-campus student population is projected to grow from 18,518 FTE students in 2018-2019 (academic year) to approximately 28,000 FTE students by 2040-2041, an increase of 9,482 students. The 2040-2041 projections for the campus were derived after careful consideration of a number of factors, including the projected systemwide demand for a UC education and a UC Santa Cruz vision that encompasses an expanded breadth and depth of undergraduate and graduate programs and a vibrant research enterprise.

An increase of about 9,482 students over the 2018-2019 baseline equates to an average addition of 431 students each year. About 13 percent of the projected 2040-2041 student population, or about 3,640 students, would be graduate and professional students.

FACULTY AND STAFF

In conjunction with the increases in student enrollment and research activity anticipated under the 2021 LRDP, three quarter average faculty and staff at UC Santa Cruz are anticipated to increase by approximately 2,200 FTE persons by the year 2040-2041, to an estimated total of approximately 5,000 FTE faculty and staff. This projection includes employees at the Westside Research Park but excludes UC Santa Cruz employees at the Coastal Science Campus and remote satellite campuses.

NON-UC EMPLOYEES AND OTHER DAILY POPULATIONS

In addition to students, faculty, and staff, other persons who may be on campus on a given day include non-UC employees and dependents of faculty, staff, and students. Non-UC employees include temporary staff (e.g., construction workers, seasonal employees), workers in food service businesses, consultants, and non-UC employees of research institutes. As shown in Table 2-1, these populations are projected to increase from an existing total of about 640 persons to approximately 990 persons by 2040-2041. Similarly, with the provision of more employee and family student housing on campus, the dependent population living on the campus is projected to increase from approximately 380 persons to approximately 1,250 persons by 2040-2041.

2.6.4 Building Program

Table 2-2 summarizes the existing and projected building space on the campus under full 2021 LRDP implementation conditions. UC Santa Cruz has developed an estimate of the amount of new building space by type that would be required to accommodate the projected growth on the campus under the 2021 LRDP. As the table shows, approximately 5.6 million asf (8.4 million gross square feet [gsf])[4] of building space would be required, attributable in part to the increase in on-campus housing and facilities to support students on campus. Total building space on the campus would increase from approximately 3.8 million asf (5.8 million gsf) in 2018-2019 to approximately 9.4 million asf (14.1 million gsf) upon full implementation of the 2021 LRDP, anticipated in 2040. As currently envisioned, development under the 2021 LRDP would occur primarily within the central and lower campus subareas, as shown in Figure 2-4.

The following discussion provides further detail regarding the types of functions for the uses that would occur under each of the land use types shown in Table 2-2.

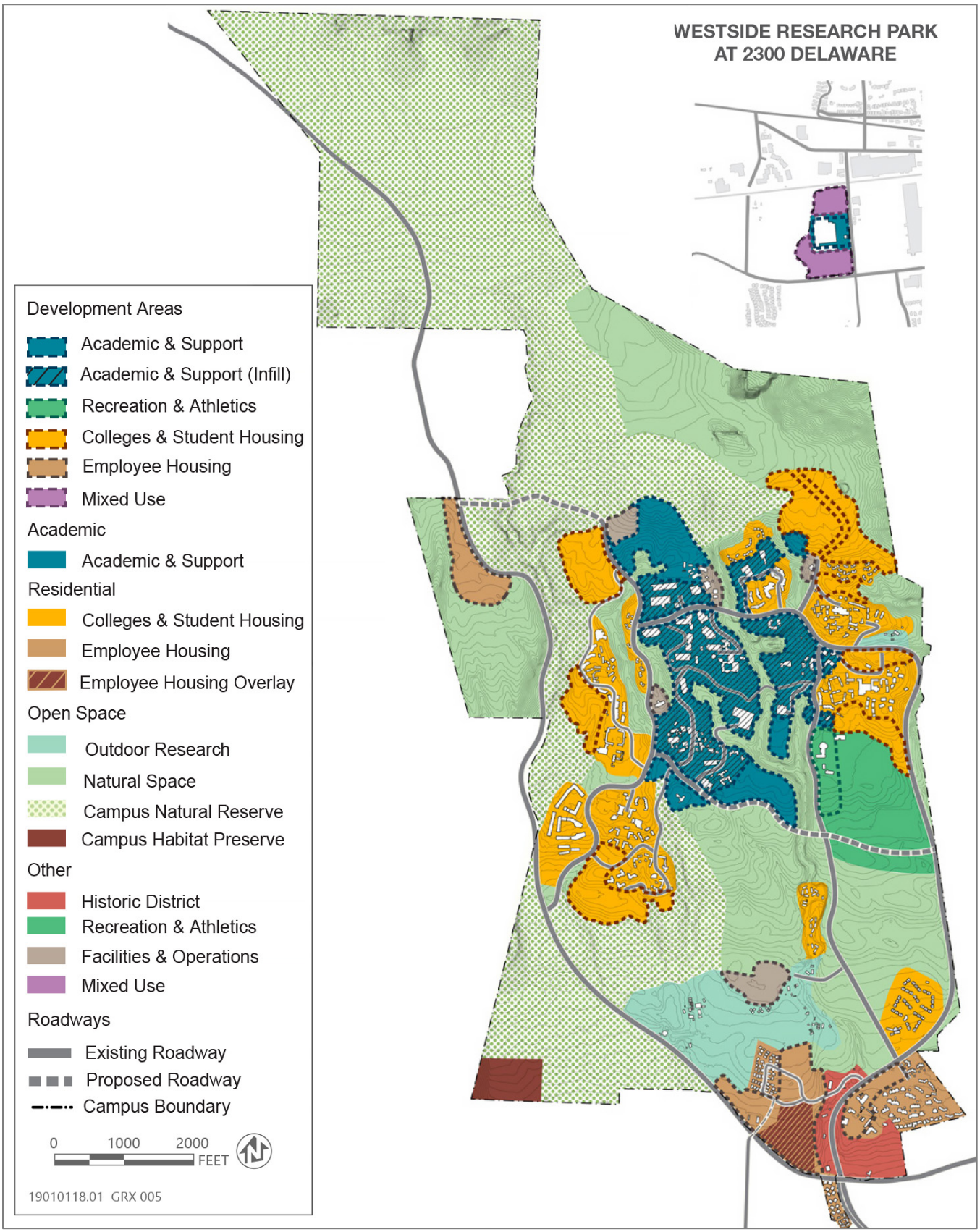
Table 2-2 Projected Increases in Building Space under the 2021 LRDP (asf)

	Existing Condition (2018–2019)	Net New under 2021 LRDP by 2040-2041	Existing + 2021 LRDP (2040-2041)
Academic and Support Space			
Instruction and Research	858,627	1,127,373	1,986,000
Academic and Administrative Support	765,368	1,290,438	2,055,806
Student Support and Public Services	348,628	608,110	956,738
Facilities & Operations	115,805	57,903	173,708
Academic and Support Space ASF Subtotal	*2,088,428*	*3,083,824*	*5,172,252*
Residential Space			
Student Housing	1,346,938	1,885,000	3,231,938
Beds	*9,283*	*8,500*	*17,783*
Faculty & Staff Housing	317,622	660,000	977,622
Units	*270*	*558*	*828*
Residential Space ASF Subtotal	*1,664,560*	*2,545,000*	*4,209,560*
Total	**3,752,988**	**5,628,824**	**9,381,812**

Notes: ASF = assignable square feet; LRDP = Long Range Development Plan.

Source: UC Santa Cruz 2020.

[4] "Assignable square feet" (asf) refers to the sum of all building space that is programmable for a particular occupant(s) or use(s) (e.g., classrooms, labs, offices, study facilities, health care, residential), whereas "gross square feet" (gsf) reflects the sum of all building space within a building, including hallways, unusable space within basements or attics, and permanent partitions.



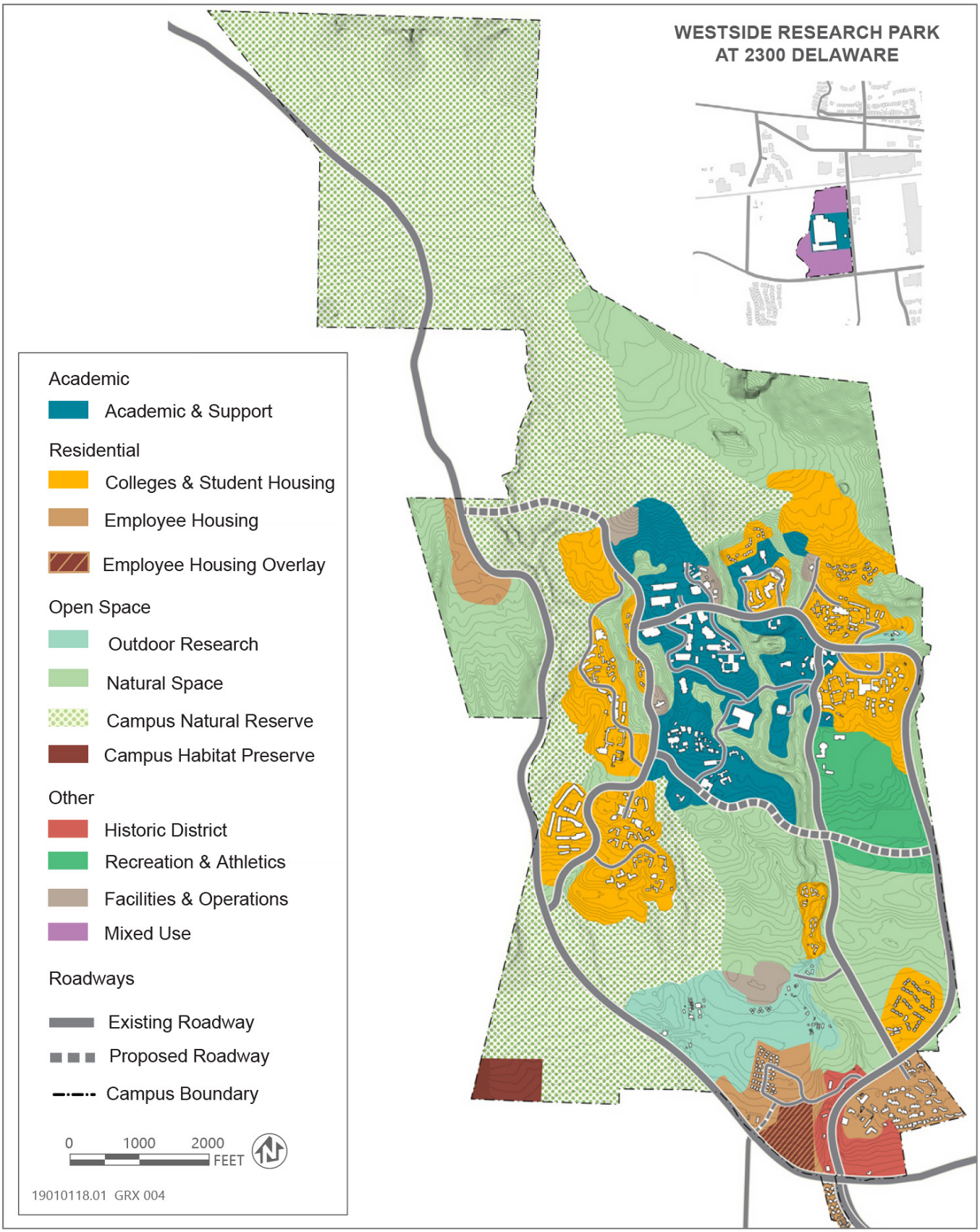
Source: UC Santa Cruz 2020

Figure 2-4 Envisioned Development Areas on the Main Residential Campus and Westside Research Park

2.6.5 Proposed Land Use Designations

The 2021 LRDP proposes a mix of land use categories to accommodate academic, residential, open space, and facilities and operational uses. Under the 2021 LRDP, these types of land use categories are retained and have been further refined through the 2021 LRDP planning process to reflect current campus needs and functions. The 2021 LRDP identifies the following land use categories to support anticipated campus growth (Figure 2-5):

- Academic & Support Space Land Use Designation (approximately 170 acres) Instruction and Research—classrooms, teaching labs, and research labs. With a focus on research growth in the new plan, UC Santa Cruz expects these areas to grow substantially to support the academic mission within the central portion of the main residential campus, adjacent to and to complement existing academic and support space development.
  - Academic and Administrative Support—various spaces that support the work of teaching, learning, and research. These include, but are not limited to, student commons spaces, including libraries and collaboration learning spaces and study commons, research space and office spaces for ladder faculty, lecturers and teaching assistants, and academic support staff.
  - Student Support and Public Services—health and wellness, student support and gathering spaces, community amenities spaces, and athletics and recreation.
- Residential Space Land Use Designations (approximately 359 acres)
  - Student Housing—residential and support spaces in both the colleges and the noncollege-affiliated developments. As discussed above, the 2021 LRDP proposes to provide beds for 100 percent of new enrollment, or approximately 8,500 students, beyond 19,500. Approximately 9,300 students lived on campus in Student Housing designated areas in 2018-2019, with more than 5,565 students living in residence halls, and more than 3,178 students living in apartments.
  - Employee Housing—residential spaces for campus employees.
- Open Space Land Use Designations (approximately 1,402 acres)
  - Outdoor Research—active landscapes for teaching, research, and community education, including the following existing research programs: Center for Agroecology and Sustainable Food Systems farm, the Arboretum and Botanic Garden, and the Chadwick Garden.
  - Campus Natural Reserve—land designated to protect natural features and processes for the purposes of teaching and research.
  - Natural Space—land protected as open space to maintain special campus landscapes for scenic value, special vegetation, and wildlife continuity.
  - Campus Habitat Preserve—habitat preserve that was established pursuant to a 2005 Implementing Agreement between the U.S. Fish and Wildlife Service (USFWS) and the Regents. The preserve is referred to as Inclusionary Parcels A and D. These parcels are designated for the management of the Ohlone tiger beetle and California red-legged frog.
- Other (approximately 127 acres)
  - Historic District—land and structures intended to express the unique historic and cultural context for academic & support facilities, community-facing programs, and visitor resources.
  - Athletics & Recreation—indoor and outdoor athletic fields and facilities.
  - Facilities & Operations—office and shop space for staff who support the continued operation of the campus.
  - Mixed Use—employee housing, academic, and support space.



Source: UC Santa Cruz 2020

Figure 2-5 2021 LRDP Proposed Land Use Designations

Table 2-3 shows the difference in acreages per land use designation between the 2005 LRDP, as amended, and those in the proposed 2021 LRDP for the main residential campus. Under the proposed 2021 LRDP, the Campus Resource Lands land use designation in the 2005 LRDP has been eliminated from the proposed 2021 LRDP and has been primarily incorporated into the Natural Space and Campus Natural Reserve designations. Similar to the 2005 LRDP, the Campus Habitat Preserve designation is included in the proposed 2021 LRDP. However, a 12.5-acre parcel (Inclusionary Parcel D Preserve or Inclusion Area D) has an employee housing overlay, which would require an amendment to the existing Habitat Conservation Plan (HCP) for Ranch View Terrace if the parcel were to be developed in the future while also maintaining the conservation objectives of the HCP (e.g., no net loss of habitat and potential relocation to more appropriate habitat). Refer to Section 3.5, "Biological Resources," for further clarification. The Outdoor Research designation, previously designated as Site Research and Support in the 2005 LRDP, includes additional areas that had been designated as Protected Landscape in the 2005 LRDP. However, the land with this designation would continue to be used for research.

Table 2-3 Land Use Designations Acreage Summary for the Main Residential Campus

Land Use Designations	Acreage Under the 2005 LRDP, as Amended[1]	2021 LRDP Acreage	Net Change
Academic Land Use Designation			
Academic & Support (Academic Core in the 2005 LRDP)	132	163	31
Residential Land Use Designations			
Colleges and Student Housing	245	277	32
Employee Housing	75	82[3]	7
Open Space Land Use Designations			
Outdoor Research (Site Research and Support in the 2005 LRDP)	152	74	-78
Campus Natural Reserve	410	789	379
Natural Space (Protected Landscape in the 2005 LRDP)	503	513	10
Campus Resource Lands	318	—	-318
Campus Habitat Preserve[2]	26	26	0
Other			
Historic District[4] (Included as an overlay in the 2005 LRDP)	—	28	28
Athletics & Recreation (Physical Education and Recreation in the 2005 LRDP)	86	67	-19
Facilities & Operations	89	21	-68
Total acreage[5]	**2,036**	**2,040**	**4**

[1] Two minor amendments were made to the 2005 Land Use Map. In 2016, Phase 1 of the Recycling Yard Project amended the 2005 LRDP by converting 1.6 acres of land from Protected Landscape to Campus Support and 2.1 acres of land from Site Research and Support to Campus Support for a total of 3.7 acres converted to Campus Support. In 2019, approximately 17 acres of land were redesignated from Campus Resource Land to Colleges and Student Housing in an LRDP amendment for the Student Housing West Project, which was previously approved by the Regents in 2019 and may be reapproved in 2021.

[2] Campus Habitat Preserve is composed of two mitigation parcels: Inclusionary Parcel D Preserve, which is 12.5 acres, and Inclusionary Parcel A Preserve, which is 13 acres. Both Inclusionary Parcel A Preserve and Inclusionary Parcel D Preserve were preserved under the Habitat Conservation Plan (HCP) prepared in support of the Incidental Take Permit (ITP) for the Ranch View Terrace project. Inclusionary Parcel A Preserve is preserved in perpetuity, and Inclusionary Parcel D Preserve is preserved through the ITP term of 60 years. Inclusionary Parcel D Preserve has an Employee Housing overlay under the 2021 LRDP, which would require a modification to the HCP if it were be developed in the future.

[3] The 12.5-acre Employee Housing Overlay on the Inclusionary Parcel D Preserve is not included as part of the overall acreage calculation shown, but the EIR evaluates the potential impacts of using this parcel for Employee Housing should UC Santa Cruz proceed with modifications to the HCP in the future.

[4] The Historic District was an overlay district on the Campus Support Land Use designation in the 2005 LRDP.

[5] Acreages are approximate, include rounding, and are based on 2005 LRDP, Draft 2021 LRDP, County parcel information, and GIS data.

Source: UC Santa Cruz 2020.

The Westside Research Park (as shown in Table 2-4) was designated Academic Core in the 2005 LRDP and continues to be designated as Academic & Support with an additional designation of Mixed Use to provide for the continuation of existing uses and the development of future mixed use housing because of its proximity to other mixed-use housing and commercial uses on the west side of Santa Cruz.

Table 2-4 Land Use Designations Acreage Summary for the Westside Research Park

Land Use Designations	Acreage under the 2005 LRDP	2021 LRDP Acreage	Net Change
Academic & Support (Academic Core in the 2005 LRDP)	18	7	-11
Mixed Use	—	11	11
Total Acreage[1]	**18**	**18**	**0**

[1] Acreages are approximate, include rounding, and are based on 2005 LRDP, Draft 2021 LRDP, County parcel information, and GIS data.

Source: UC Santa Cruz 2020.

The following section provides a detailed explanation of each land use designation in the 2021 LRDP.

ACADEMIC LAND USE DESIGNATIONS

The proposed 2021 LRDP includes a primary academic land use designation: Academic & Support.

Academic & Support

The principal use includes teaching, research, faculty and administrative offices, classrooms, libraries, student support and amenities such as food services, the bookstore, and conference and special event spaces.

Allowable support uses may include utility and facilities maintenance space, storage, delivery zones, and a limited amount of parking.

Approximately 163 acres on the main residential campus are designated Academic & Support land use and approximately 8 acres on the Westside Research Park under the 2021 LRDP (approximately 20 more acres than identified in the 2005 LRDP). The Academic & Support land use designation is the primary land use associated with the academic mission, as well as the administrative and student support space necessary to fulfill it. Along with housing, it accommodates the vast majority of the overall campus development area (i.e., area that is not open space).

The Academic & Support land use is predominantly clustered in the academic core, with some academic and support building space included in the colleges and the Westside Research Park. In addition to new areas for the development of this land use, the land use designation provides for the use of existing infill sites, as well as potential renovation of existing buildings under the 2021 LRDP

The proposed expansion of the area designated Academic & Support reflects provisions for additional capacity to accommodate future teaching, learning, and research needs and to reduce building space shortages for instruction and research throughout the campus.

New buildings would generally be similar on average to those in the current academic core, generally ranging in height between four and six stories. In the southern extension of the academic core, buildings would range from two to four stories in height and would be sited to minimize their visibility from the top of the adjoining meadows. To the north, within forested areas, buildings may be as tall as six or more floors, as dictated by their programs. This greater density of development would allow more academic destinations to be conveniently located and maximize land use efficiency, as well as accessibility for faculty, staff, and students.

RESIDENTIAL LAND USE DESIGNATIONS

The 2021 LRDP includes two primary residential land use designations: (1) Colleges & Student Housing and (2) Employee Housing. Together, these land uses represent campus housing in the broadest sense. Each of these designations includes housing and additional elements, such as residential parking land related housing amenities. As noted above and explained in further detail below, the Mixed Use designation may include mixed-use residential at Westside Research Park. Table 2-5 identified the existing and projected level of on-campus residents under the 2021 LRDP.

Table 2-5 On-Campus Residents within the LRDP Area

	Existing Condition (EIR Baseline 2018-2019)	Net New under 2021 LRDP by 2040-2041	Existing + 2021 LRDP (2040-2041)
Students	9,283	8,500	17,783
Employees	270	558	828
Non-UC Employees (dependents and non-UC employees)[1]	386	798	1,184
Total On-Campus Residents	**9,939**	**9,856**	**19,795**

[1] Other daily population is estimated based on 270 homes for faculty and staff located at Phase 1 of Ranch View Terrace, Laureate Court, Cardiff Terrace, Hagar Meadows Townhomes, and Hagar Court, and an average household size of 2.43 persons for the city of Santa Cruz (California Department of Finance 2019).

Source: UC Santa Cruz 2020.

Colleges & Student Housing

The principal uses include student housing, food services, student services, academic and academic support, childcare, and athletics and recreation spaces.

Allowable supporting uses include limited campus support and parking.

The Colleges & Student Housing land use designation totals 277 acres (approximately 32 more acres than identified in the 2005 LRDP). As shown in Table 2-2, the 2021 LRDP plans land uses to house up to an additional 8,500 students, above 19,500, in residence halls and apartments. Colleges and student housing would continue to be provided around the perimeter of the academic core to facilitate convenient access to instruction and research facilities and student support spaces throughout the day.

Two distinct student housing types would be provided on campus: housing in new colleges intended primarily for first year students, and housing not formally affiliated with the colleges and intended for continuing, upper division or graduate students. The principal uses associated with Colleges & Student Housing land use designation include housing, food services, student services, academic support, family student housing, childcare, and athletics and recreation spaces. Supporting uses include limited campus support (e.g., on-site utility improvements) and parking.

The campus would continue to grow by colleges, which are organized as active living-learning environments and include academic space as well as residential amenities such as dining halls, food service, community rooms, social and study spaces, and administrative support. Colleges at UC Santa Cruz are paired to share common resources, and that pattern of growth would continue with two new pairs of colleges proposed in the 2021 LRDP, one in the northeast corner and one in the northwest corner, for a proposed total of 14 colleges. The college environment combines a supportive social structure, essential to academic success and personal growth, with an enhanced intellectual life to create a vibrant living – learning community for students.

Where colleges primarily support first year housing needs, non-college-affiliated housing is also offered for continuing students, graduate students, and transfer students, who desire more independent housing types and additional privacy. Student housing would continue to include amenities such as food service, recreational facilities, study, and social lounges, among others.

Both colleges and non-college-affiliated student housing would continue to be located around the periphery of the academic core. As the campus includes various landscape typologies, the density of housing development would be informed by its location. Where housing is located in or near the evergreen and redwood forests toward the north,

buildings would likely be denser, at 4 to 8 stories, in order to minimize their footprint and physical extent. Where located in predominantly meadow areas, housing would be lower in density and height to maintain scenic viewsheds and configured to minimize visual impacts.

Employee Housing

The principal use include housing for staff and faculty.

Supporting uses include childcare, recreation and other community amenities, public services, limited campus support facilities (e.g., on-site utility improvements), and parking.

Approximately 82 acres are designated Employee Housing land use in the 2021 LRDP (approximately 7 more acres than identified in the 2005 LRDP). Employee housing designation would provide on-campus housing for up to 25 percent of new employees, based on demand, in a variety of housing types (primarily townhomes and apartment-style buildings.)

The land use is included in several distinct areas on the south and west side of the campus, primarily clustered around the main campus entrance in order to allow families and spouses convenient access off campus, and to utilize more centrally located areas near the academic core for student housing.

The plan proposes expanding two areas of existing employee housing, including south of Coolidge, maintaining the character of the surrounding Historic District, and adjacent to Ranch View Terrace. A new area across Empire Grade, and tucked into the woods, is also included. Additional employee housing, allowable under the Mixed-Use land use designation, could potentially be located at the Westside Research Park.

Employee Housing Overlay Site

Approximately 12.5 acres of the Employee Housing land use designation is shown within the southern portion of the main residential campus as an overlay on Inclusionary Parcel D Preserve. As noted above, the area was previously set aside in an HCP as a habitat preserve for the Ohlone tiger beetle and the California red-legged frog. UC Santa Cruz is interested in exploring the feasibility of developing this parcel, while seeking to enhance the conservation strategy of the HCP at a different location. UC Santa Cruz anticipates engaging in broader habitat conservation planning in cooperation with USFWS and the California Department of Fish and Wildlife to ensure the long-term viability of sensitive species and habitat on the campus.

OPEN SPACE LAND USE DESIGNATIONS

The 2021 LRDP includes four open space land use designations: Outdoor Research, Natural Space, Campus Natural Reserve, and Campus Habitat Preserve.

Outdoor Research

The principal uses would include landscape-based instruction and research with accompanying buildings for educational programs and visitor resources.

Allowable supporting uses could include utility infrastructure, minor access roads and a limited amount of parking.

Approximately 74 acres are designated Outdoor Research in the proposed 2021 LRDP, which is a decrease of about 78 acres of land designated Site Research and Support in the 2005 LRDP. This designation includes active landscapes for teaching, learning, research, and community education. It supports the following existing research programs: CASFS farm; the Arboretum and Botanic Garden; and the Chadwick Garden. The principal programs associated with this land use include Social Sciences, Physical and Biological Sciences, and Public Services programs.

The acreage of land designated Outdoor Research to support the Chadwick Garden has remained the same as in the 2005 LRDP. The acreage of land designated to support the CASFS program, or Farm, is also the same as in the 2005 LRDP; the area known as the Village where the Program in Community and Agroecology is located, is now included in the Colleges and Student Housing land use designation. At the Arboretum, approximately 20 acres stretched in a north-south direction along the Moore Creek ravine were removed from the previous Site Research and Support land use designation and now are designated Natural Space and Campus Natural Reserve.

The Chadwick Garden is located at the east end of McLaughlin Drive. The Arboretum and the Farm are located in the lower campus subarea. The Arboretum is accessed from Empire Drive and the Farm can be entered from multiple locations, including Village Road or Ranch View Road, or by foot on Farm Road.

Natural Space

The principal use of the Natural Space designation is to maintain the landscape in its natural state, including the Great Meadow and existing ravines and drainages throughout the campus.

Supporting uses could include carefully sited paths, roads, infrastructure, and unobtrusive research uses which do not impinge on overall character.

Approximately 513 acres are designated Natural Space in the proposed 2021 LRDP, an increase of about 10 acres compared to the 2005 LRDP (where it was designated Protected Landscape). The purpose of the Natural Space designation is to maintain special campus landscapes for their scenic value and maintain special vegetation and wildlife continuity zones that are intrinsic to the campus's identity. Natural Space will continue to be managed by Grounds. In specified areas of Natural Space used for long term research projects, including sections of the Great Meadow, the area will be managed in consultation with the UCSC Campus Natural Reserve.

Campus Natural Reserve

The principal use is to preserve landscapes in their natural state, where construction is prohibited except as required for maintenance of the area as a teaching, learning and research reserve.

Supporting uses include the limited construction of carefully sited roads, access paths, bridges, below-grade utility access and unobtrusive research equipment.

Approximately 789 acres is designated Campus Natural Reserve in the proposed 2021 LRDP, an increase of approximately 379 acres from the 2005 LRDP. The intent of this land use designation is to protect natural features and processes for the purposes of teaching, learning, and research, as integral to the academic mission. The boundary of the Campus Natural Reserve captures critical habitat and sensitive vegetation, specific sites engaged in long-term research, wildlife continuity zones, and sensitive archaeological resources.

The land area designated Campus Natural Reserve increased by approximately 379 acres, largely as a result of the designation of previously identified Campus Resource Land as Campus Natural Reserve in the 2021 LRDP. In addition, the compact boundaries of land designated Colleges & Student Housing and Academic & Support has translated into more land being protected as Campus Natural Reserve.

The Campus Natural Reserve would continue to be managed in consultation with the Campus Natural Reserve Committee. One area of the Campus Natural Reserve, the Lower Moore Creek area adjacent to the Arboretum, will be jointly managed by the UCSC Campus Natural Reserve and the Arboretum and includes a California regional native plant garden. The Campus Natural Reserve is located primarily in the North Campus and on the west side of the campus.

Campus Habitat Preserve

Two areas on the campus, which total approximately 26 acres, are designated as Campus Habitat Preserve in the 2021 LRDP. The larger of these two areas, a 13-acre parcel on the southwestern corner of the campus adjacent to Wilder Creek, is designated as a preserve to retain high-quality grassland and forest habitat on the campus for the California red-legged frog and the Ohlone tiger beetle. This preserve was established pursuant to a 2005 Implementing Agreement between USFWS and the Regents for the Ranch View Terrace development on campus and is referred to as Inclusionary Parcel A Preserve. The second area, a 12.5-acre parcel, is located on the southern portion of the campus near the main entrance. It is referred to as Inclusionary Parcel D Preserve. The southern portion of the parcel is designated as a management site for the Ohlone tiger beetle habitat with the remainder of the site managed for California red-legged frog. Campus Habitat Reserve lands are protected lands that will remain undeveloped except as permitted by the terms of the Implementing Agreement and associated HCP. Please also see the discussion above of a proposed employee housing overlay on Inclusionary Parcel D Preserve under the 2021 LRDP.

OTHER LAND USE DESIGNATIONS

The 2021 LRDP includes four land use designations in the category titled Other: Historic District, Athletics & Recreation, Facilities & Operations, and Mixed Use. Each of these designations is described below.

Historic District

Principal uses within the Historic District would include academic and support, and public services, including campus and community amenities.

Supporting uses include facilities and operation, as well as limited parking.

The Historic District designation pertains to approximately 28 acres within the lower campus subarea that are associated with the Cowell Lime Works Historic District. As described in further detail in Section 3.4, "Archaeological, Historical, and Tribal Cultural Resources," the Cowell Lime Works Historic District is listed on the National Register of Historic Places and encompasses cultural resources related to the original 19th century Cowell Ranch limestone industry. This area is currently used for primarily campus support activities (e.g., admissions office). Under the proposed 2021 LRDP, the land area associated with this land use would remain the same as the boundaries of the historic district but would have its own land use designation instead of being an overlay, as it was in the 2005 LRDP. The intent of the Historic District designation is to establish an intentional gateway to the campus to express the unique historic and cultural context of UC Santa Cruz.

Athletics & Recreation

Principal uses associated with this land use designation include playing fields and outdoor courts, indoor recreational facilities, event spaces and health and wellness facilities.

Supporting uses include parking and transit/ mobility hub facilities, and limited public services, including food service, and academic and student support uses.

Approximately 67 acres are designated Athletics & Recreation in the proposed 2021 LRDP, a decrease of about 19 acres compared to the 2005 LRDP. This decrease is due to the removal of a secondary Athletics and Recreation area on the west side of the campus which was identified in the 2005 LRDP and is not included in the proposed 2021 LRDP.

Existing recreational and athletic facilities on campus are concentrated in one area of relatively flat land in the eastern portion of the campus, and support recreational programs, intercollegiate athletics, and health and wellness activities for the UC Santa Cruz and local community. The fields and facilities are also used for special events, such as graduation, concerts, and fairs. The Athletics & Recreation land use designation serves an important aspect of public life for both the campus and local community.

The area designated Athletics & Recreation also includes a potential site for an event center that could accommodate both athletics as well as cultural events. The Athletics & Recreation land use designation may also include utility infrastructure systems such as stormwater facilities, field illumination, bicycle infrastructure, and pedestrian amenities in support of the overarching land use. Buildings supporting indoor recreation would be sensitively sited and developed at a low density and profile to maintain the sense of open space and scenic viewsheds.

Recognizing the need for distributed recreational facilities to support increased housing throughout the campus, recreation and athletics facilities have also been included as a supporting use in the Colleges & Student Housing land use designation. These may include small field houses offering courts and exercise rooms, and may also include small playing fields and open areas suitable for informal use.

Facilities & Operations

The principal uses include facilities-related support offices, mechanical equipment, storage, corporation yards, and parking for faculty and staff.

Approximately 21 acres are designated Facilities & Operations land use under the proposed 2021 LRDP, a decrease of 68 acres compared to the 2005 LRDP. This land is intended to serve the operational needs of the campus. Limited Facilities and Operations functions are also included as an allowable supporting use in housing designations for flexibility.

The proposed land use plan identifies several areas for Facilities & Operations support. Four of these areas expand existing Facilities & Operations facilities, including an area near the Cogeneration plant, an area near the campus fire station, an area adjacent to the Environmental Health and Safety facility off of Heller Drive at the west, and an area around the Recycling Yard in the Lower Meadow. The plan also introduces a new area located at the northwest corner of the central campus subarea with access via Heller Drive, which would allow for campus operations-oriented functions to be relocated from the lower campus subarea to allow improvements to the main residential campus entry for community-facing programs, public services and employee housing.

Mixed Use

The principal uses under this designation include academic and support, student housing, employee housing, public services, and limited campus support.

Supporting uses include food services, mobility/transit service space, and parking.

Approximately 11 acres are placed under the Mixed Use land use designation in the 2021 LRDP. This land use designation applies to land at the Westside Research Park. The intent of the Mixed Use land use designation is to recognize the evolving nature of the surrounding area, and to allow the development of other program opportunities beyond academic and support to create a diverse, vibrant, and active site.

The site and adjoining street and curb space may also help to support an expanded mobility hub with shuttle stop and connections to the railroad bikeway and the main residential campus.

2.6.6 Circulation, Parking, and Transportation Infrastructure

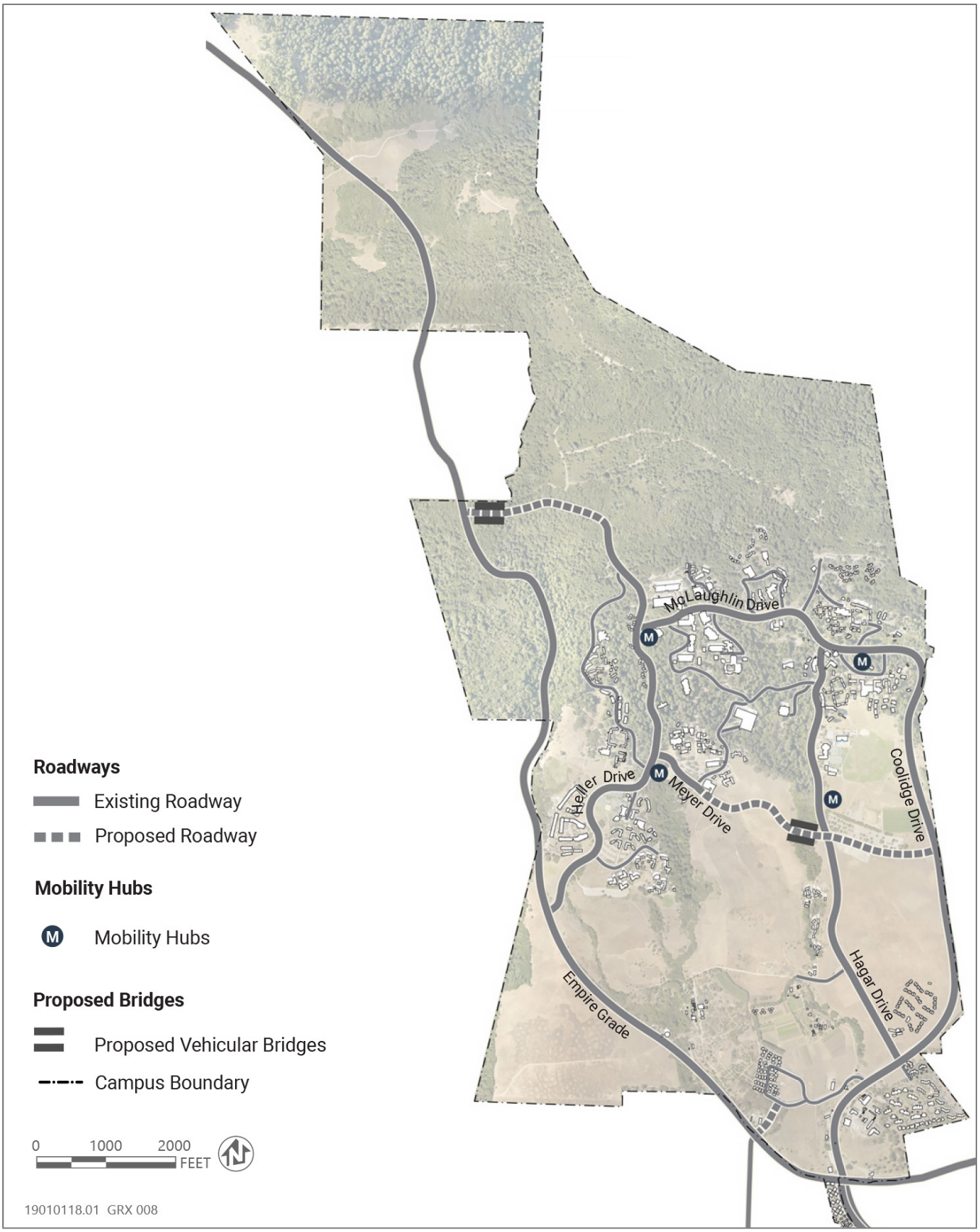
The 2021 LRDP includes an integrated transportation strategy, which envisions integrating alternative modes of transportation (transit, pedestrian and biking) with peripheral parking to promote a walkable campus core with an interconnected pedestrian corridor spine linking colleges and housing to academic and student support destinations. Integral to this concept is the proposed Meyer Drive extension, which would create an inner campus roadway loop for more efficient transit, and the development of mobility hubs at the periphery of the campus core for a more seamless transfer from one mode to another.

The planned circulation, parking, and transportation infrastructure improvements as envisioned in the 2021 LRDP's integrated transportation strategy are intended to enhance alternative transportation opportunities and increase connectivity within the campus and to the city. These improvements are described in further detail below.

ROADWAYS

As shown in Figure 2-6 and similar to the 2005 LRDP, three new roadways would be added to the transportation network on the main residential campus in order to provide better cross-campus transit service, create safer bicycle and pedestrian environments, and fill gaps in the existing roadway system. All new roadways are envisioned as multimodal "complete streets," where bicycle and pedestrian amenities are included, to reflect integrated transportation principles and guidelines.

- **East-West Extension of Meyer Drive from Heller Drive to Coolidge Drive.** Meyer Drive would be extended from the Arts Area across the top of the Great Meadow and over Jordan Gulch via a new bridge structure to connect with Hagar Avenue at a new intersection near the entrance to the East Remote parking lot. The roadway extension alignment would generally continue from this intersection along the southern edge of the East Remote parking lot and terminate at Coolidge Drive. This extension would facilitate cross-campus bus travel and could also provide a new east-west walking and bicycling connection. The Meyer Drive extension would increase overall campus mobility and facilitate improved transit routing. The Meyer Drive extension would also allow for private vehicle access to be restricted on McLaughlin Drive during certain time periods such as class changes to facilitate better and safer walking, bicycling and transit access. Automobile access would be limited on a portion of the extension between the Arts Area to Hagar Drive to prioritize transit, bicycle, and pedestrian circulation. Careful consideration would be given to the final alignment of the roadway, and how it would integrate with the Webster Way Bike Path through the Great Meadow.



Source: UC Santa Cruz 2020

Figure 2-6 Campus Roadway Network Under the 2021 LRDP

- **Northern Entrance.** A new roadway connection would be provided from the northern terminus of Heller Avenue (North Remote parking area) across Cave Gulch via a bridge structure to Empire Grade. This new roadway would provide a third access and egress point to the main residential campus, which may help facilitate north campus subarea development and emergency access.
- **Western Drive Extension.** Western Drive would be extended across High Street at a new signalized intersection to provide access to the Ranch View Terrace employee housing and other proposed housing sites.

In addition to planned new roads, the LRDP envisions a pedestrian priority area in the academic core supported by vehicular access restrictions, including a key east-west campus corridor along Steinhart Way.

- **Vehicular Access Restrictions.** Personal automobile access may be restricted and on limited portions of upper Hagar Drive, Meyer Drive Extension, McLaughlin Drive, and internal roadways to prioritize transit, bicycle and pedestrian access and reduce vehicle/pedestrian conflicts. Vehicle access on these segments of the roadways would be limited to transit and service vehicles only.
- **Steinhart Way Corridor.** In order to promote the campus core as a pedestrian priority area, Steinhart Way is proposed to be converted from a service road to a pedestrian and bicycle priority corridor with automobile access for private automobile traffic limited to the far east and west segments accessing local parking facilities. Service and accessibility vehicles may be limited or required to travel at low speeds to minimize conflicts with pedestrians and bicycles in this new east-west corridor. Service vehicles would use alternate routes wherever possible to avoid conflicts with pedestrians and bicycles.

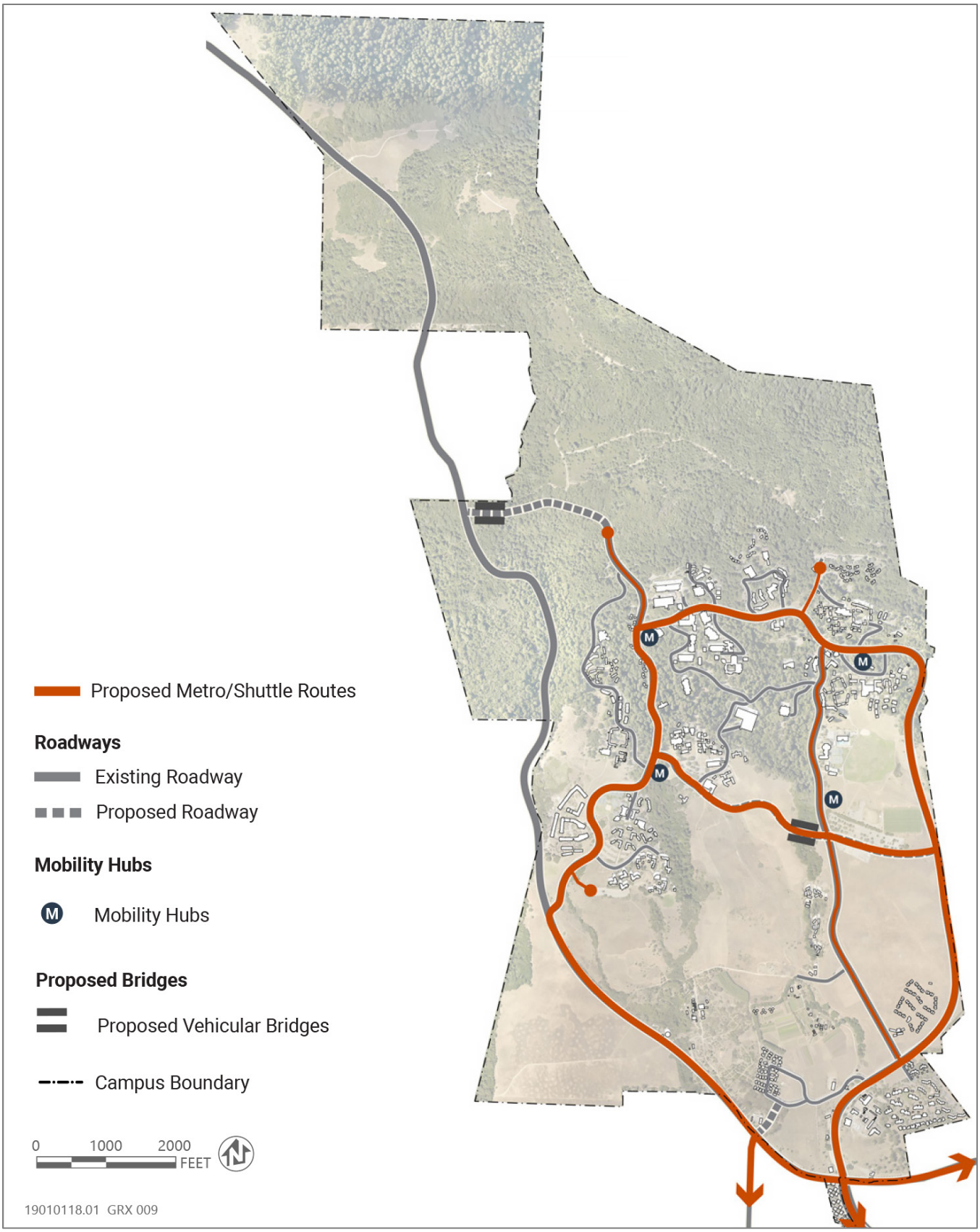
PARKING AND MOBILITY HUBS

As shown in Figure 2-6, commuter parking would be consolidated at the periphery of the academic core and a variety of mobility hubs would be established in strategic locations of the main residential campus. Mobility hubs would be organized according to their primary function as follows:

- **Primary Mobility Hubs**. Primary mobility hubs would be oriented toward commuters to and from the main residential campus and would focus on providing seamless transfers between park-and-ride type of travel modes to allow commuters to access their end destination quickly and efficiently. These hubs would be located at the four corners of the academic core. The Core West parking garage and new mobility hub near Stevenson College would primarily serve faculty/staff commuters, while the mobility hubs located at Heller Drive/Meyer Drive and the East Remote parking lot would primarily serve student commuters. Parking facilities at the primary mobility hubs may be provided in parking structures where appropriate and feasible.
- **Residential-Focused Mobility Hubs**. Residential mobility hubs would be smaller in size and focus more on providing access from on-campus housing areas to academic uses, recreational uses, and other major activity centers. In general, residential mobility hubs would provide access to frequent transit service to other campus destinations, as well as centralized bike parking, electric bikes, and clearly signed active transportation corridors. There would be limited surface parking for vehicles.
- **Gateway Hub**. The Gateway Hub would provide alternative transportation options for mode transfers and pedestrians, such as bikeshare and campus shuttles at the main entrance near High Street to access the campus core. The entry hub would include small-scale visitor parking lot(s), walking paths, bicycle routes, and enhanced transit stops.

TRANSIT AND SHUTTLE SYSTEM

As shown in Figure 2-7, the campus transit system under the 2021 LRDP would continue to emphasize regional the transit services provided by Santa Cruz Metropolitan Transit District to and from the main residential campus and Westside Research Park, and an internal campus shuttle system that serves the entire campus, is focused on loops serving the academic core, with transit hubs located at various transfer points and activity centers on campus, including Mobility Hubs.



Source: UC Santa Cruz 2020

Figure 2-7 Campus Transit Network Under the 2021 LRDP

The 2021 LRDP envisions a more efficient transit and campus shuttle system through enhancements to data collection, technology, service, and infrastructure. Campus shuttle routes would operate on modified loops to provide more frequent service to the academic core with the Meyer Drive extension. As part of the 2021 LRDP, UC Santa Cruz would work with METRO and other regional partners to explore express, or limited-stop-type regional service options from population centers directly to campus. Under the 2021 LRDP, disability van service would continue to play a vital role as an intra-campus mobility option. Electrification of shuttles and the campus fleet would assist UC Santa Cruz in reducing campus greenhouse gas emissions and achieving sustainability goals.

Existing bus stops on campus could be expanded to accommodate a higher number of increased capacity buses. Improvements to other non-motorized modes of travel would also assist in increasing transit efficiencies by providing practical and functional alternatives, such as improving pedestrian and bicycle connectivity, to free up bus and shuttle capacity.

PEDESTRIAN AND BICYCLE NETWORK

Under the 2021 LRDP and as shown in Figures 2-8 and 2-9, respectively, UC Santa Cruz would improve existing pedestrian corridors and bicycle trails, as well as provide additional opportunities and connections within the main residential campus.

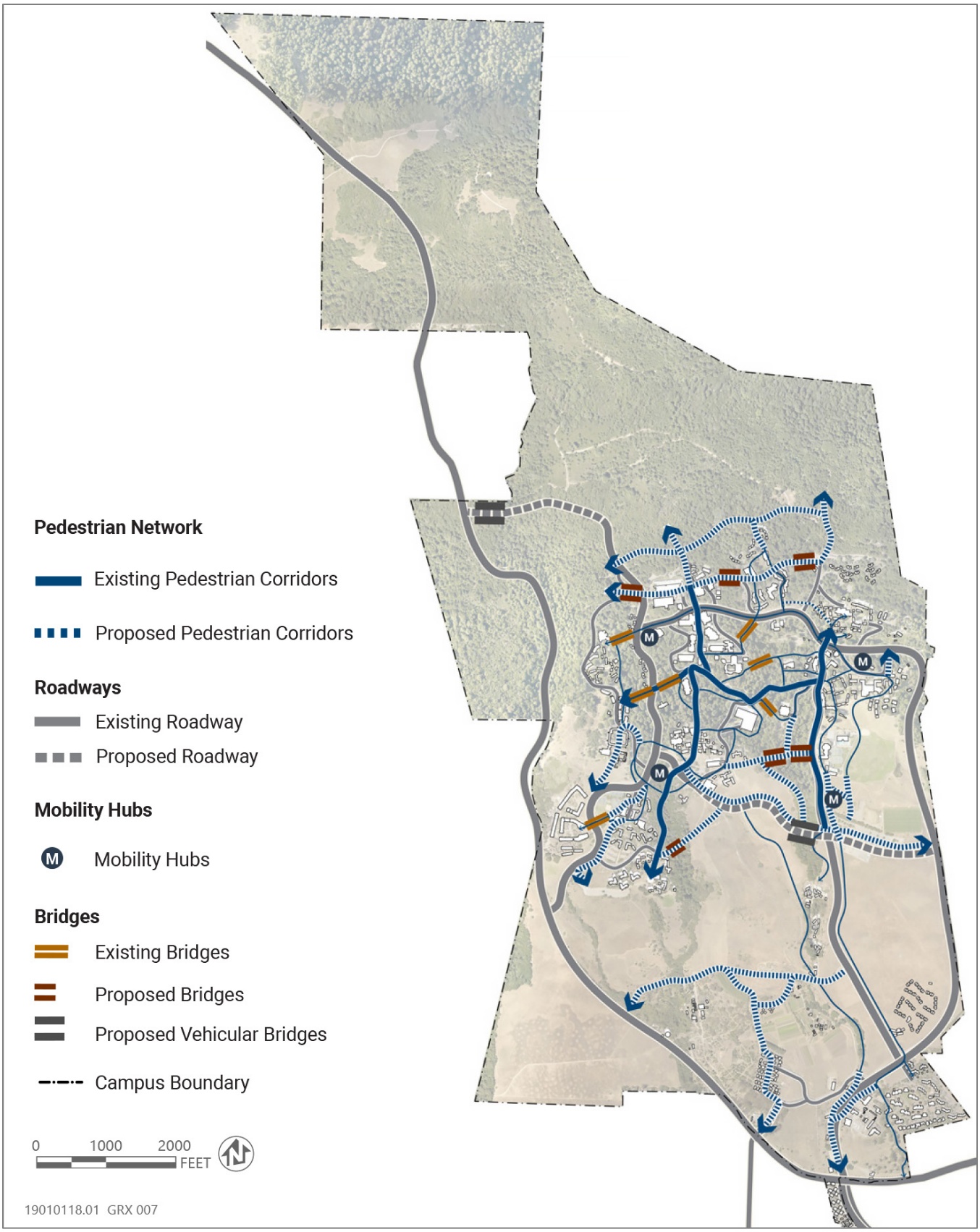
Pedestrian Corridors

The 2021 LRDP envisions expansion of the pedestrian network to provide more convenient access throughout campus. The following pedestrian corridors are proposed in the LRDP, which facilitates the following key connections:

- North of the Academic Core, two new east-west pedestrian corridors are proposed to expand the web of pathways, one connecting the engineering buildings on the west through Colleges Nine and Ten to the proposed student housing on the east at Chinquapin Road. Further north, another east-west pedestrian corridor would connect proposed academic and support space on the west with proposed student housing on the east.
- South of the Academic Core, an additional east-west connection would be needed to connect the south end of the academic core to future potential facilities on the current Hahn parking lot and Athletics and Recreation on the east and ultimately to housing on the west
- The Science Hill Corridor, Steinhart Way Corridor, and Hagar Drive Corridor would be emphasized as key pedestrian spines within the network.

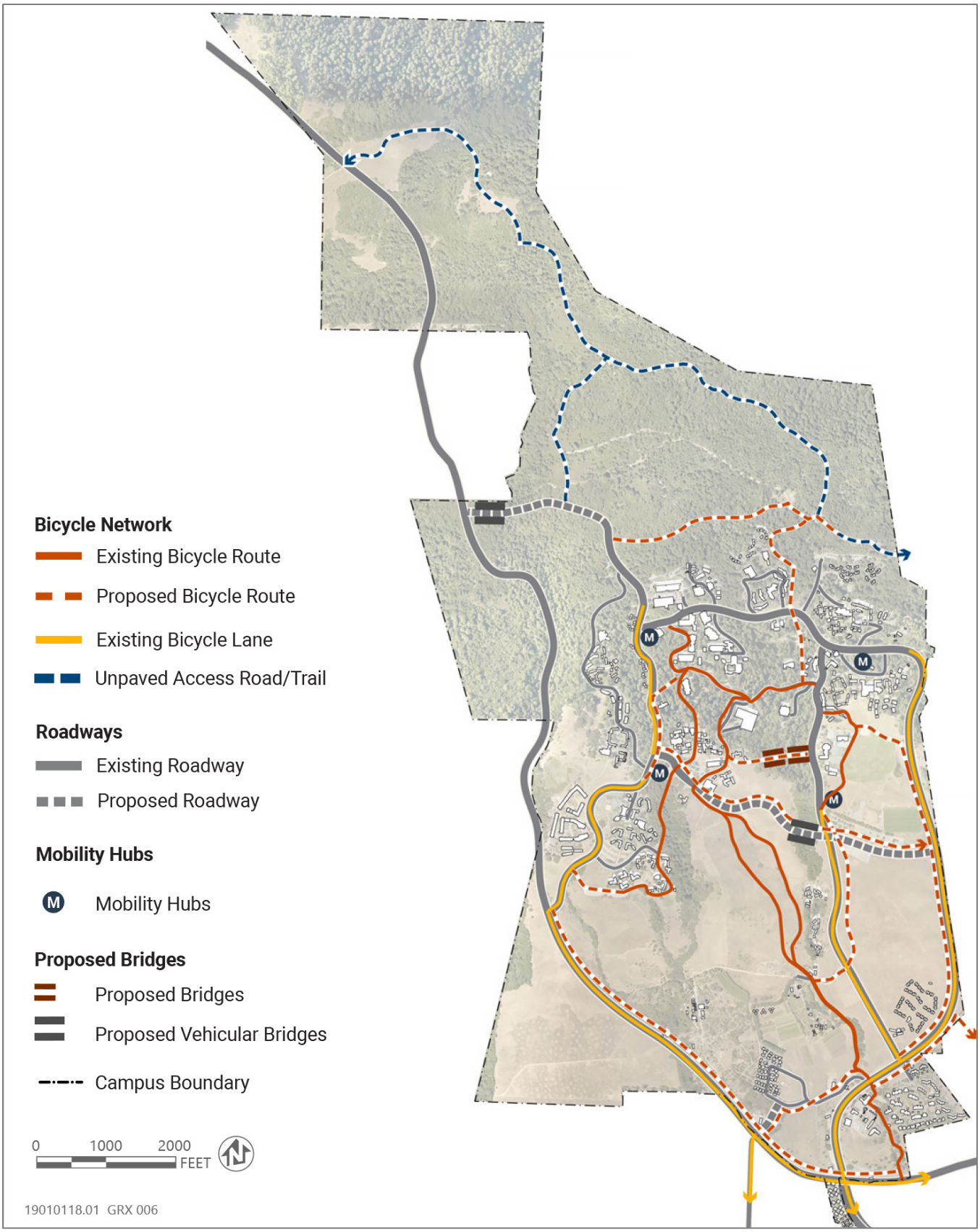
The planned pedestrian network of north-south and east-west corridors would be integrated with transit stops, mobility hubs, and activity clusters, and would strive to be multi-use to expand bicycle access across the campus.

Pedestrian crossings at major campus roadways may be improved to ensure safety. Depending on location and conditions, improvements may include raised or consolidated crosswalks, striping enhancements, and operational changes such as "scramble" crossings at high-volume locations, which is a type of traffic signal movement that temporarily stops all vehicular traffic, thereby allowing pedestrians to cross an intersection in every direction, including diagonally, at the same time. Intersections would be evaluated for traffic signals and traffic-calming measures to enhance the pedestrian experience and facilitate an increase of walking on campus. Sidewalk widths and lighting would be based on existing and planned pedestrian volumes to improve safety and congestion. Wayfinding along key pedestrian corridors would include walk-time estimates between campus destinations and directional signage. In addition, similar pedestrian improvements along Empire Grade may occur in cooperation with the County/City of Santa Cruz and in connection with other improvements to alternative transportation infrastructure.



Source: UC Santa Cruz 2020

Figure 2-8 Campus Pedestrian Network Under the 2021 LRDP



Source: UC Santa Cruz 2020

Figure 2-9 Campus Bicycle Network Under the 2021 LRDP

Pedestrian Trails

Existing trail networks could be improved and new connections provided within campus and to adjacent public lands surrounding the campus. Unpaved multi-use trail networks could include east-west connections in the north campus from Wilder Ranch State Park to Henry Cowell State Park via Pogonip City Park. North-south trail networks could connect through the Moore Creek Preserve and the Great Meadow, connecting routes north to the east-west trail network in the north campus. Additional trail improvements could include improved connections between the Spring Trail and Spring Street within the LRDP area. The Spring Trail also provides pedestrian connection to Highway 9. Trail corridors that provide access to campus research areas could be limited to pedestrians only, such as Red Hill Road gravel fire road in the north campus.

Bicycle Routes

The planned bicycle network recognizes and builds on the success of existing campus bicycle facilities. The plan envisions a combination of dedicated and multi-use path corridors to enhance connectivity between major population centers, co-located with other bicycle supportive uses such as food services and gathering places. Secure indoor and outdoor bike parking would be provided at mobility hubs and key buildings, including facilities such as showers, lockers and charging stations. UC Santa Cruz would explore the concept of an electric bike (eBike) fleet for faculty and staff use, and a campus/regional bikeshare program.

The 2021 LRDP proposes improved and new bicycle routes to connect key locations on campus. Some of these routes may be multi-use corridors, which include a separated bicycle path with adjacent pedestrian path or combined bicycle and pedestrian routes. The following bicycle routes are proposed in the 2021 LRDP, facilitating the following key connections:

East-west connections:

- North Connection: New route between proposed academic and support development north of Science Hill to proposed housing development north of Chinquapin Road;
- Steinhart Way Improvements: Improved bicycle route as part of corridor between Kerr Road and Quarry Plaza;
- New Meyer Drive Extension: New bike facility between Heller Drive and Coolidge Drive;

North-south connections:

- Empire Grade: Bicycle improvements along Empire Grade between Heller Drive and Cardiff Place;
- New Connection to Housing in Northeast: New bike route from Quarry Plaza to proposed housing development north of Chinquapin Road
- New Link along Hagar Drive: New bike route between the Farm entrance and the East Remote Lot
- Coolidge Drive: Bicycle improvements along Coolidge Drive between the Historic District to the East Field House Complex

In addition, several other minor bicycle connections are proposed to close gaps in the existing network and provide new links to mobility hubs and key destinations.

Non-Roadway Bridges

The 2021 LRDP includes the construction of three new non-roadway bridges in the north campus subarea from Crown and Merrill Colleges to east of Heller Drive, providing a new pedestrian and bicycle corridor across campus. Two additional bridges would span over existing gulches connecting the east and west campus area between McHenry Road in the Arts Area, the Hahn parking lot development site, and Hagar Drive to the Athletic and Recreation Services area. Non-roadway bridge design would accommodate bicycles where feasible, to minimize the impact of bridge structures over drainages. Bicycle facilities in these key corridors would consider the surrounding context and emphasize safety and convenience.

Westside Research Park

A commuter mobility hub, a multi-use trail, and path connections would be constructed concurrent with development at the Westside Research Park, providing site connections to existing regional bus and campus shuttle routes, coastal rail trail, and proposed new regional transit within the former rail corridor. Figure 2-10 identifies the current transportation network options available in the vicinity of Westside Research Park.

Transportation Demand Management Programs

TDM programs promote alternatives to driving to campus alone and reduce trips to and from the campus. These include walking, cycling, riding transit, carpooling, and vanpooling. Existing UC Santa Cruz TDM programs include:

- Transit, bicycle shuttle, and vanpool subsidies;
- Bicycle loans, bicycle parking, and education;
- Carpool incentives and carshare programs;
- Electric car incentives and EV charging; and
- Parking permit restrictions.

The 2021 LRDP would build on existing TDM programs and explore new efforts to further reduce campus trips and single-occupant vehicles (SOVs).

Parking Management

Parking supply on campus would be limited for on-campus housing and SOV commuters through changes to parking policies, pricing, and convenience to encourage carpooling, transit, and other non-SOV alternatives. Improved transit service from remote parking areas would be supported by enhanced pedestrian and bicycle facilities, improving connectivity with key corridors from parking areas to major campus activity centers and relieving some transit capacity for those commuters willing to walk and bike to their final campus destination.

Ride Hailing

Transportation Network Companies (TNCs), such as Uber and Lyft can be managed with designated drop-off and pick-up areas, co-located with mobility hubs. The campus would explore options, such as surcharges and geo-fencing, to better manage this emerging technology. This would increase campus roadway capacity for more frequent and reliable transit service, reduce trip numbers and VMT, and reduce vehicle/pedestrian conflicts to promote a more pedestrian-friendly campus.

Bike Shuttles and Bikeshare

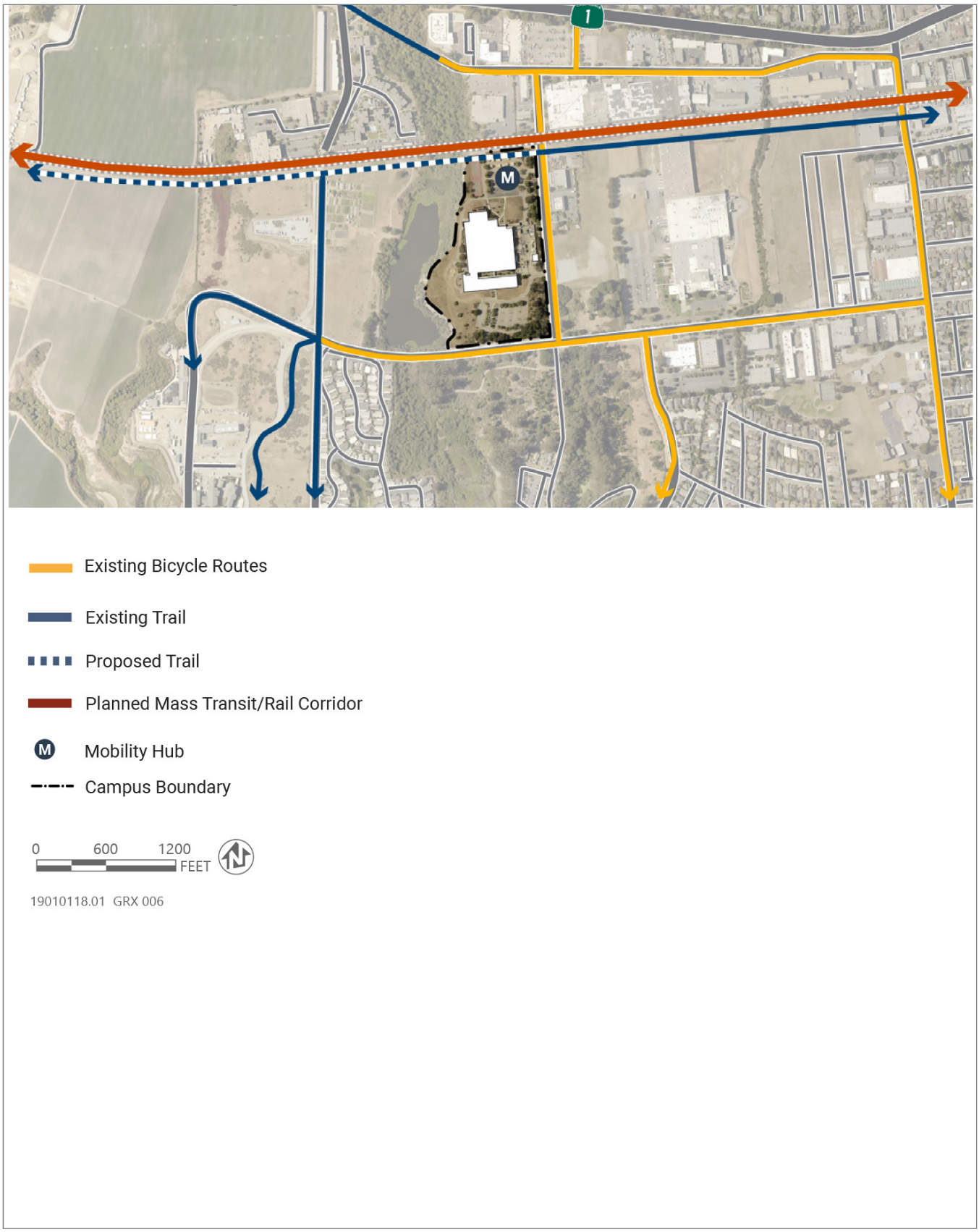
UC Santa Cruz would expand the success of the bike shuttle program and explore on- and off-campus bikeshare programs, including those with electric-assisted bicycles or eBikes, to make traversing the campus's challenging terrain more appealing and convenient. Incentives would be expanded to promote the use of these and other emerging electric mobility options.

Integrated Land Uses

New campus development under the 2021 LRDP would be guided by transit-oriented design concepts, with buildings clustered, pedestrian areas enhanced, parking consolidated in periphery lots, transit stops integrated into pedestrian corridors, and vehicle access restricted. New development at Westside Research Park would be designed and oriented as a transit village, integrating the recent multi-use rail trail, bus routes, and planned rail with planned housing, academic, and other mixed uses on-site. Increased student support and public services on-campus would also help reduce trips by those living and working on campus.

TDM Data Collection and Monitoring

The measured success of 2021 LRDP TDM programs would rely on accurate and ongoing data collection, monitoring, and performance evaluations. The 2021 LRDP proposes to identify, establish, and implement a data collection and planning program to establish existing transportation trends, establish metric-based goals, and track performance over time.



Source: UC Santa Cruz 2020

Figure 2-10 Westside Research Park Transportation Network

2.6.7 Public Services

UC Santa Cruz is serviced by a full range of public services: fire, police, school, and recreation. On campus, police protection is provided by UC Santa Cruz Police through on-campus stations and staffing, while the City of Santa Cruz provides fire protection service through an on-campus fire station at the main residential campus. At Westside Research Park, the City of Santa Cruz provides fire protection services and the UC Santa Cruz Police provides police service. Currently, UC Santa Cruz also has mutual-aid agreements with the City of Santa Cruz Fire and Police Departments, as well as the County of Santa Cruz Sheriff's Office.

With respect to schools, the Santa Cruz City Schools District provides kindergarten through grade 12 education for the Santa Cruz area, including the UC Santa Cruz campus population with school-aged children. With respect to recreation, the UC Santa Cruz campus provides on-campus recreational facilities for the campus population and open space that is available to both the on-campus population and the public. In addition, the City of Santa Cruz maintains public parks and recreation areas in the area. Refer to Section 3.15, "Recreation," for further information regarding recreation areas provided by UC Santa Cruz and in the community.

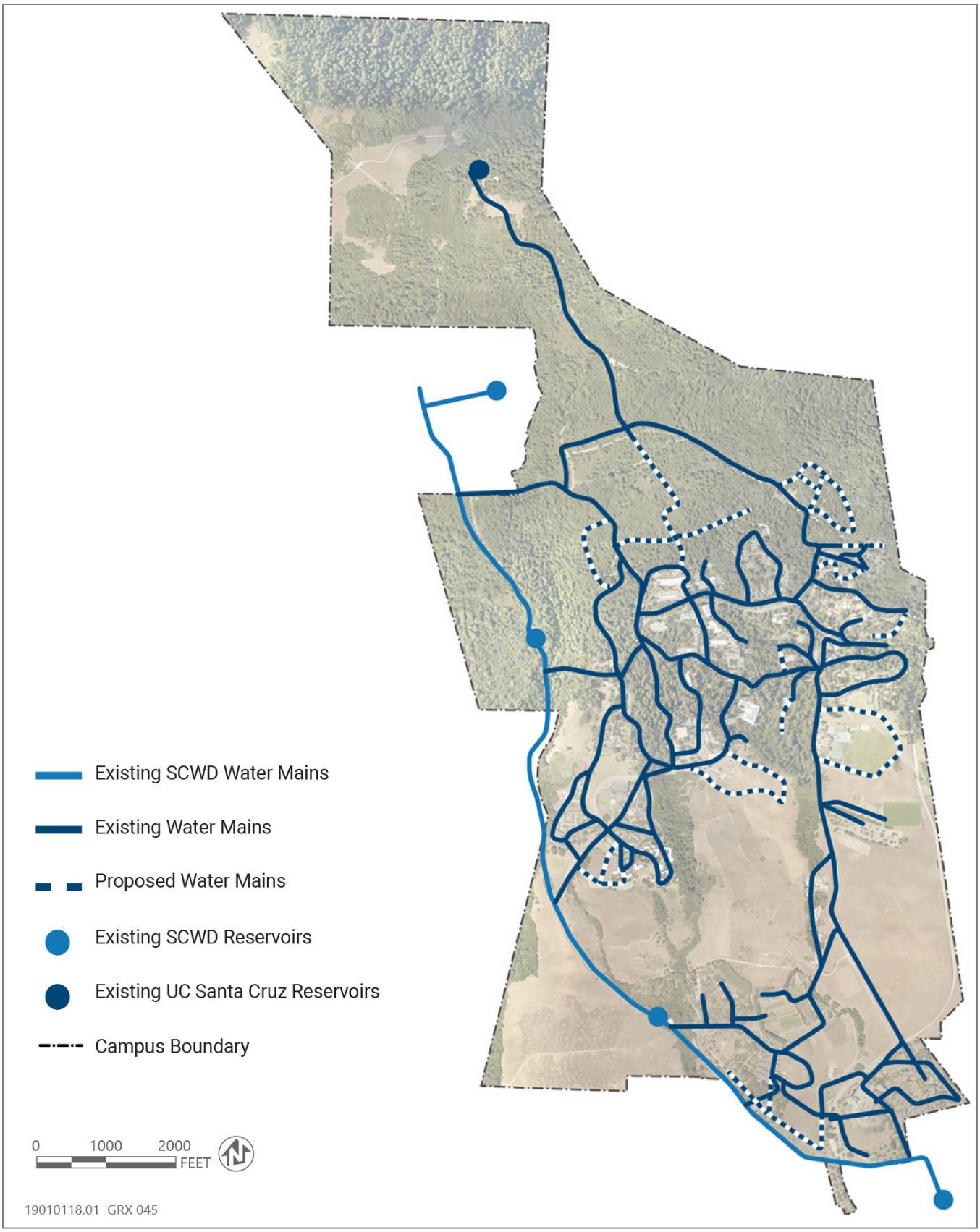
2.6.8 Utilities and Infrastructure

UC Santa Cruz is provided a full range of utility services through a well-developed utility infrastructure owned and operated by the Campus, augmented by water, wastewater, natural gas, electricity, and telecommunications services from outside providers, including the City of Santa Cruz. The City of Santa Cruz provides water and wastewater treatment service to the main residential campus and Westside Research Park via its existing treatment plants and reservoirs, and owns and operates the landfill that provides regional disposal capacity for the City and UC Santa Cruz. With respect to water service, UC Santa Cruz and the City have existing agreements in place dating back to the inception of the campus that require the City to provide water service to the entire campus, including areas outside the City's designated service boundary.

Pacific Gas and Electric Company (PG&E) provides electrical and natural gas supplies. Additionally, the main residential campus meets some of its electricity demand via an existing cogeneration facility turbine within the central campus subarea that adds utility redundancy and resiliency.

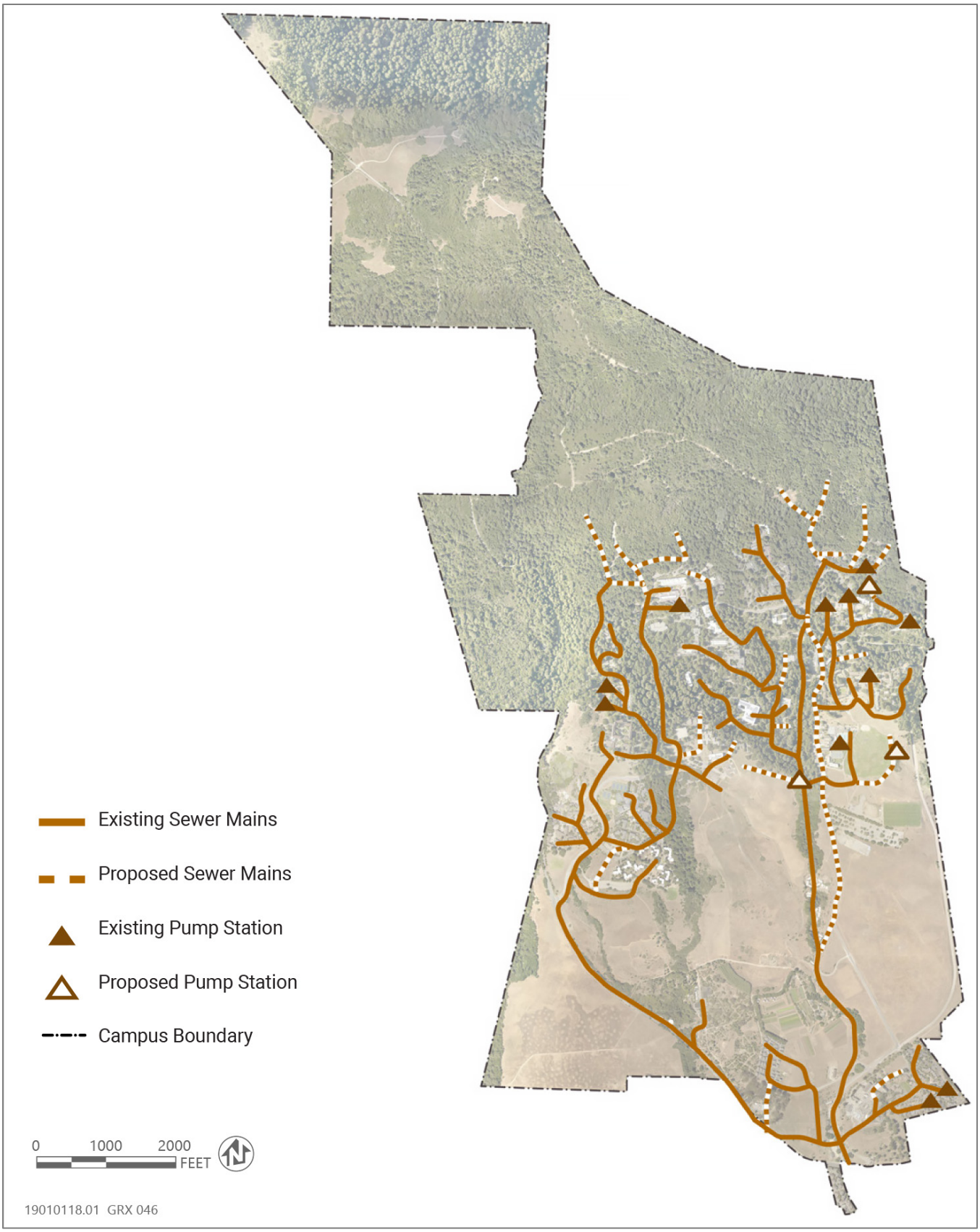
SBC and California Research and Education Network currently provide telecommunications service to UC Santa Cruz and on-campus operations are managed by the UC Santa Cruz Information Technology Services (ITS), which is located in the Communications Building. ITS also manages the campus wireless network.

UC Santa Cruz upgrades its utility systems regularly to adjust to changes in demand and in accordance with existing utility agreements, and it has a program of planned upgrades and replacements that will continue throughout the period covered by the 2021 LRDP. As part of the 2021 LRDP, UC Santa Cruz has identified preliminary utility improvements/projects that would be undertaken as part of the 2021 LRDP to ensure adequate and reliable utility service to existing campus facilities, as well as the future facilities that would be developed as part of 2021 LRDP implementation. These efforts are intended to address specific infrastructure needs through the lens of proposed development under the 2021 LRDP, as well as to address long-term and aged infrastructure issues that UC Santa Cruz has identified to reduce the risk of failures related to sensitive geological and environmental conditions within the LRDP area. Utility improvements may include new utility connections to envisioned development areas; a new electrical service entrance and standby generator facility in the southwest portion of the main residential campus; a natural gas line along Empire Grade and Heller Drive; stormwater and drainage improvements; and additional sewer pump stations within the eastern portion of the main residential campus. Additionally, and as noted in Sections 3.10, "Hydrology and Water Quality" and 3.17, "Utilities and Service Systems," UC Santa Cruz may consider additional on-site utility improvements on a project-by-project basis, which may include water recycling facilities and associated non-potable distribution infrastructure. Currently envisioned utility infrastructure under the 2021 LRDP are shown in Figures 2-11, 2-12, 2-13, and 2-14 for water, wastewater, natural gas, and electricity, respectively.



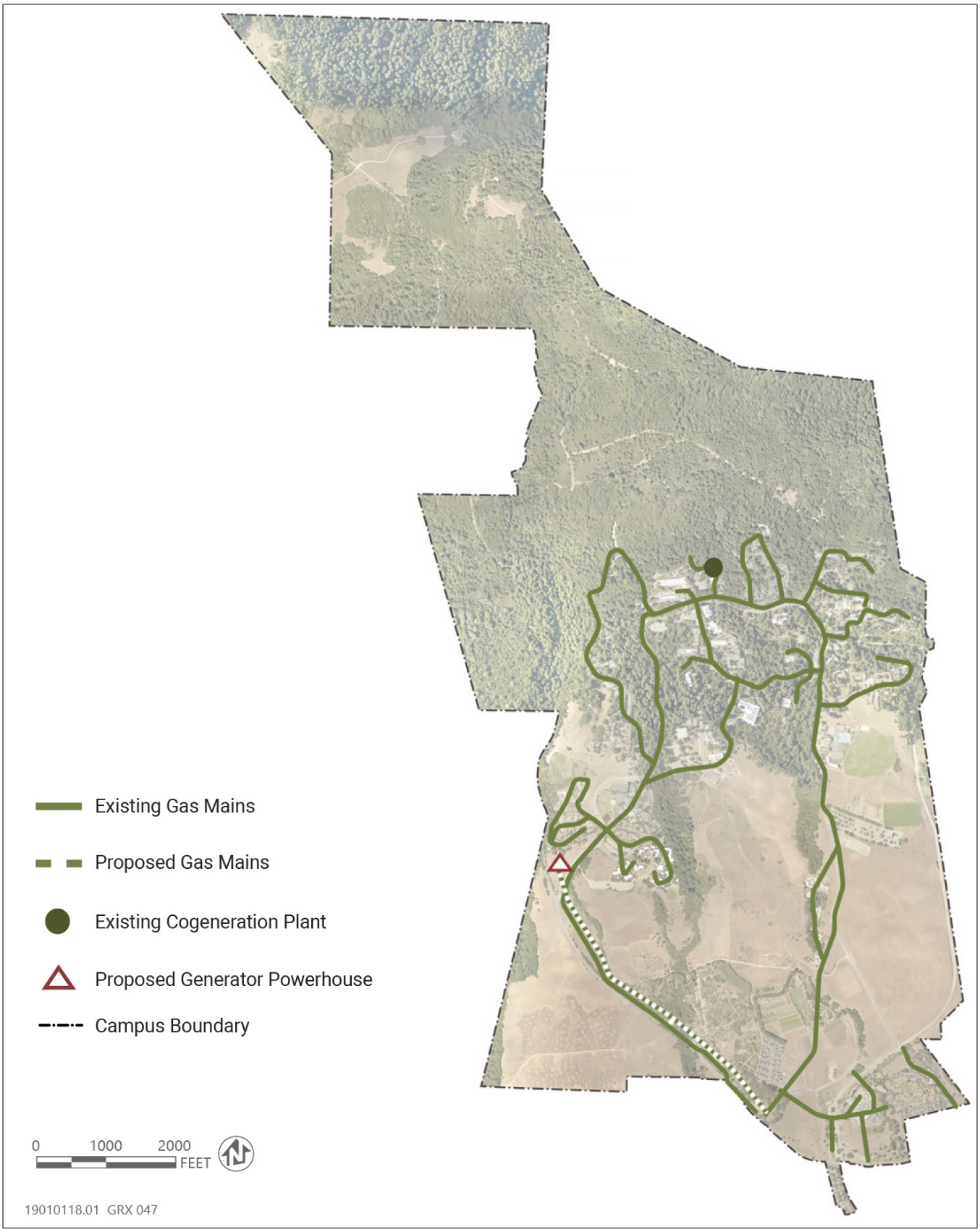
Source: UC Santa Cruz 2020

Figure 2-11 Water Infrastructure Under the 2021 LRDP



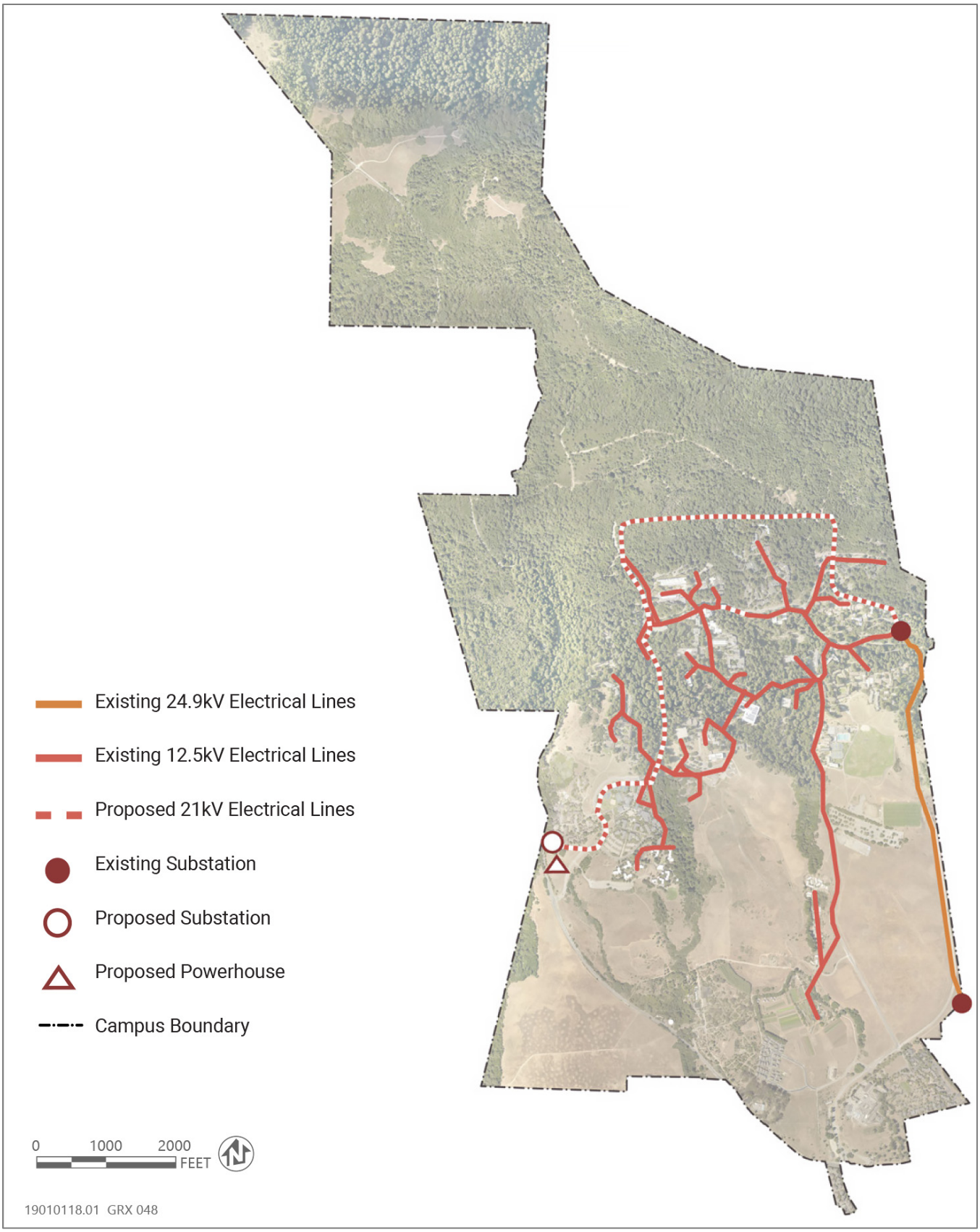
Source: UC Santa Cruz 2020

Figure 2-12 Sanitary Sewer Infrastructure Under the 2021 LRDP



Source: UC Santa Cruz 2020

Figure 2-13 Natural Gas Infrastructure Under the 2021 LRDP



Source: UC Santa Cruz 2020

Figure 2-14 Electrical Infrastructure Under the 2021 LRDP

Further, utility plans for domestic water, condensing/cooling water, stormwater, sanitary sewer, electrical generation and distribution, natural gas, and heating water are developed and reviewed on an ongoing basis and updated as necessary. Increases in the level of on-campus development and changes in the types of on-campus facilities associated with implementing the 2021 LRDP may affect demand for campus utility services as described in Section 3.17, "Utilities and Service Systems." The transmission/collection/treatment systems may be modified to address changes in demand or supply or implementation of new, more efficient systems to increase campus sustainability, and add utility redundancy and resiliency.

3 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

This chapter of the Draft Environmental Impact Report (EIR) evaluates the potential environmental impacts associated with implementation of the 2021 Long Range Development Plan (2021 LRDP) by the University of California, Santa Cruz (UC Santa Cruz). It is divided into sections addressing different environmental resource topics. Each section is organized to provide an integrated discussion of the existing environmental conditions (both regulatory setting and environmental setting); potential environmental effects (direct and indirect impacts as needed); and measures to reduce the significant effects, where feasible, of construction and operation in the plan area.

Cumulative and growth-inducing impacts are discussed in Chapter 4, "Cumulative Impacts," and Chapter 5, "Other CEQA Sections," respectively.

3.0 INTRODUCTION TO THE ANALYSIS

As required by the California Environmental Quality Act (CEQA) Guidelines (State CEQA Guidelines) (California Code of Regulations (CCR) Section 15126.2), this Draft EIR identifies and focuses on the significant direct and indirect physical environmental effects of the project. It evaluates both short-term and long-term effects. Short-term effects are generally those associated with construction, and long-term effects are generally those associated with operation of the project. The following resource topics are addressed in this chapter; no environmental issues were scoped out of this EIR:

- Section 3.1, Aesthetics
- Section 3.2, Agriculture and Forestry Resources
- Section 3.3, Air Quality
- Section 3.4, Archaeological, Historical, and Tribal Cultural Resources
- Section 3.5, Biological Resources
- Section 3.6, Energy
- Section 3.7, Geology and Soils
- Section 3.8, Greenhouse Gas Emissions and Climate Change
- Section 3.9, Hazards and Hazardous Materials
- Section 3.10, Hydrology and Water Quality
- Section 3.11, Land Use and Planning
- Section 3.12, Noise
- Section 3.13, Population and Housing
- Section 3.14, Public Services
- Section 3.15, Recreation
- Section 3.16, Transportation
- Section 3.17, Utilities and Service Systems
- Section 3.18, Wildfire

Sections 3.1 through 3.18 follow the same general format:

- The **"Regulatory Setting"** section presents the laws, regulations, plans, and policies that are relevant to the issue area. Regulations originating from the federal, State, University of California (UC), and local levels are each discussed where applicable. Please see the discussion in Section 3.0.2, below, regarding UC autonomy with respect to land use policies and municipal regulations.
- The **"Environmental Setting"** section presents the existing environmental conditions within the LRDP area and in the surrounding area as appropriate, in accordance with State CEQA Guidelines Section 15125. The geographic extent of the environmental setting area evaluated (the LRDP area or plan area) differs among resources, depending on the locations where impacts would be expected. For example, air quality impacts are assessed for the air basin (macroscale), as well as the site vicinity (microscale), whereas aesthetic impacts are assessed for the plan area vicinity only. This EIR uses the 2018-2019 academic year as the baseline year for existing environmental conditions unless otherwise specified and explained in relation to a specific topic.
- The **"Environmental Impacts and Mitigation Measures"** section identifies the significance criteria used to determine the level of significance of the environmental impacts for each resource topic, in accordance with State CEQA Guidelines Sections 15126, 15126.2, and 15143. The significance criteria used in this Draft EIR are based on the checklist presented in Appendix G of the State CEQA Guidelines, best available data, and the applicable regulatory standards of relevant public agencies. The criteria may also reflect local policies adopted for the purpose of avoiding or reducing an environmental impact, particularly for impacts that may affect off-campus resources, even though UC Santa Cruz is not bound by such policies (see Section 3.0.2, below). The level of each impact is determined by comparing the effects of the project to the existing environmental conditions and the listed criteria. Key methods and assumptions used to frame and conduct the impact analysis, as well as issues or potential impacts not discussed further (such issues for which the project would have no impact), are also described.

  Project impacts are organized numerically in each subsection (e.g., Impact 3.2-1, Impact 3.2-2, Impact 3.2-3, etc.). Each impact discussion is preceded with a summary impact statement that concludes with the level of significance identified in bold type. The discussion that follows the impact summary presents the substantial evidence supporting the impact significance conclusion.

  This Draft EIR must describe any feasible mitigation measures that could avoid, minimize, rectify, reduce, or compensate for significant adverse impacts, and the measures are to be fully enforceable through incorporation into the project (Public Resources Code [PRC] Section 21081.6[b]). Mitigation measures are not required for impacts found to be less than significant. Where feasible mitigation for a significant impact is available, it is described following the impact, along with its effectiveness at addressing the impact. Each identified mitigation measure is labeled numerically to correspond with the number of the impact that would be mitigated by the measure. Where sufficient feasible mitigation is not available to reduce the impact to a less-than-significant level, or where the UC Board of Regents (Regents) lacks the ability to ensure that the mitigation will be implemented when needed, the impact is identified as "significant and unavoidable."

3.0.1 University of California Autonomy

UC Santa Cruz is part of the UC, a constitutionally created entity of the State of California, with "full powers of organization and government" (Cal. Const. Art. IX, Section 9). As a constitutionally created State entity, the UC is not subject to the regulations of local non-state agencies, such as those that may be found in the *City of Santa Cruz General Plan* or land use ordinances, for uses on property owned or controlled by the UC that are in furtherance of the UC's educational purposes. Although there is no formal mechanism for doing so, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies for the communities surrounding the campus.

UC Santa Cruz seeks to maintain an ongoing exchange of ideas and information and to pursue mutually acceptable solutions for issues that confront both the campus and its surrounding community. To foster this process, UC Santa Cruz communicates with City of Santa Cruz, Santa Cruz County, and community organizations; sponsors various meetings and briefings to keep local organizations, associations, and elected representatives apprised of ongoing planning efforts; and considers community input.

3.0.2 Terminology Used in This EIR

This Draft EIR uses the following terminology in discussions of the project's environmental effects:

- **Less-than-Significant Impact**: A project impact is less than significant when it does not exceed the significance criteria and therefore would not cause a substantial change in the environment. No mitigation is required.
- **Potentially Significant Impact**: A potentially significant impact is a potentially substantial adverse change in the environment. There may be uncertainty as to whether an adverse change will occur because, for instance, the exact location of buildings may not be known at this time because of the current stage of planning. Additional information would be needed regarding whether an impact may occur and its extent. In these instances, if a substantial adverse change is reasonably foreseeable, the impact is determined to be potentially significant. For CEQA purposes, a potentially significant impact is treated as if it were a significant impact. Mitigation measures and/or project alternatives are identified to reduce potentially significant effects on the environment where feasible.
- **Significant Impact**: A project impact is significant if it is a substantial adverse change in the physical environment. Significant impacts are identified by the evaluation of project effects in the context of specified significance criteria. Mitigation measures and/or project alternatives are identified to reduce significant effects on the environment where feasible.
- **Significant and Unavoidable Impact**: A project impact is significant and unavoidable if it is a substantial adverse change in the environment that cannot be feasibly avoided or mitigated to a less-than-significant level. If a lead agency proposes to approve a project with significant and unavoidable impacts, it must adopt a statement of overriding considerations to explain its actions (State CEQA Guidelines Section 15093[b]).
- **Cumulative Impacts**: "'Cumulative impacts' refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (State CEQA Guidelines Section 15355). An EIR must either discuss cumulative impacts when the "project's incremental effect is cumulatively considerable…[or]…briefly describe its basis for concluding that the incremental effect is not cumulatively considerable" (State CEQA Guidelines Section 15130[a]).
- **Mitigation Measures**: State CEQA Guidelines Section 15370 defines "mitigation" as:
  a) avoiding the impact altogether by not taking a certain action or parts of an action;
  b) minimizing impacts by limiting the degree or magnitude of the action and its implementation;
  c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
  d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
  e) compensating for the impact by replacing or providing substitute resources or environments, including through permanent protection of such resources in the form of conservation easements.

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3.1 AESTHETICS

This section describes the existing visual characteristics of the LRDP area and evaluates the potential of the 2021 LRDP to result in substantial adverse visual impacts. The visual impact analysis considers existing scenic resources and the potential for public views to be affected by the project.

Comments received on the NOP (See Appendix B) related to aesthetics identified concerns regarding the change in visual character (including trees) and changes to existing scenic vistas, views, and corridors, as well as potential impacts to the Great Meadow and East Meadow within the main residential campus. All aesthetic-related comments are addressed, where appropriate, in the environmental analysis of this section.

3.1.1 Regulatory Setting

FEDERAL

There are no federal programs or policies addressing visual resources that pertain to the 2021 LRDP.

STATE

California Scenic Highway Program

California's Scenic Highway Program was created by the California Legislature in 1963 and is managed by the California Department of Transportation (Caltrans). The goal of this program is to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to highways. A highway may be designated "scenic" depending on how much of the natural landscape travelers can see, the scenic quality of the landscape, and the extent to which development intrudes on travelers' enjoyment of the view (Caltrans 2008). There are no officially designated State scenic highways in Santa Cruz County (Caltrans 2011). The closest State-designated scenic highway are segments of California SR-1 located in Monterey County (Caltrans 2020) over 25 miles to the south and outside the project viewshed.

California Coastal Act

The California Coastal Act of 1976 (Pub. Resources Code §30000-30900) was enacted with goals to protect, maintain, enhance, and restore the quality of the coastal zone environment as well as its natural and manmade resources, assure conservation of coastal zone resources, and protect the ecological balance of the coastal zone and prevent its deterioration and destruction (CCC 2019). Chapter 3 of the California Coastal Act includes coastal resources planning and management policies. Chapter 3, article 6, "Development," include the following requirements related to scenic and visual resources:

- Section 30251: The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.
- Section 30254: New or expanded public works facilities shall be designed and limited to accommodate needs generated by development or uses permitted consistent with the provisions of this division; provided, however, that it is the intent of the Legislature that State Highway Route 1 in rural areas of the coastal zone remain a scenic two-lane road. Special districts shall not be formed or expanded except where assessment for, and provision of, the service would not induce new development inconsistent with this division. Where existing or planned public works

facilities can accommodate only a limited amount of new development, services to coastal-dependent land use, essential public services and basic industries vital to the economic health of the region, state, or nation, public recreation, commercial recreation, and visitor-serving land uses shall not be precluded by other development.

- A portion of the main residential campus and the Westside Research Park are located in the coastal zone and are subject to requirements in the California Coastal Act for the protection of visual resources.

UNIVERSITY OF CALIFORNIA

Design Review Process

The UC initiated independent design and cost review of building plans in 1985 in response to concerns about the design quality management of a rapidly growing capital improvement program. Current UC policy requires independent architectural design review and independent cost estimates of projects when a total project cost exceeds $5 million. The policy requires design reviews to be performed early in the design process, at suitable intervals during design, and at the time of completion of design. Selection of the review or reviewers and the format for the design review process are left to the discretion of the Chancellor.

Design review of projects is conducted by the UC Santa Cruz Design Advisory Board, which is comprised of outside design professionals. The Design Advisory Board reports to and advises the Chancellor and Executive Vice Chancellor through the Advisory Committee for Campus Planning and Stewardship (CPS) and advises building committees with the assistance of the Campus Architect and Campus Planner. The Design Advisory Board reviews projects and planning proposals on all properties administered by the Santa Cruz campus including the main residential campus, Westside Research Park, Silicon Valley Center; Coastal Science Campus, Lick Observatory at Mount Hamilton, Big Creek Natural Reserve, and UC Monterey Bay Education, Science, and Technology Center (UC MBEST). At a minimum, consultation with the Design Advisory Board begins when a project's site is initially under consideration, with periodic reviews during Schematic Design, Design Development and Construction Documents, of major projects (UC Santa Cruz 2020).

At UC Santa Cruz, the responsibilities of the Design Advisory Board include the following:

- To assure compatibility with the approved Long Range Development Plan and supporting planning documents that have been adopted by the campus.
- To review planning studies, proposed building designs and siting alternatives for compatibility with their settings and appropriateness to their functional programs and budgets.
- To ensure that proposals for new projects are presented in a broad context, with due consideration given at all points of project development to issues of landscape design, circulation, and environmental protection.
- To review all aspects of exterior urban and landscape design and to provide guidance to the design teams, building committees, and the campus planning committee.
- To identify and articulate to the campus community planning and design issues critical to ongoing campus development.

UC Santa Cruz Campus Standards Handbook

The UC Santa Cruz Campus Standards Handbook is provided to UC Santa Cruz consultants for guidance in preparation of construction documents for projects. The handbook outlines building and site specification requirements related to products and design constraints for all construction activities. Design constraints are complementary to specific project and program requirements and may be modified by a project manager. While the standards of the handbook focus on areas of functionality and durability, sections related to site requirements, such as exterior lighting standards, tree protection, landscaping, planting, and trash collection relate to and correspond with campus aesthetics. Standards related to design and aesthetics are included below:

Exterior Lighting Standards

Provide lighting along paths to adequately illuminate the pathway. Site lighting with non-glare, downlighting characteristics is preferred for all areas around buildings, especially at housing areas. Forest areas should be illuminated with non-directional fixtures that provide light throughout the surrounding area.

Landscape General Design

A. Landscape areas should contribute to the identity of each particular college or building complex. New landscaping at existing buildings should conform to or complement the existing character of planting.

B. The design of each particular college or building complex should be sensitive to, and complementary of, any existing sensitive vegetation and mature specimen trees. All landscaping should endeavor to enhance the natural beauty of the site and to establish or preserve the identity of each college and / or building complex.

C. The landscape design shall provide for bicycle parking and circulation as well as for pedestrian circulation.

D. Personal security should be enhanced in the landscape design by maintaining visibility. Avoid creating darkened or hidden areas, both in design and plant selection.

Landscape General Planting

A. Planting areas outside building compounds should relate to the surrounding native plant community and utilize native plants, closely related species, or, in specific and limited locations, ornamentals successfully used on campus.

B. Planting areas within building compounds should respond to the uses and functions of the buildings and spaces: providing sunny seating areas, shady resting areas, colorful entries, and screening or buffers when necessary. Plant sizes should be chosen to assure long term adaptability to specific site locations.

C. Ground covers and vegetation shall be designed to minimize erosion.

D. Do not use decomposed granite or gravel at paths within developed areas or adjacent to buildings. These materials migrate onto lawns and into building entry systems, creating maintenance problems.

Lawn Areas

A. Minimize lawn areas to conserve water usage on campus within a new building complex. (General lawn areas are to be specified according to each particular project program requirements.) When lawn areas are provided, provide a few larger areas of lawn, as opposed to many smaller patches of lawn, in order to minimize maintenance costs.

B. In layout of lawn areas and other specialized landscape areas, consider the ease of lawn mower or other maintenance equipment access to such areas.

UC Santa Cruz Physical Design Framework

The UC Santa Cruz Physical Design Framework was prepared in 2010 as part of the "pilot phase" of the process redesign for approving capital improvement projects. Described as more evocative than prescriptive, the Physical Design Framework encourages an approach of "structured improvisation." The document has been structured to convey a vision of campus lands, and to propose a series of design guidelines intended to ensure that the future area planning studies, building and siting decisions, and building and infrastructure designs remain true to that vision (UC Santa Cruz 2010). The following guidelines presented in the Physical Design Framework are relevant to scenic and visual resources:

Meadow Areas

- Maintain the continuity and visual "sweep" of the meadow landscape across the lower campus, from the Pogonip east of the campus to Wilder Ranch State Park on the west.
- Do not permit new plantings or plant succession to change the overall visual character of the lower campus meadows. Avoid new fencing, except where necessary to manage meadows or grasslands.

- Preserve the integrity of meadows by maintaining a clear meadow boundary. Site development so as not to encroach on the meadow open space.
- Consider opportunities to manage, restore and enhance native meadow habitat as appropriate to maintain the visual expanse of open space and natural vegetative and wildlife diversity.
- Consider long-range views in the siting and design of facilities, both south towards the ocean and north towards the forest edge, particularly where the meadows meet the forest edge.

Forests and Forest Edge Areas

- Build carefully in the forest. Make development compatible with existing vegetation.
- Build no taller than the surrounding tree canopy.
- Consider the visual continuity of the forest edge as seen from a distance when designing buildings there. Maintain heights of buildings and infrastructure elements significantly below the tree line.
- Design nighttime lighting in the forest to provide a safe environment while minimizing light pollution and intrusion into wildlife habitats.
- Arrange building elements and clusters to create an irregular building profile against the forest edge. Avoid long, unbroken horizontal roof lines.
- Choose exterior colors to blend with the forest edge. Avoid using bright colors or highly reflective exterior surfaces.
- Use plant materials, either existing or newly planted, to blend new development appropriately into the forest edge.
- Incorporate the dramatic sense of transition when moving between the shade of the forest and light of the meadow into the design of buildings there.
- Site and design future development to preserve the visual and ecological integrity of the forest, to maintain a contiguous forest cover and habitat for wildlife, and to maintain public safety. Protect trees and understory vegetation of mixed age and species to maintain forest diversity.
- During project planning, identify trees and tree clusters of particular aesthetic value and incorporate them in the design.
- Consider the visual continuity of the forest edge as seen from a distance when designing buildings there. Maintain heights of buildings and infrastructure elements significantly below the tree line.
- Choose exterior colors to blend with the forest edge. Avoid using bright colors or highly reflective exterior surfaces.

Areas in and near the Cowell Lime Works Historic District

- Preserve the historic buildings and landscape around the campus entrance as important remnants of local history, emblematic of the historic use of the site. Protect the historic integrity of the structures by matching program uses to historic structures to avoid alterations that adversely affect the historic character of the district.
- Preserve and enhance landscape setting elements that contribute to the district's historic feeling and association. Avoid introduction of incompatible ancillary elements (e.g., fences, lights, signs, site furniture).

Guidelines Related to Topography, Geology, and Hydrology

- Limit grading beyond project footprint to reduce impacts on existing trees, vegetation, and landscape. Avoid highly geometric grading patterns, transition gradually from constructed slopes to original topography.
- During project planning, identify trees and tree clusters of particular aesthetic value and incorporate them in the design.

General Building and Siting Design

- Site buildings so as to protect visually and ecologically significant landscape features.
- Avoid free-standing single buildings set as objects in the landscape. When a building's program or scale requires a single building, and particularly when it is anticipated to be a first phase with future additions, design the building to anticipate future clustering.
- Build no taller than the surrounding tree canopy.
- Make buildings that allow all their users to engage with their surroundings, by means of careful window placement, use of outdoor "rooms," construction of roof terraces, and the like.
- Design buildings to respond to both the natural and the built elements of UC Santa Cruz's complex visual environment, reflecting its variety and richness without disrupting its cohesion.
- Use exterior building materials and massing that integrate visually with the surrounding landscape.
- Design buildings and other facilities within or adjacent to clusters, whether new or existing, using massing, height, materials, and color that relate sensitively to each other and to their natural surroundings.
- Visually screen service functions and delivery areas from public spaces and pedestrian ways.
- Incorporate a mix of uses into new housing complexes, creating distinct "college-like" communities for living and learning.

Roads and Paths

Adapt roads, paths, and bridges to their terrain and to nearby dominant trees. Use grading and planting to screen road alignments, particularly through sensitive viewsheds. Where possible, align roads and paths to reveal and emphasize unique and character defining landscape elements: special plant communities, limestone outcroppings and views.

LOCAL

As noted in Section 3.0.1, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the University's educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

County of Santa Cruz General Plan

The County of Santa Cruz General Plan (1994) contains the following policies related to visual resources in the county that may be relevant to the 2021 LRDP:

- **Policy 5.10.2: Development within Visual Resource Areas.** Recognize that visual resources of Santa Cruz County possess diverse characteristics and that the resources worthy of protection may include, but are not limited to, ocean views, agricultural fields, wooded forests, open meadows, and mountain hillside views. Require projects to be evaluated against the context of their unique environment and regulate structure height. setbacks and design to protect these resources consistent with the objectives and policies of this section. Require discretionary review for all development within the visual resource area of Highway One, outside of the Urban/Rural boundary, as designated on the GP/LCP Visual Resources Map and apply the design criteria of Section 13.20.130 of the County's zoning ordinance to such development.
- **Policy 5.10.3: Protection of Public Vistas.** Protect significant public vistas as described in policy 5.10.2 from all publicly used roads and vista points by minimizing disruption of landform and aesthetic character caused by grading operations, timber harvests, utility wires and poles, signs, inappropriate landscaping and structure design. Provide necessary landscaping to screen development which is unavoidably sited within these vistas.

- **Policy 5.10.4: Preserving Natural Buffers.** Preserve the vegetation and landform of natural wooded hillsides which serve as a backdrop for new development. Also comply with policy 8.6.6 regarding protection of ridgetops and natural landforms.
- **Policy 5.10.6: Preserving Ocean Vistas.** Where public ocean vistas exist, require that these vistas be retained to the maximum extent possible as a condition of approval for any new development.
- **Policy 5.10.9: Restoration of Scenic Vistas.** Require on-site restoration of visually blighted conditions as a mitigating condition of permit approval for new development. The type and amount of restoration shall be commensurate with the size of the project for which the permit is issued. Provide technical assistance for restoration of blighted areas.
- **Policy 5.10.10: Designation of Scenic Roads.** The following roads and highways are valued for their vistas. The public vistas from these roads shall be afforded the highest level of protection.
  - State Highways
    - Route l - from San Mateo County to Monterey County
    - Route 9 - from Route l to Santa Clara County
    - Route 17 - from Route l to Santa Clara County·
    - Route 35 -from Route 17 to San Mateo County
    - Route 129 - from Route l to San Benito County
    - Route 152 - from Route 1 to Santa Clara County
    - Route 239 -from Route 9 in Boulder Creek to Route 9 at Waterman Gap
  - County Roads
    - Amesti Road - from Varni Road to Browns Valley Road
    - Beach Road - from Highway 1 to Palm Beach
    - Bonita Drive and San Andreas Road - from Highway 1 to Beach Road
    - Bonny Doon Road - from Route 1 to Pine Flat Road
    - Browns Valley Road - from Eureka Canyon Road to Hazel Dell Road
    - Buena Vista Drive - from San Andreas Road to Larkin Valley Road
    - Casserly Road - from Mile marker 1.75 to Highway 152
    - Corralitos Road - from Freedom Boulevard to Browns Valley Road
    - Empire Grade - from the Santa Cruz City limits to the end of Empire Grade
    - East Cliff Drive - from 33"' Avenue to 41"' Avenue
    - Eureka Canyon Road - from Highland Way to Corrallitos
    - Graham Hill Road - from Lockwood Lane to Route 9
    - Hazel Dell Road - from Browns Valley Road to Mt. Madonna Road
    - Highland Way - from Summit Road to Eureka Canyon Road
    - lce Cream Grade
    - Martin Road - from Pine Flat to Ice Cream Grade
    - Mt. Hermon Road - from Scotts Valley City limits to Graham Hill Road
    - Mt. Madonna Road - from Gaffey Road to Hazel Dell Road
    - Pine Flat Road - from Bonny Doon Road to Empire Grade
    - Sand Dollar Drive
    - Smith Grade
    - Summit Road - from Highway 17 to Highland Way

- Sunset Beach and Shell Road
- Swanton Road - from Route 1 at Davenport Landing to Route 1 at Greyhound Rock

- **Policy 5.10.11: Development Visible from Rural Scenic Roads.** In the viewsheds of rural scenic roads, require new discretionary development, including development envelopes in proposed land divisions, to be sited out of public view, obscured by natural landforms and/or existing vegetation. Where proposed structures on existing lots are unavoidably visible from scenic roads, identify those visual qualities worthy of protection (See policy 5.10.2) and require the siting, architectural design and landscaping to mitigate the impacts on those visual qualities.
- **Policy 5.10.12: Development Visible from Urban and Scenic Roads.** In the viewsheds of urban scenic roads, require new discretionary development to improve the visual quality through siting, architectural design, landscaping and appropriate signage. (See policies 5.10.18, 5.10.19 and 5.10.20.)
- **Policy 5.10.13: Landscaping Requirements.** All grading and land disturbance projects visible from scenic roads shall conform to the following visual mitigation conditions:
  - Blend contours of the finished surface with the adjacent natural terrain and landscape to achieve a smooth transition and natural appearance; and
  - Incorporate only characteristic or indigenous plant species appropriate for the area.
- **Policy 5.10.15. Design Review for Public Projects Visible from Scenic Roads.** Require construction and development of any soundwalls and roadside amenities such as turnouts and vista points within or adjacent to Scenic Roads to be reviewed for consistency with the visual resource protection policies of this section and the Zoning ordinance.
- **Policy 8.6.5. Designing with the Environment**. Development shall maintain a complementary relationship with the natural environment and shall be low-profile and stepped-down on hillsides.
- **Policy 8.6.6. Protecting Ridgetops and Natural Landforms**. Protect ridgetops and prominent natural landforms such as cliffs, bluffs, dunes, rock outcroppings, and other significant natural features from development. In connection with discretionary review, apply the following criteria:
  (a) Development on ridgetops shall be avoided if other developable land exists on the property.
  (b) Prohibit the removal of tree masses when such removal would erode the silhouette of the ridgeline form. Consider the cumulative effects of tree removal on the ridgeline silhouette.
  c) Restrict the height and placement of buildings and structures to prevent their projection above the ridgeline or treeline. Restrict structures and structural projections adjacent to prominent natural land forms. Prohibit the creation of new parcels which would require structures to project above the ridge line, treeline or along the edge of prominent natural landforms. (See Visual Resources section within the Conservation and Open Space chapter.)
  (d) Require exterior materials and colors to blend with the natural landform and tree backdrops.

City of Santa Cruz General Plan

The City of Santa Cruz General Plan (2012) contains the following policies related to visual resources in the city that may be relevant to the 2021 LRDP:

- **Policy CD1.1.2:** Protect the Monterey Bay National Marine Sanctuary and the shoreline and views to and along the ocean, recognizing their value as natural and recreational resources.
- **Policy CD1.1.4:** Identify and emphasize distinguishing natural features that strengthen Santa Cruz's visual image (i.e., open space, Monterey Bay).
- **Policy CD1.2.1:** Develop complimentary siting, scale, landscaping, and other design guidelines to protect important public views and ensure that development is compatible with the character of the area.
- **Policy CD1.3.1:** Encourage UCSC development to blend with the natural landscape and maintain natural ridgelines as seen from the city.

- **Policy CD1.4.1:** Use planned development and other clustering techniques to protect resources and views and allow for siting that is sensitive to adjacent uses.
- **Policy CD3.5:** Require superior quality design for buildings at visually significant locations throughout the city, such as gateways to Santa Cruz and intersections of major corridors.
- **Policy CD4.1.6:** Encourage rehabilitation and adaptive reuse of architecturally significant buildings rather than demolition.
- **Policy CD4.2:** Ensure that new development and right-of-way improvement enhance the visual quality of streetscapes.
- **Policy CD4.2.1:** Where possible, site buildings at the street frontage and place parking areas away from street corners and to the rear of buildings.
- **Policy CD4.2.3:** Underground utilities when major road improvement or reconstruction is proposed, if possible.
- **Policy CD4.3.3:** Protect existing significant vegetation and landscaping that provides scenic value along with wildlife habitat and forage.

City of Santa Cruz Municipal Code

Chapter 24.12, "Community Design," identifies requirements for external sources of lighting related to signs (City of Santa Cruz n.d.). Specifically, Ordinance 24.12.360 states:

> Where a sign is externally illuminated the light source must be shielded such that it is not visible from the front of the sign or lighting fixture, or from beyond the property line. Illuminated signs are prohibited in residential zone districts. Intermittent or flashing lighting shall be prohibited. Illuminated surfaces with an integral light source, such as electroluminescent paneling, may be used if their illumination intensity does not interfere with surrounding land uses. Lighted signs in the Beach Recreational Area and time and temperature devices in any district are not subject to these restrictions.

3.1.2 Environmental Setting

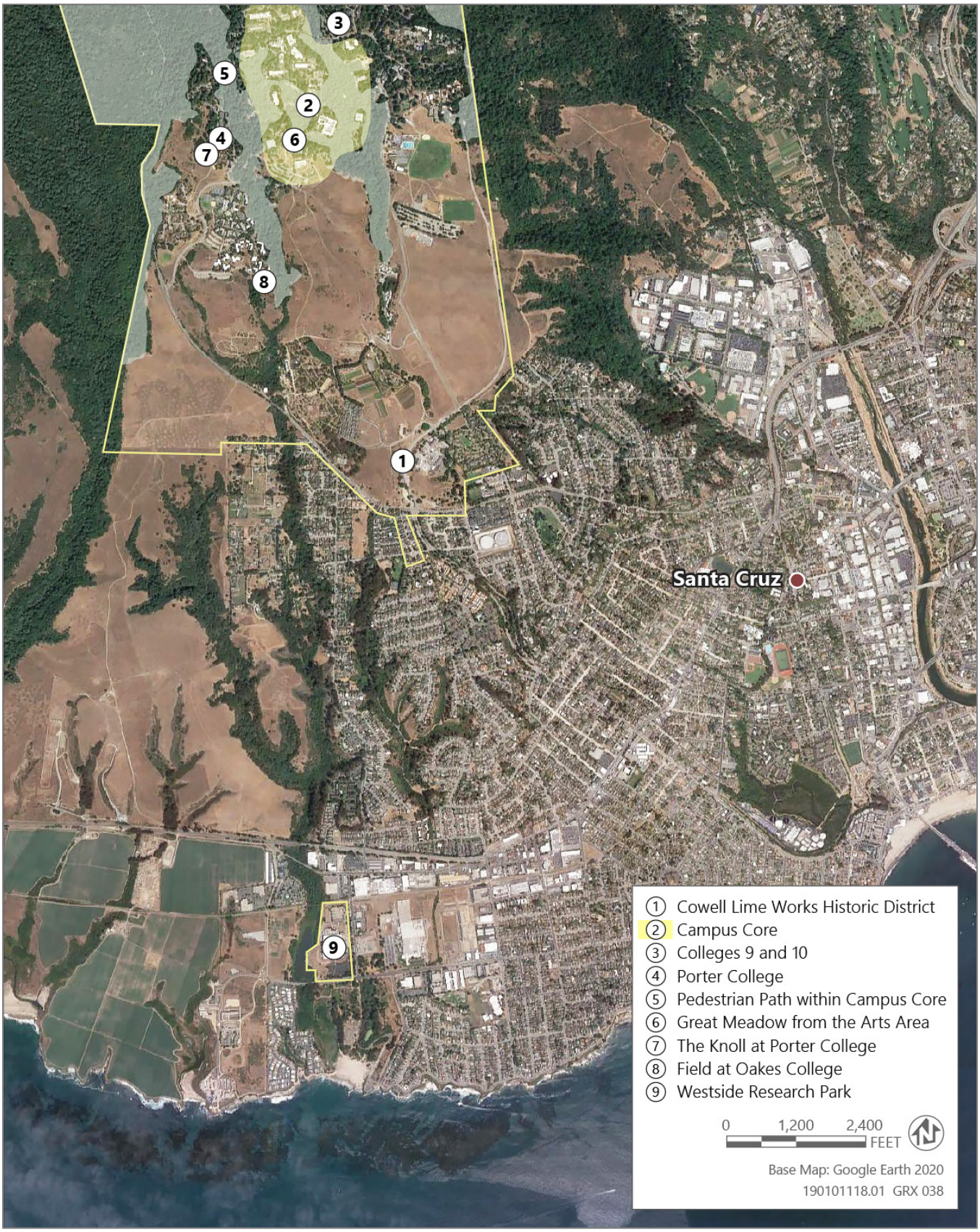
REGIONAL SETTING

The city of Santa Cruz (City) is the largest city within the county of Santa Cruz and also serves as the County seat. The city is located along four miles of coastline on the Monterey Bay, which defines the city's southern boundary. In some places, the city's coastline slopes gently toward large beaches; in others, tall coastal cliffs drop off sharply, and stairways lead from the top of the cliff down to the rocky shoreline and beaches below. Additional open space surrounds the creeks and ravines that run along the city's western edge, cutting through the rugged topography to the coast. The city's eastern edge is defined by the Santa Cruz Harbor and the protected open space of Arana Gulch. Varied topography shapes the city's character and creates many public views throughout the community, including views of Monterey Bay and the city as a whole. Arroyos and steep coastal cliffs provide the greatest variation in the city's topography.

Other features in the region include pronounced hills—most notably the coastal terraces of the UC Santa Cruz main residential campus, Pogonip, the Carbonera area, and DeLaveaga Park. Open space areas, including those that make up the City's Greenbelt, are significant contributors to Santa Cruz's natural setting. Public views to and from these open spaces help to orient people within the community, and trails in some of the areas provide limited recreational access (City of Santa Cruz 2012). Important vantage points looking across open space areas towards the upper campus include points along Empire Grade, Glenn Coolidge Drive, and Hagar Drive.

VISUAL CHARACTER OF LRDP AREA

Figure 3.1-1 shows the locations of photographs and vantage points referenced in this section.



Source: Figure produced by Ascent Environmental in 2020

Figure 3.1-1 Photograph Locations

Main Residential Campus

The main residential campus is located in the northwestern portion of the city and is bounded by Empire Grade/High Street to the west and south, Coolidge Drive to the east, and forested, natural areas to the north. The main residential campus consists of coastal and marine terraces below the Santa Cruz Mountains which provide a backdrop of protected open space and afford panoramic views of the city and Monterey Bay. The visual character of the campus is defined initially by its spectacular natural environment of open meadow spaces, coastal oak forests and redwood groves. Nestled into the landscapes are dense building clusters connected by pathways and natural open spaces. Within the campus, there are ten colleges, each with separate communities of residential and academic support space, that are built around an academic core of shared facilities. The visual character of the UC Santa Cruz main residential campus can be further described through the various scenic viewpoints and types of development offered within the campus. These are further described below and under "Representative Viewpoints."

Campus Organization

As described in Chapter 2, "Project Description," and shown on Figure 2-3, the main residential campus consists of three primary subareas: the north campus, which extends from the developed central campus subarea to the northern property line; the central campus, which extends roughly from the East and West Remote Parking Lots northward to the Crown and Merrill Colleges on the east and to the North Remote Parking Lot on the west; and the lower campus, which extends from the southern property line and main campus entrance northward to the East Remote Parking Lot on the east.

Existing Development

There are two primary entrances to the main residential campus. The main entrance is located at the southern end of the campus at the intersection of High Street and Bay Street. This entrance features UC Santa Cruz's entrance sign and large 19th-century wood-frame and stone buildings that are part of the Cowell Lime Works Historic District, as shown on Figure 3.1-2. There is a public information kiosk, and historic structures associated with the historic district, including the Cook House (Admissions Office), the Barn Theatre, cooperage, the hay barn, and other buildings and structures from the 19th century. A draft Cultural Resources Management Plan (Management Plan) for the Cowell Lime Works Historic District was prepared in 2006 that provides guidelines, strategies, and recommendations for long-term management of this historic district (UC Santa Cruz 2006). The management plan is being refined and additional studies are likely in the near term to identify opportunities to further improve the district for use as a campus and community amenity including adaptive reuse and rehabilitation of existing structures that preserves the spatial and historic character relationships in the district.

The second campus entrance, known as the west entrance, is located at the intersection of Empire Grade and Heller Drive. A small kiosk, located at the west campus entrance, is surrounded by open, rolling meadows. The Family Student Housing complex is visible on the north side of the west entrance, while Oakes College and Rachel Carson College are visible to the east. Cultivated areas on campus include the Arboretum and Botanic Garden, Center of Agroecology and Sustainable Food Systems (the Farm), and Chadwick Gardens. The Arboretum and Botanic Garden, which is surrounded by a fence, has a signed entrance off of Empire Grade. Additionally, vehicular entry points to campus property are available off of Empire Grade near Cave Gulch and Marshall Field, and from the east from Pogonip City Park. However, access to these entry points is restricted and these areas do not provide public vistas or direct access to main campus facilities.

Existing development within the main residential campus forms the campus core as shown on Figure 3.1-3, and includes a series of clustered buildings nestled in the redwood forests and at the periphery of the meadows, referred to as the "ecotone," where the redwood forests transition to the oak woodland. Campus development is generally clustered into several nodes, allowing for the retention of the existing redwood forest and meadows of the campus. Additionally, the campus is developed with parking areas, developed open space (e.g., plazas, courtyards, gardens, and recreational areas), pathways and pedestrian bridges, as well as public and service roads. The campus also has several large outdoor gathering areas, including the Quarry Amphitheater. Outdoor formal recreation areas include the East Field and the Lower East Field at the Athletics and Recreation facility located south of Cowell and Stevenson Colleges, the Oakes College Field, and the Family Student Housing Playing Field. Though these areas are not natural landscapes, they contribute to the overall visual character of the campus and of the more localized areas in which they are situated. Additionally, formal recreational areas are visually unobtrusive portions of campus that do not detract from more distant scenic views of the coast.

Source: Photograph provided by UC Santa Cruz in 2020

Figure 3.1-2 Photograph 1: View of the Cooperage and Kilns in the Cowell Lime Works Historic District

Source: Photograph provided by UC Santa Cruz in 2020

Figure 3.1-3 Photograph 2: View of the Humanities 1 building in the Campus Core

The first eight campus colleges were founded between 1965 and 1972; Colleges Nine and Ten were founded in 2000 and 2002, respectively. At UC Santa Cruz's founding, landscape architect Thomas Church stressed the goal of minimizing human intrusion on the environment by sensitive placement of buildings. He urged that the colleges and other buildings be placed at the boundaries between forests and grasslands. Thus, the bulk of campus buildings and colleges are located in the forested central campus. As shown on Figure 3.1-4 and 3.1-5 which shows Colleges Nine and Ten and Porter College, most structures blend with the surrounding forested areas and are partially screened by trees. Further, buildings have been deliberately designed not to extend above surrounding trees. By contrast, the lower campus is largely open space, dominated by the East Meadow and the Great Meadow. The extent to which lower campus buildings are visible from off-campus is largely dependent on topography. In particular, on-campus buildings in the grasslands are visible except where screened by topography.

Developed areas within the main residential campus are connected through a web of pathways. North/south routes cover significant changes in elevation, while east/west routes generally follow contours, traversing ravines via pedestrian bridges where needed. The bike path along Webster Way through the Great Meadow, a multi-use trail that accommodates both pedestrian and bicycle traffic, traverses the main residential campus and offers sweeping views of oak woodland, the forest edge, the Great Meadow, and Monterey Bay. A pedestrian path shown in Figure 3.1-6 shows how service roads, pedestrian paths, and bicycle routes weave between developed and natural areas.

Landscape Types

Landscapes types within the main residential campus include meadows, forests and forest edge, and ravines. The original vision for development on the main residential campus, as directed by the 1963 LRDP, declared for the preservation of meadows, concentrating development in forested areas, maintenance of significant contiguous forest areas, and the preservation of healthy mature trees.

Expansive meadows are present at the main entrance of the campus and in the lower campus area with transitions to redwood forests within the central campus, followed by chaparral and mixed evergreen forests as elevation increases to the north. The visual contrast among these vegetation types contributes to the visual character of the main residential campus. The Moore Creek and Jordan Gulch ravines run north-south through the forest of the campus core. The ravines are important wildlife corridors and function as major campus stormwater conveyances, channeling significant flows in the channel bottoms and into the karst aquifer that underlies the main residential campus.

There are three large meadows (Great, East, and the large meadow to the west of Empire Grade) in the lower campus as well as three smaller meadows (Porter, Crown, and Kerr) surrounded by forest lands in the central and north campus. Several of the undeveloped open space areas within the main residential campus are valued as scenic resources. These meadows consist primarily of introduced Mediterranean grasses, though patches of coastal prairie (which include higher proportions of native grasses) also exist. Meadows in the redwood forest area of the north campus also support coastal prairie communities.

Scenic Vistas and Views

Scenic views within the main residential campus are available from several prominent vantage points. These vantage points offer impressive long-range views of Santa Cruz, Monterey Bay, and adjacent hillsides. From the central campus, vantage points/scenic views along the southern forest edge generally offer unbroken sweeping views towards Monterey Bay. Prominent scenic views within campus include the Cowell College Plaza (evaluated later as a viewpoint), the Arts area in the Academic Core (Figure 3.1-7), University House, the knoll at Porter College (Figure 3.1-8), and the field at Oakes College (Figure 3.1-9). Sweeping views across the meadows (Great Meadow and East Meadow) down towards the bay are available from these points and from other points within the Great Meadow. Points along Glenn Coolidge Drive also offer panoramic views of the city, bay, and Pogonip City Park. Similarly, points along Heller Drive and Empire Grade offer panoramic views of the bay. Viewpoints along Empire Grade, Glenn Coolidge Drive, and Hagar Drive provide views of the lower campus, looking north towards the central campus. From these viewpoints, sweeping views are available across the meadows up to the forest edge. Short-range views on the campus are influenced by topography, vegetation type, height density of vegetation, and building density. Examples of locations that provide short-range scenic views and vistas include small meadows surrounded by forests or buildings, as well as relatively open meadowland vegetated with oaks and madrones. Short-range views in forested areas of ravines and pathways are also available in some areas.

Source: Figure provided by UC Santa Cruz in 2020

Figure 3.1-4 Photograph 3: View of College 9 and 10

Source: Figure provided by UC Santa Cruz in 2020

Figure 3.1-5 Photograph 4: Aerial View of Porter College

Source: Source: Photograph provided by UC Santa Cruz in 2020

Figure 3.1-6 Photograph 5: View of Pedestrian Path Within the Campus Core

Source: Photograph provided by UC Santa Cruz in 2020

Figure 3.1-7 Photograph 6: View of the Great Meadow from the Arts Area in the Academic Core

Source: Photograph provided by UC Santa Cruz in 2020

Figure 3.1-8 Photograph 7: View from the Knoll at Porter College

Source: Photograph provided by UC Santa Cruz in 2020

Figure 3.1-9 Photograph 8: View from the Field at Oakes College

Views of the campus are regarded by local residents as an important visual resource for the city, as it provides an open backdrop for developed areas of western Santa Cruz. The lower campus grasslands and forest canopy of the north campus are visible from various points throughout the city, including the wharf, the Santa Cruz Beach Boardwalk, and SR 1. Because most campus buildings are located in the forested central campus, few buildings can be seen from views outside of the campus. The most notable exceptions are the Recital Hall and Digital Arts Research Center, which can be seen from lower elevations. Some of the buildings within Cowell and Stevenson Colleges can also be seen from off-campus locations, though they are partially screened by vegetation.

Westside Research Park

The Westside Research Park is located at 2300 Delaware Avenue in the western portion of the city of Santa Cruz. The 18-acre developed property is bounded by Antonelli Pond Park to the west, commercial facilities to the north, Natural Bridges Drive and a vacant lot to the east, and Delaware Avenue and Natural Bridges State Park to the south. As shown on Figure 3.1-10, the site is developed with three buildings, two parking lots, two outdoor service yards, lawns, and other amenities, including a public access trail, tennis courts, and a volleyball court. The property is generally flat in topography and is surrounded by raised earthen berms with vegetation that primarily screens the site from the surrounding streets. The site does not provide any scenic views, nor is it part of a scenic vista.

Source: Photograph provided by UC Santa Cruz in 2020

Figure 3.1-10 Photograph 9: View of Westside Research Park

VISUAL CHARACTER OF SURROUNDING LAND USES

Main Residential Campus

The main residential campus is bounded by Pogonip City Park and Henry Cowell Redwoods State Park to the east, private and forested land to the north, and Wilder Ranch State Park to the west. Residential, commercial, and educational uses within the city border the main residential campus to the south and portions of the east. Other residential uses include the Cave Gulch Neighborhood, which is located just outside the northwestern campus boundary and consists of single-family homes, a llama ranch, places of worship, and several schools, including the Waldorf School. The western, northern, and eastern campus boundaries are largely forested, with the exception of a portion along Pogonip City Park and the open area west of Empire Grade which are predominantly grassland. As previously described, the southeastern and southern campus edges are largely developed with low-rise development (typically one to three stories in height). Off-campus development in these areas includes single-family homes, mixed-density residential housing, an elementary school, a church, and a small area of commercial development. The southwestern edge of the main residential campus consists of meadows both within and outside of campus boundaries.

Westside Research Park

Westside Research Park is located in the Natural Bridges Industrial Park, along the western edge of urbanized Santa Cruz. The visual character of the area surrounding Westside Research Park is varied with light industrial, commercial, and residential uses. Generally, surrounding development consists of generally low-rise structures (one to two stories in height), ranging from low-density warehouse and light industrial buildings to single- and multi-family developments. The area to the south and west is predominantly characterized by open space uses, including the Natural Bridges State Beach area to the south and Antonelli Pond and the associated open space area, which is owned by the Santa Cruz Land Trust to the west. The UC Santa Cruz Coastal Science Campus is located 0.5 mile southwest of the Westside Research Park.

REPRESENTATIVE VIEWPOINTS

In addition to the vantage points identified above and due to the availability of long-distance views both within and of the LRDP area, several representative viewpoints were also selected to describe visual conditions within and around the LRDP area. Figure 3.1-11 shows the location of the viewpoints referenced in this section.

Viewpoint 1: View from City of Santa Cruz Wharf Looking Northwest Towards the Main Residential Campus

As shown in Figure 3.1-12 (View from City of Santa Cruz Wharf looking northwest towards main residential campus), the main residential campus is visible in the background from the wharf in the city of Santa Cruz looking northwest. Some campus buildings, such as the Digital Art Research Center, Athletics and Recreation Wellness Center, and infill housing at Stevenson College, are visible from this viewpoint, although most campus structures either blend with the landscape or are shielded by surrounding topography and mature trees. In the foreground, there are many small shops and businesses located in predominantly 1-2 story buildings in the foreground, as well as overhead utility lines, that impede long-distance views through the area. This viewpoint also includes a view of other typical urban visual features, including pedestrian and bike amenities, vehicles, and rail crossing infrastructure. Ornamental landscaping, mature trees, and some street lighting are also visible in the foreground.

Viewpoint 2: View from Coastal Science Campus Looking North Towards the Main Residential Campus

As shown in Figure 3.1-13 (View from Coastal Science Campus looking north towards the main residential campus), Viewpoint 2 provides a long-distance view of the Santa Cruz foothills to the north, as viewed from the UC Santa Cruz Coastal Science Campus on the western end of Delaware Avenue in the west side of Santa Cruz. The main residential campus is visible in the background, although much of the existing campus development is obscured by terrain and mature trees in front of the existing campus structures. Portions of Porter and Rachel Carson colleges can be seen from this viewpoint, although the full structures are not visible due to the intervening terrain and vegetation. The foreground from this viewpoint includes open space and grassland areas, overgrown vegetation and mature trees, several low-rise, light industrial uses, street lighting, and residential housing units (along the right edge of the image).

Viewpoint 3: View from High Street Looking North Towards Main Residential Campus Entry at Glenn Coolidge Drive

As shown in Figure 3.1-14 (View from High Street looking north towards main residential campus entry at Glenn Coolidge Drive), Viewpoint 3 provides a view of the entrance to the main residential campus from High Street looking north. This viewpoint includes the "University of California Santa Cruz" entrance sign, other campus directional signage, as well as a glimpse of the low-sloped hills that continue as the viewer travels north along Coolidge Drive. The Barn Theater and UC Santa Cruz Police station are partially obscured by vegetation and topography but visible on the left and right sides, respectively, of the image. High Street, which intersects Bay Drive, is aligned east-northwest, and transitions into Empire Grade at its western end. Empire Grade is aligned in a northwesterly to northerly direction and provides access to the main residential campus via Arboretum Road and Heller Drive.

Viewpoint 4: View from Empire Grade Looking East Towards Main Residential Campus

As shown in Figure 3.1-15 (View from Empire Grade looking east towards main residential campus), Viewpoint 4 offers views of the UC Santa Cruz campus setting from the western edge of the main residential campus, along Empire Grade. From this viewpoint, portions of campus buildings in the Oakes College area and Rachel Carson College to the east can also be seen, although the existing topography and vegetation preclude unimpeded views of the existing campus development. In the foreground, this view includes a large swath of open space and grasslands within the campus, known as Oakes Meadow. The Oakes Meadow landscape consists of low-rolling hills, various grasses, overgrown vegetation, and trees, as well as some recreational walking paths.

Viewpoint 5: View from Hagar Drive Looking East

As shown in Figure 3.1-16 (View from Hagar Drive looking west), views from Hagar Drive facing west towards McHenry Road are dominated by existing open space within the center of the main residential campus. In the background, the UC Santa Cruz Recital Hall, Digital Art Research Center and New Media facilities, and Academic Resource Center buildings can be seen but are partially obscured by existing terrain and vegetation. Further north beyond the buildings, dense tree cover of the redwood forested area can be seen. In general, this view consists of portions of developed campus as well as low-rolling hills, scattered vegetation and mature trees, and open space areas.

Viewpoint 6: View from Bike Path Looking East Towards Great Meadow

As shown in Figure 3.1-17 (View from bike path looking east towards Great Meadow), Viewpoint 6 provides a view facing east towards the Great Meadow from the bike path along Webster Way through the Great Meadow within the main residential campus. The view is dominated by open space with rolling hills and oak woodland areas precluding long-distance views. To the left, the UC Santa Cruz Recital Hall building can be seen, but additional campus development is not visible through the existing vegetation and topography. Long-distance views of the Monterey Bay to the south can also be seen from this viewpoint.

Viewpoint 7: View from Cowell College Looking South

As shown in Figure 3.1-18 (View from Cowell College looking south), Viewpoint 7 provides long-distance views from Cowell College facing south towards Westside Research Park and the western portion of the city of Santa Cruz. As seen from this vantage point, clear expansive and distant scenic views of the city, coast, and Pacific Ocean are available from within the main residential campus. This view also provides short-distance views of buildings and seating areas within Cowell College, Cowell Service Road, and the Upper East recreational field. The Athletics and Recreation Wellness Building, which is also shown in Viewpoint 1, above, is partially obscured but visible from this viewpoint.

Source: Figure produced by Ascent Environmental in 2020

Figure 3.1-11 Viewpoint Locations

Before

After

190101118.01 GRX 011

Source: Figure produced by Ascent Environmental in 2020

Figure 3.1-12 Viewpoint 1 (View from City of Santa Cruz Wharf Looking Northwest Towards the Main Residential Campus)

Before

After

190101118.01 GRX 012

Source: Figure produced by Ascent Environmental in 2020

Figure 3.1-13 Viewpoint 2 (View from Coastal Science Campus Looking North Towards the Main Residential Campus)

Before

After

190101118.01 GRX 013

Source: Figure produced by Ascent Environmental in 2020

Figure 3.1-14 Viewpoint 3 (View from High Street Looking North Towards Main Residential Campus Entry at Glenn Coolidge Drive)

Before

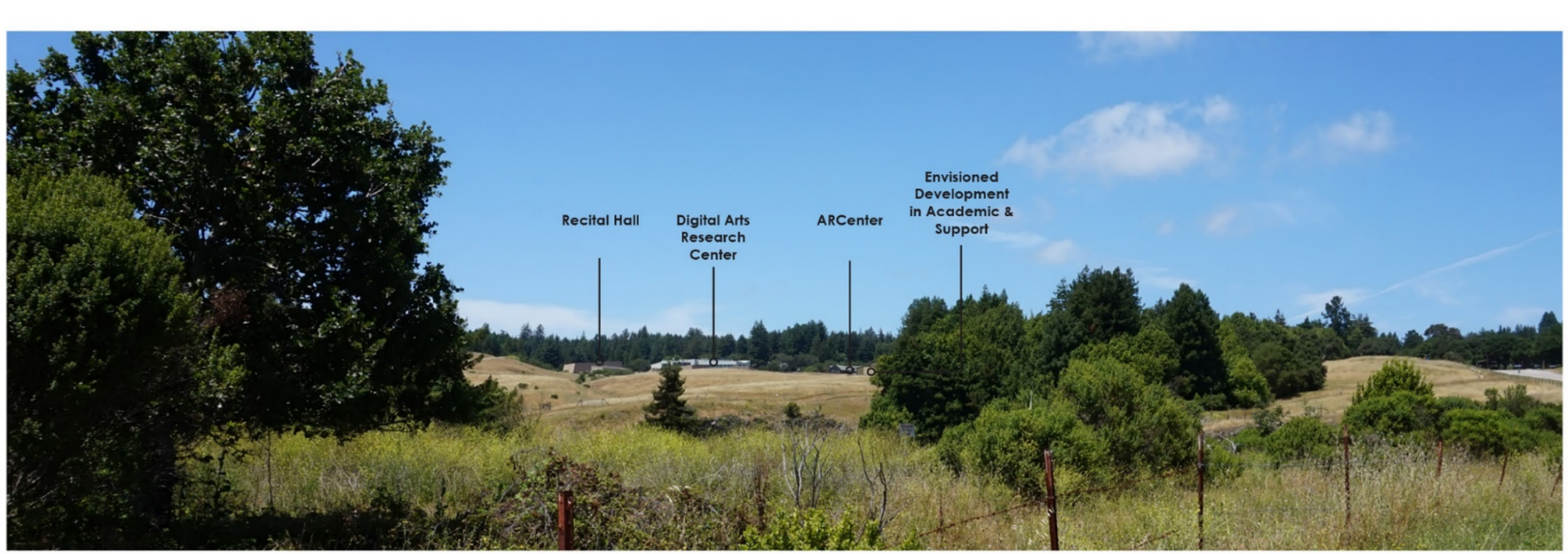
After

190101118.01 GRX 014

Source: Figure produced by Ascent Environmental in 2020

Figure 3.1-15 Viewpoint 4 (View from Empire Grade Looking East Towards Main Residential Campus)

Before



After

190101118.01 GRX 015

Source: Figure produced by Ascent Environmental in 2020

Figure 3.1-16 Viewpoint 5 (View from Hagar Drive Looking West)

Before

After

190101118.01 GRX 016

Source: Figure produced by Ascent Environmental in 2020

Figure 3.1-17 Viewpoint 6 (View from Bike Path Looking East Towards Great Meadow)

Before

After

190101118.01 GRX 017

Source: Figure produced by Ascent Environmental in 2020 8/19

Figure 3.1-18 Viewpoint 7 (View from Cowell College Looking South)

VIEWER PERSPECTIVE AND SENSITIVITY

Viewer sensitivity is considered in assessing the impacts of visual change and is a function of several factors. The sensitivity of the viewer or viewer concern is based on the visibility of resources in the landscape, proximity of the viewers to the visual resource, elevation of the viewers relative to the visual resource, frequency and duration of views, numbers of viewers, and types and expectations of individuals and viewer groups.

The viewer's distance from landscape elements plays an important role in the determination of an area's visual quality. Visibility and visual dominance of landscape elements depend on their placement within a viewshed. A viewshed is defined as all of the surface area visible from a particular location (e.g., an overlook) or sequence of locations (e.g., a roadway or trail) (FHWA 1981). Landscape elements are considered higher or lower in visual importance based on their proximity to the viewer. Generally, the closer a resource is to the viewer, the more dominant, and thus the more visually important it is. In the case of views at UC Santa Cruz, the Great Meadow is an exception due to its prominence in long distance views of the main residential campus, For purposes of analysis, landscapes are separated into foreground, middleground, and background views (USDA-FS 1995). In general, the foreground is characterized by clear details (within 0.25 or 0.5 mile of the viewer); the middleground is characterized by the loss of clear detail in a landscape, creating a uniform appearance (from the foreground to 3 to 5 miles in the distance); and the background extends from the middleground to the limit of human sight (Bacon 1979).

Visual sensitivity is also affected by viewer activity, awareness, and expectations in combination with the number of viewers and the duration of the view. Visual sensitivity is generally higher for views that are observed by people who are driving for pleasure, or engaging in recreation activities such as hiking, biking, camping or by residents of an area. Sensitivity is lower for people engaged in work activities or commuting to work. Viewer response must be based on regional context. The same landform or landscape feature may be valued differently in different settings; landscape features common in one area would not be valued as highly as the same feature in a landscape that generally lacks similar features. For example, a small hill may have little value in a mountainous area but may be highly valued in a landscape that has little topographic variation.

LIGHT AND SKY GLOW CONDITIONS

The terms "glare" and "sky glow" are used in this impact analysis to describe the visual effects of lighting. For the purposes of this impact analysis, glare is considered to be direct exposure to bright lights, reflective surfaces, and sky glow is a glow that extends beyond the light source and dominates or partially dominates views above the horizon at night.

Nighttime lighting within the main residential campus consists primarily of building, street, parking lot, and pathway lighting. The main residential campus also includes outdoor athletic field lighting within the Recreation & Athletics land use areas. Nighttime lighting is also provided through headlights of cars driving within and around the main residential campus. Angled down-lighting fixtures are generally used on the campus, per the Campus Standards Handbook, and are present within the housing areas. Parts of the campus that typically provide more non-directional lighting include the forest areas. These areas are more illuminated to provide a sense of pathway security for pedestrians. Generally, the main residential campus is a visible source of nighttime lighting, and sky glow, the diffuse brightening of the night sky, can be observed on some nights, particularly when fog is present, which reflects the lighting.

Lighting at the Westside Research Park is similar to that of commercial and industrial building uses. Lighting is provided around the exterior of the building, within the parking lot, and along the surrounding roads. Lighting in the parking lot and along the building exterior is angled and cast downwards.

Other more prominent nighttime lighting sources in the vicinity include those associated with the city of Santa Cruz, located to the south of the main residential campus and surrounding the Westside Research Park.

3.1.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, a visual resources impact would be considered significant if implementation of the 2021 LRDP would do any of the following:

- have a substantial adverse effect on a scenic vista;
- substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway;
- in non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage point); if the project is in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality; or
- create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

ANALYSIS METHODOLOGY

The evaluation of potential aesthetic and visual resource impacts is based on on-site review of the LRDP area and surrounding environment, review of site photos representing key vantage points, and documents pertaining to the UC Santa Cruz main residential campus, Westside Research Park, and surrounding areas. In determining the level of significance, this analysis focuses on the nature and magnitude of visual change, the number of public vantage points from where this change would be visible, and the number of viewers who would be affected by this change. In addition, the analysis considers viewer sensitivity as a function of the visibility of resources in the landscape, proximity of the viewers to the visual resource, elevation of the viewers relative to the visual resource, frequency and duration of views, numbers of viewers, and types and expectations of individuals and viewer groups.

It is assumed that projects implemented under the 2021 LRDP would comply with existing procedures pertaining to development within UC Santa Cruz (e.g., Design Review) and would be generally consistent with the UC Santa Cruz Physical Design Framework.

2021 LRDP Physical Planning Principles

In addition, the 2021 LRDP Physical Planning Principles, which are described below, articulate the manner in which future development under the 2021 LRDP would be planned, designed, constructed, and maintained.

A. The Campus Land – Respect and Resiliency

1. Preserve the integrity of campus landscapes. Buildings shall respond to the varied natural environments -- meadow, ecotone (forest edge), and forest – with architecture that is sensitive to the natural setting.
2. Respect major natural features. Maintain continuity of wildlife habitats, surface drainage flows, and compatibility of landscaping with surrounding native plant communities.
3. Minimize disturbance to open space. Retain for research and for its aesthetic values, as well as to honor the character and cultures of this incomparable site chosen for UC Santa Cruz.
4. Integrate planning for long-term resilience. To the extent possible, include climate adaptive strategies in all development to manage potential long-term and short-term challenges to the campus buildings and infrastructure. Foster conservation and maintenance of the land resource.
5. Integrate the natural and built environment. In forested areas, buildings should not protrude above the surrounding tree canopy; in visually sensitive areas, interruption of prime viewsheds and viewpoints will be minimized.

B. Academic Core Infill and Expansion – Growth from Within

1. Grow from within. Focus growth in previously developed areas of the academic core, including infill buildings and opportunities to densify, to minimize impacts on the natural environment
2. Maintain adjacencies with existing development. Continue compact expansion north of the Academic Core to facilitate connections to new neighboring colleges and student housing.
3. Sensitively site buildings to protect scenic viewsheds. Extend clustered development south of the Academic Core, maintaining the existing pattern of lower density development to minimize visibility of new buildings and maintain view corridors from existing buildings.
4. Maintain an open space network within the academic core. Provide spaces for contemplation, reflection and wellness.
5. Build sustainably and efficiently. Maximize investment in the land by considering long-term life cycle costs and increased building height, where feasible.

C. Campus Life and Housing – The Expanded Ring

1. Continue the pattern of colleges and student housing around the periphery. Optimize access to learning, research, and student support destinations by locating colleges and housing as close to the academic core as possible.
2. Cluster non-college student housing in infill locations near or adjoining existing colleges. Support the diverse student body with a variety of housing types, located with convenient access to academic and student support services.
3. Distribute recreational opportunities close to student housing. Complement concentrated college athletic facilities at the Athletics and Recreation area by promoting a diverse array of other opportunities for wellness and exercise throughout the campus.
4. Enrich the quality of campus life. Provide a variety of public services and student support spaces to help meet basic needs and allow students to thrive.
5. Provide supportive living / learning communities. Continue to balance the context of a major research university with the more intimate scale in the residential colleges.

D. Integrated Transportation – Walkable Core

1. Consolidate parking at the periphery of the academic core. Serve with frequent, direct transit service, and enhanced walking and biking pathways directly connecting to the academic core
2. Activate the core. Limit routine vehicular traffic flow from internal roadways to prioritize pedestrian connectivity and promote a safe pedestrian environment
3. Prioritize efficient transit access and routes. Extend Meyer Drive to create an inner campus loop and interconnected roadway network for improved access
4. Create active building frontages at ground level. Enhance the visual and experiential quality of the pedestrian and connect interior programs visually with exterior surroundings.
5. Generate dynamic public gathering spaces. Provide gathering spaces shared between buildings and at entries for increased public activity and to foster dynamic interactions between students, faculty and staff.

E. Pedestrian Mobility – Web of Pathways

1. Extend the pattern of east-west pedestrian paths. Provide convenient and direct access from new housing at the periphery to academic and social destinations in the core.
2. Improve existing pathways to reinforce walkability. Designate and prioritize select pedestrian corridors between key destinations throughout campus.

3. Strive to provide equal access throughout campus. Remove barriers through physical and programmatic improvements.
4. Expand comprehensive program of Travel Demand Management (TDM) strategies. Continue to expand options and incentives for alternative circulation modes, such as walking and bicycling.
5. Manage service road access with public circulation. Promote use of service roads to safely accommodate bicycle and pedestrian circulation. Avoid pedestrian and vehicular conflicts where possible and route deliveries and loading docks away from building entries and gathering spaces.

F. Campus and Community – Culture and Connectivity

1. Protect historic cultural resources. Maintain the historical integrity of the Cowell Lime Works Historic District and other cultural resources through rehabilitation of structures while embracing opportunities for the area to more actively contribute to campus and community life.
2. Protect prehistoric, archaeological and tribal cultural resources. In recognition of the history of Indigenous peoples and their relationship to their traditional homeland, partner with the Amah Mutsun Tribal Band in designing land stewardship practices.
3. Cultivate public programs as community resources. Continue investments in programs serving both the campus and the Santa Cruz communities.
4. Expand employee housing near campus entries. Cluster development to share resources and infrastructure and locate with ease of access to city destinations and amenities.
5. Ensure continued collaboration and communication with the greater community. Work together to sustain economic, social and physical health for the region by identifying shared strategies that address common goals.

ISSUES NOT EVALUATED FURTHER

Result in Damage to Scenic Resources within a State Scenic Highway

There are no officially designated State highways in Santa Cruz County. The closest State-designated highway includes segments of California SR-1 located in Monterey County, which is approximately 30 miles south of the main residential campus. Given the distance to the main residential campus, views of the LRDP area are not visible from designated segments of SR-1. Therefore, potential effects of the 2021 LRDP on scenic resources within a State scenic highway are not addressed further.

IMPACTS AND MITIGATION MEASURES

Impact 3.1-1: Result in a Substantial Adverse Effect on a Scenic Vista

Implementation of the 2021 LRDP would result in the construction and operation of additional facilities within the UC Santa Cruz main residential campus and Westside Research Park that could result in alteration of scenic vantage and viewpoint locations including views towards the coast. However, regarding views both from and toward campus, new development would be designed and constructed in a manner consistent with, and generally adjacent to, existing development which has already altered some long-distance views. In addition, any campus-related development would be required to comply with the UC Santa Cruz Design Review Process, and standards set forth in the UC Santa Cruz Campus Standards Handbook, and be generally consistent with the Physical Design Framework and the Physical Planning Principles and Guidelines in the 2021 LRDP, which are established to provide aesthetically compatible facilities. Therefore, this impact would be **less than significant**.

As noted above, the UC Santa Cruz main residential campus provides views of the city, coast, and the Monterey Bay from various vantage points. From many vantage points within the main residential campus, long distance views are

expansive, especially on clear days. Views of the coast and Monterey Bay are not available from the Westside Research Park due to intervening structures, trees and landscaping present within Natural Bridges State Beach and along Delaware Avenue.

Prominent campus vantage points/scenic views within the main residential campus include the Cowell College Plaza, the Arts area of the Academic Core, University House, the knoll at Porter College, and the field at Oakes College. Sweeping views across the meadows down towards the bay are available from these points and from other points within the Great Meadow. Points along Glenn Coolidge Drive offer panoramic views of the city, bay, and Pogonip City Park. Similarly, points along Heller Drive and Empire Grade offer panoramic views of the bay. Viewpoints along Empire Grade, Glenn Coolidge Drive, and Hagar Drive provide views of the lower campus, looking north towards the central campus.

New development planned under the 2021 LRDP would occur within existing developed areas of the campus, including the academic core area, colleges and student housing areas, and employee housing areas. Many of the buildings within the academic core are within the forested portion of campus and do not offer views of the Monterey Bay. Therefore, infill development within the forested portions of the main residential campus would not be expected to compromise views of the Monterey Bay since no key vantage points currently exist within that area. Similarly, new development within the northern area of the main residential campus would not be expected to affect scenic vistas towards the Monterey Bay since views to the ocean are blocked by existing forest.

Viewpoint 1: View from City of Santa Cruz Wharf looking northwest towards the main residential campus

Viewpoint 1 represents a view of the main residential campus from the Wharf in the city looking northwest. This view is one of the seven vantage points selected for visual simulation for this EIR and is representative of how the hills within the main residential campus provide a backdrop for the city. Sensitive viewing groups in this area primarily consist of city residents or tourists. For this area of the main residential campus, development is envisioned for new recreation and athletics, as well as colleges and student housing. Types of development under these uses could include playing fields and courts, indoor recreational facilities, event spaces, health and wellness facilities, as well as residence halls, apartments, townhomes, and academic buildings. As seen from the existing viewpoint and visual simulation, campus structures are positioned within the distant background and are not clearly visible. New buildings would be clustered around existing development and would not substantially alter long-distance views towards the main residential campus from the Wharf or other areas in the vicinity. Similar to existing conditions, future development within this area is not expected to be visible from this vantage point due to the topography and landscaping within the campus. Further, the visible hillside would remain undeveloped. As a result, no substantial adverse changes are anticipated.

Viewpoint 2: View from Coastal Science Campus looking north towards the main residential campus

Viewpoint 2 provides a long-distance view of the Santa Cruz foothills to the north, as viewed from the UC Santa Cruz Coastal Science Campus on the western end of Delaware Avenue in the west side of Santa Cruz. From this vantage point, existing campus buildings are largely obscured by vegetation, distant trees and surrounding hillside; however, distant views of Rachel Carson and Porter College are visible in the background. Sensitive viewers from this viewpoint primarily include UC Santa Cruz students, faculty, staff, as well as recreationalists using the trails or community members visiting the campus (e.g., Seymour Marine Discovery Center). Envisioned development in this area includes college and student housing uses, which could consist of new academic buildings, apartments, and residence halls. As shown in the visual simulation, future development would likely not be visible from this vantage point due to topography and vegetation. Further, future development would be similar in height, character, and massing to existing surrounding uses in this area of the campus. Since visual conditions would remain similar to existing views from this vantage point, no substantial adverse changes are anticipated.

Viewpoint 3: View from High Street looking north towards main residential campus entry at Glenn Coolidge Drive

Viewpoint 3 provides a view of the main residential campus entrance from High Street looking north. Sensitive viewing groups in this area include nearby residents, tourists, as well as UC Santa Cruz students, faculty, and staff. Due to the low-rolling hills, landscaping, and proposed setbacks from existing conditions within this area of campus, development uphill to the northwest and northeast of the campus entrance is largely obstructed. Views from the

entrance are largely centered on the Cowell Lime Work Historic District, with the Barn Theater prominently visible at the intersection of Bay and High. As shown in Figure 3.1-14, development under the 2021 LRDP is proposed within the middleground of this viewpoint and would consist of employee housing, which could include townhomes and apartment-style buildings, community-building amenities, and parking areas. Proposed development per the employee housing land use designation would be generally clustered adjacent to the existing Ranch View Terrace development to the northwest, as well as the area currently being used for campus support facilities and adjacent to the Office of Emergency Services uphill to the northeast. Though new buildings would be visible from High Street, the presence of new structures would not dominate views north towards the campus (as these views are already limited due to natural topography and landscaping), and would be similar in size and height to existing developed structures. Consistent with the UC Santa Cruz Physical Design Framework, development would be integrated into the landscape and visibility would be minimized to the extent feasible by implementing development patterns and architecture that are sensitive to the natural setting. In addition, the Management Plan for the Cowell Lime Works Historic District is being refined and additional studies are likely in the near term to identify opportunities to further improve the district for use as a campus and community amenity including adaptive reuse and rehabilitation of existing structures that preserves the spatial and historic character relationships in the district. For these reasons, no substantial adverse changes are anticipated.

Viewpoint 4: View from Empire Grade looking east towards main residential campus

Viewpoint 4 provides a view of the UC Santa Cruz campus setting from the western edge of the main residential campus, along Empire Grade. From this vantage point, views are largely dominated by open meadow, which includes low-rolling hills, scattered vegetation, and a few mature trees. In the background, Oakes and Rachel Carson College can be seen. Sensitive viewing groups largely include UC Santa Cruz students, faculty, and staff, but could also include nearby residents or tourists visiting the campus, and passersby. New development within this area of campus would include student residences, apartments, and related uses, intended for non-college-affiliated housing. As shown in Figure 3.1-15, new structures would be visible in the middleground, and would be similar in massing and height to existing surrounding buildings. Though new development would be visible from Empire Grade, the envisioned student housing buildings would be clustered together and at a lower density in order to protect critical viewsheds from existing buildings, as well as views into the campus from Empire Grade. Further, new structures would be situated within the hillside, taking advantage of depressions in the topography to minimize massing and height, and would not adversely affect scenic views along Empire Grade looking east. As a result, no substantial adverse changes are anticipated.

Viewpoint 5: View from Hagar Drive looking west

Viewpoint 5 offers a view from Hagar Drive facing west toward the southern boundary of the Arts area, where the Recital Hall, Digital Art Research Center, and Academic Resource Center buildings can be seen in the distant background. This view is largely dominated by a portion of the Great Meadow as well as vegetation along Hagar Drive. Similar to Viewpoint 4, sensitive viewers primarily include UC Santa Cruz students, faculty, and staff, as well as nearby residents or tourists visiting the campus, and passersby. Future development envisioned adjacent to the Digital Art Research Center would include academic support infill development. Additional development envisioned adjacent to the Recital Hall and Academic Resource Center buildings would also include academic and support uses in a clustered development pattern. This could include new buildings clustered to preserve views from existing buildings and open spaces on campus as well as views north through the Great Meadow. Proposed development in this area would be less dense than in the academic core, which is primarily surrounded by forested conditions rather than meadows and open view corridors. As described in Chapter 2, "Project Description," new buildings would range from two to four stories in height and would be sited to minimize their visibility at the top of the adjoining meadows, tucked against the edge of the ravine and nestled into the topography. As shown in Figure 3.1-16, new development is not expected to be seen from this vantage point and would not substantially alter views from Hagar Drive. Existing vegetation in the foreground, as well as views of the Great Meadow in the middleground, would continue to be maintained and the 2021 LRDP would not result in a substantial adverse change from this viewpoint.

Viewpoint 6: View from bike path looking east towards Great Meadow

Viewpoint 6 provides a view facing east towards the Great Meadow from the bike path along Webster Way within the main residential campus. This view is dominated by rolling hills and vegetation of the northern portion of the Great

Meadow, as well as mature trees in the background and scenic views towards the ocean looking south in the distant background. Sensitive users of this area include UC Santa Cruz students, faculty, and staff that regularly occupy this area for class or to travel to and from portions of the campus, as well as recreationalists that visit the campus. Additionally, recreationalists who utilize the bike path along Webster Way through the Great Meadow also constitute sensitive viewer groups in this area. The 2021 LRDP proposes new academic and support uses in this area of campus which would be less dense than in the academic core in order to preserve views north through the Great Meadow. As previously described for Viewpoint 5, new buildings in this area would be sited to minimize their visibility at the top of the adjoining meadows. As shown in Figure 3.1-17, existing trees and vegetation can be seen between the clusters of new development that would be visible within the middleground of this viewpoint. Development would be similar in both size and height to existing surrounding development. Though new structures would be present, they would be positioned amongst the rolling hills and would not block long-distance scenic views towards the ocean from existing buildings and open spaces on the campus. As a result, no substantial adverse changes are anticipated.

Viewpoint 7: View from Cowell College looking south

Viewpoint 7 provides long-distance views facing south from Cowell College. This view includes existing developed academic structures and uses within the foreground, recreational fields within the middleground, and expansive and long-distance views towards the ocean in the background. Sensitive viewers in this area include UC Santa Cruz students, faculty, and staff, as well as recreationalists that regularly occupy this area of Cowell College and the recreation fields. The 2021 LRDP proposes new college and student housing, and recreation and athletic uses in this area of the campus. Proposed development under the 2021 LRDP would be visually consistent with the existing residential housing to the north and east of Cowell College, as well as the adjacent Athletics and Recreation facilities. Types of development associated with these uses could include new student residences, apartments, and academic buildings within the Colleges and Student Housing land use designation, as well as additional playing fields and courts, indoor recreational facilities, event spaces, and health and wellness facilities within the Recreation & Athletics. As shown in Figure 3.1-18, future development would be located south of Cowell College and would likely be shielded by existing development in this portion of campus. The scenic view from the Cowell Plaza is intended to remain unobstructed. Further, planned structures would be similar in height and massing to surrounding buildings. As currently envisioned, development within this area would not block or alter views from campus towards the ocean, and no substantial adverse changes are anticipated.

Summary

Development consistent with the proposed 2021 LRDP within the main residential campus is expected to be consistent with and complementary to existing development and is not anticipated to result in substantial changes in long-distance and scenic views from within or across the main residential campus. As further shown in Section 2, "Project Description, Figure 2-4, as well as Figures 3.1-12 through 3.1-18, above (simulations of development consistent with the 2021 LRDP), new development would be clustered nearby or adjacent to existing buildings and structures such that short- and long- distance views, both from and towards campus would not be adversely impaired. Further, any campus-related development would be required to comply with the UC Santa Cruz Design Review Process, standards set forth in the Campus Standards Handbook, and be consistent with the Physical Design Framework.

With respect to potential development at Westside Research Park, the development of mixed-use land use (i.e., potential additional employee housing, public services, etc.) at this location would generally be low-rise (up to 4 stories) structures adjacent to the existing academic/administrative space located on site. As noted above, adjacent development includes a mix of light industrial, commercial, and residential uses, but all structures located in the area are of similar massing and scale, including the multi-family residential structures located to the northwest adjacent to Antonelli Pond. Therefore, views from the adjacent Antonelli Pond are not anticipated to change significantly.

Because future 2021 LRDP development would be sited within and/or adjacent to existing developed areas, would comply with design and building standards that require consistency with surrounding uses, and would not further obstruct any existing long-distance views towards the coast and Monterey Bay, adverse effects on a scenic vista are not anticipated. As a result, impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.1-2: Result in Adverse Effects on the Aesthetic Quality of the Cowell Lime Works Historic District

Implementation of the 2021 LRDP would result in temporary and permanent visual changes associated with new development that could affect the Cowell Lime Works Historic District on the UC Santa Cruz main residential campus. Development under the 2021 LRDP could degrade the aesthetic quality of the Cowell Lime Works Historic District, which is considered a scenic resource. This would be a **potentially significant** impact.

The 2021 LRDP acknowledges the cultural and aesthetic importance of the Cowell Lime Works Historic District (Historic District), which includes the historic structures located in the campus main entrance area. The 2021 LRDP proposes development to the east and west of the historic district (See Section 2, "Project Description, Figure 2-4). and some limited development could occur within the historic district, in addition to rehabilitation of historic buildings, for academic & support facilities, community-facing programs, and visitor resources. Also, some development would occur adjacent to the historic district in proximity to buildings that contribute to the historic district. As discussed in Section 3.4, "Archaeological, Historical and Tribal Cultural Resources," the Cowell Lime Works Historic District was determined to be eligible for listing in the National Register of Historic Places and in the California Register of Historic Resources.

Damage to or destruction of a building or structure that is a designated historic resource, eligible for listing as a historic resource, or a potential historic resource that has not yet been evaluated, could result in the change in its historical significance and alter the aesthetic quality of the resource. Future development proposed proximate to the Cowell Lime Works Historic District would be required to comply with the UC Santa Cruz Design Review Process and the standards set forth in the Campus Standards Handbook. New development would also be required to be generally consistent with the Physical Design Framework's guidelines for consideration of and consistency with adjacent development. However, the 2021 LRDP does not include specific sites for development, nor building designs and definitive footprints for the envisioned development, potential modifications and adverse changes to historic resources cannot be precluded at this time. Therefore, the impact to the aesthetic quality of the historical resource would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.4-4a: Protect Cowell Lime Works Historic District

(Refer to Section 3.4, "Archaeological, Historical, and Tribal Cultural Resources")

Significance after Mitigation

The Cowell Lime Works Historic District Management Plan is being refined to identify opportunities to further improve the district for use as a campus and community amenity including adaptive reuse and rehabilitation of existing structures that preserves the spatial and historic character relationships in the historic district. Implementation of Mitigation Measures 3.4-4a in Section 3.4, "Archaeological, Historical, and Tribal Cultural Resources," would require UC Santa Cruz to implement specific design considerations and conduct any development within or proximate to the Cowell Lime Work Historic District in a manner compatible with the historic aspect of the historic district until such time as the Cowell Lime Works Historic District Management Plan is adopted. Future projects located within the Cowell Lime Works Historic District would be evaluated for consistency with the visual design guidelines included in the Cowell Lime Works Historic District Management Plan. In addition, future development proposed proximate to the historic district would be required to comply with the UC Santa Cruz Design Review Process to ensure that design is complementary to and does not interfere with the historic aspect of the historic District and its buildings with respect to scale, massing, architectural style, and materials, such that the rural historic visual character of the district is maintained. As a result, implementation of the 2021 LRDP would not result in damage or substantial adverse changes in the visual quality of the historic district, and impacts would be **less than significant**.

Impact 3.1-3: Degrade Existing Visual Character or Quality

Implementation of the 2021 LRDP would result in temporary and permanent visual changes throughout the UC Santa Cruz main residential campus and Westside Research Park, especially in areas valued for their visual character or quality including publicly accessible vantage points along Empire Grade west of the Santa Cruz city limits. While new buildings and other development resulting from 2021 LRDP implementation would be required to comply with standards set forth in the UC Santa Cruz Campus Standards Handbook and be generally consistent with the Physical Design Framework and the Physical Planning Principles and Guidelines in the 2021 LRDP to ensure consistency with the existing character and quality of the campus and surrounding areas, visual changes resulting from construction and new development could degrade the existing visual character and quality within the campus, especially in areas valued for their visual character or quality, including publicly accessible vantage points along Empire Grade west of the Santa Cruz city limits This impact would be **potentially significant**.

The 2021 LRDP focuses land use changes primarily within the main residential campus of UC Santa Cruz, with some limited new development at the Westside Research Park. While the land use changes would modify the existing visual character and quality within the main residential campus and at the Westside Research Park, land use changes would generally be visually consistent with existing development under the 2021 LRDP. However, development is also planned for more remote areas of the campus, including areas proximate to Empire Grade to the west of the Santa Cruz city limits. Policy 5.10.10: Designation of Scenic Roads in the *County of Santa Cruz General Plan* designates Empire Grade as a scenic road from the Santa Cruz city limits, which is located southwest of the boundary of the Arboretum and Botanic Garden on the main campus, to the end of Empire Grade.

For example, potential future development of student housing may occur along Heller Drive, proximate to Empire Grade and employee housing may be developed to the west of Empire Grade. The area in the northern portion of campus is valued for its scenic quality because the visual landscape and attractiveness of redwood trees and forest within the foreground along Empire Grade. Therefore, it is possible that the introduction of new buildings and structures could damage the scenic value of the redwood forested area.

As described above in Section 3.1.1, the UC Santa Cruz Design Advisory Board reviews development proposals to ensure compatibility with the approved 2021 LRDP, review all aspects of exterior urban and landscape design, and provide guidance to the design teams, building committees, and the campus planning committee. The UC Santa Cruz Campus Standards Handbook identifies design and aesthetics standards specific to exterior lighting, landscape design and planting, and lawn areas. The UC Santa Cruz Physical Design Framework identifies design guidelines for specific areas of the main residential campus including meadow areas, forest and forest edge areas, areas in and near the Cowell Lime Works Historic District, and road and paths. In addition, the Physical Design Framework also includes general building and siting design, and guidelines related to topography, geology, and hydrology. The 2021 LRDP continues the procedures (i.e., use of the UC Santa Cruz Campus Standards Handbook and consultation with the Design Advisory Board) employed by UC Santa Cruz for the protection and long-term conservation of important visual quality within the campus. Specifically, consistent with the 1963 LRDP, the 2021 LRDP includes Physical Planning Principles, which articulate a pattern of development that will contribute to student success and promote the academic mission while respecting the unique history and environment of the site. (Refer to the list of Physical Planning Principles above in the "Analysis and Methodology" section and in Chapter 4.2, "LRDP Physical Planning Principles and Guidelines" of the 2021 LRDP). Further, the 2021 LRDP also provides standards and guidelines for specific areas that are envisioned for development under the 2021 LRDP including the Academic Core – South, Academic Core – North, Steinhart Way Infill Opportunities, Athletics and Recreation Area, Cowell and Stevenson Housing Densification. Additionally, as discussed in Impact 3.1-1, proposed land use changes would continue to maintain existing visual conditions in areas where UC Santa Cruz interfaces with surrounding uses within the city and county because new development would remain visually consistent with existing uses.

As described in Chapter 2, "Project Description," future buildings for academic and support under the 2021 LRDP would generally be similar to those already existing in the academic core, ranging in height between four and six stories. In the southern extent of the academic core, buildings would range from two to four stories in height and would be sited to minimize their visibility at the top of the adjoining meadows. To the north within forested areas,

buildings may be as tall as six or more floors, as dictated by their programs. Further, all future buildings, as part of the UC Santa Cruz Design Review Process, Campus Standards Handbook requirements, and Physical Design Framework guidelines, would include landscaping and other features consistent with existing environmental and site conditions, which would soften the visual interface between new development under the 2021 LRDP and existing campus structures and surrounding landscape. Additionally, land use changes identified in the 2021 LRDP largely focus future development within existing developed areas of the main residential campus. Land use changes proposed at the Westside Research Park would also occur within a developed area of the city and would be consistent with surrounding uses, which include commercial, industrial, community, and multi-family residential uses. While new development in these areas may change the visual quality, required compliance with UC Santa Cruz design standards (i.e., Physical Design Framework and Campus Standards Handbook) would provide for a continued congruous visual condition, consistent with existing development. Potential adverse effects, including those associated with development at Westside Research Park, would be avoided through continued implementation of the existing UC Santa Cruz Design Review Process in addition to compliance with the Campus Standards Handbook requirements and consistency with the Physical Design Framework guidelines.

Compliance with the UC Santa Cruz Physical Design Framework and the Campus Standards Handbook, which establish requirements intended to maintain important aesthetic features and compatibility with existing visual conditions, may include the installation of landscaping (both in terms of bulk and color) and exterior features consistent with adjacent development (e.g., exterior lighting and finishes). Overall, the 2021 LRDP would require future new/renovated land uses to consider and incorporate design elements of the existing visual character of the particular area of the campus in which that development would occur, such that the visual quality and character would not be substantially degraded. However, development activities within areas of campus that are highly regarded for their scenic and visual qualities could degrade or damage the character or quality of surrounding uses and landscapes. The northeast portion of the main residential campus contains redwood forests that are valued for their scenic nature. Additionally, the existing redwood trees in this area provides a visual continuity of forested area and a natural screening feature for future development. New development that extends beyond the height of existing redwood trees or otherwise alters the scenic nature within the forested area, including publicly accessible vantage points along Empire Grade north of the city limits, could damage or degrade the visual character and quality of the area. As a result, this impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.1-3a: Require Setback Distance from Empire Grade

UC Santa Cruz shall require that development located north of the Arboretum and Botanic Garden entrance under the 2021 LRDP, which could be seen from Empire Grade, include a minimum setback of 200 feet from Empire Grade. If establishment of a 200-foot buffer is not feasible, a vegetated barrier or screen that prevents a direct line of site between a resource and developed structures shall be provided. Vegetation shall be native to California and selected to match existing vegetation located nearby.

Mitigation Measure 3.1-3b: Implement Design Measures for Protection of Views Along Empire Grade

Development within 500 feet of Empire Grade and west of the Santa Cruz city limits and the Arboretum and Botanic Garden within the UC Santa Cruz main residential campus shall be subject to review by the Campus Design Advisory Board to ensure that design of new facilities shall be visually unobtrusive and not unduly interfere with existing views. Review of future development by the Campus Design Advisory Board shall occur upon initial selection of sites. Design shall comply with standards set forth in the UC Santa Cruz Campus Standards Handbook and be generally consistent with the Physical Design Framework and Physical Planning Principals and Guidelines in the 2021 LRDP.

Mitigation Measure 3.1-3c: Implement Design Measures for Protection of View within Scenic Areas

For any development within primary campus viewsheds identified as scenic areas, UC Santa Cruz shall require that siting, development patterns, and architecture is consistent with the 2021 LRDP Physical Planning Principles and Guidelines, including those related to building height and massing, in order to ensure that the visual character and

quality of scenic areas are not substantially degraded. Primary campus viewsheds include primary views of the main residential campus including the Great Meadow, East Meadow, and three smaller meadows (Porter, Crown, and Kerr), as well as prominent scenic views from Cowell College Plaza, the Arts area in the Academic Core, University House, the knoll at Porter College, and the field at Oakes College. Review of future developments by the Campus Design Advisory Board shall occur upon initial selection of sites. Design shall also comply with standards set forth in the UC Santa Cruz Campus Standards Handbook and be generally consistent with the Physical Design Framework.

Significance after Mitigation

Implementation of Mitigation Measures 3.1-3a, 3.1-3b, and 3.1-3c would reduce impacts to **less than significant** by requiring building limitations and development requirements as well as distancing and screening requirements, that would provide for development that is consistent with and complementary of the landscaped and existing built conditions, thereby minimizing adverse effects on existing visual character of the LRDP area. Additionally, implementation of these mitigation measures would ensure cohesive development and consistency with the natural landscapes present within these areas of campus. In addition, future projects would be required to undergo review by the Campus Design Advisory Board and incorporate design recommendations as part of the development project.

Impact 3.1-4: Create a New Source of Light or Glare

Implementation of the 2021 LRDP would introduce new sources of light and glare associated with new buildings and facilities. Such lighting could contribute to indirect lighting and/or glare on adjacent land uses that could adversely affect daytime or nighttime views and result in additional sky glow. This impact is considered **potentially significant**.

As previously described, exterior lighting within the main residential campus includes building, street, parking lot, and pathway lighting. The main residential campus also includes outdoor athletic field lighting within the Recreation & Athletics land use areas. Lighting present at the Westside Research Park consists of building, parking lot, and neighboring roadway lighting. Further, during fog conditions, nighttime lighting within the main residential campus has contributed to sky glow. Land use changes under the 2021 LRDP would create new sources of light that would include the following: exterior building lighting, lighted recreational facilities, pedestrian/bicycle pathways, parking lot lights, and headlights of vehicular traffic. These sources of light could create spillover light impacts on nearby sensitive receptors, especially in existing residential areas of the main residential campus as well as commercial and residential uses surrounding the Westside Research Park. With regard to lighted recreational facilities, development under the 2021 LRDP may include additional/improved recreational opportunities, including potential sport facilities that could require nighttime lighting. Illumination of these facilities (e.g., athletic fields, tennis courts, etc.) would include light fixtures that would be located along the periphery of the facilities. While these fixtures would be similar in character to existing recreation field light fixtures at existing recreational fields and areas within the main residential campus, new fixtures, if not properly directed and shielded, could result in sky glow and light spillover onto adjacent uses, including housing both on and off campus.

While new land uses would be subject to the UC Santa Cruz Campus Standard Handbook building and site specification requirements, as well as the guidelines presented in the Physical Design Framework, the types of building materials that may be used could result in additional glare. Therefore, it is possible, as specific architectural features and building materials have yet to be determined, that light and/or glare from new on-campus development could disrupt sensitive receptors (i.e., students and faculty), intrude on sensitive uses and facilities, and potentially contribute to sky glow within the area. As a result, this impact is considered **potentially significant**.

Mitigation Measures

Mitigation Measure 3.1-4: Minimize Light and Glare Resulting from New Development

UC Santa Cruz shall incorporate site-specific consideration of the orientation of the building, use of landscaping materials, and choice of primary façade materials to minimize potential off-site spillover of lighting and glare from new development. As part of this measure and prior to project approval, UC Santa Cruz shall require the incorporation of site- and project-specific design considerations to minimize light and glare including, but not limited to, the following:

- The use of non-reflective exterior surfaces and non-reflective (mirrored) glass.
- Safety lighting along proposed pedestrian/bicycle pathways shall be limited to non-glare, downlit, low-bollard style lights that focus illumination to the pathway surface, consistent with the exterior lighting standards identified in the UC Santa Cruz Campus Standards Handbook.
- All new outdoor lighting shall utilize directional lighting methods with shielded and cutoff type light fixtures to minimize glare and upward directed lighting such that light spillover onto adjacent structures does not occur. Verification of inclusion in project design shall be provided at the time of design review.

Consistent with the Illuminating Engineering Society of North America (IESNA) Lighting Handbook, installation of new lighting sources shall comply with the recommended "light trespass" standards for light spillover specific to the lighting environment in the project area (e.g., dark, low brightness, medium district brightness, and high district brightness) identified in the Illuminating Engineering Society of North America (IESNA) Lighting Handbook.

Significance after Mitigation

Implementation of Mitigation Measure 3-1.4 would ensure the use of non-reflective surfaces and direction lighting with shielded and cutoff type light fixtures such that light spillover onto adjacent uses and sky glow, which is typically associated with upward directed lighting, as a result of development under the 2021 LRDP would not substantially increase beyond existing conditions and impacts would be reduced to a **less-than-significant** level.

3.2 AGRICULTURE AND FORESTRY RESOURCES

This section describes existing agriculture and forestry resources within the LRDP area, including identification of Important Farmland, timberland, and forest land. The analysis includes a description of the existing environmental conditions including applicable regulatory requirements, the methods used for resource and impact assessment, and the potential direct and indirect impacts of the 2021 LRDP's implementation on agriculture and forestry resources.

Comments received on the NOP (see Appendix B) related to agriculture and forestry resources included concerns related to tree removal, the need for a Timberland Conversion Permit (TCP) or Timber Harvest Plan (THP) prior to cutting trees, protection of grazing lands, potential loss of land designated as agricultural by the County's Local Coastal Program (LCP), and protection of the Center for Agroecology and Sustainable Food Systems (CASFS) farm and the Arboretum & Botanic Garden. All comments related to agriculture and forestry resources are addressed, where appropriate, in this section.

3.2.1 Regulatory Setting

FEDERAL

There are no federal regulations related to agriculture and forest resources that apply to the LRDP.

STATE

California Department of Conservation Farmland Mapping and Monitoring Program

Important Farmland in California is classified and mapped according to the California Department of Conservation's (DOC) Farmland Mapping and Monitoring Program (FMMP). Authority for the FMMP comes from Government Code Section 65570(b) and Public Resources Code (PRC) Section 612. Government Code Section 65570(b) requires the Department of Conservation to collect or acquire information on the amount of land converted to or from agricultural use for every mapped county and to report this information to the Legislature. PRC Section 612 requires DOC to prepare, update, and maintain Important Farmland Series Maps and other soils and land capability information.

The California Land Conservation Act of 1965

The California Land Conservation Act of 1965, or Williamson Act, preserves agricultural and open space lands through property tax incentives and voluntary restrictive use contracts. Private landowners voluntarily restrict their land to agricultural and compatible open-space uses under minimum 10-year rolling term contracts. In return, restricted parcels are assessed for property tax purposes at a rate consistent with their actual use, rather than potential market value. As UC is a tax-exempt entity, land owned by UC is not eligible for registration pursuant to the Williamson Act.

California Public Resources Code

Agricultural and forestry land within California are defined by the PRC as follows:

- Section 21060.1(a) defines "agricultural land" as prime farmland, farmland of statewide importance, or unique farmland, as defined by the United States Department of Agriculture land inventory and monitoring criteria, as modified for California.
- Section 21060.1(b) states the following: In those areas of the state where lands have not been surveyed for the classifications specified in subdivision (a), "agricultural land" means land that meets the requirements of "prime agricultural land" as defined in paragraph (1), (2), (3), or (4) of subdivision (c) of Section 51201 of the Government Code.

- Section 21095 amended the California Environmental Quality Act to provide lead agencies with an optional methodology, the Land Evaluation and Site Assessment (LESA) model, to ensure that significant effects on the environment of agricultural land conversions are quantitatively and consistently considered in the environmental review process. The LESA Model evaluates measures of soil resource quality, a given project's size, water resource availability, surrounding agricultural lands, and surrounding protected resource lands. For a given project, the factors are rated, weighted, and combined, resulting in a single numeric score. The project score becomes the basis for making a determination of a project's potential significance.
- Section 12220(g) defines "forest land" as land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.
- Section 4526 defines "timberland" as land, other than land owned by the federal government and land designated by the State Board of Forestry and Fire Protection as experimental forest 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, including Christmas trees. Commercial species shall be determined by the board on a district basis.

California Department of Forestry and Fire Protection

The California Department of Forestry and Fire Protection (CAL FIRE) enforces the laws that regulate logging on non-federal lands in California. CAL FIRE also provides periodic assessments of forest resources within California as part of the Fire and Resource Assessment Program. The *California's Forests and Rangelands: 2017 Assessment* presents an assessment of the trends, conditions, and degree to which forest and rangeland conversion has occurred. CAL FIRE also maintains the Forest Legacy Program, which is intended to identify and protect environmentally important forestlands that are threatened by conversion of land to non-forest uses by either purchase or through deed restrictions, such as conservation easements.

On October 30, 2015, Governor Brown issued an emergency proclamation and established the California Tree Mortality Task Force (now a working group under the Forest Management Task Force). On September 1, 2017, Governor Brown issued Executive Order B-42-17 to bolster the State's response to unprecedented tree die-off. One goal of the Task Force was to identify and map areas of tree mortality that pose the greatest potential of harm to people and property. These areas, known as High Hazard Zones, are the areas prioritized for tree removal. The Task Force aims to increase the rate of forest treatments and expand state wood product markets through innovation, assistance, and investment. Advancing forest health project capacity, readiness, and completion statewide aligns with the California Forest Carbon Plan, the goal of which is to establish healthy and resilient forests that can withstand and adapt to wildfire, drought, and a changing climate.

Z'Berg-Nejedly Forest Practice Act of 1973

The Z'Berg-Nejedly Forest Practice Act of 1973 (FPA) (PRC Sections 4511-4630.2) established the State Board of Forestry and Fire Protection, whose mandate is to protect and enhance the State's unique forest and wildland resources. This mandate is carried out through enforcement of the California Forest Practice Rules (California Code of Regulations [CCR]), Title 14, Chapters 4, 4.5, and 10). CAL FIRE enforces the laws that regulate logging on non-federal lands in California. Additional rules enacted by the State Board of Forestry and Fire Protection are also enforced to protect forest and wildland resources. The FPA is intended to achieve "maximum sustained production of high-quality timber products… while giving consideration to values relating to recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment and aesthetic enjoyment" (PRC Section 4513[b]). The regulations created by the FPA define factors such as the size and location of harvest areas, include measures to prevent unreasonable damage to residual trees, and address the protection of riparian areas, water courses and lakes, wildlife, and habitat areas.

Z'Berg-Warren-Keene-Collier Forest Taxation Reform Act of 1976

Pursuant to the Z'berg-Warren-Keene-Collier Forest Taxation Reform Act of 1976, counties were required to provide for the zoning of land used for growing and harvesting timber as Timberland Production Zones (TPZs) (see California Government Code Section 51110(b)). A TPZ is a 10-year restriction on the use of land, and replaced the use of

agricultural preserves (Williamson Act contracts) on timberland. Land use under a TPZ is restricted to growing and harvesting timber, and to compatible uses approved by the County. In return, taxation of timberland under a TPZ is based only on such restrictions in use.

California Timberland Productivity Act of 1982

The California Timberland Productivity Act of 1982 (California Government Code Sections 51100-51155) identifies the benefits of the State's timberlands and acknowledges the threat of timberland loss via land use conversions. The law identifies policies intended to preserve timberland, including maintaining an optimum amount of timberland, discouraging premature conversion, discouraging expansion of urban land uses into timberlands, and encouraging investments in timberland. The law establishes TPZs on all qualifying timberland, which is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses. The law also provides that timber operations conducted in a manner consistent with forest practice rules under the FPA shall not be or become restricted or prohibited because of any land use in or around the locality of those operations.

California Forest Practice Rules

The California Forest Practice Rules of 2012 define the timber harvest activities that are regulated under CCR Title 14, Chapters 4, 4.5, and 10, and under the FPA (PRC Sections 4511-4630.2). CAL FIRE is the enforcing agency responsible for ensuring that logging and other forest harvesting activities are conducted in a manner that preserves and protects fish, wildlife, forests, and streams.

Before harvesting of commercial trees may occur, landowners must prepare a THP, which outlines the timber proposed for harvesting, the methods of harvesting, and the steps that will be taken to prevent damage to the environment. THPs are required to be prepared by Registered Professional Foresters. In addition, when a timberland owner proposes to carry out a project that would result in timberland being converted to a non-timber growing use, the owner must secure a TCP from CAL FIRE. The TCP formally recognizes and records the fact that timberland will be converted to another land use. Projects that would result in the conversion of less than three acres of timberland may qualify for an exemption from the requirement for a TCP.

UNIVERSITY OF CALIFORNIA

There are no UC regulations specifically related to agriculture, timberland, or forest resources that apply to the 2021 LRDP.

LOCAL

As noted in Section 3.0.1, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the university's educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

County of Santa Cruz General Plan

The County of Santa Cruz General Plan contains the following objectives and policies related to agriculture and forestry resources in the County and that may be relevant to the 2021 LRDP:

Objective 5.13 Commercial Agricultural Land. To maintain for exclusive agricultural use those lands identified on the County Agricultural Resources Map as best suited to the commercial production of food, fiber and ornamental crops and livestock and to prevent conversion of commercial agricultural land to non-agricultural uses. To recognize that agriculture is a priority land use and to resolve policy conflicts in favor of preserving and promoting agriculture on designated commercial agricultural lands.

- Policy 5.13.22. Conversion to Non-Agricultural Uses Near Urban Areas: Prohibit the conversion of agricultural lands (changing the land use designation from Agriculture to non-agriculture uses) around the periphery of urban areas except where it can be demonstrated that the viability of existing agricultural use is already severely

limited by conflicts with the urban uses, where the conversion of land would complete a logical and viable neighborhood and contribute to the establishment of a stable limit to urban development and where the conversion of such land would not impair the viability of other agricultural lands in the area. Within the Sphere of Influence of the City of Watsonville, no conversion of agricultural land is allowed which would adversely affect the city's General Plan affordable housing goals, unless determined to be of an overriding public benefit.

Objective 5.12 Timber Production. To encourage the orderly economic production of forest products on a sustained yield basis under high environmental standards, to protect the scenic and ecological values of forested areas, and to allow orderly timber production consistent with the least possible environmental impacts.

- Policy 5.12.1. Designation of Timberlands: Designate on the General Plan and Local Coastal Plan Resources Maps those timberlands which are devoted to and used for growing and harvesting timber and which are capable of producing an average annual volume of wood fiber of at least 15 cubic feet per acre.

City of Santa Cruz General Plan

The City of Santa Cruz General Plan contains the following policies related to agricultural resources within the city and that may be relevant to the 2021 LRDP:

- Policy LU1.2: Ensure that growth and development does not lead to the overdraft of any water source, the creation of unacceptable levels of air pollution, or the loss of prime agricultural land.
- Policy LU2.3.5: Support County policies and programs aimed at preserving agricultural and grazing uses within the Planning Area and on the North Coast.

3.2.2 Environmental Setting

FARMLAND CLASSIFICATION

The State of California maps and classifies farmland through the DOC FMMP. Classifications are based on a combination of physical and chemical characteristics of the soil and climate that determine the degree of suitability of the land for crop production. The classifications under the FMMP are as follows:

- Prime Farmland—land that has the best combination of features for the production of agricultural crops;
- Farmland of Statewide Importance—land other than Prime Farmland that has a good combination of physical and chemical features for the production of agricultural crops, but that has more limitations than Prime Farmland, such as greater slopes or less ability to store soil moisture;
- Unique Farmland—land of lesser quality soils used for the production of the State's leading agricultural cash crops;
- Farmland of Local Importance—land of importance to the local agricultural economy;
- Grazing Land—existing vegetation that is suitable for grazing;
- Urban and Built-Up Land—land occupied by structures in density of at least one dwelling unit per 1.5 acres;
- Land Committed to Nonagricultural Use—vacant areas, existing land that has a permanent commitment to development but has an existing land use of agricultural or grazing lands; and
- Other Land—land not included in any other mapping category, common examples of which include low-density rural developments, brush, timber, wetland, and vacant and nonagricultural land surrounded on all sides by urban development.

PRC Section 21060.1 and State CEQA Guidelines Appendix G, together, define "Important Farmland" as those lands classified by the DOC FMMP as Prime, Unique, or Farmland of Statewide Importance, and exclude grazing land. Local jurisdictions can further consider other classifications of farmland as important, and can also utilize an agricultural land evaluation and site assessment (LESA) model to determine farmland importance and impacts from conversion.

The Santa Cruz County (County) General Plan designates Commercial Agricultural (CA) land based on the criteria set forth in the General Plan and the LCP Land Use Plan. The lands designated as CA in the LRDP project area include Viable Agricultural Land within the Coastal Zone (AG-3) and Limited Agricultural Lands Experiencing Use Conflicts (AG-2D), as shown on Figure 3.2-1.

EXISTING AGRICULTURE

Agriculture plays an important role in the county, and represents a major economic sector. Regarding agricultural production in the county, as of 2018, the total gross production value of agricultural commodities was approximately $683 million (Santa Cruz County Agricultural Commissioner 2018). The top revenue crops produced in the county include berries, vegetables, nursery stock, and cut flowers and cut greens. The county has approximately 13,437 acres of Prime Farmland, 2,335 acres of Farmland of Statewide Importance, and 3,521 acres of Unique Farmland (DOC 2016). The majority of the Important Farmland is located in the southeast portion of the county, in the Pajaro River Valley around Watsonville.

Main Residential Campus

As illustrated on Figure 3.2-1, of the approximately 2,040-acre on the main residential campus, approximately 20 acres are designated Important Farmland, including approximately 7 acres designated as Prime Farmland and approximately 13 acres designated as Unique Farmland. This Important Farmland aligns with the CASFS farm, located on approximately 30 acres on the lower campus, which is used for research, training, and teaching organic production methods. Approximately 556 acres of the main residential campus is designated as Grazing Land. The majority of this Grazing Land, approximately 450 acres, is located on the meadows and grasslands of the lower campus, including approximately 196 acres that are leased to a rancher for seasonal cattle grazing. The remainder of the designated Grazing Land (approximately 80 acres) is located in the far northwestern corner of the north campus in the Marshall Field area and approximately 26 acres within the central campus. Grazing provides vegetation management and fire hazard reduction benefits to the campus as well as habitat enhancement for native flora and fauna (including the federally endangered Ohlone tiger beetle). The remainder of the main residential campus includes approximately 1,011 acres designated Other Land, the designation used mainly for forested areas, the majority of which are in the north campus area (approximately 803 acres), but Other Land also aligns with the Arboretum & Botanic Garden in the lower campus. Finally, there are approximately 453 acres designated Urban and Built-Up Land (DOC 2016), which align with developed areas throughout the main residential campus (Figure 3.2-1).

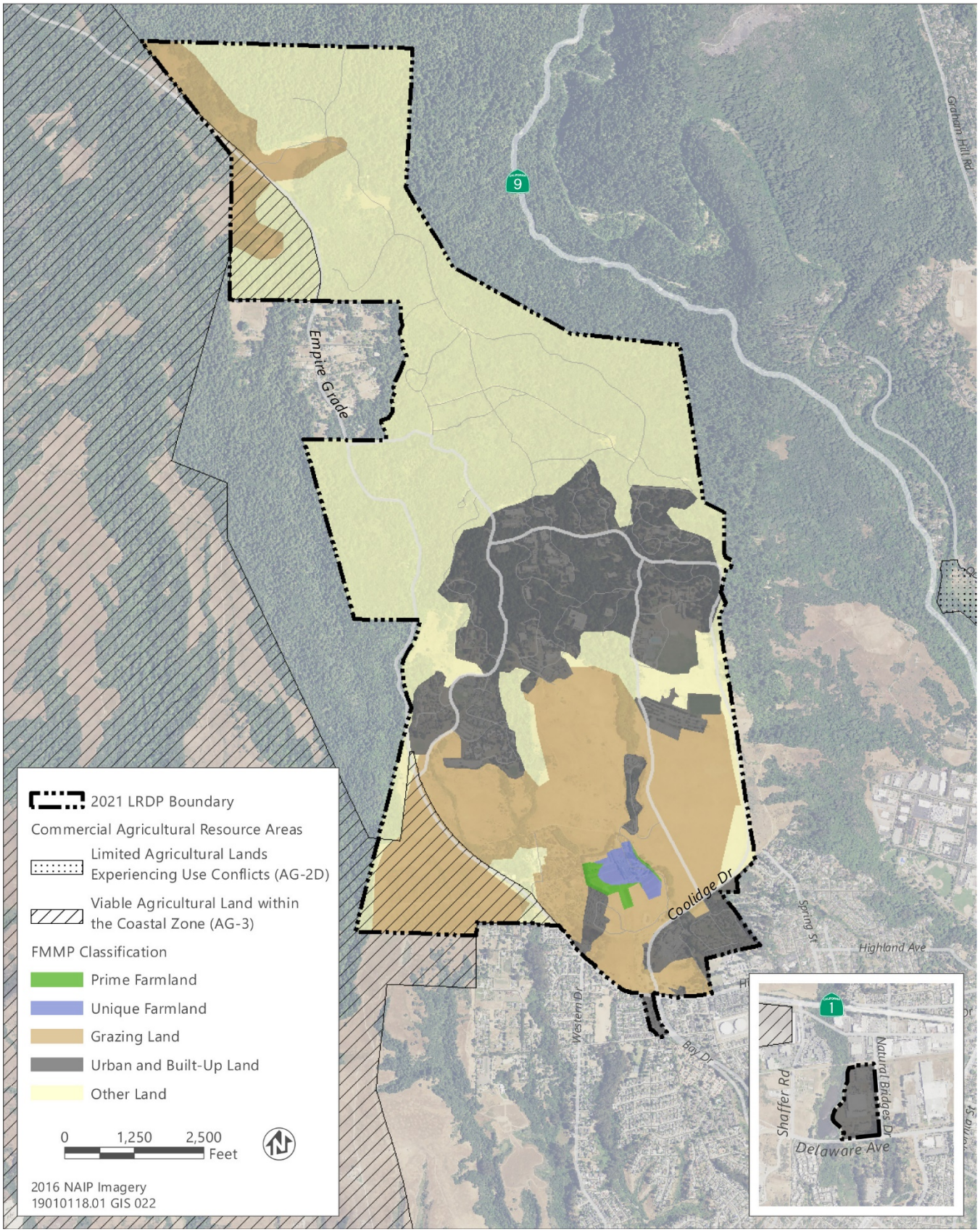
Westside Research Park

There is no Important Farmland or agricultural land on the Westside Research Park site, which is developed and as designated Urban and Built-Up Land (DOC 2016) (Figure 3.2-1).

Surrounding Lands

The County has designated lands within and adjacent to the northwestern and southwestern boundaries of the main residential campus, as well as in neighboring Wilder Ranch State Park, as Viable Agricultural Land within the Coastal Zone (AG-3) (Figure 3.2-1). This designation includes Commercial Agricultural Land in the county and all land restricted with a Williamson Act contract for Agricultural Preserve (Santa Cruz County 2020).

There are no designated agricultural lands within City of Santa Cruz limits or the City's existing Sphere of Influence. However, consistent with the County designation, the City's General Plan 2030 designates grazing land on the western edge of the city just south of the southwestern boundary of the UC Santa Cruz main residential campus as Agriculture/Grazing (AG). The City's AG designation is applied to areas used predominantly for large-scale agriculture or grazing, not community gardens or small-scale agricultural uses (City of Santa Cruz 2011, pgs. 39 and 43). Most of the City lands bordering this AG designation are within the City's protected greenbelt (Moore Creek Preserve), located north of the Westside Research Park.



Source: data downloaded from California Department of Conservation in 2019 for the year 2016 and Santa Cruz County in 2020 for the year 2019

Figure 3.2-1 Farmland

EXISTING FORESTRY RESOURCES

Forestry resources include forest land, timberland, and timberland production zones. Forest lands and timberland occupy a substantial portion of Santa Cruz County with large areas of timber production in the Santa Cruz Mountains. The Timber Production (TP) zoning district extends across approximately 71,000 acres of the county, primarily in the North Coast and Mountain Regions. The intent of the TP zoning district is to protect and maintain the county's larger tracks of timberland, and to preserve agriculture and other open space uses where they are compatible with timberland uses. Separate from the TP zoning district are areas identified by the County as "Timber Resources," which account for approximately 90,650 acres where timber may be grown and harvested if there are sufficient timber resources to meet minimum stocking standards (Santa Cruz County 2017). The total production value of timber resources for the county in 2018 was approximately $10.2 million, an approximately 30 percent increase from 2017 (Santa Cruz County 2018).

Main Residential Campus

As illustrated in Figure 3.2-2, there are approximately 1,000 acres of forest lands on the main residential campus, including redwood forest, mixed evergreen forest, riparian woodland, coastal mixed hardwood, and coast live oak. Based on mapping provided by the Bay Area Open Space Council (2019), the majority of forest lands are located within the north campus area, totaling approximately 750 acres. There are approximately 185 acres of forest lands on the central campus and approximately 50 acres within the lower campus. In addition, the County has designated approximately 12 acres at the western boundary of the lower campus as timberland (Figure 3.2-2), and this area is associated with the timberland production zone to the west and northwest in Wilder Ranch State Park (Bay Area Open Space Council 2019 and Santa Cruz County 2020). The existing forest lands within the main residential campus are located either within existing open space natural reserve areas or retained as landscaping in and around structures.

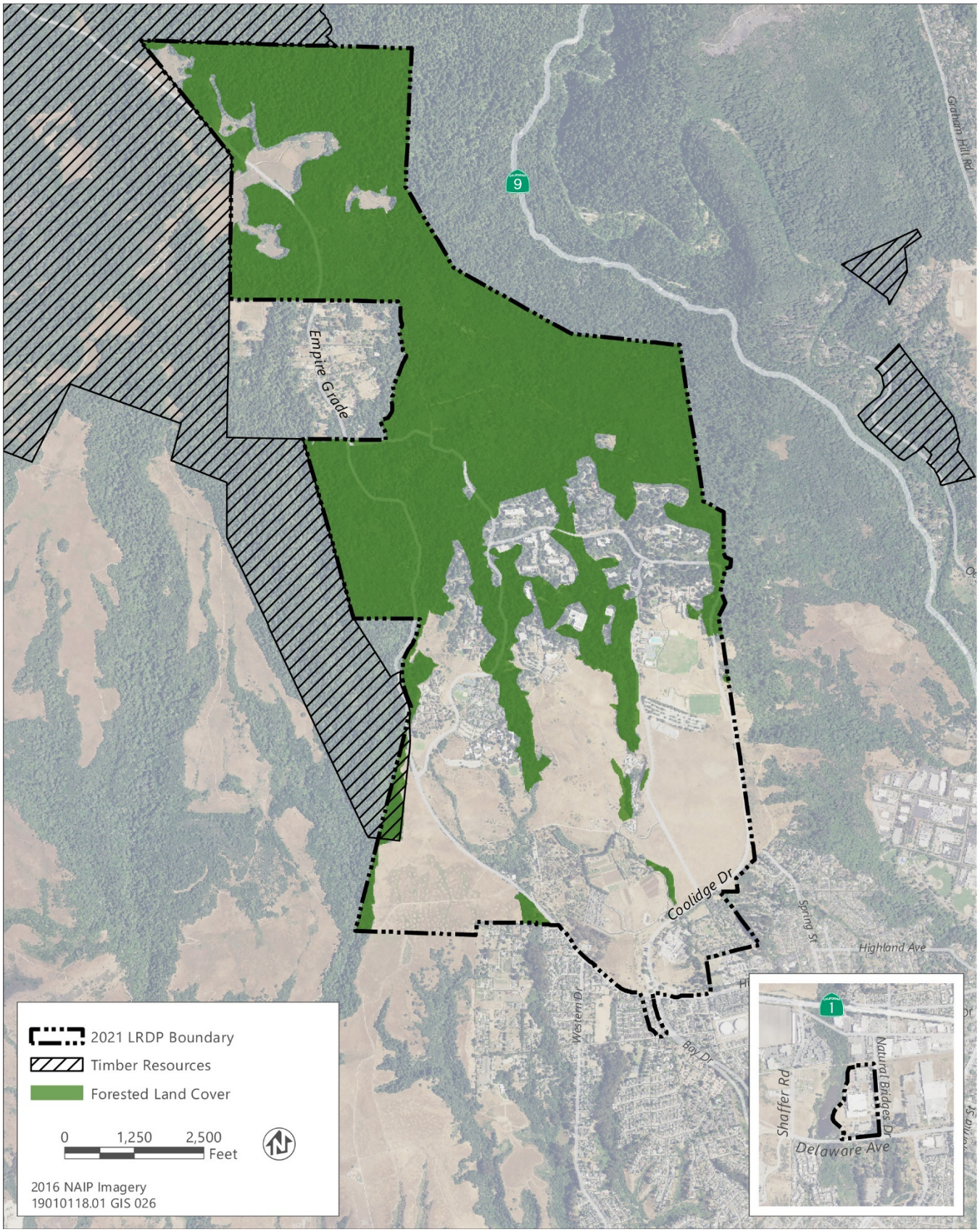
Westside Research Park

As shown in Figure 3.2-2, there is no forest land or timberland on the Westside Research Park site, which is designated Urban and Built-Up Land (DOC 2016).

Surrounding Lands

There are forest lands adjoining the main residential campus to the north, east, and west within the surrounding designated parks, open spaces, and recreational areas. These areas are designated by the FMMP as Other Land. In addition, there is County-designated timberland within Wilder Ranch State Park, directly west of the main residential campus.

The City of Santa Cruz is primarily developed, with open spaces within parks and City-owned greenbelt lands. There are no areas of protected timberland land within the City or its existing Sphere of Influence, and there are no protected timberlands within the City's General Plan 2030 planning area (City of Santa Cruz 2011).



Source: data downloaded from Bay Area Open Space Council in 2019 and Santa Cruz County in 2020; adapted by Ascent in 2020

Figure 3.2-2 Forest Resources

3.2.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, the 2021 LRDP would result in a potentially significant impact on agriculture and forest resources if it would:

- convert significant Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland)as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;
- conflict with existing zoning for agricultural use, or a Williamson Act contract;
- conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC Section 12220(g)), timberland (as defined by PRC Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g));
- result in the loss of forest land or conversion of forest land to a non-forest use; or
- involve other changes in the existing environment which, due to their location or nature, could result in conversion of Important Farmland, to non-agricultural use or conversion of forest land to non-forest use.

ANALYSIS METHODOLOGY

To evaluate the potential impacts of the 2021 LRDP on agriculture and forestry resources, the type and degree of Important Farmland and forestry resources that would be lost/converted were considered based on the FMMP and timberland designations within the LRDP area, the LESA model, and any policies and programs related to the preservation of agriculture and forest resources. The extent of Important Farmland and forest lands potentially affected by development on the main residential campus under the 2021 LRDP was determined based on GIS analysis, using mapping prepared by DOC, Bay Area Open Space Council, and Santa Cruz County, with adjustments (in the case of forest land) based on a review of aerial photography. Acreages of impact were estimated by overlaying 2021 LRDP development areas on the mapped FMMP designations and the mapped forested land cover and timber resources. In determining the level of significance, the analysis assumes that the project would comply with relevant State laws, regulations, and ordinances.

As described above, the LESA model was used to determine if the conversion of Important Farmland would be significant pursuant to PRC Section 21095. The LESA model is a point-based approach established by the DOC for rating the relative value of agricultural land resources. It is composed of six different factors: two Land Evaluation (LE) factors based upon measures of soil resource quality, and four Site Assessment (SA) factors that provide measures of a project's size, water resource availability, surrounding agricultural lands, and surrounding protected resource lands. The factors are weighted relative to one another and combined, resulting in a score that becomes the basis for a determination of a project's potential significance. Table 3.2-1 provides the LESA model scoring decision for determining if a project will result in a significant impact on agriculture.

Table 3.2-1 LESA Model Scoring Decision

Total LESA Score (points)	Scoring Decision
0 to 39	Not considered significant
40 to 59	Considered significant only if LE and SA sub-scores are each greater than or equal to 20 points
60 to 79	Considered significant unless either LE or SA sub-score is less than 20 points
80 to 100	Considered significant

Source: DOC 1997.

The Westside Research Park site, and adjacent lands, do not provide Important Farmland, agricultural land, or forest resources. Therefore, an evaluation of agriculture and forest resource impacts at the Westside Research Park is not required.

ISSUES NOT EVALUATED FURTHER

Conflict with Existing Zoning for Agricultural Use or Williamson Act Contract

The 2021 LRDP would result in land use changes only to land within the campus boundary, specifically the main residential campus and Westside Research Park. UC Santa Cruz, a constitutionally created State entity, is not subject to city or county zoning requirements within the campus boundary. Due to the specific tax-exempt status of the UC, land within the campus boundary is not subject to Williamson Act land use/tax contracts. As a result, no impacts to agricultural or timberland zoning would occur, and potential conflicts with existing agricultural or timberland zoning or with Williamson Act contracts are not evaluated further.

Indirect Conversion of Agriculture to Non-Agricultural Land Use or the Indirect Conversion of Forest Resources to Non-Forest Land Use

Indirect impacts on agriculture or forest resources would not occur due to campus development under the 2021 LRDP because, as stated above, the 2021 LRDP would not result in development adjacent to off-site agriculture or forest lands. Therefore, potential land use conflicts or associated pressure to convert neighboring agriculture or forest land to development would not occur due to the 2021 LRDP. No impacts related to indirect conversion of agriculture or forest resources would occur and these issues are not evaluated further.

As noted above, no areas within the 2021 LRDP boundaries are under Williamson Act contracts. Further, no lands adjacent to campus are under current Williamson Act contracts. Therefore, no impacts would occur to designated Williamson Act lands. Potential direct and indirect conflicts with Williamson Act contracts are not evaluated further.

IMPACTS AND MITIGATION MEASURES

Impact 3.2-1: Convert Lands Designated as Important Farmlands to Non-Agricultural Use

Implementation of the 2021 LRDP would result in the conversion of approximately 2 acres of land designated Prime Farmland on the California Department of Conservation's Farmland Mapping to non-agricultural uses. However, based on the Department of Conservation's Land Evaluation & Site Assessment (LESA) model, the 2-acre area is not considered a significant agricultural resource. In addition, the 2021 LRDP would result in the conversion of approximately 64 acres of grazing land to non-agricultural uses; however, grazing land is not considered Important Farmland and therefore its conversion to other land uses does not represent a significant environmental impact to agriculture. Therefore, the project's impact to Important Farmland is considered **less than significant**.

Approximately 20 acres of the main residential campus are designated Important Farmland, including approximately 7 acres designated as Prime Farmland, approximately 13 acres designated as Unique Farmland per the DOC FMMP (Figure 3.2-1). The 2021 LRDP land use plan designates the majority of these 20 acres of Important Farmland as Outdoor Research (see Figure 2-4) for the CASFS farm, located on approximately 30 acres in the lower campus. The extent of land use to support the CASFS program in the 2021 LRDP is the same as in the 2005 LRDP and would ensure that the farm remains in agricultural use through 2040. Nonetheless, implementation of the 2021 LRDP would result in the conversion of 2 acres of land designated as Prime Farmland to non-agricultural use as a result of the development of additional new employee housing south of the CASFS farm and east of the Ranch View Terrace employee housing (Figure 3.2-2). The 2 acres includes a vegetated buffer area that screens the Ranch View Terrace employee housing from the farm to the north. Although development within this buffer area is not anticipated, for a conservative evaluation, this area is included in the impact evaluation.

Based on the LESA model evaluation conducted for the 2-acre area, the conversion of the designated Prime Farmland to non-agricultural use would not be considered significant. The total LESA score for the 2-acre area is 46.4 points (LE factors sub-score of 38.9 and SA factors sub-score of 7.5). As shown in Table 3.2-1, above, this LESA model score is only considered significant if both the LE and SA sub-scores are each equal to or greater than 20. In this case, only the LE score (38.9) exceeds the threshold of 20 while the SA (7.5) score is well under the threshold (see Appendix C for the detailed LESA evaluation worksheet) (DOC 1997). Therefore, based on the LESA score, the 2-acre area is not considered to represent a significant agricultural resource and its conversion to other land uses does not represent a significant environmental impact to agriculture. Further, as the land is isolated with respect to farmland in the region and is not considered a significant agricultural resource, the conversion of this area is not considered inconsistent with local policy direction related to the loss of agricultural land in instances where the conversion would not affect the viability of other agricultural land in the area. Therefore, the 2021 LRDP impact to Important Farmland is considered **less than significant.**

Mitigation Measures

No mitigation is required.

Impact 3.2-2: Result in a Loss or Conversion of Forest Land to Non-Forest Use

Implementation of the 2021 LRDP would result in the development of approximately 123 acres (of the approximately 1,000 acres within the LRDP area) of forested land cover, which would result in removal of trees that may be harvested for sale. Prior to tree removal, UC Santa Cruz would be required to secure TCPs for conversion of timberland to another use and receive approval of THPs if commercial trees are harvested. In addition to compliance with the Forest Practice Rules through THPs and TCPs, as necessary, UC Santa Cruz would retain an estimated 10 percent or greater tree cover throughout each development area, similar to historic development on-campus, such that each development area would still be considered forest land and would continue to provide forest land public benefits such as aesthetics, biodiversity, water quality, and recreation. Therefore, the project's forest resource impact is considered **less than significant**.

As illustrated in Figure 3.2-2, there are approximately 1,000 acres of forested land cover on the main residential campus, which meets the definition of forest lands per PRC Section 12220(g). The forested land cover includes redwood forest, mixed evergreen forest, riparian woodland, coastal mixed hardwood, and coast live oak. The majority of forest lands are located within the north campus area, totaling approximately 750 acres. There are approximately 185 acres of forest lands on the central campus and approximately 50 acres within the lower campus. In addition, approximately 12 acres at the western boundary of the lower campus is designated as timberland by Santa Cruz County associated with the timberland production zone to the west and northwest in Wilder Ranch State Park. Implementation of the 2021 LRDP would have no impact on the 12 acres of timberland at the western boundary of the lower campus. However, the 2021 LRDP development areas would impact approximately 123 acres of forest lands, including approximately 64 acres on the north campus, approximately 56 acres on the central campus, and approximately 2 acres on the lower campus.

Development under the 2021 LRDP would preserve as many healthy trees as possible, but would require removal of existing trees in the footprints of proposed buildings, facilities, and infrastructure. Trees in poor condition would be removed before healthy trees in these areas. Development may also require removal or pruning of trees within 10 feet of existing buildings to accommodate renovation and rehabilitation activities. Although the campus does not grow commercial timber, the definition of timber under PRC Section 4526 classifies trees growing within the LRDP boundaries, such as redwoods, as commercial species trees.

CAL FIRE is the enforcing agency responsible for ensuring that logging and other forest harvesting activities are conducted in a manner that preserve and protect fish, wildlife, forests, and streams. UC Santa Cruz would prepare, submit, and get approval of a THP through CAL FIRE. The THP would likely address a group projects in proximity to each other within a geographical area/watershed. The THP outlines the timber proposed for commercial harvesting, the methods of harvesting, and the steps that will be taken to prevent damage to the environment. THPs are required to be prepared by a Registered Professional Forester. The THP is intended to provide information for CAL FIRE to determine if the proposed logging conforms to the Forest Practice Rules and to provide direction to the logging

operator who will carry out the THP. The THP documents are certified as the "functional equivalent" of an EIR to comply with CEQA; the THP evaluates the potential direct and cumulative impacts that might occur as a result of the logging plan and requires feasible measures to reduce impacts to a level of insignificance. The Forest Practice Rules state that CAL FIRE "shall disapprove a plan as not conforming to the rules" if it does not contain enough information to evaluate potential environmental effects, if it would cause "significant, long-term damage" or cause a "taking" of a threatened or endangered species, or if it would cause irreparable harm to rare or endangered plant species (see CCR Title 14, Section 898.2). After review and approval of a THP, CAL FIRE inspectors would periodically inspect the logging operation to ensure compliance with the THP and all laws and regulations. The THP is valid for five years, with an allowance for two 1-year extensions, which results in permit coverage for up to seven years. When a THP operation has been completed, UC Santa Cruz must submit a completion report to CAL FIRE, which then inspects the area to certify compliance with all requirements.

In addition, when development pursuant to the 2021 LRDP would result in timberland being converted to a non-timber growing use, UC Santa Cruz must secure a TCP from CAL FIRE. The TCP formally recognizes and records the fact that timberland will be converted to another land use. The TCP could be prepared for the overall 2021 LRDP or phased as sufficient timberland conversion information is available for projects to be implemented under the 2021 LRDP. CAL FIRE approval of the TCP(s) is based on findings that (1) the conversion would be in the public interest; (2) the conversion would not have a substantial and unmitigated adverse effect upon continued timberland within one mile; (3) the soils, slopes, and watershed conditions would be suitable for the conversion; and (4) there is not proximate and suitable land not zoned as timberland that would be suitable for the development. The 2021 LRDP is a campuswide plan for a public university and as such is considered to be in the public interest. In addition, the potential conversion of timberland would not affect such lands outside of campus and would occur only in areas suitable for campus development. Lastly, none of the land that is envisioned for development under the 2021 LRDP has been officially designated/zoned as timberland. This 2021 LRDP EIR addresses the environmental impacts of implementation of the 2021 LRDP and discloses and evaluates alternatives, which would support the preparation of TCP(s) for 2021 LRDP development to support CAL FIRE findings.

In addition to compliance with the Forest Practice Rules through THPs and TCPs, as necessary, UC Santa Cruz would retain an estimated 10 percent or greater tree cover at a given development site such that the project sites would still be considered forest land per PRC Section 12220(g). Maintaining at least 10 percent forested land cover would continue to provide public benefits such as aesthetics, biodiversity, water quality, and recreation, which are essential to UC Santa Cruz's objectives for the 2021 LRDP and would be consistent with local policy direction of the surrounding county. Because forest land cover would be maintained and because timber harvest and conversion would be implemented in compliance with regulations that are protective of the environment, the 2021 LRDP impact to forest resources is considered **less than significant**.

Mitigation Measures

No mitigation is required.

3.3 AIR QUALITY

This section presents a discussion of existing air quality conditions, a summary of applicable laws and regulations, and an analysis of potential construction and operational air quality impacts that could result from potential campus development associated with implementation of the 2021 LRDP. Mitigation measures are recommended as necessary to reduce significant air quality impacts to the extent feasible.

Public comments on the NOP (Appendix B) included concerns regarding the air quality impacts associated with growth planned under the 2021 LRDP, construction, toxic air contaminants (TACs) and odors from proposed uses, and consistency with regional growth plans. Concerns related to growth focused on the potential for the 2021 LRDP to result in increased vehicles emissions as new students and staff would be expected to live outside of the City of Santa Cruz (City) due to limited housing availability on-campus and within the City. All of the applicable issues are addressed in the impact analysis below.

3.3.1 Regulatory Setting

Air quality in the vicinity of the project is regulated by the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (CARB), and Monterey Bay Air Resources District (MBARD). Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. Although EPA regulations may not be superseded, both state and local regulations may be more stringent.

Concentrations of several air pollutants—ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead—indicate the quality of ambient air and are therefore used as the basis for regulatory standards. These pollutants, which are the most prevalent air pollutants known to be harmful to human health, are referred to as criteria air pollutants because both EPA and CARB have established specific public-health-based and welfare-based criteria, or standards, for what is considered acceptable human exposure to these pollutants. The effects of criteria pollutants on human health have been studied and documented through several years of research and epidemiological studies (Landrigan 2018, Shah 2013, Sioutas 2005, Kim 2013, Delfino et al. 2005, Dominici 2006, Levesque 2011). These air quality standards are listed in Table 3.3-3.

Air quality regulations also focus on TACs (also known as hazardous air pollutants [HAPs] in federal regulations). In general, for those TACs that may cause cancer, all concentrations present some risk and there is no safe level of exposure. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. EPA and CARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum achievable control technology (MACT) or best available control technology for toxics (T-BACT) to limit emissions. These statutes and regulations, in conjunction with additional rules set forth by MBARD, establish the regulatory framework for TACs. EPA regulates HAPs through its National Emission Standards for Hazardous Air Pollutants (NESHAPs) for various source categories, as authorized by Section 112 of the CAA. The regulations are published in Title 40 of the Code of Federal Regulations (40 CFR), Parts 61 and 63. CARB regulates TACs largely through its Airborne Toxic Control Measures (ATCMs) for several source categories that are codified in the California Code of Regulations (CCR).

Applicable regulations associated with criteria air pollutants, TACs, and odors are described below.

FEDERAL

Criteria Air Pollutants

At the federal level, EPA implements the national air quality programs. EPA air quality mandates are drawn primarily from the federal Clean Air Act (CAA), enacted in 1970. The most recent major amendments were made by Congress in 1990.

The CAA requires EPA to establish National Ambient Air Quality Standards (NAAQS). As shown in Table 3.3-3, EPA has established NAAQS for the following criteria air pollutants: ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead (CARB 2016a). The primary standards protect public health and the secondary standards protect public welfare. The CAA also requires each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA reviews all state SIPs to determine whether they conform to the mandates of the CAA and its amendments and whether implementing them will achieve air quality goals. If EPA determines a SIP to be inadequate, a Federal Implementation Plan that imposes additional control measures may be prepared for the nonattainment area. If the state fails to submit an approvable SIP, sanctions may be applied to transportation funding and stationary air pollution sources in the air basins.

Hazardous Air Pollutants and Toxic Air Contaminants

TACs, or in federal parlance, HAPs, are a defined set of airborne pollutants that may pose a present or potential hazard to human health. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

A wide range of sources, from industrial plants to motor vehicles, emit TACs. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. While many TACs can cause cancer, some TACs can also cause long-term, chronic health effects such as birth defects, neurological damage, asthma, bronchitis, or genetic damage; or short-term acute affects such as eye watering, respiratory irritation (cough), running nose, throat pain, and headaches.

For evaluation purposes, TACs are separated into carcinogens and non-carcinogens based on the nature of the physiological effects associated with exposure to the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. This contrasts with criteria air pollutants for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 3.3-3). Cancer risk resulting from exposure to TACs is expressed as the increase in cancer cases per one million exposed individuals, typically over a lifetime of exposure, based on the cancer potency factor of each TAC. Non-cancer risks are measured in terms of health hazard indices, which indicate whether a TAC concentration is above its reference exposure level (REL), and by how much. RELs are classified as acute, 8-hour, and chronic, depending on the exposure period. California's Office of Environmental Health Hazard Assessment (OEHHA) publishes standard cancer potency factors and RELs for TACs, along with information about which organ systems may be affected when RELs are exceeded (OEHHA 2009, 2019).

Corporate Average Fuel Economy Standards

In October 2012, the U.S. Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHSTA), on behalf of the Department of Transportation, issued final rules to further reduce greenhouse gas (GHG) emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 Federal Register [FR] 62624). NHTSA's CAFE standards have been enacted under the Energy Policy and Conservation Act since 1978. This national program requires automobile manufacturers to build a single light-duty national fleet that meets all requirements under both federal programs and the standards of California and other states. This program would increase fuel economy to the equivalent of 54.5 miles per gallon (mpg) limiting vehicle emissions to 163 grams of carbon dioxide (CO_2) per mile for the fleet of cars and light-duty trucks by model year 2025.

Safer Affordable Fuel-Efficient Vehicles Rule

On August 2, 2018, the National Highway Traffic Safety Administration (NHTSA) and EPA proposed the Safer Affordable Fuel-Efficient Vehicles Rule (SAFE Rule). This rule addresses emissions and fuel economy standards for motor vehicles and is separated in two parts as described below.

- Part One, "One National Program" (84 FR 51310) revokes a waiver granted by EPA to the State of California under Section 209 of the CCA to enforce more stringent emission standards for motor vehicles than those required by EPA for the explicit purpose of greenhouse gas (GHG) reduction, and indirectly, criteria air pollutants and ozone precursor emission reduction. This revocation became effective on November 26, 2019, restricting the ability of CARB to enforce more stringent GHG emission standards for new vehicles and set zero emission vehicle mandates in California. As of this writing, EMFAC2017 is CARB's most recent version of the EMFAC model series and considers effects of known policy implementation and economic forecasts, such as the implementation of the CAFE standards and Advanced Clean Cars program.
- Part Two addresses CAFE standards for passenger cars and light trucks for model years 2021 to 2026. This rulemaking proposes new CAFE standards for model years 2022 through 2026 and would amend existing CAFE standards for model year 2021. The proposal would retain the model year 2020 standards (specifically, the footprint target curves for passenger cars and light trucks) through model year 2026, but comment is sought on a range of alternatives discussed throughout the proposed rule. The proposal addressing CAFE standards is being jointly developed by NHTSA and EPA, with EPA simultaneously proposing tailpipe carbon dioxide standards for the same vehicles covered by the same model years. The final SAFE Rule Part Two was released on March 31, 2020. The outcome of any pending or potential lawsuits (and how such lawsuits could delay or affect its implementation) are unknown at this time.

Ultrafine Particulate Matter

Ultrafine particulate matter (UFP) refers to the subfraction of currently regulated $PM_{2.5}$ and PM_{10} that is most often defined as particles having an aerodynamic diameter smaller than 0.1 micrometer, or 100 nanometers (HEI 2013:1; CARB 2019a; Kleeman et al. 2007:1). Several research studies indicate that that UFP may be more toxic than larger particles (Zhu et al. 2002a:4324; Li et al. 2003:455), much of diesel PM is composed of UFP (Benbrahim-Tallaa 2012), and exposure to UFP may lead to adverse health effects in animals and humans (HEI 2013:2; Froines 2006).

To date, no federal agencies, including EPA, have established official standards, policies, or guidance regarding concentrations of UFP, though CARB did consider amending its low-emission vehicle (LEV) regulations to incorporate a solid particle number measure of UFP emissions (CARB 2010). Due to the complexities of this metric and practical considerations of implementation, CARB staff decided further study of UFP was warranted and the amendment has not yet been adopted. However, UFP is a large component of diesel particulate matter (diesel PM) (Benbrahim-Tallaa 2012), to which TAC regulations apply, as discussed above.

STATE

Criteria Air Pollutants

CARB coordinates and oversees the state and local programs for controlling air pollution in California and implements the California Clean Air Act (CCAA), adopted in 1988. The CCAA requires CARB to establish California Ambient Air Quality Standards (CAAQS), which are shown in Table 3.3-3. CARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate an additional margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and area-wide emission sources. The act provides districts with the authority to regulate indirect sources, such as through the funding of transportation demand management programs and vehicle pooling services.

CARB also oversees local air district compliance with federal and state laws, approving local air quality plans, submitting SIPs to EPA, monitoring air quality, determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

Executive Order B-48-18: Zero-Emission Vehicles

On January 26, 2018, Governor Brown signed Executive Order B-48-18 requiring all State entities to work with the private sector to have at least 5 million zero-emission vehicles (ZEVs) on the road by 2030, as well as install 200 hydrogen fueling stations and 250,000 electric vehicle (EV) charging stations by 2025. It specifies that 10,000 of the EV charging stations should be direct current fast chargers. This order also requires all State entities to continue to partner with local and regional governments to streamline the installation of ZEV infrastructure. The Governor's Office of Business and Economic Development is required to publish a *Plug-in Charging Station Design Guidebook* and update the *2015 Hydrogen Station Permitting Guidebook* (Eckerle and Jones 2015) to aid in these efforts. All State entities are required to participate in updating the *2016 Zero-Emissions Vehicle Action Plan*, along with the *2018 ZEV Action Plan Priorities Update*, which includes and extends the 2016 ZEV Action Plan (Governor's Interagency Working Group on Zero-Emission Vehicles 2016, 2018), to help expand private investment in ZEV infrastructure with a focus on serving low-income and disadvantaged communities.

Executive Order N-79-20

Governor Gavin Newsom signed Executive Order N-79-20 in September 2020, which sets a statewide goal that 100 percent of all new passenger car and truck sales in the state will be zero-emissions by 2035. It also sets a goal that 100 percent of statewide new sales of medium- and heavy-duty vehicles will be zero emissions by 2045, where feasible, and for all new sales of drayage trucks to be zero emissions by 2035. Additionally, the Executive Order targets 100 percent of new off-road vehicle sales in the state to be zero emission by 2035. CARB is responsible for implementing the new vehicle sales regulation.

Toxic Air Contaminants

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807 [Statutes of 1983]) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588 [Statutes of 1987]). AB 1807 sets forth a formal procedure for CARB to designate substances as TACs. This process includes research, public participation, and scientific peer review before CARB can designate a substance as a TAC. CARB has identified more than 200 TACs to date, including 189 HAPs identified by EPA plus 21 additional compounds. Most recently, diesel PM and environmental tobacco smoke were added to CARB's list of TACs.

Once a TAC is identified, CARB then adopts an airborne toxics control measure for sources that emit that TAC. If a safe threshold exists for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If no safe threshold exists, the measure must incorporate the best available control technology (BACT) to minimize emissions.

CARB has adopted diesel exhaust control measures and more stringent emissions standards for various transportation-related mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). Recent and upcoming milestones for transportation-related mobile sources include a low-sulfur diesel fuel requirement and tighter emissions standards for heavy-duty diesel trucks (CARB 2019b) and off-road diesel equipment (CARB 2016b) nationwide. Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under existing conditions. Mobile-source emissions of TACs (e.g., benzene, 1,3-butadiene, diesel PM) have been reduced significantly over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. Adopted regulations are also expected to continue to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

AB 2588 requires that existing stationary source facilities that continuously or intermittently emit TACs into the atmosphere and meet other criteria prepare an inventory of TAC emissions, update this inventory every four years, and potentially prepare a health risk assessment (HRA). These AB 2588 facility criteria include emitting any of over 500 listed toxic compounds identified by the act and being a major emitter of total organic gases, particulate matter, nitrogen oxides, or sulfur oxides; or being listed in any current air district toxics use or toxics air emission survey, inventory, or report. A facility meeting these criteria and included in the AB 2588 program is assigned a prioritization score, based on the cancer and non-cancer risks posed by its TAC emissions, and then categorized as a "high," "low,"

or "intermediate" priority facility. In the North Central Coast Air Basin (NCCAB), which is under the jurisdiction of MBARD, a priority score above 10 is considered "high," between one and 10 "intermediate," and below one considered "low" priority. High and intermediate priority facilities are required to perform an HRA, submit a toxic risk reduction audit and implementation plan, and provide public notification.

UNIVERSITY OF CALIFORNIA

University of California Sustainable Practices Policy

At the direction of The Regents of the University of California, UC Office of the President (UCOP) developed a Sustainable Practices Policy which establishes sustainability goals to be achieved by all campuses, medical centers, and the Lawrence Berkeley National Laboratory within the UC system. The policy is regularly updated, with the most recent update occurring in July 2020. The policy goals encompass nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, and sustainable water systems (UCOP 2020). The policy includes the following provisions relevant to the air quality emissions reductions, primarily via zero emission transportation policies. Energy efficiency policies are relevant to air quality in so far as they reduce emissions from the combustion of natural gas and other on-site combustible fuels:

- Green Building Design
  - All new buildings projects, other than acute care facilities, shall be designed, constructed, and commissioned to outperform the California Building Code (Title 24 portion of the California Code of Regulations) energy efficiency standards by at least 20 percent or achieve energy performance targets, related to 1999 benchmarks, shown in Table 1 of Section V.A.3 of the policy.
  - All new buildings will strive to achieve certification of U.S. Green Building Council's LEED "Gold" and achieve a minimum of LEED "Silver" certification, whenever possible within the constraints of program needs and standard budget parameters.
- Sustainable Transportation
  - By 2025, zero emission vehicles or hybrid vehicles shall account for at least 50 percent of all new light-duty vehicle acquisitions.
  - By 2025, each location shall strive to reduce its percentage of employees and students commuting by single-occupant vehicle (SOV) by 10 percent relative to its 2015 SOV commute rates;
  - By 2050, each location shall strive to have no more 40 percent of its employees and no more than 30 percent of all employees and students commuting to the location by SOV.
  - By 2025, each location shall strive to have at least 4.5 percent of commuter vehicles be Zero Emission Vehicles (ZEV).
  - By 2050, each location shall strive to have at least 30 percent of commuter vehicles be ZEV.
- Sustainable Building Operations for Campuses
  - Each campus shall seek to certify as many existing buildings as possible through the "LEED for Operations and Maintenance" rating system, within budgetary constraints and eligibility limitations.
  - All new buildings will achieve a U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) "Silver" certification at a minimum. All new buildings will strive to achieve certification at a USGBC LEED "Gold" rating or higher, whenever possible within the constraints of program needs and standard budget parameters.
  - The University of California will design, construct, and commission new laboratory buildings to achieve a minimum of LEED "Silver" certification as well as meeting at least the prerequisites of the Laboratories for the 21st Century (Labs21) Environmental Performance Criteria (EPC). Laboratory spaces in new buildings also shall meet at least the prerequisites of Labs21 EPC. Design, construction, and commissioning processes shall strive

to optimize the energy efficiency of systems not addressed by the California Energy Code energy efficiency standards.

- No new building or major renovation that is approved after June 30, 2019 shall use onsite fossil fuel combustion (e.g., natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure).

- Clean Energy
  - Energy Efficiency: Each location will implement energy efficiency actions in buildings and infrastructure systems to reduce the location's energy use intensity by an average of least 2 percent annually.
  - On-campus Renewable Electricity: Campuses and health locations will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of the location's Climate Action Plan or other goals.
  - Off-campus Clean Electricity: By 2025, each campus and health location will obtain 100 percent clean electricity. By 2018, the University's Wholesale Power Program will provide 100 percent clean electricity to participating locations.
  - On-campus Combustion: By 2025, at least 40 percent of the natural gas combusted on-site at each campus and health location will be biogas

LOCAL

As noted in Section 3.0.2, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the University's educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts. However, because CARB, a state agency, is legally required to and has the responsibility to monitor and approve the plans of each air district, UC Santa Cruz is subject to the rules and regulations established by MBARD as a special district/local-regional planning agency that is tasked with maintaining or improving air quality and human health within the NCCAB.

Monterey Bay Air Resources District

MBARD attains and maintains air quality conditions in the NCCAB, which comprises Monterey, San Benito, and Santa Cruz counties. MBARD is responsible for air monitoring, permitting, enforcement, long-range air quality planning, regulatory development, education, and public information activities related to air pollution, as required by the CAA and CCAA. Projects in the NCCAB are subject to MBARD's rules and regulations. Specific rules applicable to the proposed project may include:

- Rule 400 – Visible Emissions. Limits visible emissions from sources in the District and provides exemptions.
- Rule 402 – Nuisances. Prohibits the discharge from any source whatsoever such quantities of air contaminants or other materials which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; or which endanger the comfort, repose, health, or safety of any such persons or the public; or which cause, or have a natural tendency to cause, injury or damage to business or property.
- Rule 403 – Particulate Matter. Sets particulate matter emission limits for sources operating within the jurisdiction.
- Rule 424 – National Emission Standards for Hazardous Air Pollutants (NESHAP). Sets emissions standards for stationary source emissions, including asbestos emission from building demolition
- Rule 426 – Architectural Coatings. Limits the volatile organic compound (VOC) content of architectural coatings; specifically, limits the VOC content of flat coatings to 50 grams/ liter.

The CCAA requires that all air districts in the state endeavor to achieve and maintain the CAAQS in their region by the earliest practical date. The CCAA requires districts to submit air quality attainment plans (AQAP) for areas that do not meet state standards for ozone, CO, SO_2, NO_2, PM_{10}, and $PM_{2.5}$. The NCCAB is currently in attainment with all ambient air quality standards with the exception of ozone and PM_{10} California standards (CARB 2018). The attainment status for each pollutant is presented in Table 3.3-3.

In accordance with the CCAA, MBARD has developed the 2012–2015 Air Quality Management Plan (AQMP) for the NCCAB. The plan includes an updated air quality trends analysis, emission inventory, and mobile source programs. No new control measures were adopted, instead, MBARD is focusing on grant programs to reduce reactive organic gases (ROG) and NO_x emissions by offering incentives to reduce emissions from transportation sources, marine vessels, agricultural irrigation pumps, and off-road vehicles. The plan shows that the region continues to make progress toward meeting the state ozone standard.

At the local level, air pollution control or management districts may adopt and enforce CARB's control measures for TACs. Under MBARD Regulation II ("Permits"), Rule 218 ("Federal Operating Permits"), and Regulation IV ("Prohibitions"), Rule 423 ("New Source Performance Standards (NSPS)"), all sources that possess the potential to emit TACs are required to obtain permits from the district. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new-source review standards (see Rule 423 above) and air-toxics control measures. Under MBARD Regulation IV ("Prohibitions"), PM dust resulting from construction, demolition, or agricultural operations is subject to Rule 402 ("Nuisances"), which prohibits the discharge from of air contaminants that may potentially cause injury to or endanger the health or safety of any considerable number of persons or the public. MBARD prioritizes the permitting of TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors and land uses.

In addition to complying with the statewide AB 2588 program, MBARD has adopted Regulation X ("Toxic Air Contaminants"), to prevent the emission of TACs that may contribute to increased mortality or cancer risk, or pose a hazard to human health. Per Rule 1000 ("Permit Guidelines and Requirements for Sources emitting TACs"), new or reconstructed major sources of TACs that require a permit are analyzed based on their potential to emit toxics above District cancer-risk and non-cancer health hazard thresholds, as determined by an HRA. If it is found that a project includes sources that may potentially emit TACs in excess of MBARD's thresholds of significance (see Section 3.3.3, below), the responsible party must implement T-BACT on the emissions source to reduce TAC emissions. If risk posed by a source cannot be reduced below the relevant significance threshold, even after T-BACT has been implemented, MBARD will deny the required permit to operate for that source. Although MBARD regulates sources that generate TACs, it does not regulate land uses that may be sited in locations exposed to TACs. Decisions regarding whether to approve projects in locations where new receptors may be exposed to TACs is typically the responsibility of the lead agency charged with determining whether to approve a project.

MBARD has not established rules, policies, or guidance regarding UFP.

3.3.2 Environmental Setting

UC Santa Cruz is located within the NCCAB, which includes all of Monterey, Santa Cruz and San Benito counties.

The ambient concentrations of air pollutant emissions are determined by the amount of emissions released by the sources of air pollutants and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by air pollutant sources present in, near or even at a distance from the air basin, as discussed separately below.

CLIMATE, METEOROLOGY, AND TOPOGRAPHY

The NCCAB includes an area of approximately 5,159 square miles along the central coast of California, comprised of several mountain ranges, valleys, and coastal plains. The Santa Cruz mountains are in the northwest and the Diablo Range is in the northeast. The southern portion of the Santa Clara Valley runs through the northern part of the air basin, and transitions into the San Benito Valley, which runs northwest to southeast and has the Gabilan Range as its western boundary. To the west of the Gabilan Range is the Salinas Valley. The western boundary of the Salinas Valley is formed by the Sierra de Salinas, which also forms the eastern boundary of the Carmel Valley. The eastern Santa Lucia Range defines the western side of the Carmel Valley.

The NCCAB is characterized by moderately wet winters and dry summers with fog and low coastal clouds. The local meteorology of the UC Santa Cruz main residential campus and surrounding area is represented by measurements recorded at the Western Regional Climate Center (WRCC) Santa Cruz Cooperative Station. The normal annual precipitation is approximately 29.33 inches. January temperatures range from a normal minimum of 38.8 degrees Fahrenheit (°F) to a normal maximum of 60.4°F. July temperatures range from a normal minimum of 51.1°F to a normal maximum of 74.6°F (WRCC 2016). Prevailing winds in the air basin are westerly most of the year shifting to east-southeast during the winter months, from November to February (WRCC 2017). The air basin is situated downwind of the San Francisco Bay Area Air Basin (SFBAAB). Transport of ozone precursor emissions from the SFBAAB plays a dominant role in ozone concentrations measured in the NCCAB (MBARD 2017).

Figure 3.3-1 shows the predominant wind direction and wind speeds (in meters per second [m/s]) in the project region based on five years of meteorological data (2014-2018) collected at the Watsonville Airport Station.

CRITERIA AIR POLLUTANTS

As stated before, concentrations of ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead are used as indicators of ambient air quality conditions and are referred to as criteria air pollutants. Criteria air pollutants are air pollutants for which an ambient air quality standard has been set by EPA and CARB based on protecting health and welfare.

A brief description of each criteria air pollutant's source types and health effects is provided below in Table 3.3-1. Additional information, including future trends and monitoring data at those monitoring stations located closest to the project site, is provided for ozone, NO_2, and PM, the key criteria air pollutants associated with the project analysis.

Table 3.3-1 Sources and Health Effects of Criteria Air Pollutants

Pollutant	Sources	Acute[1] Health Effects	Chronic[2] Health Effects
Ozone	Secondary pollutant resulting from reaction of ROG and NO_X in presence of sunlight. ROG emissions result from incomplete combustion and evaporation of chemical solvents and fuels; NO_X results from the combustion of fuels	Increased respiration and pulmonary resistance; cough, pain, shortness of breath, lung inflammation	Permeability of respiratory epithelia, possibility of permanent lung impairment
Carbon monoxide (CO)	Incomplete combustion of fuels; motor vehicle exhaust	Reduced capacity to pump oxygenated blood; headache, dizziness, fatigue, nausea, vomiting, death	Permanent heart and brain damage
Nitrogen dioxide (NO_2)	Combustion devices (e.g., boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines), industrial processes, and fires	Coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis or pulmonary edema; aggravation of existing heart disease leading to death	Chronic bronchitis, emphysema, decreased lung function
Sulfur dioxide (SO2)	Combustion devices (e.g., boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines), industrial processes, and fires	Irritation of upper respiratory tract, increased asthma symptoms, aggravation of existing heart disease leading to death	Chronic bronchitis, emphysema

Pollutant	Sources	Acute[1] Health Effects	Chronic[2] Health Effects
Respirable particulate matter (PM_{10}), Fine particulate matter ($PM_{2.5}$)	Fugitive dust, soot, smoke, mobile and stationary sources, construction, fires and natural windblown dust, and formation in the atmosphere by condensation and/or transformation of SO_2 and ROG into secondary PM	Breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, premature death	Alterations to the immune system, carcinogenesis
Lead	Metal processing, piston-engine aircraft or other vehicles operating on leaded fuel	Reproductive/developmental effects (fetuses and children)	Numerous effects including neurological, endocrine, and cardiovascular effects

Notes: NO_X = oxides of nitrogen; ROG = reactive organic gases

[1] "Acute" refers to effects of short-term exposures to criteria air pollutants, usually at fairly high concentrations.

[2] "Chronic" refers to effects of long-term exposures to criteria air pollutants, usually at lower, ambient concentrations.

Source: EPA 2019a

Ozone

Ozone is a photochemical oxidant (a substance whose oxygen combines chemically with another substance in the presence of sunlight) and the primary component of smog. Ozone is not directly emitted into the air in large quantities but is formed through complex chemical reactions between precursor emissions of ROG and NO_X in the presence of sunlight (EPA 2019a). It is a regional pollutant. ROGs are VOCs that are photochemically reactive. ROG emissions result primarily from incomplete combustion, such as from automobiles, and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels. Emissions of the ozone precursors ROG and NO_X have decreased over the past two decades because of more stringent motor vehicle standards and cleaner burning fuels (CARB 2014:3-4 and 4-46).

Carbon Monoxide

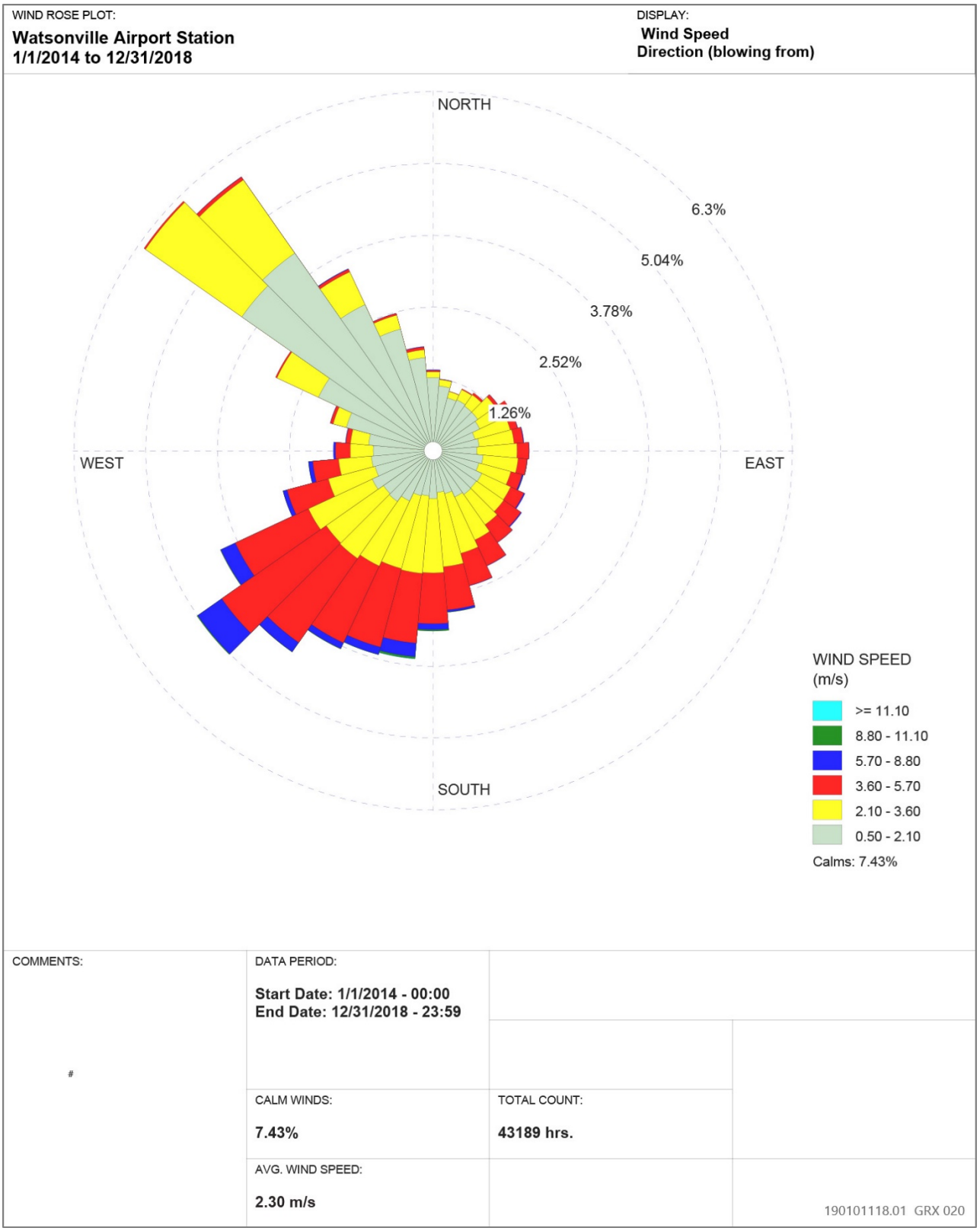
CO is an odorless and invisible gas. It is a non-reactive pollutant that is a product of incomplete combustion of gasoline in automobile engines. CO is a localized pollutant, and the highest concentrations are found near the source. Ambient carbon monoxide concentrations generally follow the spatial and temporal distributions of vehicular traffic and are influenced by wind speed and atmospheric mixing. CO concentrations are highest in flat areas on still winter nights when temperature inversions trap carbon monoxide near the ground. When inhaled at high concentrations, carbon monoxide reduces the oxygen-carrying capacity of the blood, which, in turn, results in reduced oxygen reaching parts of the body.

Nitrogen Dioxide

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2. The combined emissions of NO and NO_2 are referred to as NO_X and are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a geographical area may not be representative of the local sources of NO_X emissions (EPA 2019a).

Sulfur Dioxide

SO_2 is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills as well as by the combustion of fuel containing sulfur. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO_2 at 5 ppm or more (CDC 1978). On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis.



Source: Ascent Environmental 2020

Figure 3.3-1 Wind Speed and Flow Vector Map for the LRDP Area

Particulate Matter

Particulate matter is a class of air pollutants that consists of heterogeneous solid and liquid airborne particles from human-made and natural sources. Particulate matter is measured in two size ranges: PM_{10} and $PM_{2.5}$. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction activity, fires and natural windblown dust, and particulate matter formed in the atmosphere by reaction of gaseous precursors (CARB 2014:1-13 and 3-6). PM_{10} emissions are dominated by emissions from area sources, primarily fugitive dust from vehicle travel on unpaved and paved roads, farming operations, construction and demolition, and particles from residential fuel combustion. Direct emissions of PM_{10} have increased slightly over the last 20 years and are projected to continue to increase slightly through 2035 (CARB 2014:3-7). $PM_{2.5}$ includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. $PM_{2.5}$ emissions have remained relatively steady over the last 20 years and are projected to decrease slightly through 2035 (CARB 2014:3-6).

Lead

Lead is a metal found naturally in the environment as well as in manufactured products and is a potent neurotoxin that can cause increased chances of cancer and non-cancer health effects for adults and children. Lead is known to negatively affect child brain development and function. The major sources of lead emissions have historically been mobile and industrial sources but can occur in dust created by demolition or deterioration of lead-based paint. Lead-based paint is present on buildings built before EPA's ban on the use of such paint in 1978. EPA also phased out leaded fuels as of December 1995 resulting in an 89 percent decline in lead emissions from mobile sources between 1980 and 2010 (EPA 2020a; CARB 2001).

Monitoring Station Data and Attainment Area Designations

Criteria air pollutant concentrations are measured at several monitoring stations in the NCCAB. The 2544 Soquel Avenue monitoring station is in the center of the city of Santa Cruz and is the closest monitoring station to the UC Santa Cruz campus with recent data for ozone and $PM_{2.5}$. The next closest monitoring station that reports PM_{10} concentrations is the Fairview Road monitoring station located in Hollister, approximately 48 miles southeast of the UC Santa Cruz campus in San Benito County. In general, the local ambient air quality measurements from the Soquel Avenue monitoring station are representative of the air quality near the UC Santa Cruz campus given its similar meteorological conditions and urban surroundings. Table 3.3-2 summarizes the air quality data for the three most recent calendar years for which data are available (2016-2018).

Table 3.3-2 Summary of Annual Ambient Monitoring Data (2016-2018)

Pollutant	2016	2017	2018
Ozone[1]			
Maximum concentration (1-hr/8-hr avg, ppm)	0.064/0.058	0.082/0.075	0.075/0.061
Number of days state standard exceeded (8-hr)	0	1	0
Number of days national standard exceeded (1-hr/8-hr)	0/0	0/1	0/0
Fine Particulate Matter ($PM_{2.5}$)[1]			
Maximum 24-hr average concentration (µg/m^3)	12.7	47.3	92.0
Number of days national standard exceeded (calculated[2])	0	2.2	9.9
Respirable Particulate Matter (PM_{10})[3]			
Maximum 24-hr average concentration (µg/m^3)	44.3	80.9	95.9
Number of days state standard exceeded (calculated[2])	*	*	*
Number of days national standard exceeded (calculated[2])	0	0	0

Notes: µg/m^3 = micrograms per cubic meter; ppm = parts per million, * = insufficient (or no) data available to determine the value.

[1] Measurements from the 2544 Soquel Avenue monitoring station in Santa Cruz, CA.

[2] Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

[3] Santa Cruz County data are unavailable; measurements from the Fairview Road monitoring station in Hollister (San Benito County).

Source: CARB 2017a, data compiled by Ascent Environmental in 2020.

Both CARB and EPA use this type of monitoring data to designate areas according to their attainment status for criteria air pollutants. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." "Unclassified" is used in an area that cannot be classified based on available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called "nonattainment-transitional." The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. Attainment designations for the NCCAB as of 2018 are shown in Table 3.3-3 for each criteria air pollutant.

Table 3.3-3 Ambient Air Quality Standards and Attainment Designations for North Central Coast Air Basin

Pollutant	Averaging Time	California Standards[2] Primary[3]	California Standards[2] Attainment Status[4]	National Standards[1] Primary[3]	National Standards[1] Attainment Status[6]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	NT	–	U/A
	8-hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)	
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	U/A
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	
	8-hour (Lake Tahoe)	6 ppm (7 mg/m^3)		–	
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	A	0.053 ppm (100 µg/m^3)	U/A
	1-hour	0.18 ppm (339 µg/m^3)		0.100 ppm	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	A	0.030 ppm (80 µg/m^3)	U/A
	24-hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	
	3-hour	–		0.5 ppm (1300 µg/m^3)[5]	
	1-hour	0.25 ppm (655 µg/m^3)		0.075 ppm	
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	N	–	U
	24-hour	50 µg/m^3		150 µg/m^3	
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	A	12.0 µg/m^3	U/A
	24-hour	–		35 µg/m^3	
Lead[7]	30-day Average	1.5 µg/m^3	A	–	–
	Calendar Quarter	–		1.5 µg/m^3	U/A
	Rolling 3-Month Avg	–		0.15 µg/m^3	U/A
Sulfates	24-hour	25 µg/m^3	A	No National Standards	
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m^3)	U		
Vinyl Chloride[7]	24-hour	0.01 ppm (26 µg/m^3)	Not Available		
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more	U		

Notes: µg/m^3 = micrograms per cubic meter; ppm = parts per million; EPA=U.S. Environmental Protection Agency; CAAQS=California Ambient Air Quality Standards; CCAA=California Clean Air Act; CARB=California Air Resources Board

[1] National standards (other than ozone, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the EPA for further clarification and current federal policies.

[2] California standards for ozone, CO (except in the Lake Tahoe Basin), SO_2 (1- and 24-hour), NO_2, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[3] Concentration expressed first in units in which it was promulgated [i.e., ppm or µg/m^3]. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas. Secondary national standards are also available from EPA.

[4] Unclassified (U): a pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.

Attainment (A): a pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period.

Nonattainment (N): a pollutant is designated nonattainment if there was a least one violation of a state standard for that pollutant in the area. Non-attainment designations for ozone are classified as marginal, serious, severe, or extreme depending on the magnitude of the highest 8-Hour ozone design value at a monitoring site in a non-attainment area.

Nonattainment/Transitional (NT): is a subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.

[5] Secondary Standard

[6] Nonattainment (N): any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

Attainment (A): any area that meets the national primary or secondary ambient air quality standard for the pollutant.

Unclassifiable (U): any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

Maintenance (M): any area previously designated nonattainment pursuant to the CAAA of 1990 and subsequently redesignated to attainment subject to the requirement to develop a maintenance plan under Section 175A of the CAA, as amended.

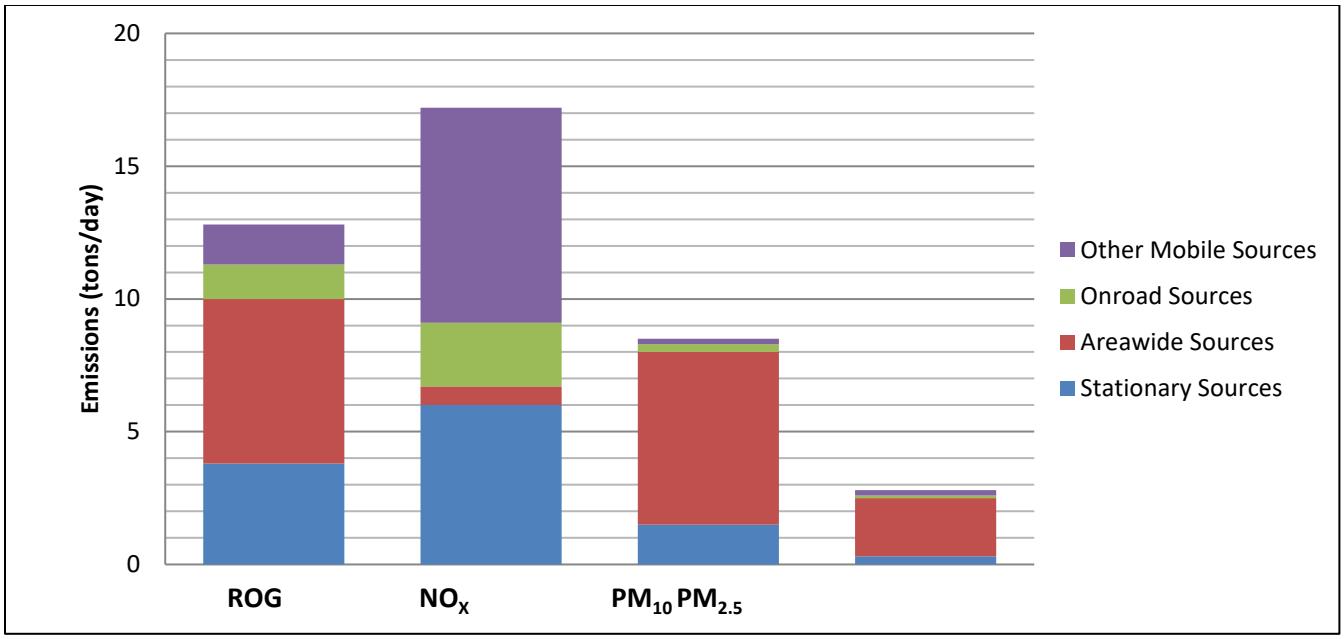
[7] CARB has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source: CARB 2018; EPA 2017; data compiled by Ascent Environmental in 2020.

MBARD sets its criteria pollutant significance thresholds for daily and annual emissions based on the attainment status of the region. The thresholds are set with the purpose of achieving and maintaining attainment with the NAAQS and CAAQS. It is within MBARD's purview to update the significance thresholds to account for any changes in regional attainment status, however the currently adopted thresholds, based on the 2018 regional attainment status summarized in Table 3.3-3, will apply to the 2021 LRDP.

EMISSIONS INVENTORY

Figure 3.3-2 summarizes an estimated emissions inventory of criteria air pollutants projected for Santa Cruz County for various source categories in 2020 based on the 2016 SIP Emissions Projection Data from CARB. According to the emissions inventory, mobile sources are the largest contributor to the estimated daily air pollutant levels of NO_X, accounting for approximately 61 percent of the total daily emissions. Area-wide sources (i.e., sources that occur over a large area rather than at a point source [e.g., industrial exhaust stack] or mobile-source [e.g., tailpipe emissions]) account for approximately 76 percent and 79 percent of the county's PM_{10} and $PM_{2.5}$ emissions, respectively, due in part to the agricultural and semi-rural conditions in **northern and southern** Santa Cruz County. Area-wide sources also contribute to approximately 48 percent of total daily ROG emissions. This is the most current emissions inventory available for Santa Cruz County (CARB 2016c).



Source: CARB 2016c, data compiled by Ascent Environmental in 2020.

Figure 3.3-2 Santa Cruz County 2020 Criteria Air Pollutant Emissions Inventory Estimate

TOXIC AIR CONTAMINANTS

According to the *California Almanac of Emissions and Air Quality* (CARB 2014) most of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being particulate matter contained in diesel exhaust (diesel PM). Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emissions control system is being used. Unlike the other TACs, no ambient monitoring data is available for diesel PM because no routine measurement method currently exists. However, CARB has made preliminary concentration estimates based on a PM exposure method. This method uses PM_{10} values found in CARB's emissions inventory database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene. Sources of these TACs vary considerably and include (but are not limited to) consumer products, vehicle exhaust, diesel machinery, welding operations, and other sources.

Diesel PM poses the greatest health risk among the 10 TACs mentioned. Based on receptor modeling techniques, CARB estimated its health risk to be 360 excess cancer cases per million people in the NCCAB in the year 2000, which when coupled with the average health risk within the NCCAB of 160 cancer cases per million people yields a total health risk of 520 cancer cases per million people. Since 1990, the health risk associated with diesel PM has been reduced by 52 percent. Overall, levels of most TACs, except para-dichlorobenzene and formaldehyde, have decreased since 1990 (CARB 2014).

According to CARB's Air Toxics "Hot Spots" Program (see Regulatory Setting above), stationary facilities that emit toxic substances above a specified level are required to prepare an inventory of toxic emissions, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures. There are only two existing facilities in Santa Cruz that emit substantial quantities of criteria pollutants, however neither one is a "Hot Spots" facility (CARB 2015). These include the City of Santa Cruz Wastewater Treatment Plant and Santa Cruz Energy, LLC. Minor stationary and/or area sources of TACs may also be in the project

vicinity and could include, but are not limited to: gasoline dispensing stations, auto body coating operations, and research and development facilities.

Major highways and roadways are also considered sources of TAC emissions, associated with the presence of diesel PM emissions from vehicle exhaust. State Route 1 (SR 1), a two-lane, largely coastal highway, passes approximately one mile south of the UC Santa Cruz main residential campus and SR 9, a rural two-lane, mountainous highway, passes approximately one mile east of the campus. Due to the relatively isolated location of UC Santa Cruz's campus, TAC emissions from major roadway traffic do not substantially affect air quality on campus.

Ultrafine Particulate Matter

Although UFP contributes only a small amount to total PM mass, the particle number concentration (PNC) is typically high, tens of thousands of particles per cubic-centimeter, and each ultrafine particle has a large surface area. Because of its small size, a given mass of UFP contains thousands to tens of thousands more particles, with a correspondingly larger combined surface area, than an equivalent mass of $PM_{2.5}$ or PM_{10} (De Jesus et al. 2019). Additionally, with such a small diameter, UFP behaves much like a gas and may be inhaled more deeply into the lungs than larger particles (Oberdörster 2001:1). Thus, a given mass of UFP can have a much greater impact on lung tissue than an equivalent mass of $PM_{2.5}$ or PM_{10} (Delfino et al. 2005:934).

Both laboratory and epidemiological studies indicate that exposure to UFP may lead to adverse health effects in animals and humans (HEI 2013:2; Froines 2006) and toxicological studies have concluded that UFP is more toxic than larger sized particles (Zhu et al. 2002a:4324; Li et al. 2003:455). Experimental studies suggest that the adverse health effects of exposure to UFPs differ from those of larger particles. Because of their physical characteristics, inhaled ultrafine particles differ from larger particles in their deposition patterns in the lung, their clearance mechanisms, and in their potential for translocation from the lung to other tissues in the body or to the brain (CARB 2019a; HEI 2013:3). UFP easily penetrates deep into the alveoli and passes rapidly into the human circulatory system, increasing the number of particles in the blood and thus increasing the exposure of other organs to UFP (Nemmar et al. 2002:411). UFP has been shown to contain many toxic components such as metals, inorganic carbon, and organic compounds which may initiate or play a role in several types of harmful cellular oxidative stress processes that can damage the heart, lungs, brain, and other organs (CARB 2019a; Oberdörster 2001:1; Donaldson et al. 2001:526; Stölzel et al. 2007:458). UFP has also been found to be more potent than $PM_{2.5}$ and PM_{10} in inducing cellular damage (Li et al. 2003:455 to 456). Observed effects in selected studies include lung function changes, airway inflammation, enhanced allergic responses, vascular thrombogenic effects, altered endothelial function, altered heart rate and heart rate variability, accelerated atherosclerosis, and increased markers of brain inflammation (HEI 2013:3, 36, 39, 45, 65). UFP, which is formed primarily during the combustion of fossil fuels, is found in the exhaust of on-road vehicles, diesel-powered generators and other equipment, off-road vehicles, and industrial stationary sources.

Naturally Occurring Asbestos

Asbestos is the common name for a group of naturally occurring fibrous silicate minerals that can separate into thin but strong and durable fibers. Naturally occurring asbestos, which was identified as a TAC by CARB in 1986, is located in many parts of California and is commonly associated with serpentine soils and rocks. According to the California Geological Survey (CGS) and U.S. Geological Survey (USGS), Division of Mines and Geology, naturally occurring asbestos have not been reported in Santa Cruz County; however, there are two reported unspecific fibrous amphiboles (i.e., fibrous crystalline material) in Santa Cruz county, located at the Kalkar Rock Quarry (201 Quarry Lane, Santa Cruz, CA, 95060) and the Gabbro body outcrops (74 Atherly Lane, Santa Cruz, CA, 95060). According to the CGS and USGS, the presence of fibrous amphiboles suggest that nearby geologic conditions are favorable toward the formation of asbestos. (Van Gosen and Clinkenbeard 2011).

Odors

Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

The ability to detect odors varies considerably among the population and is subjective. An odor that is offensive to one person may be acceptable to another (e.g., fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word strong to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Land uses that are major sources of odor typically include wastewater treatment and pumping facilities, sanitary landfills, transfer stations, recycling and composting facilities, major livestock facilities, and various industrial uses such as chemical manufacturing and food processing. Currently, UC Santa Cruz has no major sources of odors on or adjacent to the main residential campus or the Westside Research Park and there have been no odor complaints filed (Searson, personal communication 2020).

Sensitive Land Uses

Sensitive land uses generally include uses where prolonged exposure to pollutants could result in health-related risks to individuals. Residential dwellings and places where people recreate or congregate for extended periods of time such as parks or schools are of primary concern because of the potential for increased and prolonged exposure of individuals to pollutants. Hospitals, childcare centers, schools, and assisted-living facilities are examples of sites where sensitive receptors congregate. Sensitive receptors on these land uses include, but are not limited to, children, the elderly, those with respiratory conditions, and those using outdoor athletic facilities where occupants have relatively higher breathing rates.

Existing sensitive land uses located adjacent to or within the UC Santa Cruz main residential campus include one on-campus childcare facility at Student Family Housing and two off-campus schools. The childcare centers on the UC Santa Cruz campus is located on the western edge of campus, in the Family Student Housing (FSH) area. Off-campus, West Lake Elementary School and Coastal Community Preschool are located just adjacent to each other on High Street, approximately 2,000 feet south of the campus border. The Santa Cruz Waldorf School is located on Empire Grade Road, approximately 3,500 feet northwest of the core campus. Families with small children may also reside in on-campus student, faculty, and staff housing, including FSH. Families with small children and elderly may reside in the neighborhoods to the south and east of the main residential campus and within the Cave Gulch neighborhood located along the western edge of the main residential campus. The Westside Research Park is surrounded by open space and industrial uses. Residential receptors are present in apartments to the northwest, single-family homes to the east along Natural Bridges Drive and to the southeast, and mobile homes southwest. Pacific Collegiate School, a charter school is also located approximately 500 feet north of Westside Research Park.

3.3.3 Environmental Impacts and Mitigation Measures

ANALYSIS METHODOLOGY

Construction Criteria Air Pollutants and Ozone Precursors

Construction-related emissions of criteria air pollutants and ozone precursors were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2 computer program (CAPCOA 2016a), as recommended by MBARD. Modeling was based on project-specific information (e.g., land use types, traffic modelling, building space), where available, reasonable assumptions based on typical construction activities, and default values in CalEEMod that

are based on the project's location and land use type. CalEEMod accounts for known policies and regulations that may affect emissions calculations, such as state and federal emission standards for diesel off-road equipment and local air district's architectural coating VOC limits (CAPCOA 2016b).

Estimates of criteria air pollutant and precursor emissions associated with the construction of roadways, trails, and pedestrian bridges were calculated using the Sacramento Metropolitan Air Quality Management District's (SMAQMD) Road Construction Emissions Model (RCEM), Version 9.0.0 (SMAQMD 2018). SMAQMD's RCEM is the only publicly available emissions model specifically designed to estimate emissions from linear construction activities in California, such as roadways and pipelines. Although from an air district outside the NCCAB, the RCEM is recommended for linear construction modeling by multiple air districts outside the Sacramento Valley Air Basin, such as the Bay Area Air Quality Management District (BAAQMD) and the South Coast Air Quality Management District (SCAQMD) (BAAQMD 2012, SCAQMD 2020). Thus, its use to model activity in the NCCAB is acceptable (Kim, pers. comm., 2020b).

Construction activities considered in the 2021 LRDP are anticipated to commence in 2022 and continue through 2040, for a period of about 18 years, and will include building, roadway, and trail construction. Additionally, it is assumed that over the years 2022-2031, one pedestrian bridge would be constructed, and over the years 2032-2040, two pedestrian bridges would be constructed. For a detailed description of model input and output parameters, and assumptions, refer to Appendix D1.

The 2021 LRDP does not specify the timing of potential construction activities other than they would occur as early as 2022 and last through 2040.

Based on the overall building program, as shown in Chapter 2, "Project Description," annual and maximum daily construction emissions are based on the combined results of CalEEMod and RCEM runs for the construction of approximately 312,700 assignable square feet (asf) (approximately 481,100 gross square feet [gsf]) of various land uses per year (not including parking lots), amortized over 18 years to estimate average annual construction activity, associated annual emissions, and maximum daily emissions that may occur within a year of construction.

Table 3.3-4 summarizes the project-related activities for which emissions were estimated; the model, protocol, and source of emission factors used; and the key input parameters on which each activity's emissions were determined.

Operational Criteria Air Pollutants and Ozone Precursors

Operation-related emissions of criteria air pollutants and precursors from building energy use, area sources (i.e., architectural coating, consumer products, and landscaping), stationary sources, and mobile sources were calculated using a variety of models and reports. CalEEMod Version 2016.3.2 was used to estimate emissions from area sources (except for laboratory sources), combustion-based stationary sources, and mobile sources. CalEEMod accounts for certain policies that may affect operational emissions factors, such as state and federal vehicle emission standards, discussed further below. These policies are accounted for in modeling results, unless otherwise noted. Stationary fugitive emissions from laboratories and a gasoline storage tank were based off modeling conducted for the HRA.

Additional off-model adjustments were made to the consumer product ROG emissions modeled in CalEEMod to account for updates to CARB's consumer product VOC standards. According to Appendix E of the User's Guide for CalEEMod Version 2016.3.2, CalEEMod applies statewide average consumer emissions factors calculated from the State's 2008 consumer product emissions inventory for residential and non-residential buildings; CalEEMod applies a separate emissions factor for parking lots. Since 2008, CARB has made more stringent several consumer product VOC standards, which are set based on a percent VOC limit by weight. Based on UC Santa Cruz's chemical inventory data, consumer products used by UC Santa Cruz include a variety of aerosol and non-aerosol products such as: adhesives, adhesive and paint removers, solvents, soaps, cleaners, and disinfectants, hairsprays (for theater production), lubricants, polishes, sealants, and insecticides and herbicides (Carpenter, pers. comm., 2020, WAXIE 2020). Chemicals used for laboratory research purposes are not considered consumer products and are accounted for separately.

Using the inventory of consumer products purchased by UC Santa Cruz available from the university and CARB's pre- and post-2008 VOC standards, a weighted average reduction in VOC content of 31 percent was applied to the non-residential, non-parking lot consumer product emissions modeled in CalEEMod (CARB 2019c, SCAQMD 2017:E-8). This reduces the default consumer product emissions from all sources by approximately 17 percent. This method

assumes that consumer product emissions generally emit up to CARB VOC standards and all products emit VOCs at equal rates. Although emission rates vary by product, the estimated percent reduction is applied to the default emissions factor, which is based on a statewide average rate that captures those variabilities. Residential consumer products were excluded because and the inventory of residential product usage on campus was not readily available. As such, it was conservatively assumed that residential consumer product emissions would remain unchanged. The calculation details of how the reduction in VOC standards affect are shown in Appendix C.

Landscaping emissions modeled in CalEEMod were also adjusted off model based on information from UC Santa Cruz that 85 percent of landscaping equipment on campus is currently electric. It was assumed that the number of equipment is proportional to the emissions from landscaping equipment. Accordingly, CalEEMod default landscaping emissions, which do not assume electric equipment, were reduced by 85 percent.

With respect to the effect of UC policies on operational emissions, the list below describes how specific policies of the Sustainable Practices Policy are reflected in the modeling of operational criteria pollutant emissions, as a co-benefit of reductions in energy consumption and GHG emissions. In general, the modeling of operational emissions reflects sustainability policy language that specifically requires UC Santa Cruz to achieve a certain level of energy consumption or GHG emissions reduction target, versus targeting a certain level of sustainability with no set requirement.

- Green Building Design
  - Criteria pollutant emissions reductions resulting from achieving the energy performance targets related to 1999 benchmarks, as shown in Table 1 of the *UC Building 1999 Energy Benchmarks by Campus* (Sahai, et al. 2014), are accounted for through reduced energy consumption in modeling.
- Sustainable Transportation
  - Strategies to reduce GHG emissions from fleet activities and other sustainable transportation strategies are not accounted for in modeling. However, as part of Transportation Mitigation Measure 3.16-1, traffic demand model (TDM) performance standards will be implemented that result in the reduction of total VMT per capita to 15 percent below current campus average and the total employment VMT per employee to 15 percent below the countywide average. This reduction is accounted for in calculation of mitigated criteria pollutant emissions.
- Sustainable Building Operations for Campuses
  - Per the Sustainable Practices Policy Sustainable Building Operations policy, no new building or major renovation that is approved after June 30, 2019 shall use onsite fossil fuel combustion (e.g., natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure). This policy was not accounted for in modeling, as there is no way to predict the total number of building or renovation projects to be approved in the foreseeable future, nor which projects will be allowed to utilize fossil fuel combustion.

Project-related activities for which emissions were estimated; the model, protocol, and source of emission factors used; and the key input parameters based on which each activity's emissions were determined are summarized in Table 3.3-4.

Table 3.3-4 Parameters Used to Estimate Project-Related Construction and Operational Emissions of Criteria Air Pollutants and Precursors

Land Use/Source	Model/Protocol/ Source of Emission Factors	Key Input Parameter(s)
Construction Emissions		
Academic and Administrative Designated Land Use	CalEEMod	62,632 asf/year of Research and Development land use 71,691 asf/year University/College land use
Other Land Use Types (recreational, additional housing, infrastructure)	CalEEMod	33,784 asf health club space/year 3,217 asf general light industry/year 104,238 asf/year parking lots 473 mid-rise apartments/year (104,722 asf/year) 31 low-rise apartments/year (36,667 asf/year)
Campus Roads, Trails, and Pedestrian Bridges	RCEM	2 miles/year roads; 2 miles/year trails; 1 bridge between 2022-2031; 2 bridges between 2032-2040
Operational Emissions		
Area Sources	CalEEMod	Default parameters based on land use inputs except for hearths. Non-residential consumer product emissions adjusted by changes in CARB VOC standards since 2008. Assumed no fireplaces or wood-burning stoves. Landscaping equipment assumed to be 85% electric.
Stationary Sources - Natural Gas	CalEEMod	Assumes buildings meet 2019 Title 24 building energy efficiency standards
Stationary Sources – Laboratory Fume Hoods	UC Santa Cruz laboratory chemical inventory	Maximum daily emissions based on annual emissions used for the HRA analysis, divided by 287 FAD equivalents[1].
Stationary Sources – Gasoline Storage Tank	MBARD Prioritization Score Assessment for UC Santa Cruz	
Mobile Sources	EMFAC 2017 and VMT data modeled by Fehr and Peers	Emission factors from EMFAC 2017 applied to VMT data provided by Fehr and Peers. VMT based on travel demand model and on-site traffic counts/trip generation.

Notes: asf = assignable square footage; CARB = California Air Resources Board; MBARD = Monterey Bay Area Air Resources District; VOC = volatile organic compound; VMT = vehicle miles travelled; HRA = health risk assessment; FAD = full academic day

Models: CalEEMod v.2016.3.2, EMFAC 2017, RCEM v. 9.0.0.

[1] Accounts for UC Santa Cruz's academic schedule, holidays, and enrollment levels during summer and regular academic quarters.

Source: UC Santa Cruz 2005; Kim, pers. comm., 2020a; Carpenter, pers. comm., 2020; MBARD Data compiled by Ascent Environmental in 2020

Toxic Air Contaminants, Carbon Monoxide, and Odors

An HRA was conducted to estimate the health risks associated with construction- and operation-related TAC emissions that would be generated as a result of the 2021 LRDP. To assess the potential human health risks posed by the TAC emissions from campus development under the proposed 2021 LRDP, the HRA followed the methodologies outlined in the OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA 2015). As recommended by the 2015 OEHHA guidelines, CARB's Hotspots Analysis and Reporting Program, Version 2 (HARP2) was used to perform the OEHHA Tier 1 HRA for the project. Dispersion modeling was conducted using the CARB-approved American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee modeling system (AERMOD), Version 19191 (EPA 2019b). Other model assumptions and additional details can be found in the full HRA located in Appendix D2.

For both construction and operational health risk calculations, a receptor grid with 100-meter spacing was overlaid across the plan area and within 400 meters of the main residential campus's southern border and main haul routes extending along High Street and Bay Drive from the southern campus border to Highway 1. Average annual and

maximum hourly emissions were derived from the annual and maximum daily emissions from the CalEEMod, RCEM, and trail construction modeling conducted for the criteria air pollutant and GHG analyses. Operational emission rates were based solely on the CalEEMod results, which modeled the operational emissions from new buildings and parking lots. The RCEM and trail construction models did not have maintenance-related emissions rates. It is assumed that operational emissions associated with the maintenance of the proposed roadways, bridges, and trails would be minimal and, thus, are excluded from modeling. Maintenance of these components would only occur a few times per year at most, would be temporary in nature, and are assumed to be encompassed by normal operations-and-maintenance-related activities associated with campus operation.

Health risk from construction-related emissions was assessed based on the proximity of diesel PM-generating construction activity to off-site sensitive receptors, the number and types of diesel-powered construction equipment being used, and the duration of potential TAC exposure. Construction-related risks were based on an 18-year exposure period to characterize impacts across the 2021 LRDP implementation period and on annual and maximum hourly emissions derived from diesel PM_{10} exhaust results from criteria air pollutant modeling. According to Appendix D of OEHHA's 2003 HRA guidance, PM_{10} is the basis for OEHHA's potential risk calculations for diesel PM (OEHHA 2003, CARB 2020a). Thus, estimated emissions of PM_{10} from diesel combustion sources were used as a proxy for diesel PM in the risk assessment. Comprehensive details and results of the HRA are included in Appendix D2.

The level of health risk exposure from operational TAC sources was based on the new and modified existing sources that would be operated under the 2021 LRDP, including both stationary and on-road mobile sources. Depending on the type of source, the number of existing sources were scaled up by the anticipated growth in students and building square footage, and additional sources were based on the growth anticipated under the 2021 LRDP (e.g., estimated growth in energy use and building area, estimated additional VMT). The placement of these new sources was based on development areas shown in in Figure 2-4 in Chapter 2, "Project Description" and conceptual siting of structures within envisioned development areas. Any modified existing sources were not assumed to be moved from their current positions (e.g., natural gas turbines, gasoline storage tank). The exposure parameters were based on default assumptions within HARP2 for residential and worker receptor types – 30-year and 25-year exposure durations, respectively, which are conservative parameters. Although most students would reside on campus for short terms (e.g., four years), faculty housing is also located on campus and could house long-term residents.

A description of the modified and proposed sources under the 2021 LRDP are shown in Table 3.3-5.

Table 3.3-5 Proposed and Modified Existing Toxic Air Contaminant Sources Quantified Considered in the Health Risk Assessment

Construction or Operation[1]	Proposed or Modified Existing	Source	Assumed Activity under 2021 LRDP for modeling purposes[2]	Emissions Scaling method from Existing conditions
Operation	Proposed	Boilers	Three new natural gas boilers	Scaled by growth in natural gas use
Operation	Modified	Natural Gas Turbines	Current natural gas turbine at cogeneration facility to increase output by 30 percent	Scaled by growth in total energy use (turbines generate both heat and electricity)
Operation	Proposed	Emergency Generators	27 new natural gas emergency generators	Scaled by growth in electricity use
Operation	Proposed	Standby Generators	Four new natural gas standby generators	No scaling method used. Number of new standby generators were proposed by UC Santa Cruz
Operation	Proposed	Fume Hoods	New chemical emissions anticipated from potential laboratories in development areas, attributable to approximately three new buildings.	Scaled by increase in instruction and research building square footage
Operation	Modified	Gasoline Storage Tank	Current gasoline storage tank to increase usage/storage by 50 percent	Scaled by increase in total building square footage

Construction or Operation[1]	Proposed or Modified Existing	Source	Assumed Activity under 2021 LRDP for modeling purposes[2]	Emissions Scaling method from Existing conditions
Operation	Proposed	Diesel Mobile Sources	Net increase in diesel-powered VMT generated under the 2021 LRDP	Scaled by increase in VMT
Construction	Proposed	Off-Road Equipment	Diesel off-road equipment activity associated with 2021 LRDP construction	Activity based on modeled emissions for construction.
Construction	Proposed	Haul Trucks	Diesel on-road haul truck activity associated with 2021 LRDP construction	Activity based on modeled emissions for construction.

Notes: VMT = vehicle miles travelled

[1] Sources that will continue through 2021 LRDP implementation

[2] See Appendix D2 for a detailed explanation of the scaling methods used to estimate new source activity.

Source: Data compiled by Ascent Environmental in 2020

Impacts associated with exposure from CO hotspots were evaluated using screening criteria consistent with MBARD guidance. Odors were evaluated qualitatively based on proposed land uses and their relative location to existing sensitive land uses.

Ultrafine Particulate Matter

Health effects associated with exposure to UFP are based on the results of the TAC analysis included in the HRA. UFP is a subset of PM, and the list of recognized TAC pollutants in the HRA includes diesel PM and other pollutants that can manifest as PM.

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, an air quality impact is considered significant if implementation of the proposed 2021 LRDP would do any of the following:

- conflict with or obstruct implementation of the applicable air quality plan;
- result in a cumulatively considerable net increase of any criteria air pollutant for which the project region is in nonattainment under an applicable National or State ambient air quality standard (including emissions that exceed quantitative standards for ozone precursors);
- expose sensitive receptors to substantial pollutant concentrations (including TACs); or result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

As stated in Appendix G of the State CEQA Guidelines, the significance of criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. For development projects, MBARD has set forth mass-based emissions thresholds that lead agencies may use to evaluate the significance of a project's air pollutant emissions. For local plans, such as the 2021 LRDP, MBARD recommends demonstrating consistency with the AQMP in order to claim a less-than-significant impact on air quality in the NCCAB (MBARD 2008:5-10). The University has elected to use both consistency with the AQMP and mass emissions-based thresholds to evaluate the significance of LRDP-related air emissions. Thus, the proposed 2021 LRDP would result in a potentially significant impact on air quality if it would result in any of the following during either short-term construction of projects or long-term implementation of the 2021 LRDP:

- cause criteria air pollutant or precursor emissions to exceed 137 pounds per day (lb/day) for ROG or NO_X, 82 lb/day of PM_{10}, 55 lb/day of $PM_{2.5}$, or 550 lb/day of CO emissions;
- cause odorous emissions in such quantities as to cause detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which may endanger the comfort, repose, health, or safety of any such person or the public, or which may cause, or have a natural tendency to cause, injury or damage to business or property (MBARD 2008); or
- Be inconsistent with the adopted AQMP.

For the evaluation of TAC emissions, MBARD considers the contribution of TAC emissions of a project to be substantial, during either the construction or operational phases, if it would:

- Result in a maximum individual cancer risk (MICR) in excess of 10 in a million;
- Result in an acute or chronic non-cancerous health hazard index (HI) greater than 1.0.

ISSUES NOT EVALUATED FURTHER

All issues applicable to air quality, as outlined by the significance criteria above, are evaluated below.

IMPACTS AND MITIGATION MEASURES

Impact 3.3-1: Construction-Generated Emissions of Criteria Air Pollutants and Precursors

A quantitative analysis was performed to estimate the emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ that would be generated during an average year of on-campus construction under the proposed 2021 LRDP. Emissions were assumed to result from demolition, site preparation (e.g., excavation, clearing), off-road equipment use, material and equipment delivery trips, worker commute trips, and other construction activities (e.g., building, asphalt paving, application of architectural coatings), as well as trail and roadway construction, and the occasional construction of pedestrian bridges. Construction-generated daily NO_X emissions could occasionally exceed MBARD's significance threshold of 137 lb/day due to overlapping construction activities. Thus, construction emissions would have the potential to conflict with air quality planning efforts and result in a cumulatively considerable net increase of ozone for which the project region is nonattainment under the NAAQS and CAAQS. This impact would be **significant**.

Campus construction activities would result in emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ from demolition, site preparation (e.g., excavation, clearing), off-road equipment, material delivery, worker commute trips, building construction, asphalt paving, and application of architectural coatings. Fugitive dust emissions of PM_{10} and $PM_{2.5}$ are associated primarily with site preparation and grading and vary as a function of soil silt content, soil moisture, wind speed, acreage of disturbance, and VMT on and off the project site. Emissions of ozone precursors, ROG and NO_X, are associated primarily with construction equipment and on-road mobile exhaust. Paving and the application of architectural coatings result in off-gas emissions of ROG. PM_{10} and $PM_{2.5}$ are also contained in vehicle exhaust.

Typical construction activities would require all-terrain forks, forklifts, cranes, pick-up and fuel trucks, compressors, loaders, backhoes, excavators, dozers, scrapers, pavement compactors, welders, concrete pumps, concrete trucks, and off-road haul trucks, as well as other diesel-fueled equipment, as necessary. As the UC Santa Cruz main residential campus is heavily wooded in some areas, tree removal will be part of site preparation for some projects.

Construction activities could begin as early as 2022 and are estimated to occur through 2040, with the 2021 LRDP operating at its full forecasted capacity by 2040. Construction occurring as part of the 2021 LRDP would total to an average 207,493 square-feet per year (not including parking lots), consisting of the various land uses listed in Table 3.3-4. This average sf value was estimated based on 18 years of construction, from 2022 to 2040, assuming that construction activities would be relatively similar from year to year. Construction under the proposed 2021 LRDP would result in daily emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$. Estimated maximum daily construction emissions are summarized in Table 3.3-6, below. As discussed above under Methodology, these values were calculated using CalEEMod and RCEM models to estimate the daily construction emissions based on the average annual amount of construction in one year, and the distribution of typical construction phases over one year. Refer to Appendix D1 for a detailed summary of the modeling assumptions, inputs, and outputs.

Table 3.3-6 Summary of Modeled Emissions of Criteria Air Pollutants and Precursors Associated with 2021 LRDP Construction Activities – Unmitigated

Year(s) of Construction	Maximum Daily Emissions ROG (lb/day)	Maximum Daily Emissions NO_X (lb/day)	Maximum Daily Emissions PM_{10} (lb/day)	Maximum Daily Emissions $PM_{2.5}$ (lb/day)
2022 – 2040	45.3	238.1	49.0 (9.6)[1]	27.4 (8.8)[1]
MBARD Thresholds of Significance	137	137	82	55
Exceed Threshold of Significance?	No	Yes	No	No

Notes: Modeled values represent maximum daily emissions that would occur over the duration of the construction period. See Appendix D1 for detail on model inputs, assumptions, and project specific modeling parameters.

ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$ = respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less; lb/day = pounds per day; MBARD = Monterey Bay Air Resources District

[1] Numbers in parentheses represent the portion of PM emissions from exhaust. Numbers not in parentheses represent fugitive and exhaust emissions combined.

Source: Modeling conducted by Ascent Environmental in 2020.

As shown in Table 3.3-6, construction of the 2021 LRDP components could result in an exceedance of the daily NO_X threshold during years 2022 through 2040. This exceedance of the NO_X threshold would occur during overlapping phases of construction, including building and other land use construction, as well as roadway, trail, and bridge construction. See Appendix D1 for further details related to the sources of construction-related emissions.

As the estimated construction emissions associated with proposed development under the 2021 LRDP would potentially exceed MBARD daily NO_X threshold during some days of the year, this impact would be **significant**.

Mitigation Measures

Mitigation Measure 3.3-1: Reduce Construction-Generated Emissions of NO_X

Per contract specification requirements, UC Santa Cruz shall require that the contractor(s) develop and implement a plan demonstrating that the off-road equipment used on-site to construct 2021 LRDP projects would achieve a fleet-wide average 45 percent reduction in NO_X exhaust emissions, compared to uncontrolled aggregate statewide emission rates for similar equipment. One feasible plan to achieve this reduction would include the following:

- At least 80 percent of diesel-powered off-road equipment operating on the project site for more than two days continuously shall be equipped with engines meeting US EPA emissions standards for Tier 3 engines or equivalent, and use of Tier 4 engines shall be encouraged;
- Use of renewable diesel or other zero emissions alternative (e.g., electric) construction equipment to the degree available and feasible;
- Plan construction projects such that multiple project components (i.e., bridge or roadway construction) will not occur on the same days; and
- Alternatively, if UC Santa Cruz can demonstrate through preparation of an air quality assessment report prepared by an air quality specialist that large or contemporaneous 2021 LRDP construction projects would not exceed MBARD thresholds, then the above mitigation requirements may be waived.

Significance after Mitigation

Tier 3 engines have been certified by the EPA as having cleaner burning engines and lower emissions, reducing NO_X emissions from the unmitigated scenario modeled in CalEEMod. Applying the Tier 3 engine mitigation alone would result in a 41 percent reduction in maximum daily NO_X emissions, reducing NO_X emissions to 140 lb per day, which is still above the daily MBARD NO_X threshold. Separating the schedule for bridge construction from other 2021 LRDP construction activities would reduce an additional 70 lb NO_X per day from the maximum daily construction emissions. Renewable diesel can reduce NO_X emissions by another 10 percent, according to a staff report from the California Environmental Protection Agency (CalEPA) (CalEPA 2015:14). These measures would reduce maximum daily NO_X

emissions to 126 lb NO_X per day, which is below the daily MBARD NO_X threshold. In addition to reducing NO_X emissions, the implementation of Mitigation Measure 3.3-2 would also reduce ROG, PM_{10}, and $PM_{2.5}$ emissions from construction activity.

Assuming the implementation of Tier 3 equipment (e.g., excavators, cranes, graders, forklifts), separation of bridge construction, and use of renewable diesel pursuant to Mitigation Measure 3.3-2, the potential resulting mitigated emissions are presented in Table 3.3-7.

Table 3.3-7 Summary of Modeled Emissions of Criteria Air Pollutants and Precursors Associated with 2021 LRDP Construction Activities – Mitigated

Year(s) of Construction	Maximum Daily Emissions[1] ROG (lb/day)	Maximum Daily Emissions[1] NO_X (lb/day)	Maximum Daily Emissions[1] PM_{10} (lb/day)	Maximum Daily Emissions[1] $PM_{2.5}$ (lb/day)
2022 - 2040	33	126	30 (5)[2]	16 (4)[2]
MBARD Thresholds of Significance	137	137	82	55
Percent Reduction from Unmitigated Scenario	-26%	-47%	-39% (-53%)	-43% (-50%)
Exceed Threshold of Significance?	No	No	No	No

Notes: Modeled values represent maximum daily that would occur over the duration of the construction period. See Appendix D1 for detail on model inputs, assumptions, and project specific modeling parameters.

ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$ = respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less; lb/day = pounds per day; NA = not available; MBARD = Monterey Bay Air Resources District

[1] Assumes that bridge construction would not occur on the same days as building, roadway, or trail construction.

[2] Numbers in parenthesis represent the portion of PM emissions from exhaust. Numbers not in parenthesis represent fugitive and exhaust emissions combined.

Source: Modeling conducted by Ascent Environmental in 2020.

Implementation of Mitigation Measure 3.3-1 would reduce the generation of NO_X emissions related to construction under the 2021 LRDP to below MBARD significance criteria. Table 3.3-7 shows the modeled emissions after mitigation, assuming building, roadway, trail, and bridge construction were not to occur concurrently, that the use of at least 80 percent of construction fleets would include Tier 3 or better engines, and that renewable diesel would also be used in place of conventional diesel. As a stop gap, this mitigation measure requires contractors to demonstrate a minimum reduction of NO_X emissions by 45 percent or below MBARD daily thresholds. Thus, under Mitigation Measure 3.3-1, maximum daily NO_X emissions would not exceed the MBARD threshold. Therefore, this impact would be **less than significant**.

Impact 3.3-2: Operational Emissions of Criteria Air Pollutants and Precursors

Implementation of individual projects under the 2021 LRDP would result in long-term project-generated emissions of criteria air pollutants, particularly emissions of the ozone precursor, ROG, from the use of consumer products and cleaning supplies. Incremental long-term, operational ROG and PM_{10} emissions would exceed MBARD thresholds of significance (137 lb/day and 82 lb/day, respectively). Thus, operational emissions would conflict with the air quality planning efforts and result in a cumulatively considerable net increase of ozone and ambient PM_{10} concentrations, for both of which the project region is in nonattainment under the CAAQS. This would be a **potentially significant** impact.

The 2021 LRDP would result in new mobile sources and area sources associated with new residential land uses, academic building space, and recreational and athletic facilities. New and expanded existing stationary sources, such as boilers, emergency generators, and natural gas turbines, could be added to support energy needs of the expanded campus. Although development projects on the campus would be completed and begin operations as time progresses from the start of construction considered in the 2021 LRDP (i.e., from 2022 through 2040), new operational emissions that would result in 2040, when the forecasted 2021 LRDP capacity is reached, are analyzed below in order to evaluate and disclose the maximum impact. Operational emissions in the years preceding 2040 would be lower than those reported for 2040 conditions at full build-out.

The MBARD-adopted mass emissions thresholds apply at the individual project level and are cumulative in nature; that is, they identify the level of project-generated emissions below which the project's emissions would not be cumulatively considerable, or above which would be considered cumulatively considerable. Thus, the analysis set forth here reflects a conservative approach as it applies an individual project's mass emissions threshold to the evaluation of the total operational emissions that are estimated to result from all 2021 LRDP projects.

Operational emissions are discussed by source, below.

Area Sources

Area sources of emissions during 2021 LRDP operation include reapplication of architectural coatings for building maintenance, consumer products, and landscaping equipment. Architectural coating, consumer products, and landscaping emissions result from typical residential and non-residential building operation through regular building maintenance and occupancy. Consumer products used by the residential and non-residential land uses on campus contain various solvents that emit ROG and include cleaning supplies, toiletries, adhesives, adhesive and paint removers, solvents, cleaners, and disinfectants, lubricants, polishes, sealants, and insecticides and herbicides (CAPCOA 2016b:41, Carpenter, pers. comm., 2020, Waxie Sanitary Supply 2020). Landscaping emissions include exhaust emissions from the use of landscaping equipment such as gasoline-powered lawn mowers and leaf blowers. ROG emissions also result from the application of architectural coatings. Modeling data of operational 2021 LRDP emissions from area sources indicate that consumer products are responsible for an estimated 80.3 percent of ROG emissions, architectural coatings are responsible for 19.1 percent of ROG emissions, and landscaping equipment is responsible for 0.6 percent of ROG emissions.

Stationary Sources

Stationary sources during 2021 LRDP implementation would include natural gas combustion equipment (such as furnaces, boilers, natural gas turbines, and emergency generators) and fugitive emissions from potential future laboratory space, which operate fume hoods; and expanded gasoline tank storage.

Combustion of natural gas in new facilities under the 2021 LRDP would result in increased emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$. While the UC Sustainable Practices Policy states that new buildings will not use natural gas or other fossil fuels for on-site combustion, the policy allows some flexibility for campuses to use natural gas in new buildings that are connected to the existing campus central thermal infrastructure or when otherwise necessary, provided an explanation is given. The UC Sustainable Practices Policy states "Projects unable to meet this requirement shall document the rationale for this decision…" (UCOP 2020:9). Due to this flexibility in the policy, it is conservatively assumed that the additional buildings would use natural gas at a rate typical for the types of proposed land uses, as modeled through CalEEMod. It is assumed these demands would be met by a combination of natural gas equipment, including furnaces, boilers, cogeneration turbines, and emergency generators.

Stationary sources from fugitive emissions include those from research activity in new laboratories and expanded on-site gasoline storage. These sources result in various ROG emissions, including those commonly associated with cleaning solvents, coatings, gasoline vapor emissions, as well as chemical solutions specific to the type of research being conducted at laboratories.

Emissions from new stationary sources are controlled through MBARD's permitting process through Rule 423, New Source Performance Standards. As with the campus' existing permitted sources, these new sources within UC Santa Cruz would be required to apply BACT. UC Santa Cruz would also be required to purchase emission reduction credits (ERCs) to offset emissions from new sources per MBARD guidance. The level to which emissions would be offset through ERCs would be determined at the time of the permit application process for new sources under the 2021 LRDP. Additionally, an HRA was prepared, which includes an identification of stationary sources and an estimate of their contribution to operational TAC emissions, discussed in Impact 3.3-5 below.

Mobile Sources

Mobile-source emissions of criteria air pollutants and ozone precursors would result from employee and student commute trips, campus-operated fleet, and trips made to the campus by vendors and visitors. LRDP-generated mobile-source emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ were modeled using LRDP-specific data and applicable

emission rates by modifying the default assumptions in CalEEMod to match the daily trip rates presented in the transportation study. Daily VMT were adjusted to annual VMT using a conversion factor of 287 which accounts for UC Santa Cruz's academic schedule, holidays, and enrollment levels during summer and regular academic quarters.

Table 3.3-8 summarizes the modeled operational emissions of criteria air pollutants and precursors under 2021 LRDP implementation conditions in 2040. As shown in this table, operational emissions of ROG and PM_{10} associated with implementation of the 2021 LRDP would exceed the established MBARD daily threshold. The MBARD thresholds are designed to ensure that new development does not result in emissions that would interfere with the attainment of federal and state air quality standards, nor conflict with or obstruct implementation of any regional air quality plan. As the estimated operational ROG and PM_{10} emissions associated with proposed development under the 2021 LRDP would potentially exceed MBARD daily ROG and PM_{10} thresholds during some days of the year, this impact would be **significant**.

Table 3.3-8 Summary of Modeled Operational Emissions of Criteria Air Pollutants and Precursors Associated with 2021 LRDP Implementation (2040) – Unmitigated

Emissions Source	Maximum Daily Emissions ROG (lb/day)	Maximum Daily Emissions NO_X (lb/day)	Maximum Daily Emissions PM_{10} (lb/day)	Maximum Daily Emissions $PM_{2.5}$ (lb/day)
Land Uses under 2021 LRDP				
Area Sources[1]	121.9	0.2	0.1	0.8
Consumer Products	*100.6*	*0.0*	*0.0*	*0.0*
Architectural Coatings	*20.7*	*0.0*	*0.0*	*0.0*
Landscaping Equipment	*0.6*	*0.2*	*0.1*	*0.8*
Stationary Sources	3.6	23.3	1.8	1.8
Natural Gas Combustion[2]	*2.6*	*23.3*	*1.8*	*1.8*
Laboratories[3]	*1.0*	*0.0*	*0.0*	*0.0*
Gasoline Storage Tank[3]	*<0.1*	*0.0*	*0.0*	*0.0*
Mobile Sources[4]	26.6	55.3	105.8	28.5
Exhaust	26.6	55.3	*0.4*	*0.4*
Fugitive Dust	*0.0*	*0.0*	*105.3*	*28.1*
TOTAL	**152**	**79**	**108**	**30**
MBARD Thresholds of Significance	137	137	82	55
Exceed Threshold of Significance?	**Yes**	**No**	**Yes**	**No**

Note: Summation may not equal totals because of rounding. See Appendix D1 for detail on model inputs, assumptions, and project specific modeling parameters.

[1] Modeled in CalEEMod 2016.3.2.

[2] Under the UC Sustainable Practices Policy, all new facilities are prohibited from using natural gas or fossil fuels; however, there is flexibility in the policy that allows campuses to use natural gas or fossil fuel sources if they are unable to comply. As a conservative assumption, calculations assume natural gas use would continue in new buildings under the 2021 LRDP.

[3] Based on annual emissions used in HRA modeling divided by 287 full academic day equivalents, accounting for UC Santa Cruz's academic schedule, holidays, and enrollment levels during summer and regular academic quarters.

[4] Based on modeling with VMT data from Fehr and Peers and emission factors from EMFAC 2017.

ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$ = respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less; lb/day = pounds per day; LRDP = Long Range Development Plan; MBARD = Monterey Bay Air Resources District

Source: Data provided by Ascent Environmental in 2020.

Mitigation Measures

Mitigation Measure 3.3-2: Reduce Operational Emissions of ROG and PM_{10} from All Sources

The majority of ROG emissions are a result of aerosolized and evaporation of consumer products, which include cleaning solutions, personal care products, and pesticides. The calculation of ROG emissions from consumer products was based on the ability to control personal products over the use of consumer products, such as personal care products and household cleaners used off-campus. However, UC Santa Cruz is responsible for facility-related purchases, such as commercial cleaning and sanitizing solutions. Additional measures should also be taken to reduce ROG emissions from other sectors, such as mobile sources, landscaping equipment, and architectural coatings.

As such, UC Santa Cruz shall make every effort to reduce ROG emissions generated under the 2021 LRDP. With respect to the new construction and operations that would occur under the 2021 LRDP, UC Santa Cruz shall implement the following measures for on-campus activities:

- Use zero or low-VOC consumer products and cleaning supplies that exceed CARB's consumer product VOC standards (as defined in CCR Title 17, Division 3, Chapter 1, Subchapter 8.5, Articles 1 through 5), such as those using electrolyzed water, where available.
- Use zero-VOC architectural coatings with a VOC content no greater than 5 grams per liter.
- Increase the level of zero emission landscaping equipment over time, such as electric lawnmowers, leaf blowers, and chainsaws, to attain 95-100 percent of zero emission landscaping equipment use on campus.
- Choose zero emission vehicles for all new light-duty fleet purchases.
- Choose zero or low emission vehicles for all new heavy-duty fleet purchases, where available and feasible.
- Encourage the use of zero emission vehicles by installing electric vehicle charging stations in parking facilities.
- Reduce campus vehicle speed limits to the extent feasible and install traffic calming or signal coordination to reduce the intensity of vehicle braking and acceleration.

Mitigation Measure 3.16-2: Implement Transportation Demand Management Program and Monitoring

(Refer to Section 3.16, "Transportation")

Significance after Mitigation

Mitigation Measures 3.3-2 and 3.16-1 would reduce the generation of ROG and PM_{10} emissions related to implementation of the 2021 LRDP. As a result, ROG emissions would not exceed MBARD significance criteria, however the mitigated PM_{10} emissions would still exceed MBARD significance criteria. Table 3.3-9 shows the modeled emissions after mitigation, quantifying all reductions resulting from the proposed measures within Mitigation Measure 3.3-2, except for consumer product mitigation, that are under UC Santa Cruz's direct control. Consumer product mitigation was not quantified due to the uncertainty related to the VOC levels of products that residents within the LRDP area may use.

As shown in Table 3.3-9, implementation of Mitigation Measures 3.3-2 and 3.16-1 would reduce total maximum daily ROG emissions by 24 pounds per day, from 152 pounds per day to 128 pounds per day, and PM_{10} emissions by 10 pounds per day, from 108 pounds per day to 98 pounds per day. Although ROG emissions can be mitigated to below the threshold, the PM_{10} emissions rate remains above the MBARD threshold of significance.

With the majority of PM_{10} emissions result from roadway fugitive dust, additional mitigation of these emissions from non-university operations (e.g., motor vehicle use), beyond the actions described above in Mitigation Measure 3.3-3 and 3.16-1, is not considered feasible. According to Appendix A of the CalEEMod User's Guide, daily roadway fugitive dust emissions from paved roads are calculated based on a formula that accounts for roadway particle sizes, road surface silt loading, average vehicle weight, local precipitation levels, and VMT. This formula is based on EPA's AP-42 compilation of emission factors (EPA 2011). None of these variables can be feasibly changed except for VMT, which is already mitigated under Mitigation Measure 3.16-1. Many studies have indicated that the contribution of roadway

activity to roadway fugitive dust is not well understood and that the actual roadway fugitive dust emissions are highly variable depending on individual roadway conditions and silt levels (Kuhns 2001, Pant 2013). Although some studies also show that vehicle speeds are positively correlated with roadway fugitive PM emissions, the exact relationship between the two variables varies by study area (Pirjola 2009, Kuhns 2001). For this reason, reducing campus vehicle speed limits is recommended under Mitigation Measure 3.3-3 but the associated PM emissions reductions are not quantified.

Table 3.3-9 Summary of Modeled Operational Emissions of Criteria Air Pollutants and Precursors Associated with 2021 LRDP Implementation (2040) – Mitigated

Emissions Source	Maximum Daily Emissions ROG (lb/day)	Maximum Daily Emissions NO_X (lb/day)	Maximum Daily Emissions PM_{10} (lb/day)	Maximum Daily Emissions $PM_{2.5}$ (lb/day)
Land Uses under 2021 LRDP				
Area Sources[1]	101.4	0.0	0.0	0.0
Consumer Products	*100.6*	*0.0*	*0.0*	*0.0*
Architectural Coatings	*0.8*	*0.0*	*0.0*	*0.0*
Landscaping Equipment	*0.0*	*0.0*	*0.0*	*0.0*
Stationary Sources	3.6	23.3	1.8	1.8
Natural Gas Combustion[2]	*2.6*	*23.3*	*1.8*	*1.8*
Laboratories[3]	*1.0*	*0.0*	*0.0*	*0.0*
Gasoline Storage Tank[3]	*0.1*	*0.0*	*0.0*	*0.0*
Mobile Sources[4]	22.8	47.4	95.9	25.8
Exhaust	*22.8*	*47.4*	*0.4*	*0.3*
Fugitive Dust	*0.0*	*0.0*	*95.6*	*25.5*
TOTAL	**128**	**71**	**98**	**28**
MBARD Thresholds of Significance	137	137	82	55
Exceed Threshold of Significance?	**No**	**No**	**Yes**	**No**

Note: Summation may not equal totals because of rounding. See Appendix D1 for detail on model inputs, assumptions, and project specific modeling parameters.

[1] Modeled in CalEEMod 2016.3.2.

[2] Under the UC Sustainable Practices Policy, all new facilities are prohibited from using natural gas or fossil fuels; however, there is flexibility in the policy that allows campuses to use natural gas or fossil fuel sources if they are unable to comply. As a conservative assumption, calculations assume natural gas use would continue in new buildings under the 2021 LRDP.

[3] Based on annual emissions used in HRA modeling divided by 287 full academic day equivalents, accounting for UC Santa Cruz's academic schedule, holidays, and enrollment levels during summer and regular academic quarters.

[4] Based on modeling with VMT data from Fehr and Peers and emission factors from EMFAC 2017.

ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; $PM_{2.5}$ = respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less; lb/day = pounds per day; LRDP = Long Range Development Plan; MBARD = Monterey Bay Air Resources District

Source: Data provided by Ascent Environmental in 2020.

UC Santa Cruz has little direct control over fugitive PM emissions from roadway dust nor the use of zero-emissions vehicles from non-university mobile sources. Further PM_{10} reductions would require mitigation of these sources of PM_{10} emissions. Therefore, this impact would be **significant and unavoidable**.

The calculations shown in Table 3.3-9 do not include reductions associated with zero emissions fleet because VMT projections were not broken down by fleet and non-fleet activity, meaning that estimating the reductions associated with a zero emissions fleet would be speculative. However, a review of UC Santa Cruz's 2018 GHG emissions shows

that fleet activity (Scope 1 mobile emissions) accounted for eight percent of total mobile source emissions in 2018 (Second Nature 2018). For informational purposes, assuming the level of fleet activity relative to total mobile emissions remains the same under the 2021 LRDP as under existing conditions, selecting 100 percent zero emission vehicles for all new light and heavy-duty fleet purchases under the 2021 LRDP would result in an additional reduction of 7 pounds per day of PM_{10}. These additional reductions would reduce total PM_{10} emissions to 84 pounds per day but would not likely reduce impacts to less than significant.

Critically, these calculations also do not take into account additional reductions in VMT resulting from on-campus housing projects that have been approved but not yet constructed (refer to Chapter 4, "Cumulative Impacts.") The Student Housing West project and the Kresge Housing project, as well as the Crown College Major Maintenance Project, will collectively provide 2,175 additional student beds on campus, contributing toward meeting existing need for on-campus housing. These projects are not being proposed as part of this 2021 LRDP, but were instead approved based on the 2005 LRDP; therefore, they are treated as cumulative projects in this EIR and are not accounted for in the project impact analysis above. However, UC Santa Cruz intends to construct these projects well before full implementation of this 2021 LRDP. With those two projects constructed and an additional 2,175 students living on campus—instead of off campus—in 2040, VMT will be significantly reduced, and this impact would be less-than-significant. In other words, while at a project level this impact is significant and unavoidable, under the cumulative scenario—which represents actual conditions likely to occur in 2040—the impact is less than significant.

Health Impacts Related to Project-Generated Pollutants of Concern

With respect to the potential health impacts associated with the one pollutant that cannot be mitigated to less-than-significant, direct emissions of PM_{10}, air districts develop region-specific thresholds of significance based on existing attainment status of the CAAQS and NAAQS in the air basin (see Table 3.3-3.) As noted in that table, the NCCAB is in non-attainment for the PM_{10} standard. The ambient air quality standards were developed based on scientific evidence related to the acceptable pollutant concentrations above which human health may be adversely impacted. These concentrations are the cumulative effect of all pollutant sources in the air basin. MBARD considers projects with emissions below the thresholds of significance to have a minor or negligible impact on the regional cumulative emission concentrations that would exceed the ambient air quality standards (MBARD 2008). Projects that exceed an applicable threshold could contribute to the continued nonattainment designation of a region or potentially degrade a region from attainment to nonattainment resulting in acute or chronic respiratory and cardiovascular illness associated with exposure to concentrations of criteria air pollutants above what EPA and CARB consider safe. Elevated PM concentrations have been linked to aggravated asthma, premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, decreased lung function, and increased respiratory symptoms (e.g., coughing or difficulty breathing) (EPA 2020b).

As shown in the analysis above, 98 percent of estimated PM_{10} emissions would come from roadway fugitive dust. The exact location and magnitude of specific health impacts that could occur as a result of project-level construction- or operation-related fugitive dust PM_{10} emissions is infeasible to model with a high degree of accuracy. Roadway fugitive dust concentrations vary considerably depending on roadway silt levels, precipitation, vehicle speeds, vehicle weights, and roadway conditions and configurations that affect tire wear, brake wear, and resuspension of roadway dust. Additional factors include meteorology, topography, air flow, etc. Given the large number of variables considered, modeling is subject to high levels of inaccuracy and speculation.

While such modeling may be warranted when considering projects that exceed thresholds by multiples, they are of questionable value, and are, in fact, often misleading when considering projects such as the 2021 LRDP, which only exceeds the significance standard by 11 percent. Further, while dispersion modeling of project-generated PM may be conducted to evaluate resulting ground-level concentrations, localized impacts of directly-emitted PM do not always equate to local PM concentrations due to the transport of emissions. Therefore, it is simply not possible, based on current modeling technologies, to model specific health impacts of this exceedance with a reasonable degree of scientific certainty, and doing so would not provide reliable, credible informational value to decisionmakers or the public.

From a broader perspective and in terms of the trends in PM_{10} concentration in the region, the average annual concentration of PM_{10} has been steadily declining in the NCCAB between 1997 and 2019 at a rate of about 1 percent per year, although concentrations have remained relatively the same since 2008 (CARB 2020b). PM_{10} concentrations in the NCCAB have not exceeded the PM_{10} standards since 2011 (CARB 2020b). Table 3.3-9 shows that operation of the 2021 LRDP after mitigation would exceed PM_{10} thresholds of significance by 11 percent, and the majority of these emissions are from fugitive roadway dust, which would be dispersed along roadways in and around the LRDP area. A review of existing literature suggests that, although there have been documented health effects related to roadway fugitive PM (Denier 2013), the current research is extremely limited and additional study is needed to determine the health effects that could be caused by incremental increases in PM_{10} fugitive dust concentrations in the NCCAB.

Furthermore, the forecasted VMT increase used in this analysis is based on the comparison of the 2019 Existing and 2019 Project VMT scenarios, as analyzed in Impact 3.16-2 of Section 3.16, "Transportation." This comparison and resulting VMT estimates are conservative and do not include anticipated improvements in the roadway network that may further reduce VMT generated by the 2021 LRDP. Of note, the improvements are included as part of the cumulative scenario (refer to Chapter 4, "Cumulative Impacts"). Accounting for the cumulative scenario could lower the net change in VMT used for this analysis by at least 20 percent. Thus, although regional trends in PM_{10} concentrations have been declining, the health effects related to the exceedance of the PM_{10} threshold is uncertain, but may be overstated due to the use of a conservative VMT scenario used in this analysis.

Impact 3.3-3: Conflict with or Obstruct Implementation of an Applicable Air Quality Plan

MBARD has developed its *2012-2015 Air Quality Management Plan* (AQMP) to guide the region toward achieving attainment of the California 8-hour ozone standard. The plan is based on an inventory of existing emission sources as well as projections about the future level of land use development in the NCCAB. With implementation of the 2021 LRDP, on-campus improvements related to promoting pedestrian/bicycle modes of transportation and decreasing on-campus parking are consistent with objectives of the AQMP. Further, new buildings planned for development would be consistent with the UC Sustainable Practices Policy. However, operational ROG and PM_{10} emissions resulting from implementation of the 2021 LRDP would exceed MBARD's daily emissions thresholds. For this reason, the project would conflict with MBARD's long-term air quality planning efforts to achieve and maintain attainment with the ozone and PM_{10} CAAQS, and this impact would be **significant**.

Santa Cruz County is in an area of nonattainment-transitional for ozone and non-attainment for PM_{10} with respect to the CAAQS. Because of this, MBARD is required to develop an air quality plan to achieve and maintain the state ozone standard by the earliest practicable date. As a means of reducing regional ambient ozone concentrations, MBARD sets daily and annual significance thresholds for emissions of ozone precursors ROG and NO_X, as specified in the AQMP.

MBARD's AQMP addresses the attainment and maintenance of the NAAQS and CAAQS by outlining strategies to reduce ozone precursor and PM_{10} emissions from various sources. The plan includes a stationary source control program, administered by MBARD for permitted stationary sources, as well as transportation and land use management strategies to reduce mobile-source emissions. In addition, local jurisdictions prepare population forecasts, which are used by MBARD to forecast emissions and progress towards air quality attainment.

A consistency analysis with the AQMP is required for a program-level environmental review. For such programs or plans, evaluation of consistency is partly based on a comparison of the plan with the land use and transportation control measures and strategies outlined in the AQMP. If the plan is consistent with these measures, the plan is considered consistent with the AQMP. Additionally, consistency with regional growth projections, such as those developed by the Association of Monterey Bay Area Governments (AMBAG), is considered as part of the overall AQMP consistency analysis.

The 2021 LRDP was guided by overarching sustainability principles and the goal of wise resource management is reflected in features and policies throughout the 2021 LRDP. The UCOP Sustainable Practices Policy, which UC Santa Cruz would adhere to during the development of the 2021 LRDP, contains several provisions relevant to the air quality emissions reductions:

- Zero emission transportation policies, such as D.1a, D.3a, and D.3b, would reduce criteria air pollutants from mobile sources.
- Clean energy policies B.1, B.2, B.3, and B.4, including LEED requirements for new facilities, would reduce criteria air pollutants through improved energy efficiency and the use of natural gas and other on-site combustible fuels.

All of these efforts would reduce air pollutant emissions and be consistent with MBARD's AQMP. Regarding growth in the county attributable to UC Santa Cruz expansion and as noted in Section 3.13, "Population and Housing," AMBAG projects that UC Santa Cruz will grow to 27,000 to 28,000 FTE students by 2040 (AMBAG 2018), which aligns with the 2040 FTE student population estimated in the 2021 LRDP. MBARD utilizes AMBAG growth predictions in its AQMP projected emissions estimates; therefore, the growth projected in the 2021 LRDP is consistent with the growth accounted for in the AQMP. However, the second part of consistency with MBARD's AQMP is whether a project exceeds established thresholds for ROG and NO_X. As shown below, the ROG emissions associated with implementation of the 2021 LRDP are projected to exceed the MBARD daily threshold of significance (see Impact 3.3-3). The thresholds are established for the purposes of achieving and maintaining attainment with the NAAQS and CAAQS, which is the primary air quality goal of the AQMP. The AQMP specifically states that a project that emits more ROG or PM_{10} than the specified threshold would conflict with implementation of the AQMP. As campus-related development under the 2021 LRDP would result in ROG and PM_{10} emissions that exceed the established daily thresholds, this impact would be **significant**.

Mitigation Measures

Mitigation Measure 3.3-2 (above): Reduce Operational Emissions of ROG and PM_{10} from All Sources

Significance after Mitigation

Table 3.3-9 shows the modeled emissions after mitigation, quantifying all proposed measures within Mitigation Measure 3.3-2 that are under UC Santa Cruz's direct control. Mitigation Measure 3.3-2 would reduce the generation of ROG and PM_{10} emissions related to implementation of the 2021 LRDP, however the reduced emissions would not fall below MBARD significance criteria. As shown in Table 3.3-9, implementation of Mitigation Measure 3.3-2 would reduce total maximum daily ROG emissions by 24 pounds per day, from 152 pounds per day to 128 pounds per day, and PM_{10} emissions by 10 pounds per day, from 108 pounds per day to 98 pounds per day. Although ROG emissions can be mitigated to below the threshold, the PM_{10} emissions rate remains above the MBARD threshold of significance. While implementation of the Sustainable Practices Policy would result in further emissions reductions, these practices are applied only when feasible, thus no definitive mechanism exists to ensure their application. As a result, this impact would be **significant and unavoidable**.

Impact 3.3-4: Mobile-Source CO Concentrations

Operational mobile-source emissions of CO generated by additional traffic to and from the campus under the proposed 2021 LRDP would not violate an air quality standard or contribute substantially to an existing or projected air quality violation or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact would be **less than significant**.

Traffic-congested roadways and intersections have the potential to generate localized high levels of CO, which is produced in greatest quantities from vehicle combustion and is usually concentrated at or near ground level. Localized mobile-source CO emissions near roadway intersections are a function of traffic volume, speed, and delay. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. However, under certain specific meteorological conditions, CO concentrations near roadways and/or intersections may reach unhealthy levels and affect nearby sensitive land uses, such as residential areas, schools, and childcare facilities. Over the past several decades, though, CO emissions from vehicles has been dramatically reduced, and is only a potential problem in rare instances of extremely high vehicular volumes at intersections. As a result, CO is analyzed at the local level.

MBARD has a project-level CO threshold of 550 pounds per day, which may be indicative of a localized impact when this level of CO is produced by an individual project, but is inappropriate for a LRDP, where these CO levels would be dispersed throughout the campus area. A more accurate threshold at the plan level is tied to congestion at a particular roadway intersection coupled with a high volume of cars. Because they do not have CO significance criteria directly related to intersection traffic volumes, MBARD was consulted for approval to use screening criteria for CO emissions at high-volume intersections developed by SMAQMD. MBARD verified that it would be appropriate to use SMAQMD screening criteria as they relate to the magnitude of intersection volumes affected by the 2021 LRDP (Frisbey, personal communication 2020). Screening criteria for SMAQMD were developed based on a conservative analysis of local intersections and are considered appropriate for a preliminary screening analysis. If the SMAQMD criteria are exceeded for the project, a detailed dispersion modeling analysis would need to be performed based on local data. These screening criteria have been developed in a manner such that, if they are met, local development-generated, operational mobile-source emissions of CO would not violate an air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations.

According to SMAQMD, a project would result in a less-than-significant CO impact if the following criterion is met (SMAQMD 2016):

- The project would not result in an affected intersection experiencing more than 31,600 vehicles per hour.

Whereas the SMAQMD screening criteria reference intersection vehicle volumes of 31,600 vehicles per hour or more, the intersection volumes in the project vicinity do not exceed 10,000 vehicles per hour even under Cumulative with Project conditions (refer to Section 3.16, "Transportation").

As a result, development-generated, operational local mobile-source emissions of CO would not violate an air quality standard or contribute substantially to an existing or projected air quality violation or expose sensitive receptors to substantial pollutant concentrations of CO. Thus, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.3-5: Short-Term Construction Emissions of Toxic Air Contaminants

Construction activities would result in temporary, short-term project-generated emissions of TACs, particularly diesel PM. Construction TAC emissions would not result in a HI greater than 1.0 or in an incremental increase in cancer risk that exceeds 10 in one million. This impact would be **less-than-significant**.

Construction activities associated with projects under the 2021 LRDP would result in temporary, short-term emissions of diesel PM from the exhaust of off-road, heavy-duty diesel equipment used during demolition, site preparation, building construction, paving, and application of architectural coatings and the exhaust of on-road haul truck travel. For construction activity, diesel PM is the primary TAC of concern. Demolition and renovation of older facilities may also result in the release of airborne asbestos because of the disturbance of asbestos-containing material that may be present in older buildings.

Based on the emissions modeling conducted for the criteria air pollutant analysis, construction activities under the 2021 LRDP would result in an average annual emissions of 0.59 tons per year (1,195 lb per year) and a daily maximum of 9.6 lb per day of PM_{10} emissions from diesel exhaust. Assuming a 9-hour workday, this would translate to a maximum hourly emission of 1.1 lb of diesel PM per hour. These emissions are assumed to occur across all development areas and near sections of main haul truck routes (High Street and Bay Drive between the main residential campus and up to Mission Street/Highway 1). Based on these emission rates and assumed modeling parameters, the HRA concluded that the temporary construction activities under the 2021 LRDP could result in an incremental increase in the probability of contracting cancer of up to 8.4 in one million the maximally exposed individual resident (MEIR) (i.e., the modeled receptor location at a residential land use that has the highest risk), which is located in the vicinity of College Nine and Ten apartments (See the results in Appendix D2). The MEIR for the non-cancer health impact (HI), located in the vicinity of the UC Observatories/Lick Building, would have an HI no greater

than 0.002. These results are both below MBARD's thresholds of 10 in one million for cancer risk and an HI of 1.0 for non-cancer risk. Health effects associated with UFPs from construction activity are assumed to be included in the health effects related to diesel PM.

Additionally, renovation and demolition of existing structures would potentially result in the airborne entrainment of asbestos due to the disturbance of asbestos-containing materials. Asbestos is listed as a TAC by CARB. The risk of disease is dependent upon the intensity and duration of exposure. Exposure to asbestos fibers may result in health issues such as lung cancer, mesothelioma (a rare cancer of the thin membranes lining the lungs, chest and abdominal cavity), and asbestosis (a non-cancerous lung disease which causes scarring of the lungs) (CARB 2017b). These activities would be subject to the Federal EPA Asbestos NESHAP regulation and MBARD Rule 424 (Asbestos). The rule requires UC Santa Cruz and its contractors to notify MBARD of any renovation or demolition activity at least 10 working days prior to commencement of demolition/renovation. When removing any Regulated Asbestos Containing Material (RACM), MBARD regulations must be followed. This notification includes a description of structures and methods utilized to determine whether asbestos-containing materials are potentially present. All RACM found on the site must be removed prior to renovation activity and there are specific requirements for surveying, notification, removal, and disposal of material containing asbestos. Therefore, projects under the 2021 LRDP that comply with MBARD Rule 424 and Federal regulations would ensure that asbestos-containing materials would be disposed of appropriately and safely and unsafe exposure to asbestos would not occur.

Projects under the 2021 LRDP would comply with Rule 424 and unsafe exposure to asbestos would be avoided; and the cancer and non-cancer risks from construction TAC emissions would be below MBARD thresholds. As such, construction activities following the implementation of the 2021 LRDP would have a **less-than-significant** impact.

Mitigation Measures

No mitigation is required.

Impact 3.3-6: Operational Emissions of Toxic Air Contaminants

The 2021 LRDP would result in additional sources of TACs (e.g., laboratories, boilers); however, the additional risks associated with these sources would not exceed MBARD thresholds of 10 in one million for cancer risk nor a HI of 1.0 for both acute and chronic exposures. Therefore, this impact would be **less than significant**.

New sources of operational TAC emissions associated with the 2021 LRDP implementation would likely include new stationary sources such as additional boilers, emergency and standby generators, laboratories, increased vehicular traffic, and increased gasoline storage. New facilities that have the potential to generate stationary source emissions would be required to obtain a permit from MBARD. For facilities that have the potential to generate health risks above established risk levels, MBARD is required to distribute public notifications to notify families of children enrolled and all persons within 1,000 feet of the source before approving any permits (Health & Safety Code §42301.6) (MBARD 2008). Health effects associated with UFPs from construction activity are assumed to be included in the health effects related to diesel PM.

With regards to TAC levels under the 2021 LRDP, the HRA concluded that the probability of contracting cancer for the MEIR would not exceed 1.8 in one million and ground-level concentrations of TACs would result in a HI no greater than 0.1 for the MEIR (See Appendix D2 for the HRA analysis). These results are less than MBARD's thresholds of 10 in one million for cancer risk and a HI of 1.0 for non-cancer risk. Thus, the 2021 LRDP would not result in additional stationary and mobile sources of TACs that would significantly contribute to the existing risk level in the project area. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.3-7: Exposure of Sensitive Receptors to Odors

The 2021 LRDP may introduce new odor sources into the area, such as new research facilities and diesel-related exhaust from delivery trucks. The new odor sources would be similar to existing sources that operate in and around the UC Santa Cruz campus. As a result, impacts would be **less than significant**.

The occurrence and severity of odor impacts depends on numerous factors, including: the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptors. While offensive odors rarely cause any physical harm, they still can be unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and regulatory agencies. Projects with the potential to frequently expose a substantial number of members of the public to objectionable odors would be deemed to have a significant impact.

Minor odors from the use of heavy-duty diesel equipment and the laying of asphalt during project-related construction activities would be intermittent and temporary and would dissipate rapidly from the source with an increase with distance. Construction activities would be spread over a relatively long-term period (approximately 18 years), and odors resulting from construction activity would occur in different areas of the 2,000-acre main residential campus at different times over the 2021 LRDP period, not exposing any single area or individual receptor to construction-related odors for extended periods of time. Additionally, the UC Santa Cruz central campus is relatively distant from surrounding residential neighborhoods in the City of Santa Cruz and embedded within a forested area, factors which also help prevent any possible odors from reaching nearby receptors. However, there is the possibility that construction may occur near student and faculty housing for short periods of time, and that new facilities, with the potential to generate odors, may be located on the lower campus, which is adjacent to nearby residential areas.

Operational uses under the 2021 LRDP would result in various levels of odorous emissions, ranging from odors associated with motor vehicle operation to food preparation. Diesel-fueled delivery trucks would haul materials to and from the academic and administrative, residential, recreational, and retail areas; however, these types of sources are not different from those that currently deliver materials to existing land uses in the LRDP area and other parts of the City. No odor complaints regarding UC Santa Cruz have been received by MBARD in recent memory (Searson, pers. comm., 2020), thus it is unlikely similar sources under the 2021 LRDP would result in new complaints. The 2021 LRDP may include operation of new restaurant kitchens, but any odors potentially generated by the kitchens are not typically considered to be objectionable and are also not different from the restaurant kitchens in the project vicinity.

Other potential sources of odors include research activities, such as through general laboratory research and handling of volatile organic materials. These odor sources would be contained within buildings in the campus core and not likely result in objectionable odors affecting a substantial number of people.

Thus, implementation of the 2021 LRDP would not result in major sources of odor that could create objectionable odors affecting a substantial number of people. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

3.4 ARCHAEOLOGICAL, HISTORICAL, AND TRIBAL CULTURAL RESOURCES

This section analyzes and evaluates the potential impacts of the 2021 LRDP on known and unknown cultural resources in the LRDP area. Cultural resources include districts, sites, buildings, structures, or objects generally older than 50 years and considered to be important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. They include archaeological, historical, and tribal cultural resources.

Archaeological sites are locations where human activity has measurably altered the earth or left deposits of prehistoric or historic period physical remains (e.g., stone tools, bottles, former roads, house foundations). Historical (or built-environment) features include historic period standing buildings (e.g., houses, barns, outbuildings, cabins), intact structures (e.g., dams, bridges, and roads), and districts. Tribal cultural resources (as defined by Assembly Bill [AB] 52, Statutes of 2014, in Public Resources Code [PRC] Section 21074) are sites, features, places, cultural landscapes, sacred places, and objects, with cultural value to a California Native American tribe.

Six comment letters regarding cultural resources were received in response to the NOP (See Appendix B). The Native American Heritage Commission (NAHC) requested AB 52 and Senate Bill (SB) 18 compliance information. AB 52 compliance is described below. SB 18, which applies to city or county general plan amendments, is not applicable to the 2021 LRDP. The Santa Cruz City – County Task Force to Address UCSC Growth Plans, the League of Women Voters of Santa Cruz County, and the Coalition for Limiting University Expansion stated that the 2021 LRDP EIR should analyze the potential impact of on- and off-campus developments on on-campus archeological, historical, or tribal cultural resources. One individual was concerned over the preservation of the Cowell Lime Works Historic District; another requested that the EIR consider how permanent protection of the Campus Natural Reserve could protect important tribal cultural resources in perpetuity but did not identify the type or location of tribal cultural resources.

3.4.1 Regulatory Setting

FEDERAL

National Historic Preservation Act

Among those statutes enacted by Congress that affect historic properties, the National Historic Preservation Act of 1966 (NHPA) is the most significant law that addresses historic preservation. One of the most important provisions of the NHPA is the establishment of the National Register of Historic Places (NRHP), the official designation of historical resources. Districts, sites, buildings, structures, and objects are eligible for listing in the Register. Nominations are listed if they are significant in American history, architecture, archaeology, engineering, and culture. The NRHP is administered by the National Park Service. The NRHP is the nation's master inventory of known historic resources. It includes listings of buildings, structures, sites, objects, and districts that possess historic, architectural, engineering, archaeological, or cultural significance at the national, state, or local level.

The formal criteria (36 CFR 60.4) for determining NRHP eligibility are as follows:

1. The property is at least 50 years old (however, properties under 50 years of age that are of exceptional importance or are contributors to a district can also be included in the NRHP);
2. It retains integrity of location, design, setting, materials, workmanship, feeling, and associations; and
3. It possesses at least one of the following characteristics:

   Criterion A Is associated with events that have made a significant contribution to the broad patterns of history (events).

   Criterion B Is associated with the lives of persons significant in the past (persons).

Criterion C Embodies the distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic values; or represents a significant, distinguishable entity whose components may lack individual distinction (architecture).

Criterion D Has yielded, or may be likely to yield, information important in prehistory or history (information potential).

A project is considered to have a significant impact when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. These seven aspects of integrity are described as:

- **Location.** Integrity of location refers to whether a property remains where it was originally constructed or was relocated.
- **Design.** Integrity of design refers to whether a property has maintained its original configuration of elements and style that characterize its plan, massing, and structure. Changes made after original construction can acquire significance in their own right.
- **Setting.** Integrity of setting refers to the physical environment surrounding a property that informs the characterization of the place.
- **Materials.** Integrity of materials refers to the physical components of a property, their arrangement or pattern, and their authentic expression of a particular time period.
- **Workmanship.** Integrity of workmanship refers to whether the physical elements of a structure express the original craftsmanship, technology and aesthetic principles of a particular people, place, or culture at a particular time period.
- **Feeling.** Integrity of feeling refers to the property's ability to convey the historical sense of a particular time period.
- **Association.** Integrity of association refers to the property's significance defined by a connection to a particular important event, person, or design.

Listing in the NRHP does not entail specific protection or assistance for a property but it does guarantee recognition in planning for federal or federally assisted projects, eligibility for federal tax benefits, and qualification for federal historic preservation assistance. Additionally, project effects on properties listed in the NRHP must be evaluated under CEQA.

The National Register Bulletin also provides guidance in the evaluation of the significance of an archaeological site. If a heritage property cannot be placed within a particular theme or time period, and thereby lacks "focus," it is considered not eligible for listing in the NRHP. In further expanding on the generalized NRHP criteria, evaluation standards for linear features (such as roads, trails, fence lines, railroads, ditches, and flumes) are considered in terms of four related criteria that account for specific elements that define engineering and construction methods of linear features: (1) size and length, (2) presence of distinctive engineering features and associated properties, (3) structural integrity, and (4) setting. The highest probability for NRHP eligibility exists in the intact, longer segments, where multiple criteria coincide.

Section 106 of the National Historic Preservation Act

Federal protection of cultural resources is legislated by (a) the NHPA of 1966 as amended by 16 U.S. Code 470, (b) the Archaeological Resource Protection Act of 1979, and (c) the Advisory Council on Historical Preservation. Section 106 of the NHPA and accompanying regulations (36 Code of Federal Regulations [CFR] Part 800) constitute the main federal regulatory framework guiding cultural resources investigations and require consideration of effects on properties that are listed in, or may be eligible for listing in the NRHP. These laws and organizations maintain processes for determination of the effects on historical properties that are listed or determined to be eligible for listing in the NRHP. For UC Santa Cruz, listing on the NRHP and compliance with Section 106 is relevant to future projects requiring federal permitting.

Secretary of the Interior's Standards

The "Secretary of the Interior's Standards for the Treatment of Historic Properties" (Secretary's Standards), codified in 36 CFR 67, provide guidance for working with historic properties. The Secretary's Standards are used by lead agencies to evaluate proposed rehabilitative work on historic properties. The Secretary's Standards are a useful analytic tool for understanding and describing the potential impacts of proposed changes to historic resources. Projects that comply with the Secretary's Standards benefit from a regulatory presumption that they would not result in a significant impact to a historic resource. Projects that do not comply with the Secretary's Standards may or may not cause a substantial adverse change in the significance of a historic property.

In 1992 the Secretary's Standards were revised so they could be applied to all types of historic resources, including landscapes. They were reduced to four sets of treatments to guide work on historic properties: Preservation, Rehabilitation, Restoration, and Reconstruction. The four distinct treatments are defined as follows:

- **Preservation** focuses on the maintenance and repair of existing historic materials and retention of a property's form as it has evolved over time.
- **Rehabilitation** acknowledges the need to alter or add to a historic property to meet continuing or changing uses while retaining the property's historic character.
- **Restoration** depicts a property at a particular period of time in its history, while removing evidence of other periods.
- **Reconstruction** re-creates vanished or non-surviving portions of a property for interpretive purposes.

The Guidelines for the Treatment of Historic Properties

The "Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings" (Guidelines) illustrate how to apply the four treatments detailed above to historic properties in a way that meets the Secretary's Standards. The Guidelines are advisory, not regulatory. The purpose of the Guidelines is to provide guidance to historic building owners and building managers, preservation consultants, architects, contractors, and project reviewers prior to beginning work. They address both exterior and interior work on historic buildings. There are four sections in the Guidelines, each focusing on one of the four treatment Standards: Preservation, Rehabilitation, Restoration, and Reconstruction. Each section includes one set of Standards with accompanying Guidelines that are to be used throughout the course of a project.

Cultural Landscapes

Under the NRHP, historic properties may be defined as sites, buildings, structures (such as bridges or dams), objects, or districts, including cultural landscapes. A cultural landscape differs from a historic building or district in that it is understood through the spatial organization of the property, which is created by the landscape's cultural and natural features. Some features may create viewsheds or barriers (such as a fence), and others may create spaces or "rooms" (such as an arrangement of buildings and structures around a lawn area). Some features, such as grading and topography, underscore the site's development in relationship to the natural setting. To be listed in the NRHP, a cultural landscape must meet one of the four evaluation criteria and must retain its integrity.

Cultural landscapes include residential gardens and community parks, scenic highways, rural communities, institutional grounds, cemeteries, battlefields, zoological gardens, religious sacred sites and massive geological structures. They are composed of character-defining features that individually or collectively contribute to the landscape's physical appearance as they have evolved over time. In addition to vegetation and topography, cultural landscapes may include water features, such as ponds, streams, and fountains; circulation features, such as roads, paths, steps, and walls; buildings; and furnishings, including fences, benches, lights, and sculptural objects.

A cultural landscape is defined as "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values" (Birnbaum 1994). There are four general types of cultural landscapes—historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes—and they are not mutually exclusive:

- A historic site is a landscape significant for its association with a historic event, activity, or person. Examples include battlefields and a president's house properties.
- A historic designed landscape is a landscape that was consciously designed or laid out by a landscape architect, master gardener, architect, or horticulturist according to design principles or by an amateur gardener working in a recognized style or tradition. The landscape may be associated with a significant person, trend, or event in landscape architecture, or it may illustrate an important development in the theory and practice of landscape architecture. Aesthetic values play a significant role in designed landscapes. Examples include parks, campuses, and estates.
- A historic vernacular landscape is a landscape that evolved through use by the people whose activities or occupancy shaped that landscape. Such a landscape reflects the social and cultural attitudes of an individual, a family, or a community, as well as the physical, biological, and cultural character of everyday lives. Function plays a significant role in vernacular landscapes. They can be a single property, such as a farm, or a collection of properties, such as a district of historic farms along a river valley. Examples include rural villages, industrial complexes, and agricultural landscapes.
- An ethnographic landscape is a landscape containing a variety of natural and cultural resources that associated people define as heritage resources. Examples are contemporary settlements, religious sacred sites, and massive geological structures. Small plant communities, animals, subsistence, and ceremonial grounds are often components of such landscapes.

STATE

California Register of Historic Resources

All properties in California that are listed in or formally determined eligible for listing in the NRHP are eligible for listing in the California Register of Historical Resources (CRHR). The CRHR is a listing of State of California resources that are significant in the context of California's history. It is a Statewide program with a scope and with criteria for inclusion similar to those used for the NRHP. In addition, properties designated under municipal or county ordinances are also eligible for listing in the CRHR.

A historic resource must be significant at the local, State, or national level under one or more of the criteria defined in the California Code of Regulations Title 15, Chapter 11.5, Section 4850 to be included in the CRHR. The CRHR criteria are tied to CEQA because any resource that meets the criteria below is considered a significant historical resource under CEQA. As noted above, all resources listed in or formally determined eligible for listing in the NRHP are automatically listed in the CRHR.

The CRHR uses four evaluation criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States.
2. Is associated with the lives of persons important to local, California, or national history.
3. Embodies the distinctive characteristics of a type, period, region, or method of construction; represents the work of a master; or possesses high artistic values.
4. Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

Similar to the NRHP, a resource must meet one of the above criteria and retain integrity to be listed in the CRHR. The CRHR uses the same seven aspects of integrity used by the NRHP.

California Environmental Quality Act

CEQA requires public agencies to consider the effects of their actions on both "historical resources" and "unique archaeological resources." Pursuant to Public Resources Code (PRC) Section 21084.1, a "project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment." PRC Section 21083.2 requires agencies to determine whether proposed projects would have effects on unique archaeological resources.

Historical Resources

"Historical resource" is a term with a defined statutory meaning (PRC Section 21084.1; State CEQA Guidelines Sections 15064.5[a] and [b]). Under State CEQA Guidelines Section 15064.5(a), historical resources include the following:

1) A resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in, the CRHR (PRC Section 5024.1).

2) A resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g), will be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

3) Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource will be considered by the lead agency to be historically significant if the resource meets the criteria for listing in the CRHR (PRC Section 5024.1).

4) The fact that a resource is not listed in or determined to be eligible for listing in the CRHR, not included in a local register of historical resources (pursuant to PRC Section 5020.1[k]), or identified in a historical resources survey (meeting the criteria in PRC Section 5024.1[g]) does not preclude a lead agency from determining that the resource may be a historical resource as defined in PRC Sections 5020.1(j) or 5024.1.

Unique Archaeological Resources

CEQA also requires lead agencies to consider whether projects will affect unique archaeological resources. PRC Section 21083.2(g) states that "unique archaeological resource" means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets one or more of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. Has a special and particular quality, such as being the oldest of its type or the best available example of its type.
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Tribal Cultural Resources

CEQA also requires lead agencies to consider whether projects will affect tribal cultural resources. PRC Section 21074 states:

a) "Tribal cultural resources" are either of the following:

   1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

      A) Included or determined to be eligible for inclusion in the California Register of Historical Resources.

      B) Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

b) A cultural landscape that meets the criteria of subdivision (a) is a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape.

c) A historical resource described in PRC Section 21084.1, a unique archaeological resource as defined in subdivision (g) of PRC Section 21083.2, or a "nonunique archaeological resource" as defined in subdivision (h) of PRC Section 21083.2 may also be a tribal cultural resource if it conforms with the criteria of subdivision (a).

Health and Safety Code, Section 7050.5

Section 7050.5 of the Health and Safety Code requires that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If they are determined to be those of a Native American, the coroner must contact NAHC.

California Native American Historical, Cultural, and Sacred Sites Act

The California Native American Historical, Cultural and Sacred Sites Act applies to both State and private lands. The Act requires that upon discovery of human remains, construction or excavation activity should cease, and the county coroner should be notified. If the remains are of a Native American, the coroner must notify the NAHC. The NAHC then notifies those persons most likely to be descended (MLD) from the Native American's remains. The Act stipulates the procedures the descendants may follow for treating or disposing of the remains and associated grave goods. The descendants may, with the permission of private landowners, inspect the site and recommend to the owner or the person responsible for the excavation for treating or disposing of the remains and associated grave goods. The descendants must complete their inspection and make recommendations within 24 hours of notification by the NAHC. The recommendation may include scientific removal and non-destructive analysis.

California Native American Historic Resource Protection Act

The California Native American Historic Resources Protection Act of 2002 imposes civil penalties, including imprisonment and fines up to $50,000 per violation, for persons who unlawfully and maliciously excavate upon, removes, destroys, injures, or defaces a Native American historic, cultural, or sacred site that is listed or may be listed in the CRHR.

Public Resources Code, Section 5097

PRC Section 5097 specifies the procedures to be followed if human remains are unexpectedly discovered on nonfederal land. The disposition of Native American burial falls within the jurisdiction of NAHC. Section 5097.5 of the code states:

> No person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

PRC Section 5097.98 (and reiterated in CEQA Guidelines Section 15064.59 [e]) identifies steps to follow in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery. PRC Section 5097.99, as amended, states that no person shall obtain or possess any Native American artifacts or human remains which are taken from a Native American grave or cairn. Any person who knowingly or willfully obtains or possesses any such artifacts or human remains is guilty of a felony which is punishable by imprisonment. Any person who removes, without authority of law, any such items with an intent to sell or dissect or with malice or wantonness is also guilty of a felony which is punishable by imprisonment.

Public Resources Code Section 21080.3

AB 52, signed by the California governor in September 2014, established a new class of resources under CEQA: "tribal cultural resources," defined in PRC Section 21074. Pursuant to PRC Sections 21080.3.1, 21080.3.2, and 21082.3, lead agencies undertaking CEQA review must, upon written request of a California Native American tribe, begin consultation before the release of an EIR, negative declaration, or mitigated negative declaration.

UNIVERSITY OF CALIFORNIA

There are no UC regulations specifically related to archaeological, historical, or tribal cultural resources that apply to the 2021 LRDP.

LOCAL

As noted in Section 3.0.2, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the university's educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

County of Santa Cruz General Plan

The County of Santa Cruz General Plan contains the following objectives and policies related to archaeological, historical, and tribal cultural resources in the county and that may be relevant to the 2021 LRDP:

Objective 5.19 Archaeological Resources. To protect and preserve archaeological resources for their scientific, educational, and cultural values, and for their value as local heritage.

- **Policy 5.19.3. Development Around Archaeological Resources.** Protect archaeological resources from development by restricting improvements and grading activities to portions of the property not containing these resources, where feasible, or by preservation of the site through project design and/or use restrictions, such as covering the site with earthfill to a depth that ensures the site will not be disturbed by development, as determined by a professional archaeologist.
- **Policy 5.19.5. Native American Cultural Sites.** Prohibit any disturbance of Native American Cultural Sites without an archaeological permit which requires, but is not limited to, the following:

  (a) A statement of the goals, methods, and techniques to be employed in the excavation and analysis of the data, and the reasons why the excavation will be of value.

  (b) A plan to ensure that artifacts and records will be properly preserved for scholarly research and public education.

  (c) A plan for disposing of human remains in a manner satisfactory to local Native American Indian groups.

Objective 5.20 Historical Resources. To protect and where possible restore buildings, sites, and districts of historic significance to preserve the rich cultural heritage of the community.

- **Policy 5.20.5. Encourage Protection of Historic Structures.** Encourage and support public and private efforts to protect and restore historic structures and to continue their use as an integral part of the community.

City of Santa Cruz General Plan

The City of Santa Cruz General Plan contains the following policies related to archaeological, historical, and tribal cultural resources in the city and that may be relevant to the 2021 LRDP:

- **Policy HA1.1:** Preserve (or where not possible, responsibly manage) archaeological and paleontological sites important to the community's heritage.

- **Policy HA1.2:** Protect (or where not possible, responsibly manage) sensitive archaeological and paleontological resources as early in the land-use planning and development process as possible.
- **Policy HA1.3:** Seek and consider input of descendent community and historical organizations on the protection of archeological resources.
- **Policy HA1.4:** Manage the discovery of human remains and the protection of archaeological deposits in accordance with local, State, and federal requirements.
- **Policy HA1.6:** Provide opportunities for the interpretation of paleontology and prehistoric and historical archaeology in the city.
- **Policy HA1.7:** Encourage and facilitate the protection and preservation of traditional cultural properties.
- **Policy HA1.8:** Protect, encourage, and develop guidelines for restoring and rehabilitating historic or architecturally-significant buildings, sites, and landmarks.
- **Policy HA1.9:** Require compatible development within historic districts and on sites outside but immediately adjacent to those districts.

3.4.2 Environmental Setting

REGIONAL PREHISTORY

The earliest confirmed evidence of prehistoric occupation in the Santa Cruz region comes from an archaeological site located 4 miles northeast of the main residential campus in the Santa Cruz Mountains near Scotts Valley which may date to approximately 10,000 years before present (BP). This is supported by the California Central Coast Chronology, which posits prehistoric life in the region extending to 10,000 years BP or earlier. While few sites have been identified from the Paleoindian through the Early Archaic (8000 to 5000 BP) periods in the Santa Cruz area, numerous sites have been dated to the Middle Archaic (5000 BP to 3000 BP) and Late Archaic (3000 BP to 1000 AD [Anno Domini]) periods. The Late Prehistoric Period (1000 to about 1600 AD) has been identified from at least one site near Santa Cruz. Archaeological testing at several sites on the UC Santa Cruz campus in the 1960s resulted in the recovery of two human burials and nearly 1,300 artifacts. Artifact types and radiocarbon dates suggest campus lands were occupied by Native American inhabitants as early as 5,500 BP (3550 BC) to as recently as 200 BP (1750 AD).

Archaeological evidence indicates that Native American groups in the region participated in extensive trade networks. As throughout much of Central California, acorns were an important plant food staple. The Monterey Bay area provided a wide range of resources that were important to Native Americans. In addition to well-known plant and animal foods, important locally available resources included Monterey banded chert, which was used for the manufacture of chipped stone tools such as arrowheads. The bay was also an exceptional source of abalone (*Haliotis* sp.) and olive snail (*Olivella* sp.) shells. These served as raw material for the manufacture of shell ornaments and beads that were traded throughout California and much of the West, and they were important wealth items that were often deposited in graves.

A chronological system that focused on the significant variability and stylistic/typological transitions seen in artifact assemblages across the region was developed as a model of culture change for the Central Coast and adjacent inland areas. The chronological system relied on six key periods (Paleo-Indian, pre-8000 BC; Millingstone, or Early Archaic, 8000 to 3500 BC; Early, 3500 to 600 BC; Middle, 600 BC to AD 1000; Middle/Late Transition, AD 1000 to 1250; and Late, AD 1250 to 1769). Three cultures (the Millingstone Culture, the Hunting Culture, and the Late Period) were used to describe broader social patterns.

The Millingstone Culture is the earliest well-established sequence and dates to the Millingstone or Early Archaic Period (8000 to 3500 BC). This period is defined by the presence of large numbers of handstones, millingslabs, expedient core tools, and lesser quantities of flaked stone tools and large side-notched projectile points. Contracting stemmed points, lanceolate points, and crescents have also been recovered from Millingstone levels. Artifactual and faunal evidence

indicates a wide variety of mammals, shellfish, birds, and to a lesser degree fish were collected. The Millingstone groundstone assemblage also suggests vegetal matter was processed on rock slabs rather than in shaped bowl mortars. Millingstone occupations have been located in a variety of settings from the coast to nearshore interior valleys.

The Hunting Culture spans the Early and Middle Periods (3500 to AD 1000) and is defined by an abundance of stemmed and notched projectile points and large bifaces. The Early Period is marked by the presence of contracting stemmed, Rossi square-stemmed, and large side-notched projectile points generally thought to indicate dart or spear hunting of large and small mammals. Groundstone assemblages include handstones, pitted stones, and portable mortars and pestles. Middle Period sites indicate stylistic changes in stone technology from the earlier square stemmed and large side-notched projectile points. Middle Period stone tools include contracting-stemmed and large-stemmed points, but no square-stemmed or large side-notched points. Groundstone artifacts consist of slabs, handstones, portable mortars, and pestles. Pitted stones and grooved stone net sinkers are common. Hunting Culture sites occur mainly in coastal areas but extend into nearby valleys as well. Faunal remains include deer, rabbits, sea otters, birds, and fish with preferences dependent on locale.

The Middle/Late Transition Period (AD 1000 to 1250) exhibits increasing numbers of arrow points and decreasing numbers of stemmed points indicating more reliance on the bow and arrow which was gradually replacing the use of spears for hunting. The Late Period (AD 1250 to 1769) is defined by the abundance of Desert side-notched and Cottonwood arrow points. Small, serrated points and contracting-stemmed points are present at some sites. Other artifacts include bedrock mortars, hopper mortars, several bead types, small bifacial bead drills, and circular fishhooks. Unlike earlier periods, Late Period sites are more common in the interior than on the coast.

The historic period began in earnest when early Spanish explorers made extensive forays up the Central Coast. Sebástian Vizacaíno landed in the area of Monterey in 1602. Long term contact with Native American inhabitants intensified with the Portolá overland expedition in 1769-1770, which camped along the San Lorenzo River, and the establishment of Mission Santa Cruz in 1771. The Spanish referred to the indigenous population in this region as Costaño or "coast people." Historically, they have become known as Costanoan; in 1770, just before missionization, the Costanoan group was made up of approximately 50 politically autonomous nations and tribelets. At that time, the UC Santa Cruz area was occupied by a tribal group identified as the Uypi which occupied the mouth of the San Lorenzo River.

Mission life, non-Native diseases, and cultural disruption took a severe toll on the Costanoan population. One effect was that groups of mixed ethnicities congregated in a few Native communities. In many cases, these individuals are identified in records (such as those of the Indian Land Claims Act) only as “Mission Indian.” Thus, it is now often difficult or impossible to trace descendants from a specific locale. Many descendants of the San Francisco Bay and Monterey Bay regions identify themselves as Ohlone.

ETHNOGRAPHY

The Costanoan language group comprises seven closely related languages. These languages were spoken throughout a large area extending from the San Francisco Bay southward along the coast to Point Sur and inland to the Diablo Range and portions of the northern San Joaquin Valley. The term “Costanoan” is misleading, however as it amalgamates the 10,000 or more people who lived in the region into a single ethnolinguistic unit. In reality, the term “Costanoan” subsumes as many as 40 or 50 politically independent groups, some of which spoke mutually unintelligible but genetically related languages. Many present-day Native descendants prefer the term Ohlone, which is said to have derived from the name of a coastal village in San Mateo County. Knowledge of Ohlone culture is largely based on information gathered from Spanish expeditions between 1769 and 1776, documents maintained at missions, the works of ethnographers and linguists, and from Ohlone descendants.

The 18th century Ohlone tribelet that lived the vicinity of Mission Santa Cruz was recorded in mission records as Uypi. UC Santa Cruz, as standard practice, acknowledges the traditional territory of the Uypi tribe as including the LRDP area and the need to restore/maintain traditional stewardship practices of the area. Other linguistic dialect groups of Ohlone peoples in the vicinity included the Cotoni (Davenport area), Achistaca (Boulder Creek area), Sayanta (Zayante area), and Aptos (Aptos area). The precise population of the contact period Uypi is uncertain, but around 500 to 700

Native Americans from the Santa Cruz County area were taken to Mission Santa Cruz between 1791 and 1797. Demographic studies in the 1980s estimated an Ohlone population in the Santa Cruz area at around 1,700 persons at the time of contact. Given what is known about population demographics in the area, this suggests that at least one pre-contact or contact period village was present in the UC Santa Cruz vicinity.

Spanish missionization, and the introduction of European diseases for which most Native American inhabitants had little natural resistance, resulted in rapid and dramatic Native American population declines. Subsequent persecution and suppression of Native cultural expressions by Spanish, Mexican, and American colonizers contributed to the transformation of traditional culture. Today, a number of Ohlone tribes remain active in Santa Cruz County, including the Amah Mutsun Tribal Band, the Costanoan Ohlone Rumsen-Mutsen Tribe, and the Indian Canyon Mutsun Band of Costanoan, among others.

REGIONAL HISTORY

Regional Overview

In 1769, the Portolá expedition was the first non-Native exploration party to visit the area between the San Lorenzo River and Wilder Creek. A mission, *La Misión de la Exaltación de la Santa Cruz,* was established in Santa Cruz near the San Lorenzo River in 1791 as part of Spanish colonization efforts in Alta California. Campus lands likely were used by the mission for grazing and/or agricultural fields. After Mexico won its independence from Spain in the 1820s, the Mexican government began the secularization of church lands. Starting in 1834, mission properties were distributed among Spanish and Mexican immigrants, though rarely among Native American citizens. The lands that became the UC Santa Cruz campus made up portions of three Mexican-era land grants: *Rancho de la Cañada del Rincon en el Rio San Lorenzo de Santa Cruz* (Rancho Rincon), *Rancho Zayante*, and *Rancho Rufugio*. By the 1850s, there were also two lime kilns producing quicklime on Rancho Rincon.

In 1848, Mexico ceded California to the US, and California quickly attained statehood in 1850. The major influx of settlers (fueled by the Gold Rush) resulted in a rapid increase in demand for goods and services, including house-building supplies. At that time, quicklime, a principal ingredient in mortar, plaster, and stucco, was shipped from the east around Cape Horn, making it very expensive. In 1851, entrepreneurs Isaac Davis and Albion Jordan discovered that high-quality limestone was available in Santa Cruz, and they bought a 160-acre parcel on the future campus site near High and Bay Streets. There they constructed three lime kilns for the production of quicklime. Davis and Jordan produced 21,000 barrels of lime in 1855, one third of Santa Cruz County's production in that year.

When Albion Jordan retired in 1863, Isaac Davis entered a partnership with Henry Cowell. The lime business flourished, and by 1865 the Cowell and Davis Lime Company was operating eight lime kilns, including the original kilns near the main campus entrance, the Upper Quarry Kiln on the Upper Quarry rim, the Bridge Kiln near McLaughlin Drive, and the Elfland Kiln near College Ten. By 1880, the company had become one of the three largest lime companies in California. The business included quarrying and lumbering operations, a wooden tramway for hauling limestone and lumber, a cooperage to manufacture barrels for shipping, a drayage operation to transport the barrels to the warehouse and wharf, and company schooners to transport the material to San Francisco for shipping. A ranch home, workmen's houses, a carriage house, and other facilities also were established on the campus site along with agricultural operations in support of the lime production business.

In 1906, the devastating San Francisco earthquake demonstrated that brick and mortar were not the best building materials for this region. The Cowell quicklime operations began a major decline, and the lime kiln complex near the main campus entrance was shut down during the early decades of the 20th century, though the Upper Quarry and other kilns on the campus site continued to operate until 1946. During the first decades of the 20th century, agricultural operations on the Cowell property became more important and the Cowells started leasing grazing land, though quarrying continued sporadically for several decades. The property became known as Cowell Ranch, and leases for agricultural operations and grazing persisted into the 1960s.

Another use of the ranch lands was community oriented. The City of Santa Cruz built a reservoir on the western side of Cowell Ranch in 1890 as part of its first public water system. The reservoir, which dammed off Moore Creek with

three earthen dams, leaked badly and was abandoned in 1948. Land ownership reverted to the Cowell Ranch at that time. The reservoir later became the site of the UC Santa Cruz Arboretum and Botanic Gardens in the mid-1960s.

City of Santa Cruz

Mission Santa Cruz, founded in 1791, was the first permanent European settlement in the Santa Cruz area. The first site of the mission was flooded by the San Lorenzo River in the winter of 1791 and was rebuilt over the next several years on the hillside above it. Diego de Borcia, then the Governor of Alta California, selected the Santa Cruz area as the best location to fortify Spanish holdings against the colonial interests of Russia, France, and Great Britain and established *Pueblo de Branciforte* in 1797 on a bluff across the San Lorenzo River from the mission. Branciforte remained a separate settlement until 1905 when it was incorporated into the City of Santa Cruz. After Mexico became independent from Spain and secularized the missions (1833 to 1834), the site of Mission Santa Cruz (at the mission's second location, completed in 1794) became Holy Cross Church. The Mission Hill community surrounding it was a center of commercial, political, and religious activity during the Spanish and Mexican periods and transitioned into the American Period.

Santa Cruz County (first called Branciforte County) was established in 1850 as one of California's original 27 counties. The Gold Rush of 1848 caused a huge influx of settlers into northern California, and Santa Cruz County grew and enjoyed a prosperous economy based on logging, lime processing, agriculture, and commercial fishing. The City of Santa Cruz was granted a legislative charter in 1866 and was incorporated in 1876. The city soon became a prominent resort community in California. One of the first saltwater baths west of the Mississippi was established there by Mary Lidell in 1864, followed by the Neptune Baths in the 1890s. In 1904 to 1907, Fred Swanton developed his boardwalk at the same location, which included a casino, heated indoor pool, and 500 dressing rooms. In 1912, a carousel was added, and the Giant Dipper roller coaster was installed in 1924, which continues to draw summer crowds to this day.

University of California, Santa Cruz

In 1951, plans were begun for the construction of a new campus within the UC system in the southern Central Coast region. By 1961, The Board of Regents of the UC system had chosen Santa Cruz as the location of the new campus. The campus was planned by architect John Carl Warnecke and landscape architect Thomas Church, and the design was based on the Oxford and Cambridge University model of small, independent liberal arts colleges. The campus was conceived as a group of "scholarly villages," with each village representing a different academic discipline. The colleges were designed to be semi-autonomous in function and distinct in architectural and academic style. Each college and its associated libraries, walkways, and dormitories were all designed to appear and function as integral parts of the immediate natural landscape. Construction began in 1964 and the campus opened in 1965.

The Westside Research Park (2300 Delaware Avenue) parcel had a different focus. In the 19th to the early 20th century, this property was owned by the Woolf, Chace, and Leek families just north of the Hall dairy farm and east of Moore Creek. In 1908, the San Vicente Lumber Company sawmill dammed Moore Creek where it now passes into Natural Bridges State Beach and formed a log pond that the Ocean Shore Railroad also used as a trestle. The sawmill shipped its lumber using the Ocean Shore Railroad from 1909 to 1923, when the lumber company moved to Plumas County. The rails were removed, and the rail grade eventually became Delaware Avenue. The pond and the surrounding land then became the Antonelli Brothers' begonia gardens and farm during the ca. 1930s through ca. 1980. Between 1982 and 1994, the Land Trust of Santa Cruz County acquired the pond and land to the west. The land to the east of the pond, between Delaware Avenue and the Southern Pacific Railroad tracks, was acquired by UC Santa Cruz in 2004; the current building complex had been constructed by 1981. In 2019, the UC Santa Cruz Westside Research Park became the home of the UC Santa Cruz Genomics Institute, based in the Baskin School of Engineering.

KNOWN RESOURCES

Resources can be classified as buildings, structures, objects, sites, or districts (Office of Historic Preservation 1995):

- Building: A building, such as a house, barn, church, hotel, or similar construction, is created principally to shelter any form of human activity. "Building" may also be used to refer to a historically and functionally related unit, such as a courthouse and jail or a house and barn.

- Structure: The term "structure" is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter.
- Object: The term "object" is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed. Although it may be, by nature or design, movable, an object is associated with a specific setting or environment.
- Site: A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of the value of any existing structure.
- District: A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

Northwest Information Center Records Search

Background literature and document searches were conducted at the Northwest Information Center (NWIC) of the California Historical Resources Information System at Sonoma State University, Rohnert Park, California on April 21, 2020 (NWIC File No. 19-1702). The records search revealed sixty-eight cultural resource studies within the LRDP area. In addition to the record review, the archival and records search included a review of the following:

- The Historic Properties Directory;
- The California Inventory of Historic Resources;
- California Historical Landmarks;
- California Points of Historical Interest listing May 1992; and
- The National Register of Historic Places (NRHP) (Directory of Determinations of Eligibility, California Office of Historic Preservation, Volumes I and II, 1990; Office of Historic Preservation Computer Listing 1990 and updates).

Prehistoric Archaeological Sites

Eight prehistoric archaeological sites and three prehistoric isolates (resources consisting of three or fewer artifacts) have been identified on the UC Santa Cruz main residential campus. Isolates are defined as one or two artifacts occurring by themselves and not associated with an archaeological site. Because they have no historical context, isolates are generally not eligible for listing in the CRHR or NRHP and, therefore, are not evaluated for significance and not discussed further in this Draft EIR.

Although five of the eight prehistoric sites were subject to test excavations in the 1960s and 1970s, none has been formally evaluated for listing in the CRHR. Two of the sites include habitation deposits (CA-SCR-3/P-44-000011 and CA-SCR-160/P-44-000163), and burials were reportedly recovered from a third possible habitation site (CA-SCR-4/P-44-00012). These three sites have the potential to yield important information and may be eligible for listing in the CRHR.

The remaining five sites are recorded as lithic scatters (scattered chipped stone tool manufacture debris), several with Monterey-banded chert: CA-SCR-94/P-44-00098, CA-SCR-142/P-44-000145, CA-SCR-143/P-44-000146, CA-SCR-180/P-44-000182, and CA-SCR-181/P-44-000183. The last site, CA-SCR-181/P-44-000183, was not relocated during a 2005 archaeological survey. In general, the boundaries of these sites are not well defined, it has been difficult to accurately relocate these sites in subsequent surveys, and it is unclear whether the deposits have subsurface components. These eight sites have been assumed eligible for listing in the CRHR for management and preservation purposes until their significance can be documented through archaeological testing.

Historic Period Archaeological Sites and Features

Two overlapping historic period districts, 11 historic period archaeological sites, and 19 historic period isolates have been identified on the UC Santa Cruz main residential campus; no sites or isolates have been identified on the Westside Research Park site. The two overlapping historic districts are located in the lower campus. The first is the Cowell Home Ranch District (P-44-000855), which includes standing ranch buildings, kilns, and quarries. It was originally nominated to the NRHP in 2003 but was not listed following review by the California Office of Historic

Preservation. The second is the Cowell Lime Works Historic District (CA-SCR-198H), which was listed in the NRHP and CRHR in 2007. Cowell Lime Works Historic District is considered a multi-component site, meaning that it contains both historic period archaeological features and historic period built-environment features. Therefore, it is both an archaeological resource and a historic resource.

The Cowell Lime Works Historic District is an extensive complex of extant 19th and 20th century buildings, structures, and associated archaeological features, as well as several other related archaeological sites (CA-SCR-182H, CA-SCR-183H, and CA-SCR-361H) that include railroad, quarrying, and lime kiln features associated with quicklime production at Cowell Ranch between about 1851 and 1946. During development of the 2005 LRDP, a NRHP nomination for the Cowell Lime Works Historic District was prepared. The District was determined to be eligible for listing in the NRHP under Criterion A and in the CRHR under Criterion 1 for its role in the development of lime mortar manufacturing in California between 1851 and 1906. While the integrity of many of the buildings and features had been diminished through deterioration, physical damage from development, or adaptive reuse and thus no longer contributed to its significance, the district and many of its features retained their historical significance. A draft historic district management plan was prepared in 2006 with the objective of maintaining the district's historical character. This plan is being refined to identify opportunities to further improve the Cowell Lime Works Historic District for use as a campus and community amenity including adaptive reuse and rehabilitation of existing structures that preserve the spatial and historic character relationships in the historic district. As noted above, the Cowell Lime Works Historic District was listed in the NRHP and CRHR in 2007 (NPS #07001220). In 2009, two archaeological features (P-44-000958 and UCSC-0906) within the district boundaries were discovered and tested. Both features were assumed eligible for listing in the CRHR and recommended as contributing elements to the district.

Most of the other historic period sites documented on the main campus also are presumed potentially eligible for listing in the CRHR for their potential to yield important historical data and for their association with important events, namely the economic development of Santa Cruz County, and particularly its quicklime industry. Several of the recorded sites may predate the Cowell Ranch period, such as the Elfland Kiln (CA-SCR-361H) and Upper Quarry Kiln, and may offer contrasting and comparative data on the economy in Santa Cruz prior to the lime industry boom. Other recorded sites (CA-SCR-184H, CA-SCR-185H, CA-SCR-186H, and CA-SCR-424H) include features likely associated with the agricultural activities at Cowell Ranch in the late 19th to early 20th century. Based on their locations, two sites may not be directly associated with Cowell Ranch; these include a habitation site (CA-SCR-262H) and domestic debris dump (CA-SCR-360H). Finally, one resource (CA-SCR-359H) served as the original City of Santa Cruz reservoir and is now occupied by the site of the UC Santa Cruz Arboretum and Botanic Gardens. One previously recorded site, SCR-277H (also known as CA-SCR-227H), does not appear to be eligible for listing in the CRHR. It consists of a historic period agricultural field and was recorded because it appeared on a 1931 aerial photo; today, it does not appear to retain any elements that suggest its historical character, and it has little potential to provide additional historical information beyond its recorded location.

Tribal Cultural Resources

On February 22, 2020 UC Santa Cruz sent letters to the six Native American Tribes that had previously requested, in writing, to be informed by UC Santa Cruz of proposed projects per PRC Section 21080.3.1 (b)(1). These letters notified the tribes that the project was being addressed under CEQA, as required by PRC Section 21080.3.1. The specific details of the consultations are confidential pursuant to California law; however, a summary of events related to communication between the tribes and UC Santa Cruz is provided in Table 3.4-1.

Table 3.4-1 AB 52 Consultation

Native American Tribe and Contact	Date of Initial Response	Follow-up Response	Comment
Mr. Valentin Lopez, Chairperson of the Amah Mutsun Tribal Band	Chairman Lopez requested consultation via email on 4/21/2020.	Conference call meeting with UC Santa Cruz and Chairman Lopez on 5/20/20 that presented an overview of the 2021 LRDP. On 7/27/2020, UC Santa Cruz emailed a copy of the cultural resources investigation to Chairman Lopez and requested a follow-up meeting. On 10/6/2020, 11/17/2020, and 12/9/2020, UC Santa Cruz emailed Chairman Lopez to set up a meeting to discuss potential mitigation measures. On 12/14/2020, UC Santa Cruz had a conference call with Chairman Lopez regarding potential mitigation measures.	Consultation is ongoing.
Edward Ketchum of the Amah Mutsun Tribal Band	No response.	Not applicable.	Not applicable.
Mark Mondragon of the Amah Mutsun Tribal Band	No response.	Not applicable.	Not applicable.
Ms. Irenne Zwierlein, Chairperson of the Amah Mutsun Tribal Band of Mission San Juan Bautista	No response.	Not applicable.	Not applicable.
Mr. Patrick Orozco, Chairman of the Costanoan Ohlone Rumsen-Mutsun Tribe	No response.	Not applicable.	Not applicable.
Ms. Ann Marie Sayers, Chairperson of the Indian Canyon Mutsun Band of Costanoan	No response.	Not applicable.	Not applicable.
Ms. Rosemary Cambra of the Muwekma Ohlone Indian Tribe of the San Francisco Bay Area	No response.	Not applicable.	Not applicable.
Ramona Garibay of the Trina Marine Ruano Family	No response.	Not applicable.	Not applicable.

Source: Data compiled by Ascent Environmental in 2020

As shown in Table 3.4-1, only one Tribe requested consultation with UC Santa Cruz. The Amah Mutsun Tribal Band has identified the eight prehistoric archaeological sites on the UC Santa Cruz main residential campus as tribal cultural resources. This includes the three habitation sites (CA-SCR-3/P-44-000011; CA-SCR-160/P-44-000163; and CA-SCR-4/P-44-00012), five lithic scatter sites (CA-SCR-94/P-44-00098; CA-SCR-142/P-44-000145; CA-SCR-143/P-44-000146; CA-SCR-180/P-44-000182; and CA-SCR-181/P-44-000183).

A search of NAHC's Sacred Lands Files revealed that Native American cultural sites have been previously recorded within both the UC Santa Cruz main residential campus and the Westside Research Park site.

Historical Resources

As part of a Getty Campus Heritage Grant awarded to UC Santa Cruz, the campus core was surveyed and evaluated in 2005. The survey concluded that portions of the original UC Santa Cruz campus core, including the first six colleges and a number of other campus buildings (see Table 3.4-2 and Figure 3.4-1), could be significant at the national level as a potential historic district under NRHP/CRHR Criterion C/3, as an exceptional example of the Bay Region Modernism movement. As noted in the archival research conducted as part of the Getty Campus Heritage Grant, planning for the UC Santa Cruz campus began in 1961; the administrators urged diversity of design with the

avoidance of a "single hand (architect)" approach to architecture on the university campus. The Regents approved the UC Santa Cruz campus master plan in 1963 after years of thoughtful collaboration by a Campus Planning Committee comprised of school administrators and nationally renowned architects and landscape architects including, Ernest J. Kump, Robert Anshen, Theodore Bernardi, John Carl Warnecke, and Thomas Church. Driven by the philosophies of landscape architect Thomas Church, the Campus Planning Committee designed a campus of diverse building styles and characters that protected a naturally majestic site (Architectural Resources Group 2006).

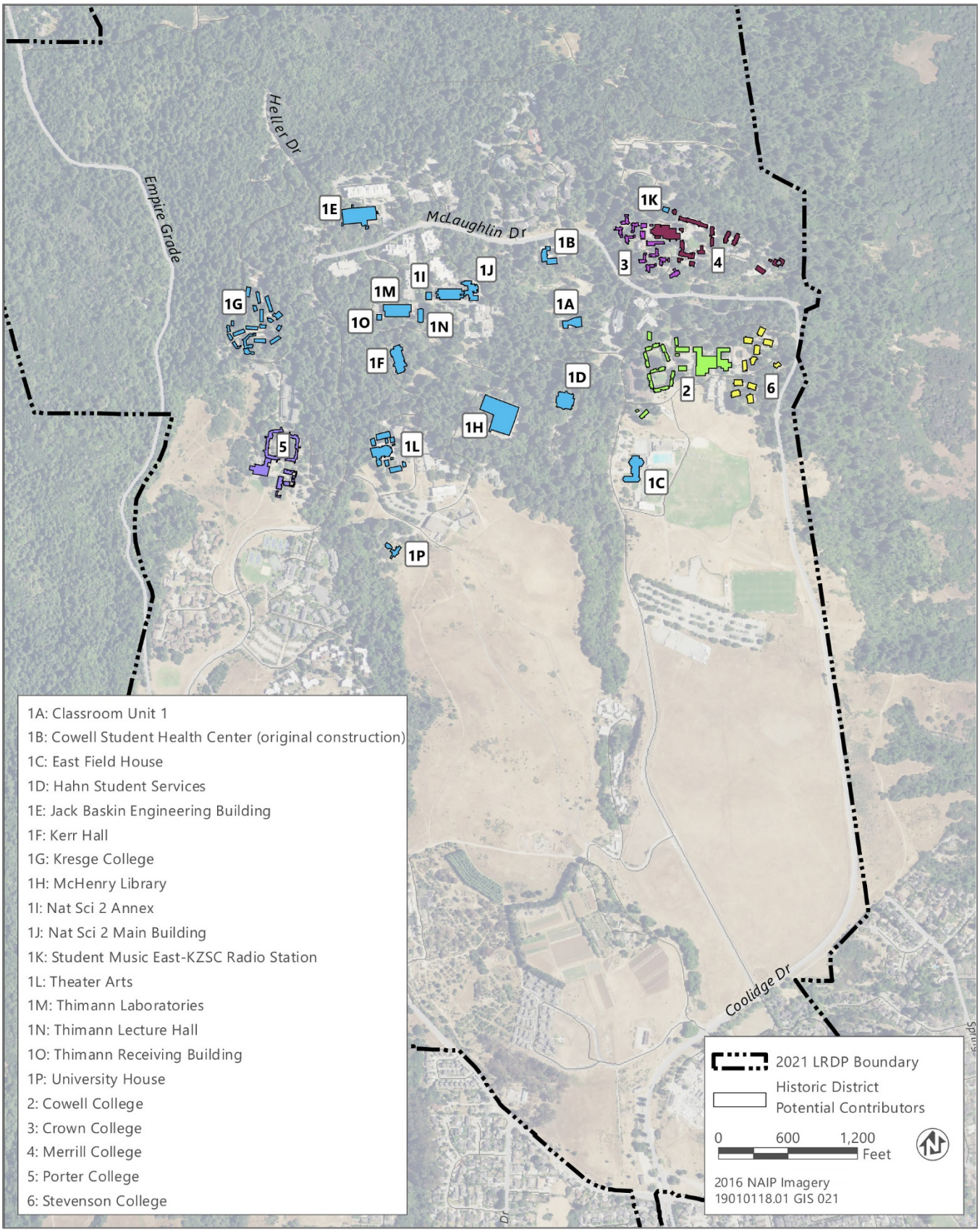
It is important to note that at the time of the 2005 survey, the earliest buildings on the UC Santa Cruz campus were only 40 years in age and did not meet the recommended 50-year threshold for buildings eligible for the NRHP. As such, the buildings in Table 3.4-2 were identified as having the potential to contribute to a UC Santa Cruz campus core historic district when they reached 50 years in age. Because these potentially contributing individual buildings and groups of buildings are spread throughout the campus core, interspersed with a mixture of newer buildings, this would be considered a discontiguous historic district. Consistent with the original 1963 master plan idea of avoiding a single architect design, newer buildings and structures with different architectural styles intermingle with the buildings listed in Table 3.4-2.

Table 3.4-2 UC Santa Cruz Campus Core Potential Historic District Contributors

Building Name	Construction Year
Classroom Unit 1	1972
Cowell College	1966
Cowell Student Health Center (original construction)	1970
Crown College	1967
East Field House	1965
Hahn Student Services	1965
Jack Baskin Engineering Building	1971
Kerr Hall	1973
Kresge College	1973
McHenry Library	1966
Merrill College	1968-1971
Nat Sci 2 Annex	1969
Nat Sci 2 Main Building	1969
Porter College	1971-1973
Stevenson College	1966-1968
Student Music East-KZSC Radio Station	1967
Theater Arts	1971
Thimann Laboratories	1965
Thimann Lecture Hall	1965
Thimann Receiving Building	1965
University House	1967

Source: architecture + history 2020.

As described above, the Cowell Lime Works Historic District is a collection of industrial and ranch-related buildings, structures, and objects constructed of wood and limestone masonry that are scattered over an area of about 30 acres just inside the UC Santa Cruz main residential campus entrance. The Cowell Lime Works Historic District was listed at the local level of significance under NRHP Criterion A and CRHR Criterion 1 in the area of industry. While many of the resources have been altered or have deteriorated, they still create a cohesive historic district conveying both the process and physical characteristics of the historic Cowell Lime Works. Table 3.4-3 shows the buildings that are listed in the NRHP as contributors to the historic district.



Source: Data downloaded from USFWS in March 2020

Figure 3.4-1 Contributors to a Potential Discontiguous Historic District

Table 3.4-3 Cowell Lime Works Historic District Contributors

Building Name	Address	Construction Year
Blacksmith Shop #1	93 Ranch View Road	1850s, circa
Blacksmith Shop #2	93 Ranch View Road	1850s, circa
Cardiff House Women's Center (Ranch House)	117 Carriage House Road	1850s, circa; expanded 1864
Cook House	109 Coolidge Drive	1850s, circa
Cooperage	113 Coolidge Drive	1854
Granary	102 Coolidge Drive	1860s, circa
Hay Barn	94 Ranch View Road	1850s, circa
Powder House	90 Ranch View Road	1850s, circa
Stone House (Paymaster's House)	100 Coolidge Drive	1860s, circa
Barn Theater	101 Coolidge Drive	1850s, circa

Source: architecture + history 2020

3.4.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Thresholds of significance used in this EIR are based on Appendix G of the State CEQA Guidelines. 2021 LRDP implementation would result in a significant impact on cultural resources if it would:

- cause a substantial adverse change in the significance of a historical resource as pursuant to Section 15064.5 of the State CEQA Guidelines;
- cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5 of the State CEQA Guidelines;
- disturb any human remains, including those interred outside of dedicated cemeteries; or
- cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe; and that is:
  - i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in PRC Section 5020.1(k), or
  - ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

ANALYSIS METHODOLOGY

The impact analysis for archaeological resources is based on the findings of the *Technical Memo for Cultural Resource Studies, UC Santa Cruz, Long Range Development Plan* (Pacific Legacy 2020), which is included as Appendix E1. The impact analysis for historical resources is based on the findings and recommendations of the *UC Santa Cruz 2020 Long Range Development Plan Historic Resources Technical Memorandum* (architecture + history 2020), which is included as Appendix E2. The analysis is also informed by the provisions and requirements of federal, state, and local laws and regulations that apply to cultural resources.

For the purposes of the impact discussion, "historical resource" is used to describe built-environment historic period resources. Archaeological resources (both prehistoric and historic period), which may qualify as "historical resources"

pursuant to CEQA, are analyzed separately from built-environment historical resources. Section 15064.5 of the State CEQA Guidelines defines "substantial adverse change" as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the resource would be materially impaired. Material impairment includes changes to the physical characteristics that make a historical resource eligible for listing in the CRHR such that the resource would no longer be eligible for the NRHP, CRHR, or local historical registers (State CEQA Guidelines, Title 14, Section 15064.5(b)(2)).

PCR Section 21083.2 defines "unique archaeological resource" as an archeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets one or more of the following CRHR-related criteria: (1) that it contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information; (2) that it has a special and particular quality, such as being the oldest of its type or the best available example of its type; or (3) that it is directly associated with a scientifically recognized important prehistoric or historic event or person. An impact on a "nonunique resource" is not a significant environmental impact under CEQA (State CEQA Guidelines Section 15064.5[c][4]). If an archaeological resource qualifies as a resource under CRHR criteria, then the resource is treated as a unique archaeological resource for the purposes of CEQA.

PRC Section 21074 defines tribal cultural resources as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe" that are listed or determined eligible for CRHR listing, listed in a local register of historical resources, or otherwise determined by the lead agency to be a tribal cultural resource.

In addition, according to State CEQA Guidelines Section 15126.4(b)(1), if a project adheres to the "Secretary of the Interior's Standards for the Treatment of Historic Properties," the project's impact "will generally be considered mitigated below the level of a significance and thus is not significant."

ISSUES NOT EVALUATED FURTHER

All issues applicable to archaeological, historical, and tribal cultural resources listed under the significance criteria above are addressed in this section.

IMPACTS AND MITIGATION MEASURES

Impact 3.4-1: Impacts to Unique Archaeological Resources

Future development associated with the 2021 LRDP could be located on properties that contain known or unknown archaeological resources and ground-disturbing activities could result in discovery of or damage to yet undiscovered archaeological resources as defined in CEQA Guidelines Section 15064.5. This would be a **potentially significant** impact.

Archaeological testing at several sites on the UC Santa Cruz campus in the 1960s resulted in the recovery of nearly 1,300 artifacts. Artifact types and radiocarbon dates suggest campus lands were occupied by Native inhabitants as early as 5,500 BP (3550 BC) to as recently as 200 BP (1750 AD).

Eight prehistoric archaeological sites have been recorded on the main campus. None has been formally evaluated for listing in the CRHR. Three habitation sites have the potential to yield important information and may be eligible for listing in the CRHR. The remaining five sites are recorded as lithic scatters. These eight sites have been assumed eligible for listing in the CRHR, however for management and preservation purposes until their significance can be documented through archaeological testing.

Eleven historic period archaeological sites and two historic period archaeological districts have been identified on the UC Santa Cruz main campus. The Cowell Home Ranch District was determined not eligible for listing in the NRHP in 2003; however, the district may still be eligible for listing in the CRHR. The Cowell Lime Works Historic District has been evaluated as eligible for the NRHP/CRHR; the district was listed in 2007. The remaining sites have not been formally evaluated but are assumed eligible for management and preservation.

The 2021 LRDP proposes general types of campus development and land uses to support projected campus population growth and to enable expanded and new program initiatives. This development would be related to academic, residential, and infrastructural space and would include various levels of ground disturbance. As currently envisioned, development under the 2021 LRDP would occur primarily within the central and lower campus subareas as infill or expansion of already developed areas, although new development would also occur on the north campus. Additionally, the 2021 LRDP plans for the Westside Research Park to be developed with mixed-use academic, research, and housing.

While new development under the 2021 LRDP would generally avoid disturbance in the areas of the recorded archaeological sites on the campus, some development could encroach into the vicinity of known archaeological sites. Further, development or improvements in locations of sensitivity, where highly important sites are most likely to be located, could encounter previously undiscovered or unrecorded archaeological sites and materials. Ground disturbance could damage or destroy previously unknown or known archaeological resources, which would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.4-1: Identify and Protect Unknown Archaeological Resources

As early as possible in the project planning process for individual projects under the 2021 LRDP, UC Santa Cruz shall define the project's area of effect for archaeological resources. UC Santa Cruz shall determine the potential for the proposed project to result in cultural resource impacts, based on the extent of ground disturbance and site modifications anticipated for the proposed project. UC Santa Cruz shall also review confidential resource records to determine whether complete intensive archaeological survey utilizing current techniques and practices, including consultation with a culturally-affiliated Native American tribe has been performed on the site and whether any previously recorded cultural resources are present. UC Santa Cruz shall implement the following steps to identify and protect archaeological resources that may be present in the project's area of effects:

1) For project sites that have not been subject to a prior complete intensive archaeological survey, UC Santa Cruz shall ensure that a complete intensive surface survey is conducted by a qualified archaeologist, who meets the Secretary of the Interior's Professional Qualification Standards in Archaeology, once the area of ground disturbance has been identified and prior to soil disturbing activities. Additionally, UC Santa Cruz shall notify the Amah Mutsun Tribal Band of the area not subject to an intensive survey and a tribal representative shall be invited to participate. 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, UC Santa Cruz 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. If the qualified archaeologist determines that the archaeological material is Native American in origin and the qualified archaeologist assigned to the surveying and monitoring process is not an authorized representative of the Amah Mutsun Tribal Band, UC Santa Cruz and/or archaeologist shall consult with the Amah Mutsun Tribal Band in the process of designing a survey and monitoring program.

2) Where native soils will be disturbed, UC Santa Cruz shall require contractor crews to attend an informal training session provided by UC Santa Cruz 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 UC Santa Cruz if any are found. In the event of a discovery, UC Santa Cruz shall implement item (4), below.

3) If it is determined that a known archaeological site extends into the project's area of potential effects, UC Santa Cruz 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 Section 15064.4. This evaluation may require additional research, including subsurface testing, or avoidance measures, as described in item (5) below. If the archaeological resources is determined to be Native American in origin, and the qualified

archaeologist performing the evaluation is not an authorized representative of the Amah Mutsun Tribal Band, the archaeologist shall consult and partner with the Amah Mutsun Tribal Band in the process of evaluating the significance and eligibility of the resource. If the resource does not qualify, or if no resource is present within the project's area of effect, this will be reported in the environmental document and no further mitigation will be required unless there is a discovery during construction.

4) 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. UC Santa Cruz shall contact a qualified archaeologist to provide and implement a plan for survey, subsurface investigation as needed to define 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. If the archeological resource is determined to be Native American in origin, and the qualified archaeologist performing the evaluation is not an authorized representative of the Amah Mutsun Tribal Band, the archaeologist shall consult and partner with the Amah Mutsun Tribal Band in the process of planning a survey program and evaluating the significance and eligibility of the resource. Mitigation Measure 3.4-1(2) and (3) shall also be implemented.

5) If archaeological material within the project's area of effects is determined to qualify as a historical resource or a unique archaeological resource (as defined by CEQA), UC Santa Cruz 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, the establishment of a preservation easement, or more substantial modifications where feasible that will permit avoidance or substantial preservation in place of the resource. If the archeological resource is determined to be Native American in origin, and the qualified archaeologist performing the evaluation is not an authorized representative of the Amah Mutsun Tribal Band, the archaeologist shall consult and partner with the Amah Mutsun Tribal Band in the process of planning a survey program and evaluating the significance and eligibility of the resource. If avoidance or substantial preservation in place is not possible, UC Santa Cruz shall implement Mitigation Measure 3.4-1(6).

6) If avoidance or preservation in place is not possible for an archaeological site that has been determined to meet CEQA significance criteria, before the property is excavated, damaged, or destroyed, UC Santa Cruz shall retain a qualified archaeologist who meets the Secretary of the Interior's Professional Qualification Standards in Archaeology. UC Santa Cruz is aware that the Amah Mutsun Tribal Band (AMTB) maintains a staff of registered professional archaeologists and tribal monitors who engage in cultural resource management through the tribe's nonprofit organization, the Amah Mutsun Land Trust (AMLT). When selecting a qualified archaeologist for work that relates to archaeological resources on campus lands that are determined to be Native American in origin, UC Santa Cruz will include AMTB/AMLT in notifications regarding forthcoming opportunities and contracts. The qualified archaeologist, in consultation with UC Santa Cruz and Native American tribes as applicable, 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. UC Santa Cruz shall also ensure that appropriate technical analyses are performed, and a full written report prepared and filed with the California Historical Resources Information System; UC Santa Cruz shall also provide for the permanent curation of recovered materials.

Significance after Mitigation

Implementation of Mitigation Measure 3.4-1 would reduce potentially significant impacts to unique archaeological resources to less than significant because mitigation would be developed in coordination with the appropriate federal, state, and/or local agency(ies) and tribes to avoid, move, record, or otherwise treat the archaeological resource appropriately, in accordance with pertinent laws and regulations. Therefore, the project's impacts would be **less than significant**.

Impact 3.4-2: Substantial Adverse Change in the Significance of a Tribal Cultural Resource

Future development associated with the 2021 LRDP would involve land development activities that could cause a substantial adverse change in the significance of a tribal cultural resource. The eight prehistoric archaeological sites that currently exist on the main residential campus have been identified as tribal cultural resources, and ground-disturbing construction activities could unearth previously unrecorded resources. This impact would be **potentially significant**.

As described previously, UC Santa Cruz sent notification letters to six tribes February 22, 2020 per PRC 21080.3.1 (b)(1). UC Santa Cruz had a verbal communication with Mr. Valentin Lopez, Chairperson of the Amah Mutsun Tribal Band. The Amah Mutsun Tribal Band identified the eight prehistoric archaeological sites on the UC Santa Cruz main residential campus as tribal cultural resources.

Additionally, the campus is located in a region where significant resources have been documented. The NAHC Sacred Lands database search revealed that Native American cultural sites (i.e., sites that have either not been evaluated or do not meet the definition of a tribal cultural resource under PRC Section 21074) have been previously documented within both the UC Santa Cruz main residential campus and the Westside Research Park site. While none of the envisioned development areas are located on sites of known prehistoric archaeological materials, there remains a potential that unrecorded prehistoric archaeological resources that may meet the definition of tribal cultural resources could be unearthed or otherwise discovered during ground-disturbing construction activities. Therefore, this impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.4-2: Protect Tribal Cultural Resources

No less than 2 weeks prior to ground disturbance within 400 feet of a known prehistoric archaeological deposit (eight prehistoric archaeological sites are currently known to exist on the main residential campus), UC Santa Cruz shall notify the Amah Mutsun Tribal Band of the potential ground disturbance. As part of the notification, a Native American monitor of the Amah Mutsun Tribal Band will be provided an opportunity to monitor during ground disturbance for potential archaeological materials and human remains within 400 feet of a known prehistoric archaeologic deposit. In addition, as described in Mitigation Measure 3.4-1(1), if a previously unknown prehistoric archaeological deposit is uncovered during construction, a Native American monitor of the Amah Mutsun Tribal Band will be provided the opportunity to monitor grading within 400 feet of the find. If the find is Native American in origin, the Amah Mutsun Tribal Band shall coordinate with UC Santa Cruz regarding appropriate treatment, including preparation and implementation of a formal treatment plan. As described in Mitigation Measure 3.4-1(5), the preferred method of treatment is avoidance and preservation of the resources in place, including, but not limited to, planning and construction to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria. If avoidance or preservation is not possible, potential curation or reinterment (either on-site or at an appropriate off-site location, as designated and previously approved by the tribe), of the encountered tribal cultural resources would be coordinated and approved by the tribe.

<u>Significance after Mitigation</u>

Implementation of Mitigation Measure 3.4-2 would reduce the potentially significant impact on tribal cultural resources to **less than significant** because the culturally affiliated tribe would be provided the opportunity to monitor construction and by requiring appropriate and respectful treatment (i.e., proper care as determined through preparation and implementation of a treatment plan that is approved by the tribe) of artifacts if they are recovered.

Impact 3.4-3: Impacts to Human Remains

Although unlikely, construction and excavation activities associated with project development could unearth previously undiscovered or unrecorded human remains, if they are present. Compliance with California Health and Safety Code Sections 7050.5 and 7052 and PRC Section 5097 would make this impact **less than significant**.

No historic period burials or cemeteries are known within the UC Santa Cruz main residential campus or on the Westside Research Park parcel. However, two prehistoric burials were reportedly recovered from an archaeological site in the 1960s. Grave sites and Native American remains can occur outside of dedicated cemeteries or burial sites. Ground-disturbing construction activities could uncover previously unknown human remains, which could be archaeologically or culturally significant. The 2021 LRDP proposes new development and building improvements involving construction activities that would disturb native terrain, including excavation, grading, and soil removal; therefore, the potential exists for previously undiscovered human remains to be discovered.

California law recognizes the need to protect Native American human burials, skeletal remains, and items associated with Native American burials from vandalism and inadvertent destruction. The procedures for the treatment of Native American human remains are contained in California Health and Safety Code Sections 7050.5 and 7052 and California PRC Section 5097.

If human remains are discovered during any construction activities, potentially damaging ground-disturbing activities in the area of the remains shall be halted immediately, and UC Santa Cruz shall notify the Santa Cruz County coroner and the NAHC immediately, according to PRC Section 5097.98 and Section 7050.5 of California's Health and Safety Code. If the remains are determined by the NAHC to be Native American, the guidelines of the NAHC shall be adhered to in the treatment and disposition of the remains. Following the coroner's findings, UC Santa Cruz and the NAHC-designated most likely descendant shall recommend the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments are not disturbed. The responsibilities for acting upon notification of a discovery of Native American human remains are identified in California PRC Section 5097.94.

Compliance with California Health and Safety Code Sections 7050.5 and 7052 and California PRC Section 5097 would provide an opportunity to avoid or minimize the disturbance of human remains, and to appropriately treat any remains that are discovered. Therefore, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.4-4: Impacts to Historical Resources

The 2021 LRDP proposes general types of campus development to support projected campus population growth and to enable expanded and new program initiatives, including the renovation of some existing buildings. This could result in damage, destruction, or loss of integrity to a historic building, structure, or district, thereby resulting in a substantial adverse change in the significance of a historical resource as defined in Section 15064.5. This would be a **potentially significant** impact.

Historical (or built-environment) resources include standing buildings (e.g., houses, barns, cabins) and intact structures (e.g., dams, bridges). Over the years, historical resources on campus have been identified through historic building surveys and cultural resource studies. These surveys and studies have led to the identification of the NRHP-listed Cowell Lime Works Historic District and a potential discontiguous Campus Core historic district. Additionally, buildings that currently are, or will become, 50 years old during the planning period for this 2021 LRDP could be evaluated as eligible for listing in the CRHR or NRHP.

The 2021 LRDP proposes general types of campus development and land uses to support projected campus population growth and to enable expanded and new program initiatives. This development would be related to academic, residential, and infrastructural space. As currently envisioned, development under the 2021 LRDP would occur primarily within the central and lower campus subareas as infill or as expansion of already developed areas, although some development would extend north from the Campus Core. Within the Cowell Lime Works Historic District, some limited development could occur, in addition to rehabilitation of historic buildings, for academic & support facilities, community-facing programs, and visitor resources as described in the land use designation for the Historic District in Chapter 2, "Project Description." As discussed in Section 3.1, "Aesthetics," a Management Plan for the Cowell Lime Works Historic District is being refined to identify opportunities to further improve the historic district for use as a campus

and community amenity including adaptive reuse and rehabilitation of existing structures that preserve the spatial and historic character relationships in the Cowell Lime Works Historic District.

Damage to or destruction of a building or structure that is a designated historic resource, eligible for listing as a historic resource, or a potential historic resource that has not yet been evaluated, could result in the change in its historical significance. Similarly, the integrity of a historic district could be adversely affected by either (1) the direct demolition or substantial modification of contributing buildings or (2) the construction of noncontributing buildings within colleges deemed to be contributing. This must be examined on a case-by-case basis as specific development is proposed/designed under the 2021 LRDP to determine whether sufficient modifications within a historic district could result in a loss of integrity and therefore a change in its historical significance. However, as the 2021 LRDP does not include specific sites for development or building designs and definitive footprints for the envisioned development, potential modifications and adverse changes to historic resources cannot be precluded at this time. Therefore, the impact to historical resources would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.4-4a: Protect Cowell Lime Works Historic District

During project-specific environmental review of development under the 2021 LRDP, UC Santa Cruz shall define the project's area of effect for historic buildings and structures as early as possible. If the project is located within or adjacent to the Cowell Lime Works Historic District, UC Santa Cruz shall take the following measures into account in project design to preserve the historic visual quality of the historic district:

- To the greatest extent feasible, a buffer of at least 200 feet shall be maintained between the boundaries of the Cowell Lime Works Historic District and new building development that would be visible against the backdrop of historic buildings from significant campus viewpoints.
- Any development, including new buildings, structures, access improvements, within a 500-foot buffer or within the district boundaries shall be evaluated by an architectural historian prior to implementation and conducted in compliance with the "Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings" (Weeks and Grimmer 1995).
- New buildings or structures within 500 feet of the district boundaries shall be subject to design review by the Design Advisory Board, to ensure that design does not interfere with the historic aspect of the district and its buildings with respect to scale, massing, and materials, such that the rural historic visual character of the district is maintained.

Mitigation Measure 3.4-4b: Protect the Potential Campus Core Discontiguous Historic District

During project-specific environmental review of development under the 2021 LRDP, UC Santa Cruz shall define the project's area of effect for historic buildings and structures as early as possible. For projects affecting any building identified as a potential contributor to the potential Campus Core discontiguous historic district, UC Santa Cruz shall implement the following procedures:

- For all buildings located within the potential Campus Core discontiguous historic district, projects involving interior alterations or routine maintenance work do not need review by an architectural historian.
- For minor exterior repairs that do not alter the visual appearance of the building—such as caused by water damage—to buildings that could be contributors to the potential Campus Core discontiguous historic district, if the repairs meet the "Secretary of the Interior's Standards for the Treatment of Historic Properties," then review by an architectural historian is not required. Buildings that contribute to the potential Campus Core discontiguous historic district are Classroom Unit 1, Cowell College, Cowell Student Health Center (original construction), Crown College, East Field House, Hahn Student Services, Jack Baskin Engineering Building, Kerr Hall, Kresge College, McHenry Library, Merrill College, Nat Sci 2 Annex, Nat Sci 2 Main Building, Porter College, Stevenson College, Student Music East-KZSC Radio Station, Theater Arts, Thimann Laboratories, Thimann Lecture Hall, Thimann Receiving Building, and the University House.

- For larger exterior repairs, building additions, or demolition of buildings that could be contributors to the potential Campus Core discontiguous historic district, UC Santa Cruz shall retain a qualified architectural historian to determine if the building, or group of buildings, could be contributors. If large repairs, alterations, or demolitions are proposed at Cowell, Crown, Merrill, Porter, or Stevenson colleges, those groups of buildings shall be evaluated for their potential to comprise separate, individual sub-districts. (Note: Kresge College is not included in this group because Kresge College has been previously been evaluated at a district level; due to lack of integrity, the college is not eligible for listing on the NRHP or CRHR.)

  The qualified architectural historian shall record the buildings on the appropriate California Department of Parks and Recreation DPR 523 forms and evaluate the buildings against NRHP and CRHR significance criteria. If the building or group of buildings does not meet the CEQA criteria for a historical resource, no further mitigation is required. If the buildings qualify as a historic resource, the architectural historian and UC Santa Cruz shall consult to consider measures that would enable the project to avoid direct or indirect impacts to the potential Campus Core discontiguous historic district or contributing building.

  If the project cannot avoid modifications to the building, UC Santa Cruz shall ensure that documentation and treatment shall be carried out by a qualified architectural historian, as follows:

  a) If the building or structure can be preserved on-site, but remodeling, renovation or other alterations are required, this work shall be conducted in compliance with the "Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings" (Weeks and Grimmer 1995).

  b) If a significant historic building or structure is proposed for major alteration or renovation, or to be moved and/or demolished, UC Santa Cruz shall ensure that a qualified architectural historian thoroughly documents the building and associated landscaping and setting. Documentation shall include still and video photography and a written documentary record of the building to the standards of the Historic American Building Survey (HABS) or Historic American Engineering Record (HAER), including accurate scaled mapping, architectural descriptions, and scaled architectural plans, if available. A copy of the record shall be deposited in the McHenry Library Special Collections, and with the California Historical Resources Information System. The record shall be accompanied by a report containing site-specific history and appropriate contextual information. This information shall be gathered through site-specific and comparative archival research, and oral history collection as appropriate.

  c) If preservation and reuse at the site are not feasible, the historical building shall be documented as described in item (b) and, when it is physically and financially feasible, it shall be moved and preserved or reused.

  d) If, in the opinion of the qualified architectural historian, the nature and significance of the building is such that its demolition or destruction cannot be fully mitigated through documentation, UC Santa Cruz shall reconsider project plans in light of the high value of the resource, and implement more substantial modifications, where feasible, to the proposed project that would limit the degree of modification or allow the structure to be preserved intact. These could include project redesign, relocation, or abandonment. If no such measures are feasible, the historical building shall be documented as described in item (b).

- For new infill construction within the potential historic district that does not involve building demolition:

  a) Infill projects outside Cowell, Crown, Merrill, Porter, or Stevenson colleges would not affect the potential college sub-districts or the potential Campus Core discontiguous historic district, and do not need review by an architectural historian; and

  b) Infill projects within Cowell, Crown, Merrill, Porter, or Stevenson College will require review by an architectural historian for elements such as form, massing, and scale, to ensure visual compatibility with the college, and the review shall be conducted in compliance with the "Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings" (Weeks and Grimmer 1995).

Mitigation Measure 3.4-4c: Conduct Project-Specific Surveys and Implement Measures to Protect Previously Unidentified Historic Resources

For areas outside the Cowell Lime Works Historic District and the potential Campus Core discontiguous historic district, as early as possible in the project planning process, UC Santa Cruz shall define the project's area of potential effect for historic structures. UC Santa Cruz 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.

Before altering or otherwise affecting a building or structure 50 years old or older that has not been evaluated previously, UC Santa Cruz shall retain a qualified architectural historian to record it at professional standards and assess its significance under CEQA Guidelines Section 15064.4. The evaluation process shall include the development of appropriate historical background research as context for the assessment of the significance of the structure in the history of the UC system, the campus, and the region. For historic buildings, structures or features that do not meet the CEQA criteria for historical resource, no further mitigation is required, and the impact would be less than significant.

For a building or structure that qualifies for listing on the CRHR, UC Santa Cruz shall consult with the architectural historian to consider measures that would enable the project to avoid direct or indirect impacts to the building or structure. These could include preserving a building on the margin of the project site, using it "as is," or other measures that would not alter the building.

If the project cannot avoid modifications to a significant building or structure, UC Santa Cruz shall ensure that documentation and treatment shall be carried out by a qualified architectural historian, as described below:

a) If the building or structure can be preserved on site, but remodeling, renovation or other alterations are required, this work shall be conducted in compliance with the "Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings" (Weeks and Grimmer 1995).

b) If a significant historic building or structure is proposed for major alteration or renovation, or to be moved and/or demolished, UC Santa Cruz shall ensure that a qualified architectural historian thoroughly documents the building and associated landscaping and setting. Documentation shall include still and video photography and a written documentary record of the building to the standards of the Historic American Building Survey (HABS) or Historic American Engineering Record (HAER), including accurate scaled mapping, architectural descriptions, and scaled architectural plans, if available. A copy of the record shall be deposited in the McHenry Library Special Collections, and with the California Historical Resources Information System. The record shall be accompanied by a report containing site-specific history and appropriate contextual information. This information shall be gathered through site specific and comparative archival research, and oral history collection as appropriate.

c) If preservation and reuse at the site are not feasible, the historical building shall be documented as described in item (b) and, when it is physically and financially feasible, it shall be moved and preserved or reused.

d) If, in the opinion of the qualified architectural historian, the nature and significance of the building is such that its demolition or destruction cannot be fully mitigated through documentation, UC Santa Cruz shall reconsider project plans in light of the high value of the resource, and implement more substantial modifications to the proposed project that would limit the degree of modification or allow the structure to be preserved intact. These could include project redesign, relocation, or abandonment. If no such measures are feasible, the historical building shall be documented as described in item (b).

Significance after Mitigation

Implementation of Mitigation Measures 3.4-4a, 3.4-4b, and 3.4-4c would reduce potentially significant impacts to historic resources because actions would be taken to record, evaluate, avoid, or otherwise treat the resource appropriately, in accordance with pertinent laws and regulations. However, if demolition or other substantial modifications occur, CEQA Guidelines [Section 15126.4(b)(2)] note that in some circumstances, documentation of a historical resource will not mitigate the effects to a less-than-significant level because the historic resources would no longer exist or would lose its integrity. Therefore, because the potential for permanent loss of a historic resource or its integrity cannot be precluded, the project's impacts would remain **significant and unavoidable**.

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3.5 BIOLOGICAL RESOURCES

This section addresses biological resources known or with potential to occur in or near the LRDP area and describes potential effects of implementation of the 2021 LRDP on those resources. Biological resources include vegetation and habitat types, special-status plant and animal species, and otherwise sensitive plant communities. Data reviewed in preparation of the analysis include existing literature and data sources; publicly available databases maintained by the California Department of Fish and Game (CDFW), California Native Plant Society (CNPS), and U.S. Fish and Wildlife Service (USFWS); and recent biological resource surveys and assessments conducted on campus. In response to the NOP for the 2021 LRDP EIR, comment letters (see Appendix B) were received from CDFW, USFWS, the California Department of Forestry and Fire Protection, the League of Women Voters of Santa Cruz County, the Santa Cruz City-County Task Force to Address UCSC Growth Plans, the Coalition for Limiting University Expansion, the County of Santa Cruz, the City of Santa Cruz, the East Meadow Action Committee, Habitat and Watershed Caretakers, and many individual citizens regarding endangered and threatened wildlife and plant species, other special-status wildlife and plant species, cave organisms, sensitive habitats, sensitive natural communities, Campus Natural Reserve lands, the Great Meadow, wildlife movement corridors, sudden oak death, invasive species, the Ranch View Terrace Habitat Conservation Plan (HCP), and development of a comprehensive HCP. These issues are considered and addressed below, where applicable. Refer to Appendix B for comments received on the NOP.

3.5.1 Regulatory Setting

FEDERAL

Federal Endangered Species Act

Pursuant to the federal ESA (16 U.S.C. Section 1531 et seq.), USFWS regulates the taking of species listed in ESA as threatened or endangered. In general, persons subject to ESA (including private parties) are prohibited from "taking" endangered or threatened fish and wildlife species on private or government-owned property, and from "taking" endangered or threatened plants in areas under federal jurisdiction or in violation of state law. Under Section 9 of the ESA, the definition of "take" is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." USFWS has also interpreted the definition of "harm" to include significant habitat modification that could result in take.

Section 10 of ESA applies if a non-federal agency is the lead agency for an action that results in take and no other federal agencies are involved in permitting the action. Section 7 of ESA applies if a federal discretionary action is required (e.g., a federal agency must issue a permit), in which case the involved federal agency consults with USFWS.

Clean Water Act

Section 404 of the Clean Water Act (CWA) requires project applicants to obtain a permit from U.S. Army Corps of Engineers (USACE) before performing any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands. Waters of the United States include navigable waters of the United States, interstate waters, tidally influenced waters, and all other waters where the use, degradation, or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Many surface waters and wetlands in California meet the criteria for waters of the United States.

In accordance with Section 401 of the CWA, projects that apply for a USACE permit for discharge of dredged or fill material must obtain water quality certification from the appropriate regional water quality control board (RWQCB) indicating that the action would uphold state water quality standards.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), first enacted in 1918, provides for protection of international migratory birds and authorizes the Secretary of the Interior to regulate the taking of migratory birds. The MBTA provides that it is unlawful, except as permitted by regulations, to pursue, take, or kill any migratory bird, or any part, nest, or egg of any such bird. Under the MBTA, "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities." A take does not include habitat destruction or alteration, if there is not a direct taking of birds, nests, eggs, or parts thereof. The current list of species protected by the MBTA can be found in Title 50 of the Code of Federal Regulations (CFR), Section 10.13 (50 CFR 10.13). The list includes nearly all birds that are native to the United States.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act, enacted in 1940 and amended multiple times since, prohibits the taking of bald and golden eagles without a permit from the Secretary of the Interior. Similar to the ESA, the Bald and Golden Eagle Protection Act defines "take" to include "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb" (16 U.S. Code 668–668c). For the purpose of the act, disturbance that would injure an eagle, decrease productivity, or cause nest abandonment, including habitat alterations that could have these results, are considered take and can result in civil or criminal penalties.

STATE

California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA), a permit from CDFW is required for projects that could result in the "take" of a plant or animal species that is listed by the state as threatened or endangered. Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species, but the CESA definition of take does not include "harm" or "harass," like the ESA definition does. As a result, the threshold for take is greater under CESA than under ESA. Authorization for take of state-listed species can be obtained through a California Fish and Game Code Section 2081 incidental take permit.

Native Plant Protection Act

The Native Plant Protection Act (NPPA) (California Fish and Game Code Section 1900 et seq.) allows the California Fish and Game Commission to designate plants as rare or endangered. Sixty-four species, subspecies, and varieties of plants are protected as rare under the NPPA. The act prohibits take of endangered or rare native plants but includes exceptions for agricultural and nursery operations; for emergencies; and, after proper notification of CDFW, for vegetation removal from canals, roads, and other building sites, changes in land use, and other situations.

California Fish and Game Code Sections 3503 and 3503.5

Section 3503 of the Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 of the California Fish and Game Code states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders *Falconiformes* and *Strigiformes*), including their nests or eggs. Typical violations include destruction of active nests as a result of tree removal or disturbance caused by project construction or other activities that cause the adults to abandon the nest, resulting in loss of eggs or young.

Fully Protected Species

Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code prohibit take of fully protected birds, mammals, reptiles and amphibians, and fish. Species listed under these statutes may not be taken or possessed at any time and no incidental take permits can be issued for these species except for scientific research purposes, for relocation to protect livestock, or as part of a Natural Community Conservation Plan (NCCP).

California Fish and Game Code Section 1602—Streambed Alteration

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports fish or wildlife resources are subject to regulation by CDFW under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do any of the following without first notifying CDFW:

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

The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation (California Code of Regulations Title 14, Section 1.72). CDFW jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A streambed alteration agreement must be obtained for any diversion or alteration that would substantially adversely affect a fish or wildlife resource in a river, stream, or lake.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Act, waters of the state fall under the jurisdiction of the appropriate RWQCB. The LRDP area is within the Central California RWQCB. The RWQCB must prepare and periodically update water quality control plans (basin plans). Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control point and nonpoint sources of pollution to achieve and maintain these standards. The RWQCB's jurisdiction includes federally protected waters as well as areas that meet the definition of "waters of the state." Waters of the state are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. In addition to water quality certifications under Section 401 of the federal CWA, discharges to waters of the state, including wetlands, must meet the RWQCB waste discharge requirements. This issue is addressed comprehensively in Section 3.10, "Hydrology and Water Quality," as well as herein with respect to biological resources.

California Coastal Act

The California Coastal Act (CCA), administered by the California Coastal Commission (CCC), includes policies for development proposed within the coastal zone and recognizes California ports, harbors, and coastline beaches as important coastal-dependent uses and resources. CCC regulates all jurisdictional wetlands that are under the joint jurisdiction of USACE and the RWQCBs, as well as riparian habitat under the jurisdiction of CDFW. The CCA also defines "Environmentally Sensitive [Habitat] Area" (ESHA) as "any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments" (Section 30107.5). The CCA requires that such areas be protected and that development projects within or adjacent to such areas be limited only to uses dependent on the ESHA resources and planned and sited to prevent significant disruption or degradation of habitat value. The California Coastal Zone is defined as land and water area of the State of California from the Oregon border to the border of the Republic of Mexico, extending seaward to the state's outer limit of jurisdiction, including all offshore islands, and extending inland generally 1,000 yards from the mean high tide line of the sea, but it is specifically designated on maps held by the legislature. In significant coastal estuarine habitat and recreational areas, it extends inland to the first major ridgeline paralleling the sea or 5 miles from the mean high tide line of the sea, whichever is less, and in developed urban areas, the zone generally extends inland less than 1,000 yards.

Portions of the LRDP area, including the Westside Research Park and the area west of Empire Grade within the Main Residential Campus, fall within the coastal zone. As described in Section 3.11, "Land Use and Planning," although campus lands are not included in any Local Coastal Program (LCP), UC Santa Cruz must comply independently with the requirements of the CCA.

UNIVERSITY OF CALIFORNIA

Ranch View Terrace Habitat Conservation Plan

The Ranch View Terrace HCP was developed by the UC Regents to seek regulatory compliance for the construction and operations of the Ranch View Terrace project and a new Emergency Response Center and was approved in 2005 (UC Santa Cruz 2005b). The HCP area includes approximately 38.8 acres in the lower campus portion of the LRDP area (Figure 3.5-1). This HCP covers two federally listed species: California red-legged frog (*Rana draytonii*) and Ohlone tiger beetle (*Cicindela ohlone*). Two preserves were established as mitigation areas to maintain habitat for Ohlone tiger beetle and California red-legged frog, including the 12.5-acre Inclusion Area A (IAA) preserve (off-site of the Ranch View Terrace project site) in the southwestern portion of the LRDP area and the 13-acre Inclusion Area D (IAD) preserve (on-site) directly south of the Ranch View Terrace project site (Figure 3.5-1). A 5.7-acre Ohlone tiger beetle management area was established within IAD.

LOCAL

As noted in Section 3.0.1, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of its educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

County of Santa Cruz General Plan

The Conservation and Open Space Element of the County of Santa Cruz General Plan contains the following policies related to biological resources in the county and that may be relevant to the 2021 LRDP:

Objective 5.1: Biological Diversity.

- Policy 5.1.1: Sensitive Habitat Designation. Designate the following area as sensitive habitats: (a) areas shown on the County General Plan and LCP Resources and Constraints Maps; (b) any undesignated area which meet the criteria (policy 5.1.2) and which are identified through the biotic review process or other means; and (c) areas of biotic concern as shown on the Resources and Constraints Maps which contain concentrations of rare, endangered, threatened or unique species.
- Policy 5.1.2: Definition of Sensitive Habitat. An area is defined as a sensitive habitat if it meets one or more of the following criteria:

  (a) Areas of special biological significance as identified by the State Water Resources Control Board.

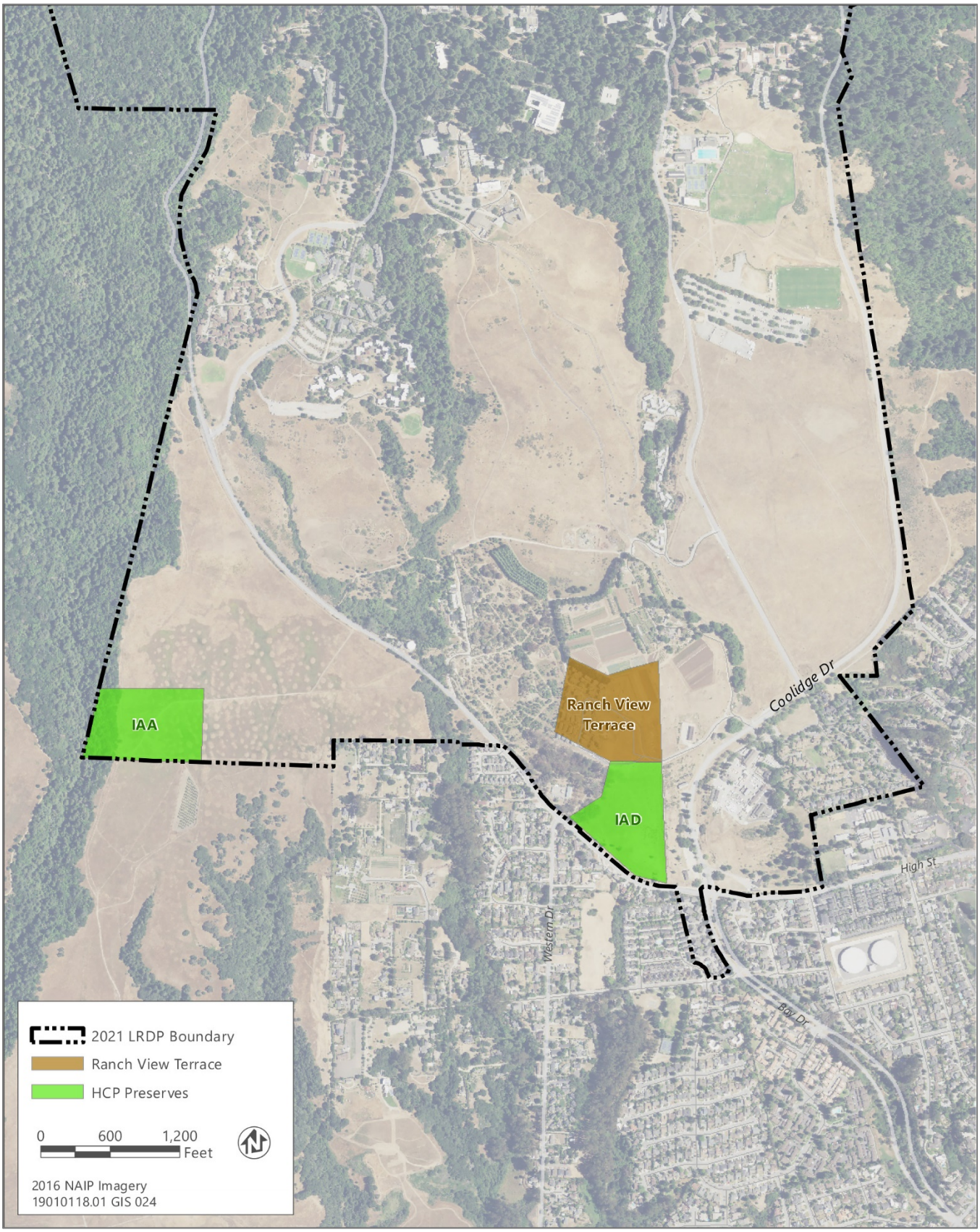
  (b) Areas which provide habitat for locally unique biotic species/communities, including coastal scrub, maritime chaparral, native rhododendrons and associated Elkgrass, mapped grasslands in the coastal zone and sand parkland; and Special Forests including San Andreas Live Oak Woodlands, Valley Oak, Santa Cruz Cypress, indigenous Ponderosa Pine, indigenous Monterey Pine and ancient forests.

  (c) Areas adjacent to essential habitats of rare, endangered or threatened species as defined in (e) and (f) below.

  (d) Areas which provide habitat for Species of Special Concern as listed by the California Department of Fish and Game in the Special Animals list, Natural Diversity Database.

  (e) Areas which provide habitat for rare or endangered species which meet the definition of Section 15380 of the California Environmental Quality Act guidelines.

  (f) Areas which provide habitat for rare, endangered or threatened species as designated by the State Fish and Game Commission, United State Fish and Wildlife Service or California Native Plant Society.



Source: data received from UC Santa Cruz in 2020

Figure 3.5-1 Ranch View Terrace Habitat Conservation Plan Area

(g) Nearshore reefs, rocky intertidal areas, seacaves, islets, offshore rocks, kelp beds, marine mammal hauling grounds, sandy beaches, shorebird roosting, resting and nesting areas, cliff nesting areas and marine, wildlife or educational/research reserves.

(h) Dune plant habitats.

(i) All lakes, wetlands, estuaries, lagoons, streams and rivers.

(j) Riparian corridors.

- Policy 5.1.3: Environmentally Sensitive Habitats. Designate the areas described in 5.1.2 (d) through (j) as Environmentally Sensitive Habitats per the California Coastal Act and allow only uses dependent on such resources in these habitats within the Coastal Zone unless other uses are:

  (a) consistent with sensitive habitat protection policies and serve a specific purpose beneficial to the public;

  (b) it is determined through environmental review that any adverse impacts on the resource will be completely mitigated and that there is no feasible less-damaging alternative; and

  (c) legally necessary to allow a reasonable economic use of the land, and there is no feasible less-damaging alternative.

- Policy 5.1.6: Development Within Sensitive Habitats. Sensitive habitats shall be protected against any significant disruption of habitat values; and any proposed development within or adjacent to these areas must maintain or enhance the functional capacity of the habitat. Reduce in scale, redesign, or, if no other alternative exists, deny any project which cannot sufficiently mitigate significant adverse impacts on sensitive habitats unless approval of a project is legally necessary to allow a reasonable use of the land.

- Policy 5.1.8: Chemicals Within Sensitive Habitats. Prohibit the use of insecticides, herbicides, or any toxic chemical substance in sensitive habitats, except when an emergency has been declared, when the habitat itself is threatened, when a substantial risk to public health and safety exists, including maintenance for flood control by Public Works, or when such use is authorized pursuant to a permit issued by the Agricultural Commissioner.

- Policy 5.1.9: Biotic Assessments. Within the following areas, require a biotic assessment as part of normal project review to determine whether a full biotic report should be prepared by a qualified biologist:

  (a) Areas of biotic concern, mapped;

  (b) Sensitive habitats, mapped & unmapped.

- Policy 5.1.10: Species Protection. Recognize that habitat protection is only one aspect of maintaining biodiversity and that certain wildlife species, such as migratory birds, may not utilize specific habitats. Require protection of these individual rare, endangered and threatened species and continue to update policies as new information becomes available.

- Policy 5.1.11: Wildlife Resources Beyond Sensitive Habitats. For areas which may not meet the definition of sensitive habitat contained in policy 5.1.2, yet contain valuable wildlife resources (such as migration corridors or exceptional species diversity), protect these wildlife habitat values and species using the techniques outlined in policies 5.1.5 and 5.1.7 and use other mitigation measures identified through the environmental review process.

- Policy 5.1.14: Removal of Invasive Plant Species. Encourage the removal of invasive species and their characteristic native plants, except where such invasive species provide significant habitat value and where removal of such species would severely degrade the existing habitat. In such cases, develop long-term plans for gradual conversion to native species providing equal or better habitat values.

Objective 5.2: Riparian Corridors and Wetlands.

- Policy 5.2.1: Designation of Riparian Corridors and Wetlands. Designate and define the following areas as Riparian Corridors:

  (a) 50' from the top of a distinct channel or physical evidence of high water mark of a perennial stream;

(b) 30' from the top of a distinct channel or physical evidence of high water mark of an intermittent stream as designated on the General Plan maps and through field inspection of undesignated intermittent and ephemeral streams;

(c) 100' of the high water mark of a lake, wetland, estuary, lagoon, or natural body of standing water;

(d) The landward limit of a riparian woodland plant community;

(e) Wooded arroyos within urban areas.

Designate and define the following areas as Wetlands:

Transitional areas between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water periodically or permanently. Examples of wetlands are saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps. mudflats, and fens.

The US Army Corps of Engineers, and other federal agencies utilize a "unified methodology" which defines wetlands as "those areas meeting certain criteria for hydrology, vegetation, and soils."

City of Santa Cruz 2030 General Plan

The Natural Resources and Conservation Element of the City of Santa Cruz General Plan contains the following policies related to biological resources in the city and that may be relevant to the 2021 LRDP:

GOAL NRC1: Protected, enhanced, and sustainably managed creek systems, riparian environments, and wetlands.

- **Policy NRC 1.1:** Protect the city's river and wetland areas while increasing and enhancing public access where appropriate.
- **Policy NRC 1.2:** Encourage low impact uses and practices in watershed lands upstream of the city's riverine, stream, and riparian environments.
- **Policy NRC 1.3**: Encourage the restoration and enhancement of existing riparian corridors, wetlands, and other water resources.

GOAL NRC2: Protected, enhanced, and sustainable native and natural plant and animal communities and habitats.

- **Policy NRC 2.1**: Protect, enhance, or restore habitat for special-status plant and animal species.
- **Policy NRC 2.2**: Protect sensitive habitat areas and important vegetation communities and wildlife habitat, to include riparian, wetland (salt marsh and freshwater wetland), coastal prairie, coastal bird habitat, and habitat that support special status species, as well as, sensitive and edge habitats ("ecotones").
- **Policy NRC 2.3**: Protect, enhance, and maintain significant dispersal corridors and buffers.
- **Policy NRC 2.4**: Protect, manage, and enhance tree groves and understory that provide sensitive habitat features.

GOAL NRC 3: Conservation and stewardship of resources.

- **Policy NRC 3.1**: Lead the community in conserving resources.
- **Policy NRC 3.2**: Discourage the use of environmentally harmful pesticides, herbicides, and chemical fertilizers.
- **Policy NRC 3.3**: Require resource conservation and environmentally sensitivity in project design and construction.

GOAL NRC 5: An enhanced and sustainable urban forest.

- **Policy NRC 5.1**: Protect and manage tree resources in the urban environment, with emphasis on significant and heritage trees.
- **Policy NRC 5.2**: Increase the percent of tree canopy by promoting street tree planting.

GOAL NRC 6: Protected open space lands and coastline.

- **Policy NRC 6.1**: Manage and enhance open space and the coastline.
- **Policy NRC 6.3**: Enhance and protect native habitat areas within the Greenbelt and open spaces.

3.5.2 Environmental Setting

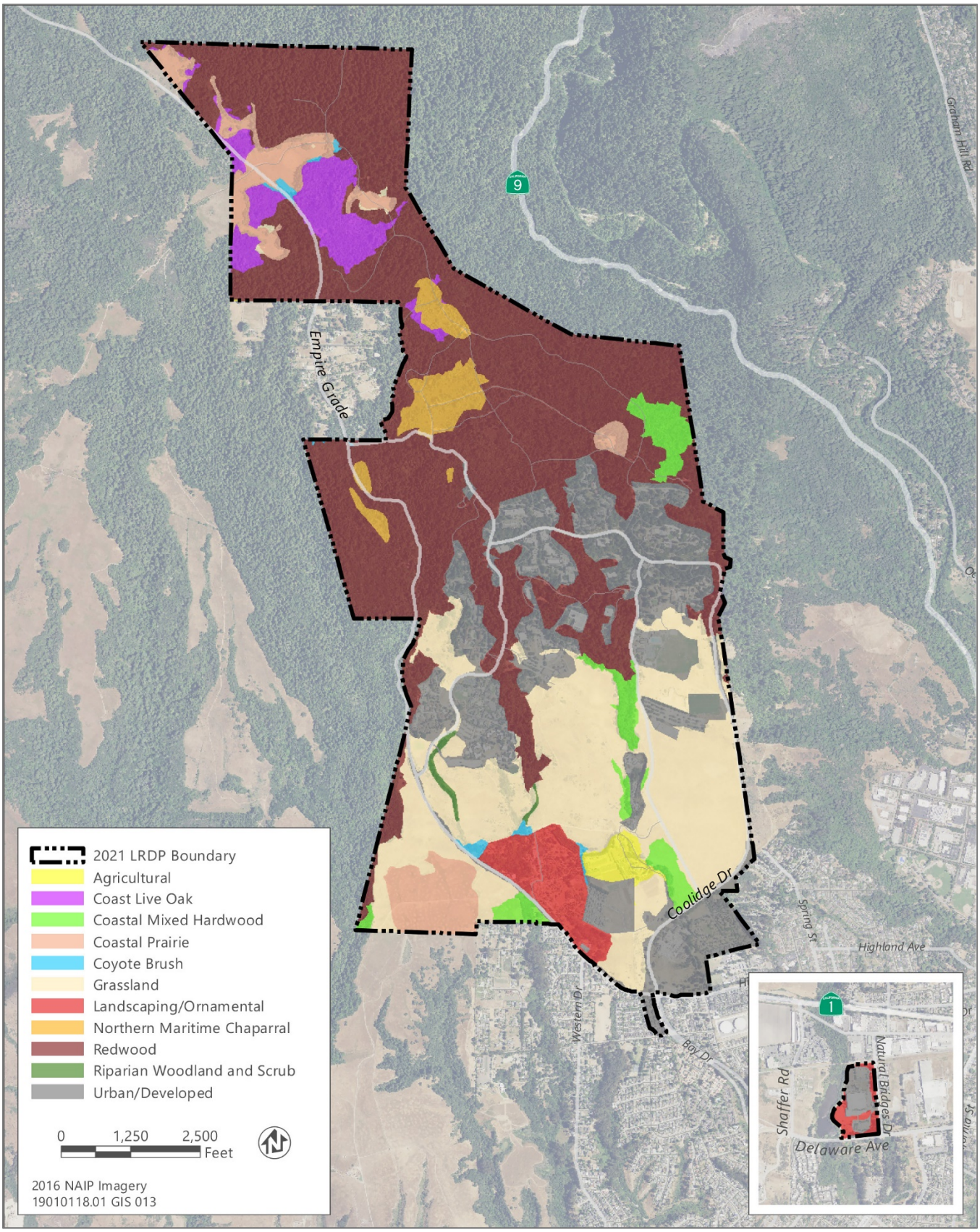
VEGETATION COMMUNITIES

Vegetation communities within the LRDP area are summarized in Table 3.5-1 and Figures 3.5-2 and 3.5-3. The distribution of vegetation communities in the LRDP area were derived from recent mapping efforts conducted as part of the Conservation Lands Network project (Bay Area Open Space Council 2019). Because the 2019 mapping was conducted at a coarse scale, some vegetation communities are not presented, including known sensitive natural communities mapped for the 2005 LRDP (i.e., coastal prairie, northern maritime chaparral), and layers depicting these communities from 2005 LRDP were included for completeness (UC Santa Cruz 2005a, Figure 3.5-2). Because of the coarse scale of the 2019 mapping, some vegetation communities may be overrepresented or underrepresented in Table 3.5-1 and Figure 3.5-2. However, the overall habitat types as presented below and in Figure 3.5-1 are considered the best available comprehensive data and appropriate for this analysis. The impact analysis considers known sensitive natural communities. Confirmation of fine-scale vegetation community distribution will be conducted during project-specific review associated with 2021 LRDP implementation. Total acreages of each habitat type are presented in Table 3.5-1, and land cover types are described below in order of abundance.

Table 3.5-1 Total Acres of Vegetation Communities in the LRDP area

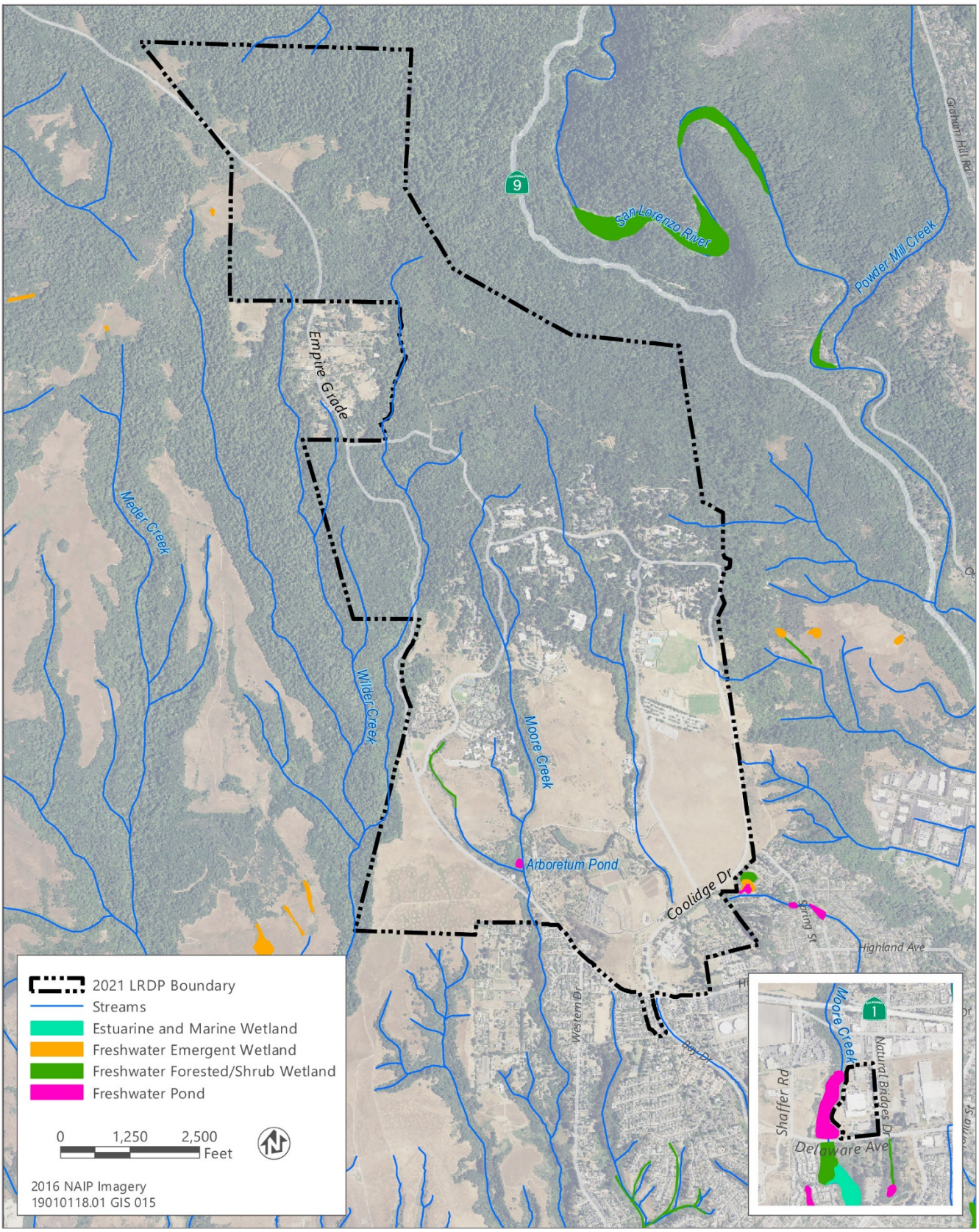
Vegetation Community Type	Size (acres)
Terrestrial Habitats	
Redwood	860.4
Urban/Developed	405.7
Grassland	399.0
Coastal Prairie	107.9
Coast Live Oak	74.0
Landscaping/Ornamental	63.6
Coastal Mixed Hardwood	61.4
Northern Maritime Chaparral	54.9
Agricultural	18.8
Coyote Brush	7.3
Riparian Woodland and Scrub	5.2
Aquatic Habitats	
Lake	0.3
Freshwater Forested/Shrub Wetland	0.3
Stream	7.2 miles
Perennial Stream	*1.7 miles*
Intermittent Stream	*2.4 miles*
Swale	*3.1 miles*

Source: Data compiled by Ascent Environmental in 2020; Bay Area Open Space Council 2019; CDFW 2020; UC Santa Cruz 2005a



Source: data downloaded from the Bay Area Open Space Council in 2019; adapted by Ascent Environmental in 2020

Figure 3.5-2 Vegetation Communities in the LRDP Area



Source: Data downloaded from the County of Santa Cruz and USFWS (County of Santa Cruz 2020, USFWS 2020b); adapted by Ascent Environmental in 2020

Figure 3.5-3 Aquatic Habitat Mapped by the County of Santa Cruz and USFWS in the LRDP Area

Terrestrial Habitat

Redwood

The LRDP area contains an estimated 860.4 acres of redwood habitat, which occurs throughout north campus and portions of central campus (Table 3.5-1, Figure 3.5-2). Redwood habitat is typically dominated by coast redwood trees (*Sequoia sempervirens*) and also contains tree canopy species including Douglas fir (*Psuedotsuga menziesii*), Pacific madrone (*Arbutus menziesii*), knobcone pine (*Pinus attenuata*), California bay (*Umbellularia californica*), and tan oak (*Notholithocarpus densiflorus*). The understory of redwood forests is typically sparse except for shade-tolerant ferns and forbs. Habitat mapped as redwood within the LRDP area intergrades with other forested habitat types: coast live oak and coastal mixed hardwood and may contain varying proportions of tree species associated with these types or be dominated by tree species other than redwood in some areas. This redwood habitat is mostly characterized as second growth (i.e., forests that have been previously logged) and there is no old growth redwood habitat in the LRDP area (UC Santa Cruz 1971:9).

Distinct stands of "dwarf" redwood trees have been observed within the LRDP area, characterized by trees with short stature (i.e., 10 to 50 feet tall) compared to typical adult redwood trees (i.e., 100 to 340 feet tall; UC Santa Cruz 2005a). Dwarf redwoods are not considered a distinct vegetation community type, but the uniqueness of these stands in the LRDP area may warrant additional consideration for campus planning purposes due to the potential rarity of this community type.

Urban/Developed

The LRDP area contains approximately 405.7 acres of urban/developed habitat, primarily within central and lower campus (Figure 3.5-2, Table 3.5-1). Urban/developed areas within the LRDP area contain buildings associated with the UC Santa Cruz campus, including classrooms, libraries, laboratories, administration facilities, support facilities, residence halls, apartments, and recreational areas. Urban/developed areas also include parking lots, sidewalks, roads, and some landscaping. While urban/developed areas may not provide high quality habitat for wildlife due to a baseline level of disturbance (e.g., vehicle and foot traffic, noise, visual stimuli), some common and special-status wildlife species are known to occur within or in close proximity to developed areas.

Grassland

The LRDP area contains approximately 399.0 acres of grassland habitat, which occurs primarily within lower campus and parts of central campus, including two grassland habitat areas referred to as the Great Meadow and the East Meadow (Table 3.5-1, Figure 3.5-2). Grasslands within the LRDP area are dominated by nonnative grasses, including slim oat (*Avena barbata*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), rattlesnake grass (*Briza maxima*), common velvetgrass (*Holcus lanatus*), and Italian rye grass (*Festuca perennis*), but also contains some native grass species, including California oat grass (*Danthonia californica*), purple needlegrass (*Stipa pulchra*), and California bromegrass (*Bromus carinatus*). Grassland habitat in the LRDP area also contains nonnative and native forbs.

Coastal Prairie

The LRDP area contains approximately 107.9 acres of coastal prairie habitat, which is considered a sensitive natural community (Figure 3.5-2, Table 3.5-1). This habitat is present within portions of north and lower campus. Coastal prairie habitat is similar to other grassland habitat within the LRDP area, but with greater incidence of native grass species, including California oat grass and western panic grass (*Panicum acuminatum*). Coastal prairie habitat also supports a diverse assemblage of native forbs, including coyote thistle (*Eryngium armatum*), wild hyacinth (*Triteleia hyacinthina*), dwarf brodiaea (*Brodiaea terrestris*), and yampah (*Perideridia kelloggii*). Due to the coarse scale of vegetation mapping, some areas of the LRDP area mapped as grassland as shown in Figure 3.5-2, may meet the alliance requirements to be classified as coastal prairie.

Coastal prairie habitat in the southwest corner (west of Empire Grade) of the lower campus portion of the LRDP area and in the Marshall Fields complex in north campus is characterized by Mima mound habitat. Mima mounds are hillocks typically found in grassland habitat, the origin of which has been historically debated. Recent modelling studies support the "fossorial rodent hypothesis," which suggests that Mima mounds are built by burrowing mammals (e.g., pocket

gophers) over time to provide refuge from seasonally saturated soils or that they are the result of a combination of the biotic factors and abiotic factors, such as vegetation/erosion interactions (Cramer and Barger 2014, Gabet et al. 2014).

Coast Live Oak

The LRDP area contains approximately 74.0 acres of coast live oak habitat within north campus (Figure 3.5-2, Table 3.5-1). This habitat is dominated by coast live oak (*Quercus agrifolia*) and in some areas, intergrades into habitat dominated by Douglas fir. Other tree species within the coast live oak habitat include Shreve oak (*Quercus parvula* var. *shrevei*), California bay, and Pacific madrone.

Landscaping/Ornamental

The LRDP area contains approximately 63.6 acres of landscaping/ornamental habitat, which includes maintained lawns and landscape trees within the Westside Research Park and the UC Santa Cruz Arboretum and Botanic Garden in lower campus (Figure 3.5-2, Table 3.5-1). The UC Santa Cruz Arboretum and Botanic Garden includes various types of plantings, including a California native garden, a redwood grove, and gardens featuring plants from Australia, New Zealand, and South Africa (UC Santa Cruz 2017). While landscaping/ornamental habitat within the LRDP area may not be completely natural, much of it provides habitat for wildlife species.

Coastal Mixed Hardwood

The LRDP area contains approximately 61.4 acres of coastal mixed hardwood habitat within north, central, and lower campus (Figure 3.5-2, Table 3.5-1). This habitat represents an intergrade from other habitat types within the LRDP area, particularly redwood and coast live oak habitats. Tree species within coastal mixed hardwood habitat include coast live oak, California bay, Pacific madrone, Douglas fir, ponderosa pine (*Pinus ponderosa*), and knobcone pine. Coastal mixed hardwood habitat in some portions of the LRDP area occurs in transitional communities between chaparral (described below) and redwood vegetation communities.

Northern Maritime Chaparral

The LRDP area contains approximately 54.9 acres of northern maritime chaparral habitat, which is predominately located within north campus (Figure 3.5-2, Table 3.5-1). Northern maritime chaparral habitat within the LRDP area is typically dense and is dominated by brittle leaf manzanita (*Arctostaphylos crustacea*) and Santa Cruz manzanita (*Arctostaphylos andersonii*), which is a special-status plant species. Other species present include wartleaf ceanothus (*Ceanothus papillosus*), blue blossom (*Ceanothus thyrsiflorus* var. *thyrsiflorus*), yerba santa (*Eriodictyon californicum*), and knobcone pine.

Agricultural

The main residential campus contains approximately 20 acres of agricultural habitat within the UC Santa Cruz Farm and the Chadwick Garden, which are facilities that support the UC Santa Cruz Center for Agroecology and Sustainable Food Systems (Figure 3.5-2, Table 3.5-1). This habitat includes row crops, orchards, research plots, as well as buildings, including greenhouses, laboratories, offices, and a visitor's center. Agricultural land typically does not provide high quality habitat for wildlife species; however, common species likely use this habitat for foraging and cover.

Coyote Brush

The LRDP area contains approximately 7.3 acres of coyote brush scrub habitat in lower and north campus (Figure 3.5-2, Table 3.5-1). Coyote brush scrub habitat is dominated by coyote brush (*Baccharis pilularis*) along with other shrub species, including sticky monkeyflower (*Diplacus aurantiacus*), poison oak (*Toxicodendron diversilobum*), and blue blossom. Within the LRDP area, this habitat is located adjacent to grassland or coastal prairie habitats. Coyote brush may also occur in varying or patchy density in other portions of the LRDP area that are not currently mapped.

Riparian Woodland and Scrub

The LRDP area contains approximately 5.2 acres of riparian woodland and scrub habitat, which is considered a sensitive natural community (Figure 3.5-2, Table 3.5-1). This habitat is present within central and lower campus and is associated with intermittent streams in the LRDP area. Tree species within riparian woodland and scrub habitat include willows (Salix spp.) black cottonwood (*Populus trichocarpa*), bigleaf maple (*Acer macrophyllum*), and California

hazelnut (*Corylus cornuta*). Understory species include California blackberry (*Rubus ursinus*), common snowberry (*Symphoricarpos albus*), giant chain fern (*Woodwardia fimbriata*), California wood-fern (*Dryopteris arguta*), and western swordfern (*Polystichum munitum*).

Aquatic Habitat

Aquatic habitat within the LRDP area includes pond, stream, and wetland habitats (Figure 3.5-3). Approximately 7.2 miles of stream habitat occur in the LRDP area: approximately 1.7 miles of perennial stream habitat (e.g., Wilder Creek), approximately 2.4 miles of intermittent stream habitat, and approximately 3.1 miles of swale habitat (i.e., shallow ephemeral or intermittent wetland with gently sloping sides). This habitat includes intermittent stream habitat in Cave Gulch. The LRDP area contains approximately 0.3 acre of freshwater forested/shrub wetland habitat associated with riparian areas along intermittent stream habitat, both in central and lower campus. The LRDP area contains approximately 0.3 acre of pond habitat within the Arboretum Pond in the UC Santa Cruz Arboretum and Botanic Garden (known as the Arboretum Pond) (Figure 3.5-3). Antonelli Pond, which is located along Moore Creek, is adjacent to Westside Research Park; however, the pond is not located in the LRDP area. While much of the aquatic habitat in the LRDP area has been mapped, there may be additional aquatic habitat features (e.g., wetlands, seeps, springs, drainages) that have not been mapped. Seeps and springs are known to be present in north campus and typically occur in small patches (UC Santa Cruz 2005a). The distribution of wetland, seep, or drainage habitats will be determined using fine-scale mapping as development is proposed under the 2021 LRDP, but impacts are considered in this EIR.

SENSITIVE BIOLOGICAL RESOURCES

Special-Status Species

Special-status species are defined as species that are legally protected or that are otherwise considered sensitive by federal, state, or local resource agencies. Special-status species are species, subspecies, or varieties that fall into one or more of the following categories, regardless of their legal or protection status:

- officially listed by California under the California Endangered Species Act (CESA) or the federal government under the Endangered Species Act (ESA) as endangered, threatened, or rare;
- a candidate for state or federal listing as endangered, threatened, or rare under CESA or ESA;
- taxa (i.e., taxonomic category or group) that meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the State CEQA Guidelines;
- species identified by CDFW as Species of Special Concern;
- species listed as Fully Protected under the California Fish and Game Code;
- species afforded protection under local planning documents; and
- taxa considered by the CDFW to be "rare, threatened, or endangered in California" and assigned a California Rare Plant Rank (CRPR) of 1, 2, or 3. The CDFW system includes rarity and endangerment ranks for categorizing plant species of concern, and ranks 1, 2, and 3 are summarized as follows:
  - CRPR 1A - Plants presumed to be extinct in California;
  - CRPR 1B - Plants that are rare, threatened, or endangered in California and elsewhere;
  - CRPR 2A - Plants presumed to be extinct in California but common elsewhere;
  - CRPR 2B - Plants that are rare, threatened, or endangered in California but more common elsewhere; and
  - CRPR 3 - Plants about which more information is needed (a review list).

The term "California species of special concern" is applied by CDFW to animals not listed under ESA or CESA, but that are considered to be declining at a rate that could result in listing, or that historically occurred in low numbers and known threats to their persistence currently exist. CDFW's fully protected status was California's first attempt to identify and protect animals that were rare or facing extinction. Most species listed as fully protected were eventually

listed as threatened or endangered under CESA; however, some species remain listed as fully protected but do not have simultaneous listing under CESA. Fully protected species may not be taken or possessed at any time and no take permits can be issued for these species except for scientific research purposes, for relocation to protect livestock, or as part of an NCCP.

Of the 64 special-status plant species that are known to occur within the eight U.S. Geological Survey (USGS) 7.5-minute quadrangles including and surrounding the LRDP area, seven species is known to occur within the LRDP area, and 28 additional species were determined to have potential to occur in the LRDP area based on the presence of habitat suitable for the species (California Natural Diversity Database [CNDDB] 2020, CNPS 2020, Table 3.5-2). Of the 66 special-status wildlife species that could occur within the eight USGS quadrangles, 19 species are known to occur within the LRDP area (currently or historically) and 16 additional species were determined to have potential to occur in the LRDP area based on the presence of habitat suitable for the species (CNDDB 2020, Table 3.5-3). The tables describe the species' regulatory status, habitat, and potential for occurrence in the LRDP area.

Table 3.5-2 Special-Status Plant Species Known to Occur in the Vicinity of the LRDP area and Their Potential for Occurrence in the LRDP area

Species	Federal Listing Status[1]	Status[1] State Listing	CRPR	Habitat	Potential for Occurrence[2]
Blasdale's bent grass *Agrostis blasdalei*	–	–	1B.2	Coastal dunes, coastal bluff scrub, coastal prairie. Sandy or gravelly soil close to rocks; often in nutrient-poor soil with sparse vegetation. 16–1,198 feet in elevation. Blooms May–July.	*May occur*. The LRDP area contains coastal prairie habitat potentially suitable for this species.
Bent-flowered fiddleneck *Amsinckia lunaris*	–	–	1B.2	Cismontane woodland, valley and foothill grassland, coastal bluff scrub. 10–2,608 feet in elevation. Blooms March–June.	*May occur*. The LRDP area contains woodland and grassland habitat potentially suitable for this species.
Santa Cruz manzanita *Arctostaphylos andersonii*	–	–	1B.2	Broadleaved upland forest, chaparral, north coast coniferous forest. Open sites, redwood forest. 197–2,493 feet in elevation. Blooms November–May.	*Known to occur.* Santa Cruz manzanita has been documented within northern maritime chaparral habitat in the LRDP area and is a dominant species in some areas (UC Santa Cruz 2005a).
Schreiber's manzanita *Arctostaphylos glutinosa*	–	–	1B.2	Closed-cone coniferous forest, chaparral. Mudstone or diatomaceous shale outcrops; often with knobcone pine (*Pinus attenuata*). 558–2,247 feet in elevation. Blooms March–April.	*Not expected to occur*. The LRDP area is outside of the known range of this species (Kauffmann et al. 2015).
Ohlone manzanita *Arctostaphylos ohloneana*	–	–	1B.1	Coastal scrub, closed cone coniferous forests. Monterey shale. 1,476–1,739 feet in elevation. Blooms February–March.	*Not expected to occur*. The LRDP area is outside of the known range of this species (Kauffmann et al. 2015).
Pajaro manzanita *Arctostaphylos pajaroensis*	–	–	1B.1	Chaparral. Sandy soils. 98–509 feet in elevation. Blooms December–March.	*Not expected to occur*. The LRDP area is outside of the known range of this species (Kauffmann et al. 2015).
Kings Mountain manzanita *Arctostaphylos regismontana*	–	–	1B.2	Broadleaved upland forest, chaparral, north coast coniferous forest. Granitic or sandstone outcrops. 787–2,313 feet in elevation. Blooms December–April.	*Not expected to occur*. The LRDP area is outside of the known range of this species (Kauffmann et al. 2015).
Bonny Doon manzanita *Arctostaphylos silvicola*	–	–	1B.2	Chaparral, closed-cone coniferous forest, lower montane coniferous forest. Only known from Zayante sands in Santa Cruz County. 492–1,706 feet in elevation. Blooms January–March.	*Not expected to occur*. The LRDP area does not contain Zayante soil habitat.

Species	Federal Listing Status[1]	Status[1] State Listing	CRPR	Habitat	Potential for Occurrence[2]
Marsh sandwort *Arenaria paludicola*	FE	SE	1B.1	Marshes and swamps. Growing up through dense mats of *Typha*, *Juncus*, *Scirpus*, etc. in freshwater marsh. Sandy soil. 10–558 feet in elevation. Blooms May–August.	*Not expected to occur.* The LRDP area does not contain marsh or swamp habitat.
Santa Cruz Mountains pussypaws *Calyptridium parryi* var. *hesseae*	–	–	1B.1	Chaparral, cismontane woodland. Sandy or gravelly openings. 984–5,036 feet in elevation. Blooms May–August.	*May occur.* The LRDP area contains chaparral and woodland habitat potentially suitable for this species.
Swamp harebell *Campanula californica*	–	–	1B.2	Bogs and marshes in a variety of habitats; uncommon where it occurs. 3–1,329 feet in elevation. Blooms June–October.	*Not expected to occur.* The LRDP area does not contain bog or marsh habitat.
Bristly sedge *Carex comosa*	–	–	2B.1	Lake margins, wet places. 16–5,315 feet in elevation. Blooms May–September.	*May occur.* The LRDP area contains wetland habitat potentially suitable for this species.
Deceiving sedge *Carex saliniformis*	–	–	1B.2	Coastal prairie, coastal scrub, meadows and seeps, saltmarshes, and swamps. Mesic sites. 10–755 feet in elevation. Blooms June.	*Known to occur.* This species was thought to be extirpated from Santa Cruz County until several colonies were discovered in 2000 in forested areas on the UC Santa Cruz campus (Neubauer 2013).
Congdon's tarplant *Centromadia parryi* ssp. *congdonii*	–	–	1B.1	Valley and foothill grassland. Alkaline soils sometimes described as heavy white clay. 0–755 feet in elevation. Blooms May–October.	*Not expected to occur.* The LRDP area does not contain alkaline soils.
Ben Lomond spineflower *Chorizanthe pungens* var. *hartwegiana*	FE	–	1B.1	Lower montane coniferous forest. Zayante coarse sands in maritime ponderosa pine sandhills. 344–1,558 feet in elevation. Blooms April–July.	*Not expected to occur.* The LRDP area does not contain Zayante soil habitat.
Monterey spineflower *Chorizanthe pungens* var. *pungens*	FT	–	1B.2	Sandy soils in coastal dunes or more inland within chaparral or other habitats. 0–558 feet in elevation. Blooms April–June.	*May occur.* The LRDP area contains chaparral habitat potentially suitable for this species.
Scotts Valley spineflower *Chorizanthe robusta* var. *hartwegii*	FE	–	1B.1	Meadows, valley and foothill grassland. In grasslands with mudstone and sandstone outcrops. 344–804 feet in elevation. Blooms April–July.	*May occur.* The LRDP area contains grassland habitat potentially suitable for this species.
Robust spineflower *Chorizanthe robusta* var. *robusta*	FE	–	1B.1	Cismontane woodland, coastal dunes, coastal scrub, chaparral. Sandy terraces and bluffs or in loose sand. 30–804 feet in elevation. Blooms April–September.	*May occur.* The LRDP area contains woodland and chaparral habitat potentially suitable for this species.
Mt. Hamilton fountain thistle *Cirsium fontinale* var. *campylon*	–	–	1B.2	In seasonal and perennial drainages on serpentine. 328–2,920 feet in elevation. Blooms April–October.	*Not expected to occur.* The LRDP area does not contain serpentine habitat.
San Francisco collinsia *Collinsia multicolor*	–	–	1B.2	Closed-cone coniferous forest, coastal scrub. On decomposed shale (mudstone) mixed with humus; sometimes on serpentine. 98–820 feet in elevation. Blooms March–May.	*May occur.* The LRDP area contains forest habitat potentially suitable for this species.
Tear drop moss *Dacryophyllum falcifolium*	–	–	1B.3	North Coast coniferous forest. Limestone substrates and rock outcrops. 164–902 feet in elevation.	*May occur.* The LRDP area contains limestone soils.

Species	Federal Listing Status[1]	Status[1] State Listing	CRPR	Habitat	Potential for Occurrence[2]
Western leatherwood *Dirca occidentalis*	–	–	1B.2	On brushy slopes, mesic sites; mostly in mixed evergreen and foothill woodland communities. 82–1,394 feet in elevation. Blooms January–March.	*Not expected to occur.* The LRDP area is outside of the known range of this species.
Santa Clara Valley dudleya *Dudleya abramsii* ssp. *setchellii*	FE	–	1B.1	On rocky serpentine outcrops and on rocks within grassland or woodland. 197–1,493 feet in elevation. Blooms April–October.	*Not expected to occur.* The LRDP area does not contain serpentine habitat.
Ben Lomond buckwheat *Eriogonum nudum* var. *decurrens*	–	–	1B.1	Chaparral, cismontane woodland, lower montane coniferous forest. Ponderosa pine sandhills in Santa Cruz County. 164–2,625 feet in elevation. Blooms June–October.	*Not expected to occur.* The LRDP area does not contain sandhills habitat.
Menzies' wallflower *Erysimum menziesii*	FE	SE	1B.1	Localized on dunes and coastal strand. 3–82 feet in elevation. Blooms March–September.	*Not expected to occur.* The LRDP area does not contain dune or coastal strand habitat.
Santa Cruz wallflower *Erysimum teretifolium*	FE	SE	1B.1	Lower montane coniferous forest, chaparral. Inland marine sands (Zayante coarse sand). 591–1,690 feet in elevation. Blooms March–July.	*Not expected to occur.* The LRDP area does not contain Zayante soil habitat.
Minute pocket moss *Fissidens pauperculus*	–	–	1B.2	Redwood. Moss growing on damp soil along the coast. In dry streambeds and on stream banks. 33–3,360 feet in elevation.	*May occur.* The LRDP area contains redwood and stream habitat potentially suitable for this species.
Fragrant fritillary *Fritillaria liliacea*	–	–	1B.2	Often on serpentine; various soils reported though usually on clay, in grassland. 10–1,312 feet in elevation. Blooms February–April.	*Not expected to occur.* The LRDP area does not contain serpentine habitat.
Toren's grimmia *Grimmia torenii*	–	–	1B.3	Openings, rocky, boulder and rock walls, carbonate, volcanic. 1,066–3,806 feet in elevation.	*Not expected to occur.* The LRDP area does not contain carbonate or volcanic soils.
Vaginulate grimmia *Grimmia vaginulata*	–	–	1B.1	Limestone. Chaparral. Openings; rocky, boulder and rock walls, carbonate. 2,247–3,724 feet in elevation.	*May occur.* The plan contains limestone soils.
San Francisco gumplant *Grindelia hirsutula* var. *maritima*	–	–	3.2	Sandy or serpentine slopes, sea bluffs. 49–1,001 feet in elevation. Blooms June–September.	*Not expected to occur.* The LRDP area does not contain serpentine habitat.
Short-leaved evax *Hesperevax sparsiflora* var. *brevifolia*	–	–	1B.2	Coastal bluff scrub, coastal dunes, coastal prairie. Sandy bluffs and flats. 0–705 feet in elevation. Blooms March–June.	*May occur.* The LRDP area contains coastal prairie habitat potentially suitable for this species.
Santa Cruz cypress *Hesperocyparis abramsiana* var. *abramsiana*	FT	SE	1B.2	Restricted to the Santa Cruz Mountains, on sandstone and granitic-derived soils; often with knobcone pine, redwoods. 984–3,560 feet in elevation.	*May occur.* The LRDP area contains forest habitat potentially suitable for this species.
Butano Ridge cypress *Hesperocyparis abramsiana* var. *butanoensis*	FT	SE	1B.2	Closed-cone coniferous forest, lower montane coniferous forest, chaparral. Sandstone. 1,312–1,608 feet in elevation.	*May occur.* The LRDP area contains forest and chaparral habitat potentially suitable for this species.
Loma Prieta hoita *Hoita strobilina*	–	–	1B.1	Serpentine; mesic sites. 197–3,199 feet in elevation. Blooms May–July.	*Not expected to occur.* The LRDP area does not contain serpentine habitat.

Species	Federal Listing Status[1]	Status[1] State Listing	CRPR	Habitat	Potential for Occurrence[2]
Santa Cruz tarplant *Holocarpha macradenia*	FT	SE	1B.1	Coastal prairie, coastal scrub, valley and foothill grassland. Light, sandy soil or sandy clay; often with nonnatives. 33–722 feet in elevation. Blooms June–October.	*May occur*. The LRDP area contains grassland and coastal prairie habitat potentially suitable for this species.
Kellogg's horkelia *Horkelia cuneata* var. *sericea*	–	–	1B.1	Old dunes, coastal sandhills; openings. 16–705 feet in elevation. Blooms April–September.	*Not expected to occur*. The LRDP area does not contain dune or sandhill habitat.
Point Reyes horkelia *Horkelia marinensis*	–	–	1B.2	Sandy flats and dunes near coast; in grassland or scrub plant communities. 7–2,543 feet in elevation. Blooms May–September.	*Known to occur*. This species has been documented within the Marshall Fields complex in the north campus portion of the LRDP area (CNDDB 2020). The LRDP area contains additional grassland habitat potentially suitable for this species.
Perennial goldfields *Lasthenia californica* ssp. *macrantha*	–	–	1B.2	Coastal bluff scrub, coastal dunes, coastal scrub. 16–607 feet in elevation. Blooms January–November.	*Not expected to occur*. The LRDP area does not contain coastal dune or scrub habitat.
Woolly-headed lessingia *Lessingia hololeuca*	–	–	3	Clay, serpentine; roadsides, fields. 49–1,001 feet in elevation. Blooms June–October.	*Not expected to occur*. The LRDP area does not contain serpentine habitat.
Smooth lessingia *Lessingia micradenia* var. *glabrata*	–	–	1B.2	Serpentine; often on roadsides. 394–1,378 feet in elevation. Blooms July–November.	*Not expected to occur*. The LRDP area does not contain serpentine habitat.
Arcuate bush-mallow *Malacothamnus arcuatus*	–	–	1B.2	Chaparral, cismontane woodland. Gravelly alluvium. 3–2,411 feet in elevation. Blooms April–September.	*May occur*. The LRDP area contains chaparral and woodland habitat potentially suitable for this species.
Mt. Diablo cottonweed *Micropus amphibolus*	–	–	3.2	Bare, grassy or rocky slopes. 148–2,707 feet in elevation. Blooms March–May.	*May occur*. The LRDP area contains grassland habitat potentially suitable for this species.
Marsh microseris *Microseris paludosa*	–	–	1B.2	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland. 16–984 feet in elevation. Blooms April–June.	*Known to occur*. This species has been documented in the Marshall Fields complex in the north campus portion of the LRDP area (CNDDB 2020). The LRDP area contains forest and grassland habitat potentially suitable for this species.
Northern curly-leaved monardella *Monardella sinuata* ssp. *nigrescens*	–	–	1B.2	Coastal dunes, coastal scrub, chaparral, lower montane coniferous forest. Sandy soils. 0–984 feet in elevation. Blooms May–July.	*May occur*. The LRDP area contains chaparral and forest habitat potentially suitable for this species.
Woodland woollythreads *Monolopia gracilens*	–	–	1B.2	Grassy sites, in openings; sandy to rocky soils. Often seen on serpentine after burns but may have only weak affinity to serpentine. 328–3,937 feet in elevation. Blooms March–July.	*May occur*. The LRDP area contains grassland habitat potentially suitable for this species.

Species	Federal Listing Status[1]	Status[1] State Listing	CRPR	Habitat	Potential for Occurrence[2]
Kellman's bristle moss *Orthotrichum kellmanii*	–	–	1B.2	Sandstone outcrops with high calcium concentrations from eroded boulders out of non-calcareous sandstone bedrock. Rock outcrops in small openings within dense chaparral with overstory of scattered knobcone pine. 1,125–2,247 feet in elevation. Blooms January–February.	*May occur*. The LRDP area contains chaparral habitat potentially suitable for this species.
Dudley's lousewort *Pedicularis dudleyi*	–	SR	1B.2	Deep shady woods of older coast redwood forests; also in maritime chaparral. 197–2,953 feet in elevation. Blooms April–June.	*May occur*. The LRDP area contains redwood and chaparral habitat potentially suitable for this species.
Santa Cruz Mountains beardtongue *Penstemon rattanii* var. *kleei*	–	–	1B.2	Sandy shale slopes; sometimes in the transition between forest and chaparral. 1,312–3,609 feet in elevation. Blooms May–June.	*May occur*. The LRDP area contains forest and chaparral habitat potentially suitable for this species.
White-rayed pentachaeta *Pentachaeta bellidiflora*	FE	SE	1B.1	Open dry rocky slopes and grassy areas, often on soils derived from serpentine bedrock. 115–2,001 feet in elevation. Blooms March–May.	*May occur*. The LRDP area contains grassland habitat potentially suitable for this species.
Monterey pine *Pinus radiata*	–	–	1B.1	Closed-cone coniferous forest, cismontane woodland. Three primary stands are native to California. Dry bluffs and slopes. 197–410 feet in elevation.	*May occur*. While the LRDP area is not within the known primary stands of this species, the nearest known occurrence of this species is approximately 0.2 mile south of the LRDP area (CNDDB 2020). The LRDP area contains forest habitat potentially suitable for this species.
White-flowered rein orchid *Piperia candida*	–	–	1B.2	Sometimes on serpentine. Forest duff, mossy banks, rock outcrops, and bogs. 148–5,299 feet in elevation. Blooms May–September.	*May occur*. The LRDP area contains forest habitat potentially suitable for this species.
Choris' popcornflower *Plagiobothrys chorisianus* var. *chorisianus*	–	–	1B.2	Chaparral, coastal scrub, coastal prairie. Mesic sites. 49–525 feet in elevation. Blooms March–June.	*May occur*. The LRDP area contains chaparral and coastal prairie habitat potentially suitable for this species.
San Francisco popcornflower *Plagiobothrys diffusus*	–	SE	1B.1	Valley and foothill grassland, coastal prairie. Historically from grassy slopes with marine influence. 148–1,181 feet in elevation. Blooms March–June.	*Known to occur*. This species has been documented in the Marshall Fields complex in the north campus portion of the LRDP area (CNDDB 2020). The LRDP area contains grassland and coastal prairie habitat potentially suitable for this species.
Hairless popcornflower *Plagiobothrys glaber*	–	–	1A	Coastal salt marshes and alkaline meadows. 16–591 feet in elevation. Blooms March–May.	*Not expected to occur*. The LRDP area does not contain alkaline soils.
Scotts Valley polygonum *Polygonum hickmanii*	FE	SE	1B.1	Purisima sandstone or mudstone with a thin soil layer; vernally moist due to runoff. 689–755 feet in elevation. Blooms May–August.	*Not expected to occur*. The LRDP area is outside of the known, limited range of this species.
Rock sanicle *Sanicula saxatilis*	–	SR	1B.2	Bedrock outcrops and talus slopes in chaparral or oak woodland habitat. 2,198–4,101 feet in elevation. Blooms April–May.	*Not expected to occur*. The LRDP area does not contain outcrop or talus slope habitat.
Chaparral ragwort *Senecio aphanactis*	–	–	2B.2	Chaparral, cismontane woodland, coastal scrub. Drying alkaline flats. 66–2,805 feet in elevation. Blooms January–April.	*Not expected to occur*. The LRDP area does not contain alkaline soils.

Species	Federal Listing Status[1]	Status[1] State Listing	CRPR	Habitat	Potential for Occurrence[2]
San Francisco campion *Silene verecunda* ssp. *verecunda*	–	–	1B.2	Coastal scrub, valley and foothill grassland, coastal bluff scrub, chaparral, coastal prairie. Often on mudstone or shale; one site on serpentine. 98–2,116 feet in elevation. Blooms March–June.	*May occur*. The LRDP area contains grassland, chaparral, and coastal prairie habitat potentially suitable for this species.
Santa Cruz microseris *Stebbinsoseris decipiens*	–	–	1B.2	Open areas in loose or disturbed soil, usually derived from sandstone, shale, or serpentine, on seaward slopes. 33–1,640 feet in elevation. Blooms April–May.	*May occur*. The LRDP area contains sandstone habitat potentially suitable for this species.
Metcalf Canyon jewelflower *Streptanthus albidus* ssp. *albidus*	FE	–	1B.1	Relatively open areas in dry grassy meadows on serpentine soils; also on serpentine balds. 148–2,625 feet in elevation. Blooms April–July.	*Not expected to occur*. The LRDP area does not contain serpentine habitat.
Most beautiful jewelflower *Streptanthus albidus* ssp. *peramoenus*	–	–	1B.2	Serpentine outcrops, on ridges and slopes. 312–3,281 feet in elevation. Blooms April–September.	*Not expected to occur*. The LRDP area does not contain serpentine habitat.
Santa Cruz clover *Trifolium buckwestiorum*	–	–	1B.1	Moist grassland. Gravelly margins. 344–2,001 feet in elevation. Blooms April–October.	*Known to occur*. This species has been documented in the Marshall Fields complex in the north campus portion of the LRDP area (CNDDB 2020). The LRDP area contains potentially grassland habitat.
Pacific Grove clover *Trifolium polyodon*	–	SR	1B.1	Along small springs and seeps in grassy openings. 16–394 feet in elevation. Blooms April–June.	*Known to occur*. This species has been documented in the Marshall Fields complex in the north campus portion of the LRDP area (CNDDB 2020). The LRDP area contains seep habitat within grasslands potentially suitable for this species.

Notes: CRPR = California Rare Plant Rank; CESA = California Endangered Species Act; CEQA = California Environmental Quality Act; ESA = Endangered Species Act; NPPA = Native Plant Protection Act

1 Legal Status Definitions

Federal:

FE Federally Listed as Endangered (legally protected by ESA)
FT Federally Listed as Threatened (legally protected by ESA)

State:

SE State Listed as Endangered (legally protected by CESA)
SR State Listed as Rare (legally protected by NPPA)

California Rare Plant Ranks:

1A Plant species that are presumed extirpated or extinct because they have not been seen or collected in the wild in California for many years. A plant is extinct if it no longer occurs anywhere. A plant that is extirpated from California has been eliminated from California but may still occur elsewhere in its range.
1B Plant species considered rare or endangered in California and elsewhere (protected under CEQA, but not legally protected under ESA or CESA).
2B Plant species considered rare or endangered in California but more common elsewhere (protected under CEQA, but not legally protected under ESA or CESA).
3 Plant species for which there is not enough information to assign the species to one of the other ranks or reject them.

Threat Ranks:

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

2 Potential for Occurrence Definitions

Not expected to occur: Species is unlikely to be present because of poor habitat quality, lack of habitat features suitable for the species, or restricted current distribution of the species.
May occur: Habitat suitable for the species is available and there have been nearby recorded occurrences of the species.
Known to occur: The species has been observed within the LRDP area.

Sources: CNDDB 2020; CNPS 2020; Kauffmann et al. 2015; Neubauer 2013

Table 3.5-3 Special-Status Wildlife Species Known to Occur in the Vicinity of the LRDP area and Their Potential for Occurrence in the LRDP area

Species	Federal Listing Status[1]	State Listing Status[1]	Habitat	Potential for Occurrence[2]
Amphibians and Reptiles				
California giant salamander *Dicamptodon ensatus*	–	SSC	Known from wet coastal forests near streams and seeps from Mendocino County south to Monterey County and east to Napa County. Aquatic larvae found in cold, clear streams, occasionally in lakes and ponds. Adults known from wet forests under rocks and logs near streams and lakes.	*Known to occur.* This species is known to breed within Cave Gulch and its tributaries and has been documented in the north campus portion of the LRDP area and within Empire Cave (Jones, pers. comm., 2020, CNDDB 2020). Habitat potentially suitable for this species is present within stream and seep habitat and in wet upland areas throughout forested areas of the LRDP area.
California red-legged frog *Rana draytonii*	FT	SSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby, or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	*Known to occur.* California red legged frog is known to occur within numerous locations in the southwestern portion of the LRDP area (e.g., within Moore Creek), and is known to breed in the Arboretum Pond (Biosearch Environmental Consulting 2020, CNDDB 2020). Additional aquatic breeding habitat is present within two miles of the LRDP area (Biosearch Environmental Consulting 2020). The LRDP area contains approximately 970 acres of critical habitat for California red-legged frog.
California tiger salamander *Ambystoma californiense*	FT	ST	Need underground refuges, especially ground squirrel burrows, and vernal pools or other seasonal water sources for breeding.	*Not expected to occur.* The majority of the LRDP area is outside of the known range of this species. The nearest known California tiger salamander occurrence is approximately 12 miles southeast of the LRDP area (CNDDB 2020). The LRDP area does not contain wetland or vernal pool habitat suitable for this species.
Coast horned lizard *Phrynosoma blainvillii*	–	SSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	*May occur.* The nearest known occurrence of coast horned lizard is approximately 23 miles east of the LRDP area (CNDDB 2020). Habitat potentially suitable for coast horned lizard is present within grasslands and open areas in chaparral and forest habitats.
Foothill yellow-legged frog West/Central Coast clade *Rana boylii*	–	SE	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Need at least some cobble-sized substrate for egg-laying. Need at least 15 weeks to attain metamorphosis.	*Known to occur.* There is a historic known occurrence of foothill yellow-legged frog in the LRDP area within stream habitat in Cave Gulch (1959), and approximately 1.9 miles north of the LRDP area (1931; CNDDB 2020). Habitat potentially suitable for this species is present within stream habitat in the LRDP area.

Species	Federal Listing Status[1]	State Listing Status[1]	Habitat	Potential for Occurrence[2]
San Francisco gartersnake *Thamnophis sirtalis tetrataenia*	FE	SE FP	Vicinity of freshwater marshes, ponds and slow-moving streams in San Mateo County and extreme northern Santa Cruz County. Prefers dense cover and water depths of at least one foot. Upland areas near water are also very important.	*Not expected to occur.* The LRDP area is outside of the known range of this species.
Santa Cruz black salamander *Aneides niger*	–	SSC	Mixed deciduous and coniferous woodlands and coastal grasslands in San Mateo, Santa Cruz, and Santa Clara counties. Adults found under rocks, talus, and damp woody debris.	*Known to occur.* This species is known to occur within the LRDP area and has been documented near the Quarry Amphitheater and in Jordan Gulch (Jones, pers. comm., 2020, CNDDB 2020. There are several additional occurrences within approximately 1 mile of the LRDP area (CNDDB 2020).
Santa Cruz long-toed salamander *Ambystoma macrodactylum croceum*	FE	SE FP	Freshwater marsh, marsh and swamp, and wetlands. Wet meadows near sea level in a few restricted locales in Santa Cruz and Monterey counties. Aquatic larvae prefer shallow water, using clumps of vegetation or debris for cover. Adults use mammal burrows.	*Not expected to occur.* Within Santa Cruz County, this species is limited to a small number of restricted localities, none of which are located within the LRDP area (CNDDB 2020).
Southwestern pond turtle *Actinemys pallida*	–	SSC	Aquatic turtle of ponds, marshes, rivers, streams, and irrigation ditches, usually with aquatic vegetation, below 6,000 feet elevation. Need basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.3 mile from water for egg-laying.	*Known to occur.* There is one known occurrence of southwestern pond turtle within the LRDP area in the Arboretum Pond (CNDDB 2020). Aquatic habitat suitable for this species is present within stream habitat in the LRDP area, and upland habitat potentially suitable for the species is present within surrounding grasslands and open areas in chaparral and forested areas.
Western spadefoot *Spea hammondii*	–	SSC	Occurs primarily in grassland habitats but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.	*Not expected to occur.* The LRDP area is outside of the known range of this species.
Birds				
American peregrine falcon *Falco peregrinus anatum*	FD	SD FP	Near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also, human-made structures. Nest consists of a scrape or a depression or ledge in an open site.	*May occur.* There are no documented peregrine falcon nest sites within the LRDP area; however, there are many recent observations of the species within and adjacent to the LRDP area (CNDDB 2020, eBird 2020). Habitat potentially suitable for nesting for this species is present on human-made structures or ledges in the LRDP area.
Bald eagle *Haliaeetus leucocephalus*	FD	SE FP	Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests within 1 mile of water. Nests in large, old-growth, or dominant live tree with open branches, especially ponderosa pine. Roosts communally in winter.	*May occur.* There are no documented bald eagle nest sites within the LRDP area; however, there are many recent observations of the species within and adjacent to the LRDP area (CNDDB 2020, eBird 2020). Habitat potentially suitable for nesting for this species is present within large trees in the LRDP area.

Species	Federal Listing Status[1]	State Listing Status[1]	Habitat	Potential for Occurrence[2]
Bank swallow *Riparia riparia*	–	ST	Riparian scrub, riparian woodland. Colonial nester; nests primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	*Not expected to occur.* There is one known historic (1950) occurrence of bank swallow approximately 1 mile east of the LRDP area, potentially associated with the San Lorenzo River (CNDDB 2020). However, bank swallows are considered extirpated from Santa Cruz County (Remsen 1978).
Black swift *Cypseloides niger*	–	SSC	Coastal belt of Santa Cruz and Monterey Co; central and southern Sierra Nevada; San Bernardino and San Jacinto Mountains. Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above the surf; forages widely.	*May occur.* Black swifts are known to breed within ocean-facing cliffs and caves along the coast approximately 4 miles west of the LRDP area (CNDDB 2020). While the LRDP area does not contain nesting habitat suitable for this species, black swifts may forage within the LRDP area.
Bryant's savannah sparrow *Passerculus sandwichensis alaudinus*	–	SSC	Restricted to a narrow coastal strip from Humboldt Bay south to the Morro Bay area. This sparrow occupies low tidally influenced habitats, adjacent ruderal areas, moist grasslands within and just above the fog belt, and, infrequently, drier grasslands.	*Known to occur.* The LRDP area is within the range of this species, and habitat potentially suitable for the species is present within grasslands in the LRDP area. Bryant's savannah sparrow has been observed breeding within IAA and has been observed during the breeding season in the Great Meadow and East Meadow (Jones, pers. comm., 2020).
Burrowing owl *Athene cunicularia*	–	SSC	Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	*Known to occur.* Burrowing owls are known to occur within two locations in the southern portion of the LRDP area (CNDDB 2020). Habitat potentially suitable for this species is present within grasslands and open areas within chaparral habitat in the LRDP area.
California black rail *Laterallus jamaicensis coturniculus*	–	ST FP	Inhabits freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat.	*Not expected to occur.* While there is one historic (1941) black rail occurrence within approximately 1 mile of the LRDP area, the LRDP area is outside of the current known range of this species.
California brown pelican *Pelecanus occidentalis californicus*	FD	SD FP	Colonial nester on coastal islands just outside the surf line. Nests on coastal islands of small to moderate size which afford immunity from attack by ground-dwelling predators. Roosts communally.	*Not expected to occur.* Brown pelicans likely roost along nearby coastal areas; however, there is no roosting habitat suitable for pelicans within the LRDP area.
California condor *Gymnogyps californianus*	FE	SE FP	Require vast expanses of open savannah, grasslands, and foothill chaparral in mountain ranges of moderate altitude. Deep canyons containing clefts in the rocky walls provide nesting sites. Forages up to 100 miles from roost/nest.	*Not expected to occur.* The LRDP area is outside of the known range of this species, and there are no known nesting occurrences within the LRDP area (CNDDB 2020).
California least tern *Sternula antillarum browni*	FE	SE FP	Nests along the coast from San Francisco Bay south to northern Baja California. Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, landfills, or paved areas.	*Not expected to occur.* The LRDP area is outside of the known range of this species.

Species	Federal Listing Status[1]	State Listing Status[1]	Habitat	Potential for Occurrence[2]
Golden eagle *Aquila chrysaetos*	–	FP	Rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	*May occur.* There are no documented golden eagle nest sites within the LRDP area; however, there are many recent observations of the species within and adjacent to the LRDP area (CNDDB 2020, eBird 2020). Nesting habitat potentially suitable for this species is present within large trees in the LRDP area.
Least Bell's vireo *Vireo bellii pusillus*	FE	SE	Riparian forest, riparian scrub, riparian woodland. Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2,000 feet. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	*Not expected to occur.* The LRDP area is outside of the current known range of the species.
Loggerhead shrike *Lanius ludovicianus*	–	SSC	Broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub, and washes. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	*May occur.* There are no known loggerhead shrike nesting sites within the LRDP area; however, there have been many recent observations of the species within and adjacent to the LRDP area (CNDDB 2020, eBird 2020). Nesting habitat potentially suitable for this species is present within chaparral habitat in the LRDP area.
Marbled murrelet *Brachyramphus marmoratus*	FT	SE	Lower montane coniferous forest, old growth, redwood. Feeds near-shore; nests inland along coast from Eureka to Oregon border and from Half Moon Bay to Santa Cruz. Nests in old-growth redwood-dominated forests, up to six miles inland, often in Douglas-fir.	*Not expected to occur.* The nearest known marbled murrelet occurrence is approximately 4.5 miles northwest of the LRDP area (CNDDB 2020). The LRDP area is located within the known marbled murrelet breeding range. The LRDP area also contains approximately 3.8 acres of critical habitat for marbled murrelet and is surrounded by other critical habitat areas within Henry Cowell Redwoods State Park to the north and east and Wilder Ranch State Park to the southwest (Figure 3.5-3). However, the LRDP area does not contain old growth or old second growth habitat, which characterizes suitable breeding habitat for the species (California Department of Parks and Recreation 2017). Thus, marbled murrelets are not expected to breed within the LRDP area.
Mountain plover *Charadrius montanus*	–	SSC	Short grasslands, freshly plowed fields, newly sprouting grain fields, and sometimes sod farms. Short vegetation, bare ground, and flat topography. Prefers grazed areas and areas with burrowing rodents.	*Not expected to occur.* The LRDP area is outside of the known range of this species.

Species	Federal Listing Status[1]	State Listing Status[1]	Habitat	Potential for Occurrence[2]
Northern harrier *Circus hudsonius*	–	SSC	Coastal salt and fresh-water marsh. Nest and forage in grasslands, from salt grass in desert sink to mountain cienagas. Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	*May occur.* There are no documented northern harrier nesting occurrences within the LRDP area; however, the species is common within the LRDP area, and there have been many recent observations of the species within and adjacent to the LRDP area (Jones, pers. comm., 2020, CNDDB 2020, eBird 2020). Nesting habitat potentially suitable for northern harrier is present within grassland habitat in the LRDP area.
Olive-sided flycatcher *Contopus cooperi*	–	SSC	Nesting habitats are mixed conifer, montane hardwood-conifer, Douglas-fir, redwood, red fir, and lodgepole pine. Most numerous in montane conifer forests where tall trees overlook canyons, meadows, lakes, or other open terrain.	*Known to occur.* Olive-sided flycatchers have been observed nesting within forest habitat in upper campus (Jones, pers. comm., 2020). Additionally, there have been many recent observations of the species within and adjacent to the LRDP area (eBird 2020). Nesting habitat potentially suitable for this species is present within redwood and other forested habitat in the LRDP area.
Purple martin *Progne subis*	–	SSC	Inhabits woodlands, low elevation coniferous forest of Douglas-fir, ponderosa pine, and Monterey pine. Nests in old woodpecker cavities mostly, also in human-made structures. Nest often located in tall, isolated tree/snag.	*May occur.* There are no known purple martin nesting occurrences within the LRDP area; however, there have been many recent observations of the species within and adjacent to the LRDP area (CNDDB 2020, eBird 2020). Nesting habitat potentially suitable for this species is present within forested habitat and human made structures in the LRDP area.
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	–	SSC	Resident of the San Francisco Bay region, in fresh and saltwater marshes. Requires thick, continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	*Not expected to occur.* The LRDP area is within the known range of this species; however, there is no saltwater marsh habitat in the LRDP area.
Southwestern willow flycatcher *Empidonax traillii extimus*	FE	SE	Riparian woodlands in Southern California.	*Not expected to occur.* The LRDP area is outside of the known range of this species.
Tricolored blackbird *Agelaius tricolor*	–	ST SSC	Highly colonial species, most numerous in Central Valley and vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few kilometers of the colony.	*May occur.* The nearest known tricolored blackbird nesting colony is located in Antonelli Pond, directly adjacent to the Westside Research Park portion of the LRDP area (CNDDB 2020). Additionally, there have been many recent observations of the species within and adjacent to the LRDP area (eBird 2020). Nesting habitat potentially suitable for tricolored blackbird is present adjacent to aquatic habitat in the LRDP area.
Vaux's swift *Chaetura vauxi*	–	SSC	Redwood, Douglas-fir, and other coniferous forests. Nests in large hollow trees and snags. Often nests in flocks. Forages over most terrains and habitats but shows a preference for foraging over rivers and lakes.	*May occur.* There are no known Vaux's swift nesting occurrences within the LRDP area; however, there have been many recent observations of the species within and adjacent to the LRDP area (CNDDB 2020, eBird 2020). Nesting habitat potentially suitable for this species is present within redwood and other forested habitat in the LRDP area.

Species	Federal Listing Status[1]	State Listing Status[1]	Habitat	Potential for Occurrence[2]
Western snowy plover *Charadrius alexandrinus nivosus*	FT	SSC	Great Basin standing waters, sand shore, wetland. Sandy beaches, salt pond levees and shores of large alkali lakes. Needs sandy, gravelly, or friable soils for nesting.	*Not expected to occur.* Western snowy plovers are known to occur within coastal areas near the LRDP area (CNDDB 2020). However, the LRDP area does not contain suitable sandy or gravel beach habitat for this species.
White-tailed kite *Elanus leucurus*	–	FP	Rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	*Known to occur.* White-tailed kite nests have been documented within redwood forest habitat, in the UC Santa Cruz Arboretum and Botanic Garden, and in the central campus portion of the LRDP area (Jones, pers. comm., 2020, CNDDB 2020). Additionally, there have been many recent observations of the species within and adjacent to the LRDP area (eBird 2020). Nesting habitat potentially suitable for this species is present within forested and riparian areas in the LRDP area.
Yellow rail *Coturnicops noveboracensis*	–	SSC	Summer resident in eastern Sierra Nevada in Mono County. Fresh-water marshlands.	*Not expected to occur.* The LRDP area is outside of the known range of this species. While there have been some observations of yellow rails in Santa Cruz County, there are no known occurrences in the LRDP area (CNDDB 2020, eBird 2020).
Yellow warbler *Setophaga petechia*	–	SSC	Riparian forest, riparian scrub, riparian woodland. Riparian plant associations in close proximity to water. Also nests in montane shrubbery in open conifer forests in Cascades and Sierra Nevada. Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	*May occur.* There are no known yellow warbler nesting occurrences within the LRDP area; however, there have been many recent observations of the species within and adjacent to the LRDP area (CNDDB 2020, eBird 2020). Nesting habitat potentially suitable for this species is present within riparian habitat in the LRDP area.
Yellow-breasted chat *Icteria virens*	–	SSC	Riparian forest, riparian scrub, riparian woodland. Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, wild grape; forages and nests within 10 feet of ground.	*May occur.* There are no known yellow-breasted chat nesting occurrences within the LRDP area; however, there have been many recent observations of the species within and adjacent to the LRDP area (CNDDB 2020, eBird 2020). Nesting habitat potentially suitable for this species is present within riparian habitat in the LRDP area.
Fish				
Coho salmon - central California coast ESU *Oncorhynchus kisutch* pop. 4	FE	SE	Federal listing refers to populations between Punta Gorda and San Lorenzo River. State listing includes populations south of Punta Gorda. Require beds of loose, silt-free, coarse gravel for spawning. Also need cover, cool water, and sufficient dissolved oxygen.	*Not expected to occur.* The LRDP area does not contain aquatic habitat suitable for this species.

Species	Federal Listing Status[1]	State Listing Status[1]	Habitat	Potential for Occurrence[2]
Eulachon *Thaleichthys pacificus*	FT	–	Found in Klamath River, Mad River, Redwood Creek and in small numbers in Smith River and Humboldt Bay tributaries. Spawn in lower reaches of coastal rivers with moderate water velocities and bottom of pea-sized gravel, sand, and woody debris	*Not expected to occur.* The LRDP area does not contain aquatic habitat suitable for this species.
Pacific lamprey *Entosphenus tridentatus*	–	SSC	Found in Pacific Coast streams north of San Luis Obispo County, however regular runs in Santa Clara River.	*Not expected to occur.* The LRDP area does not contain aquatic habitat suitable for this species.
Riffle sculpin *Cottus gulosus*	–	SSC	Found in headwater streams with cold water and rocky or gravelly substrate.	*Not expected to occur.* The LRDP area does not contain aquatic habitat suitable for this species.
San Joaquin roach *Lavinia symmetricus* ssp. 1	–	SSC	Tributaries to the San Joaquin River from the Cosumnes River south.	*Not expected to occur.* The LRDP area does not contain aquatic habitat suitable for this species.
Steelhead - central California coast DPS *Oncorhynchus mykiss irideus* pop. 8	FT	–	From Russian River, south to Soquel Creek and to, but not including Pajaro River. Also San Francisco and San Pablo Bay basins.	*Not expected to occur.* Steelhead have been documented within Wilder Creek, a small portion of which is within the LRDP area. However, the upstream limit of anadromy is located about 0.4 mile downstream from Cave Gulch, which is outside of the LRDP area (Center for Ecosystem Management and Restoration 2020).
Steelhead - south-central California coast DPS *Oncorhynchus mykiss irideus* pop. 9	FT	–	Federal listing refers to runs in coastal basins from the Pajaro River south to, but not including the Santa Maria River.	*Not expected to occur.* The LRDP area is outside of the range of this species.
Tidewater goby *Eucyclogobius newberryi*	FE	SSC	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River. Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels.	*Not expected to occur.* The LRDP area does not contain aquatic habitat suitable for this species.
Invertebrates				
Bay checkerspot butterfly *Euphydryas editha bayensis*	FT	–	Restricted to native grasslands on outcrops of serpentine soil in the vicinity of San Francisco Bay. *Plantago erecta* is the primary host plant; *Orthocarpus densiflorus* and *Orthocarpus purpurscens* are the secondary host plants.	*Not expected to occur.* The LRDP area is outside of the known range of this species.
Black abalone *Haliotis cracherodii*	FE	–	Marine intertidal and splash zone communities. Mid to low rocky intertidal areas.	*Not expected to occur.* The LRDP area does not contain intertidal habitat suitable for this species.

Species	Federal Listing Status[1]	State Listing Status[1]	Habitat	Potential for Occurrence[2]
Dolloff cave spider[3] *Meta dolloff*	–	–	Limestone. Known from caves in the Santa Cruz area. This species is an orb-weaver and occurs from the cave mouth into deep twilight.	*Known to occur.* This species is known to occur within cave habitat in the LRDP area and has also been identified within soil pits surrounding the UC Santa Cruz Forest Ecology Research Plot in the north campus portion of the LRDP area, indicating that the species may occur within other non-cave habitats (Krohn and Jones 2020).
Empire Cave amphipod[3] *Stygobromus imperialis*	–	–	Aquatic. Endemic to Empire Cave in Santa Cruz County	*Known to occur.* This species is known to occur within cave habitat in the LRDP area.
Empire Cave psuedoscorpion[3] *Fissilicreagris imperialis*	–	–	Limestone. Known only from Empire Cave in Santa Cruz County.	*Known to occur.* This species is known to occur within cave habitat in the LRDP area.
MacKenzie's Cave amphipod[3] *Stygobromus mackenziei*	–	–	Aquatic, limestone. Known only from Empire Cave. A metamorphosed limestone cave subject to intermittent flooding.	*Known to occur.* This species is known to occur within cave habitat in the LRDP area.
Monarch butterfly - California overwintering population *Danaus plexippus* pop. 1	–	–	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (Eucalyptus, Monterey pine, cypress), with nectar and water sources nearby.	*Known to occur.* Monarch butterflies are known to overwinter in trees within the UC Santa Cruz Arboretum and Botanic Garden. Habitat potentially suitable for this species is present within forested areas and tree groves throughout the LRDP area.
Mount Hermon (=barbate) June beetle *Polyphylla barbata*	FE	–	Interior dunes. Occurs only within "sandhills" habitat (i.e., certain habitats containing Zayante soils, which are excessively drained sandy soils that formed in weakly consolidated marine sediments) in Santa Cruz County. Known only from sandhills in vicinity of Mt. Hermon, Santa Cruz County.	*Not expected to occur.* The LRDP area does not contain Zayante soil habitat.
Ohlone tiger beetle *Cicindela ohlone*	FE	–	Remnant native grasslands with California oatgrass (*Danthonia californica*) and purple needlegrass (*Stipa pulchra*) in Santa Cruz County. Substrate is poorly-drained clay or sandy clay soil over bedrock of Santa Cruz mudstone.	*Known to occur.* Ohlone tiger beetle is known to occur in lower campus within the grassland/coastal prairie area in the southwest corner of the LRDP area west of Empire Grade, including IAA (one of the preserves established for the Ranch View Terrace HCP), and within the Marshall Fields complex in north campus (Arnold 2020, Jones, pers. comm., 2020). The species has potential to occur within portions of the LRDP area that contain grassland or coastal prairie habitats associated with Watsonville loam soils (Arnold 2020).
Santa Cruz telemid spider[3] *Telema* sp.	–	–	Limestone. Known from caves in the Santa Cruz area.	*Known to occur.* This species is known to occur within cave habitat in the LRDP area.

Species	Federal Listing Status[1]	State Listing Status[1]	Habitat	Potential for Occurrence[2]
Smith's blue butterfly *Euphilotes enoptes smithi*	FE	–	Most commonly associated with coastal dunes and coastal sage scrub plant communities in Monterey and Santa Cruz counties. Hostplant: *Eriogonum latifolium* and *Eriogonum parvifolium* are utilized as both larval and adult foodplants.	*Not expected to occur.* The LRDP area is outside of the known range of this species.
Western bumble bee *Bombus occidentalis*	–	SC	Bumble bees have three basic habitat requirements: suitable nesting sites for the colonies, availability of nectar and pollen from floral resources throughout the duration of the colony period (spring, summer, and fall), and suitable overwintering sites for the queens.	*Not expected to occur.* The LRDP area is within the historic range of this species. However, western bumble bee has recently undergone a decline in abundance and distribution and is no longer present across much of its historic range. In California, western bumble bee populations are currently largely restricted to high elevation sites in the Sierra Nevada and a few locations on the northern California coast (Xerces Society 2018).
Zayante band-winged grasshopper *Trimerotropis infantilis*	FE	–	Isolated sandstone deposits in the Santa Cruz Mountains. Occurs only within "sandhills" habitat (i.e., certain habitats containing Zayante soils, which are excessively drained sandy soils that formed in weakly consolidated marine sediments) in Santa Cruz County.	*Not expected to occur.* The LRDP area does not contain Zayante soil habitat.
Mammals				
American badger *Taxidea taxus*	–	SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils, and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	*Known to occur.* Over 100 feeding digs associated with American badgers have been observed within the LRDP area, including within Great Meadow and the UC Santa Cruz Arboretum and Botanical Garden in lower campus (Jones, pers. comm., 2020). Additionally, an American badger carcass was recovered in 2004 within grassland habitat in the LRDP area (CNDDB 2020). The LRDP area contains grassland and open chaparral and forest habitats potentially suitable for this species.
Mountain lion *Puma concolor*	–	SC	Mountain lions inhabit a wide range of ecosystems, including mountainous regions, forests, deserts, and wetlands. Mountain lions establish and defend large territories and can travel large distances in search of prey or mates. The Central Coast and Southern California Evolutionarily Significant Units (ESUs) were granted emergency listing status in April of 2020, and CDFW is currently reviewing a petition to list these ESUs as threatened under CESA.	*Known to occur.* Mountain lions have been documented traversing through the LRDP area, and it is likely that the LRDP area comprises a portion of the home range for many individual lions (Santa Cruz Puma Project 2020). While there are no known mountain lion dens within the LRDP area, potential den habitat (e.g., caves, cavities, thickets) may be present within less developed portions of the LRDP area.

Species	Federal Listing Status[1]	State Listing Status[1]	Habitat	Potential for Occurrence[2]
Pallid bat *Antrozous pallidus*	–	SSC	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	*May occur.* The nearest known historic (1928) occurrence of this species is approximately 4 miles east of the LRDP area (CNDDB 2020). Roost habitat potentially suitable for this species is present in the LRDP area within rock areas and large trees.
Ringtail *Bassariscus astustus*	–	FP	Riparian habitats, forest habitats, and shrub habitats in lower to middle elevations. Usually found within 0.6 mile of a permanent water source.	*May occur.* Habitat potentially suitable for ringtail is present within riparian areas and forested areas near streams and drainages in the LRDP area.
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	–	SSC	Chaparral, redwood. Forest habitats of moderate canopy and moderate to dense understory. May prefer chaparral and redwood habitats. Constructs nests of shredded grass, leaves, and other material. May be limited by availability of nest-building materials.	*Known to occur.* San Francisco dusky-footed woodrat nests have been observed within chaparral and forest habitats throughout the LRDP area, and the species is considered to be common within habitat areas suitable for the species (Jones, pers. comm., 2020). Habitat suitable for this species is present throughout chaparral, forest, and other wooded areas within the LRDP area.
Southern sea otter *Enhydra lutris nereis*	FT	FP	Aquatic, protected deepwater coastal communities. Nearshore marine environments from about Año Nuevo, San Mateo County to Point Sal, Santa Barbara County. Needs canopies of giant kelp and bull kelp for rafting and feeding. Prefers rocky substrates with abundant invertebrates.	*Not expected to occur.* The LRDP area does not contain marine habitat suitable for this species.
Townsend's big-eared bat *Corynorhinus townsendii*	–	SSC	Throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	*May occur.* The nearest known historic (1945) occurrence of this species is approximately 1 mile southwest of the LRDP area (CNDDB 2020). Roost habitat potentially suitable for this species is present within buildings, other human-made structures (e.g., bridges), and cave systems in the LRDP area.
Western red bat *Lasiurus blossevillii*	–	SSC	Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	*May occur.* There are no known occurrences of western red bat within the LRDP area; however, habitat potentially suitable for this species is present within forested portions of the LRDP area.

Notes: CNDDB = California Natural Diversity Database; CEQA = California Environmental Quality Act

1 Legal Status Definitions

Federal:

FE Federally Listed as Endangered (legally protected)
FT Federally Listed as Threatened (legally protected)
FD Federally Delisted

State:

FP Fully protected (legally protected)
SSC Species of special concern (no formal protection other than CEQA consideration)
SE State Listed as Endangered (legally protected)
ST State Listed as Threatened (legally protected)
SC State Candidate for listing (legally protected)
SD State Delisted

2 Potential for Occurrence Definitions

Not expected to occur: Species is unlikely to be present because of poor habitat quality, lack of habitat features suitable for the species, or restricted current distribution of the species.
May occur: Habitat suitable for the species is available; however, there are little to no other indicators that the species might be present.
Known to occur: The species has been observed within the LRDP area.

3 Species associated with caves in the LRDP area are not listed under ESA or CESA; however, these species are considered locally important and potentially rare or endemic to the area.

Sources: CNDDB 2020; eBird 2020; Jones, pers. comm., 2020; USFWS 2020a; Xerces 2018; Santa Cruz Puma Project 2020

Critical Habitat

Critical habitat is mapped by USFWS and is defined in ESA as specific geographic areas that contain features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species but that may be needed for its recovery. Given the large scale at which critical habitat is mapped, it may also include areas that are not suitable for a species and would not be occupied. The LRDP area contains approximately 969.5 acres within the area mapped as California red-legged frog critical habitat, and approximately 3.8 acres of marbled murrelet critical habitat in the north eastern portion of the main residential campus (Figure 3.5-4). Again, the area mapped as critical habitat may not necessarily contain the features essential to conservation of the species. Making that determination requires site-specific habitat assessments or surveys.

A critical habitat designation only applies to activities performed by federal agencies or that involve a federal permit, license, or funding, and that are likely to destroy or adversely affect the area of critical habitat. UC Santa Cruz, as a state agency, is not required to consult with USFWS for nonfederal actions within critical habitat. However, as part of its consideration of whether to approve an HCP or issue or amend an incidental take permit for portions of the LRDP area, USFWS would be required to consult with itself under Section 7 of the ESA. Further, critical habitat is described in this EIR for informational purposes and to highlight the importance these areas may have to the recovery of California red-legged frog and marbled murrelet.

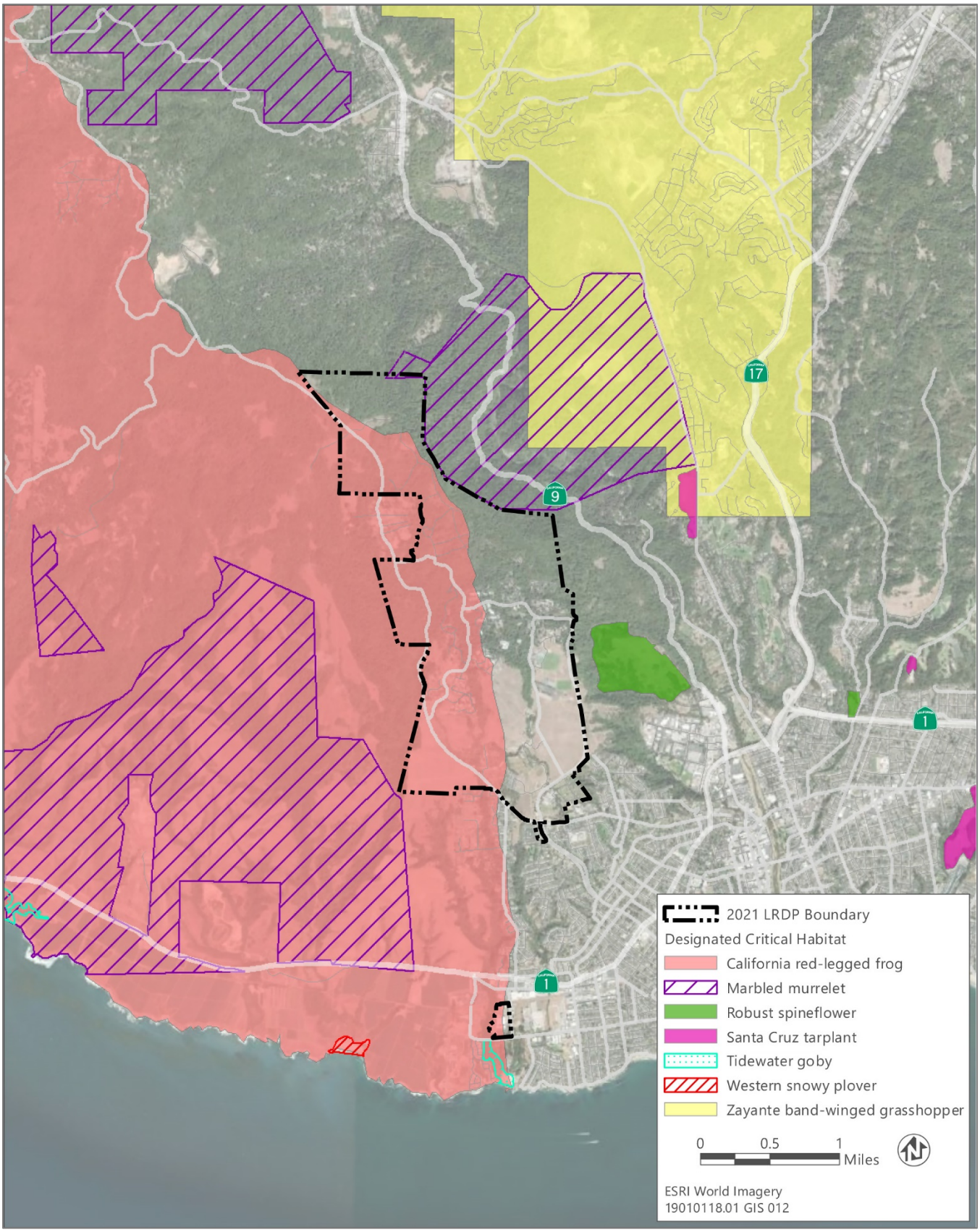
Sensitive Natural Communities

Sensitive natural communities are those native plant communities defined by CDFW as having limited distribution statewide or within a county or region and that are often vulnerable to environmental effects of projects (CDFW 2018). These communities may or may not contain special-status plants or their habitat (CDFW 2018). CDFW designates sensitive natural communities based on their state rarity and threat ranking using NatureServe's Heritage Methodology. Natural communities with rarity ranks of S1 to S3, where S1 is critically imperiled, S2 is imperiled, and S3 is vulnerable, are considered sensitive natural communities to be addressed in the environmental review processes of CEQA and its equivalents (CDFW 2018).

Sensitive natural communities are generally identified at the alliance level of vegetation classification hierarchy using the Manual of California Vegetation (Sawyer et al. 2009). Known occurrences of sensitive natural communities are included in the CNDDB; however, no new occurrences have been added to the CNDDB since the mid-1990s when funding was cut for this portion of the CNDDB program. Eight sensitive natural communities were identified within the eight USGS quadrangles surrounding the LRDP area through a query of the CNDDB: north central coast drainage Sacramento sucker/roach river, north central coast California roach/stickleback/steelhead stream, north central coast short-run coho stream, northern maritime chaparral, northern coastal salt marsh, Monterey pine forest, northern interior cypress forest, and maritime coast range ponderosa pine forest (CNDDB 2020). However, given the incomplete nature of this information in the CNDDB, it is assumed that other sensitive natural communities may occur in the LRDP area based on the vegetation communities known to occur in the LRDP area, as identified below.

North Central Coast Drainage Sacramento Sucker/Roach River

The nearest known occurrence of this sensitive natural community is within the San Lorenzo River, approximately 0.5 mile east of the LRDP area (CNDDB 2020). The LRDP area does not contain north central coast drainage Sacramento sucker/roach river habitat.



Source: Data downloaded from USFWS in March 2020

Figure 3.5-4 Critical Habitat in the Vicinity of the LRDP Area

North Central Coast California Roach/Stickleback/Steelhead Stream

The nearest known occurrence of this sensitive natural community is approximately 14 miles north of the LRDP area within Pescadero Creek (CNDDB 2020). The LRDP area does not contain north central coast California roach/stickleback/steelhead stream habitat.

North Central Coast Short-run Coho Stream

The nearest known occurrence of this sensitive natural community is approximately 8 miles northwest of the LRDP area within Scott Creek (CNDDB 2020). The LRDP area does not contain north central coast short-run coho stream habitat.

Northern Maritime Chaparral

The LRDP area contains approximately 54.9 acres of northern maritime chaparral habitat. The full description of this habitat can be found above under the "Vegetation Communities" section.

Northern Coastal Salt Marsh

Northern coastal salt marsh typically contains pickleweed (*Salicornia* spp.), cordgrass (*Spartina* spp.), and saltgrass (*Distichlis spicata*). The nearest known occurrence of northern coastal salt marsh is approximately 8 miles northwest of the LRDP area near the mouth of Scott Creek (CNDDB 2020). Salt marsh habitat is not present within the LRDP area.

Monterey Pine Forest

Monterey pine forests are typically dominated by Monterey pine, but may also include other canopy species. Monterey pine is also considered a special-status plant species. The nearest known occurrence of Monterey pine forest habitat is approximately 11 miles northwest of the LRDP area (CNDDB 2020). While it is possible that Monterey pine trees could occur within the LRDP area, no significant stands of this species have been identified within the LRDP area.

Northern Interior Cypress Forest

Northern interior cypress forest habitat, or Santa Cruz cypress grove habitat, is dominated by Santa Cruz cypress (*Hesperocyparis abramsiana* var. *abramsiana*) and may be associated with other species including knobcone pine, ponderosa pine, Douglas fir, tan oak, Pacific madrone, coast live oak, and redwood. The nearest known occurrence of northern interior cypress forest is approximately 3.7 miles northwest of the LRDP area (CNDDB 2020). While it is possible that Santa Cruz cypress trees could occur within the LRDP area, no significant stands of this species have been identified within the LRDP area.

Maritime Coast Range Ponderosa Pine Forest

Maritime coast range ponderosa pine forest habitat is typically dominated by ponderosa pine, and may be associated with other canopy species, including tan oak, Douglas fir, and interior live oak. The nearest known occurrence of maritime coast range ponderosa pine forest habitat is approximately 1.4 miles west of the LRDP area within Henry Cowell Redwoods State Park (CNDDB 2020). The LRDP area contains ponderosa pine trees; however, this species is not dominant in any of the forested habitat in the LRDP area.

Redwood Forest

Redwood is typically the dominant species in redwood forest but may be co-dominant with other tree species (e.g., bigleaf maple, alder, Pacific madrone, California bay). Redwood typically makes up more than 50 percent relative cover in the tree canopy, with a lower tier of hardwood tree canopy cover. Approximately 860.4 acres of redwood forest habitat have been mapped in the LRDP area (Bay Area Open Space Council 2019). However, much of this mapped habitat may not meet the qualifications of the redwood forest sensitive natural community based on the species assemblages and degree of dominance of redwood within the habitat. The full description of this habitat can be found above under the "Vegetation Communities" section.

Coastal Prairie

The LRDP area contains approximately 107.9 acres of coastal prairie habitat. The full description of this habitat can be found above under the "Vegetation Communities" section.

Arroyo Willow Thickets

Arroyo willow (*Salix lasiolepis*) is typically the dominant species in this community and can be co-dominant with other tall shrubs or low trees (e.g., bigleaf maple, coyote brush). Arroyo willow typically makes up more than 50 percent of the relative cover in the shrub or tree canopy. The LRDP area contains approximately 5.2 acres of riparian woodland and scrub habitat, some of which is known to contain arroyo willow (Jones, pers. comm., 2020). Riparian habitat is considered sensitive, but riparian habitat dominated by arroyo willow may also qualify as this sensitive natural community.

Black Cottonwood Forest and Woodland

Black cottonwood forest and woodland is dominated by black cottonwood but may be co-dominant with other tree species (e.g., bigleaf maple, alder [*Alnus* spp.], coast live oak, willow). Black cottonwood typically makes up more than 30 percent relative cover in the tree canopy. The LRDP area contains approximately 5.2 acres of riparian woodland and scrub habitat, which contains black cottonwood. Riparian habitat is considered sensitive, but riparian habitat dominated by black cottonwood may also qualify as this sensitive natural community.

Shreve Oak Forest

Shreve Oak Forest is dominated by Shreve oak but may also include canopy species like big-leaf maple, tan oak, Douglas fir, coast live oak, redwood, and California bay. This community could be interspersed with areas identified as coast live oak habitat, redwood habitat, or other forested areas in the LRDP area.

Purple Needlegrass Grassland

Purple needlegrass grassland is characterized by the presence of greater than 10 percent cover of purple needlegrass. This habitat may also include nodding needle grass (*Stipa cernua*), other needlegrass species (*Stipa* spp.), and melic grass species (*Melica* spp.), as well as nonnative grass and native and nonnative forbs. This habitat is likely interspersed with grassland and coastal prairie habitat within the Great Meadow, IAA and IAD, and the Marshall Fields complex in the LRDP area.

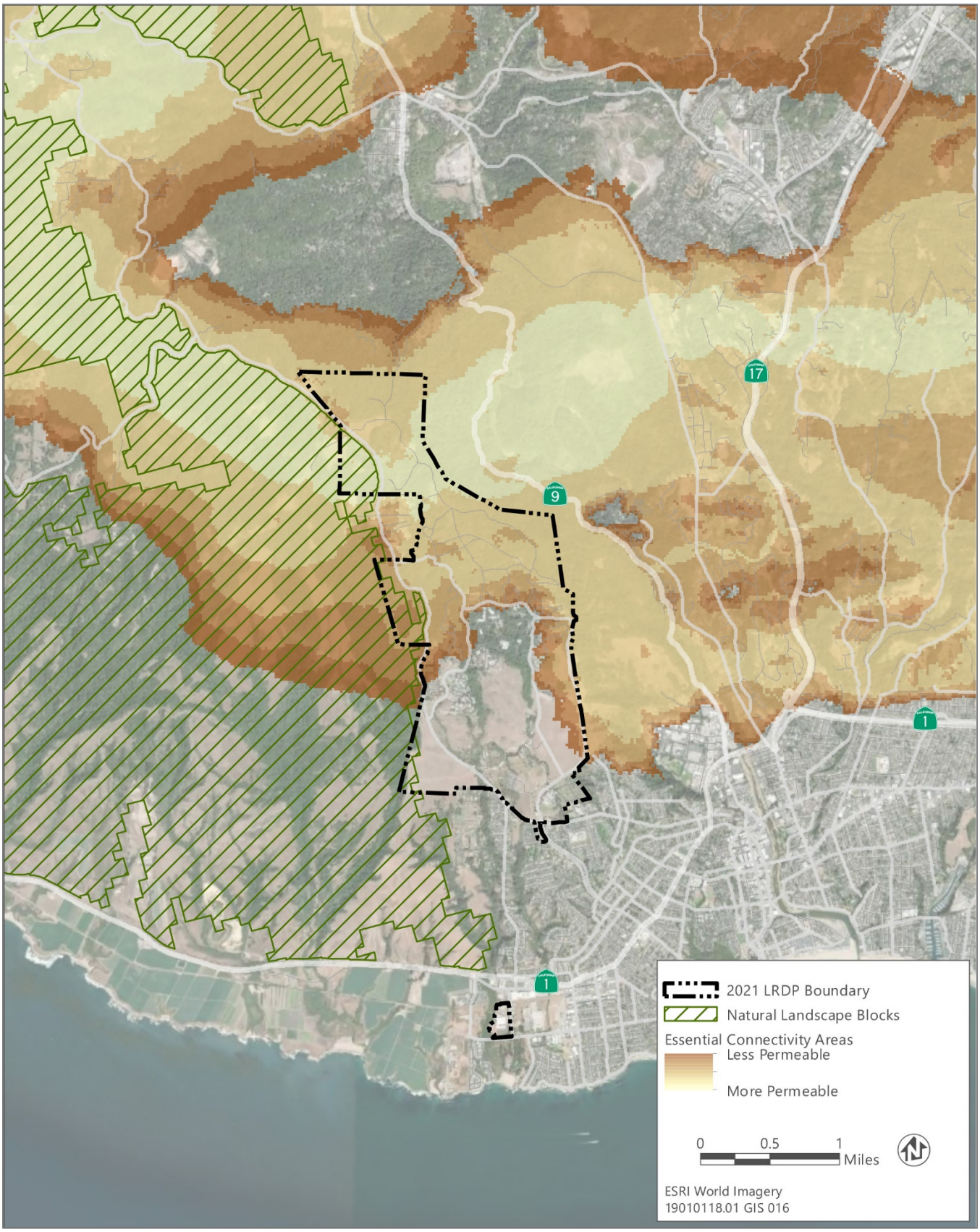
California Bay Forest

California bay forest is typically dominated by California bay, but may also include coast live oak, Douglas fir, tanoak, redwood, and madrone. This habitat may be interspersed within coastal mixed hardwood habitat in the LRDP area.

Wildlife Movement Corridors

The north campus portion of the LRDP area is predominately composed of relatively intact natural habitat, including redwood, coast live oak, coastal prairie, northern maritime chaparral, coastal mixed hardwood, and coyote brush habitat (Figure 3.5-2). Wilder Creek and several other intermittent and perennial streams run through the LRDP area (Figure 3.5-3). These features likely provide value as movement corridors for terrestrial and aquatic wildlife species and also provide connectivity with other natural habitats surrounding the LRDP area.

Some of the important areas for habitat connectivity in California were mapped as Essential Connectivity Areas (ECA) for the California Essential Habitat Connectivity Project, which was commissioned by the California Department of Transportation and CDFW with the purpose of making transportation and land-use planning more efficient and less costly, while helping reduce dangerous wildlife-vehicle collisions (Spencer et al. 2010). The ECAs were not developed for the purposes of defining areas subject to specific regulations by CDFW or other agencies. As shown in Figure 3.5-5, the LRDP area is surrounded on the north, west, and south by areas characterized as natural landscape blocks. The north campus portion of the LRDP area itself is considered an ECA, providing connectivity between these natural landscape blocks, and is generally "more permeable" relative to other areas outside of natural landscape blocks (see Figure 3.5-5). Most of the central campus and all of the lower campus portions of the LRDP area are not considered ECAs or natural landscape blocks due to the developed nature of those areas; however, these areas, especially riparian corridors, may still be used for wildlife movement to some degree.



Source: Data downloaded from CDFW in 2014

Figure 3.5-5 Essential Connectivity Areas and Natural Landscape Blocks in the LRDP Area

Wildlife Nursery Sites

Nursery sites are locations where fish or wildlife concentrate for hatching and/or raising young, such as nesting rookeries for birds (e.g., herons, egrets), spawning areas for native fish, fawning areas for mule deer (*Odocoileus hemionus*), and maternal roosts for bats. The LRDP area could contain a variety of these wildlife nursery sites. Deer fawning areas typically occur in chaparral, woodland, and riparian habitats which occur within the LRDP area. Several common bat species are known to occur within the LRDP area: big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*), California myotis (*Myotis californicus*), long-eared myotis (*Myotis evotis*), little brown myotis (*Myotis lucifugus*), fringed myotis (*Myotis thysanodes*), long-legged myotis (*Myotis volans*), Yuma myotis (*Myotis yumanensis*), and Mexican free-tailed bat (*Tadarida brasiliensis*; UC Santa Cruz 2016b). Roost characteristics of common bat depend on the species, but may include specialized roosting habitat, such as caves, tree foliage, buildings, bridges, crevices, and tree hollows. Significant common bat roosts may also be present within habitat suitable for roosts in the LRDP area.

Invasive Plant Species, Noxious Weeds, and Plant Pathogens

An invasive plant is one that is not native to a region, but rather is introduced, and tends to crowd out native vegetation and thereby adversely affect the wildlife that feeds on it. There are many invasive plant species in Santa Cruz County, and they occur throughout several different habitat types (Calflora 2020). Noxious weeds are plants that injure or cause damage to crops, livestock, or other agriculture and are designated by the US Department of Agriculture in accordance with the Plant Protection Act of 2000. Aggressive noxious weeds such as Scotch broom (*Cytisus scoparius*) and French broom (*Genista monspessulana*) can invade grasslands and exclude native grassland species. Invasive plant species such as English ivy (*Hedera helix*), Acacia (*Acacia* spp.), blue gum (*Eucalyptus globulus*), Pampas grass (*Cortaderia jubata*), giant reed (*Arundo donax*), and Himalayan blackberry (*Rubus armeniacus*) can invade forest or riparian habitats and exclude native understory species. Additionally, plant pathogens in the genus *Phytophthora*, including sudden oak death (*Phytophthora ramorum*) and *Phytophthora tentaculata*, pose a threat to native plant species. Sudden oak death is a forest disease that results in widespread dieback of oak trees in California and Oregon forests. Sudden oak death has been documented in many trees in Santa Cruz County, including one tree within the LRDP area (California Oak Mortality Task Force 2019).

Environmentally Sensitive Habitat Areas

The Coastal Act defines ESHAs as "[a]ny area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could easily be disturbed or degraded by human activities and developments." Therefore, to designate an ESHA, the following three elements must be evaluated:

- presence of species or habitats that are rare, or
- presence of species or habitats that are valuable, and
- sensitivity of species or habitat to human disturbance or degradation.

Portions of the LRDP area fall within the coastal zone, including the Westside Research Park and the area west of Empire Grade within the Main Residential Campus. Some habitats in these areas, including Mima mound wetlands within coastal prairie habitat and northern maritime chaparral habitat, may qualify as ESHAs. CCC considers species and habitats meeting the definitions of rare or especially valuable to be vulnerable to human disturbance or degradation because of historic losses and adverse effects of urbanization in coastal California. The CCA restricts development in ESHAs to only those uses dependent on the resource (e.g., hiking, educational signs and kiosks, research, and restoration), requires protection of ESHAs against any significant disruption of habitat values, and requires that development adjacent to ESHAs be designed to avoid degradation of the ESHAs and be compatible with continuance of habitat and recreation areas. Development setbacks are required and vary depending on the resource and type and intensity of disturbance but are commonly between 50 and 300 feet.

3.5.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Thresholds of significance are based on Appendix G of the State CEQA Guidelines. LRDP implementation would result in a significant impact on biological resources if it would:

- have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS;
- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS;
- have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

ANALYSIS METHODOLOGY

This impact evaluation is based on review of existing databases that address biological resources in the vicinity of the LRDP area, aerial photographs, and reports regarding biological resource surveys in the LRDP area, as described above. The impact evaluation focuses on the potential for impacts on special-status species, sensitive natural communities, state or federally protected wetlands, migratory wildlife corridors or native wildlife nursery sites, and conflict with local policies, ordinances, or habitat conservation plans.

It is assumed that approximately 223 acres of natural vegetation communities (i.e., excluding urban/developed areas) and approximately 155 acres of urban/developed areas could be developed/redeveloped within the LRDP area as a result of 2021 LRDP implementation (Table 3.5-4). The acreages presented in Table 3.5-4 were derived by overlaying envisioned development areas and the vegetation communities in the LRDP area, as shown in Figure 3.5-6. Table 3.5-4 also identifies the relative percentage of potential impact acreage (by vegetation community) compared to total acreage of each vegetation community (as shown in Table 3.5-1) within the LRDP area that could be affected by 2021 LRDP implementation. Because the envisioned development areas represent overall land use categories and because not all of the envisioned development acreage would likely be developed as part of 2021 LRDP implementation, the impact acreages identified in Table 3.5-4 are considered to be conservative.

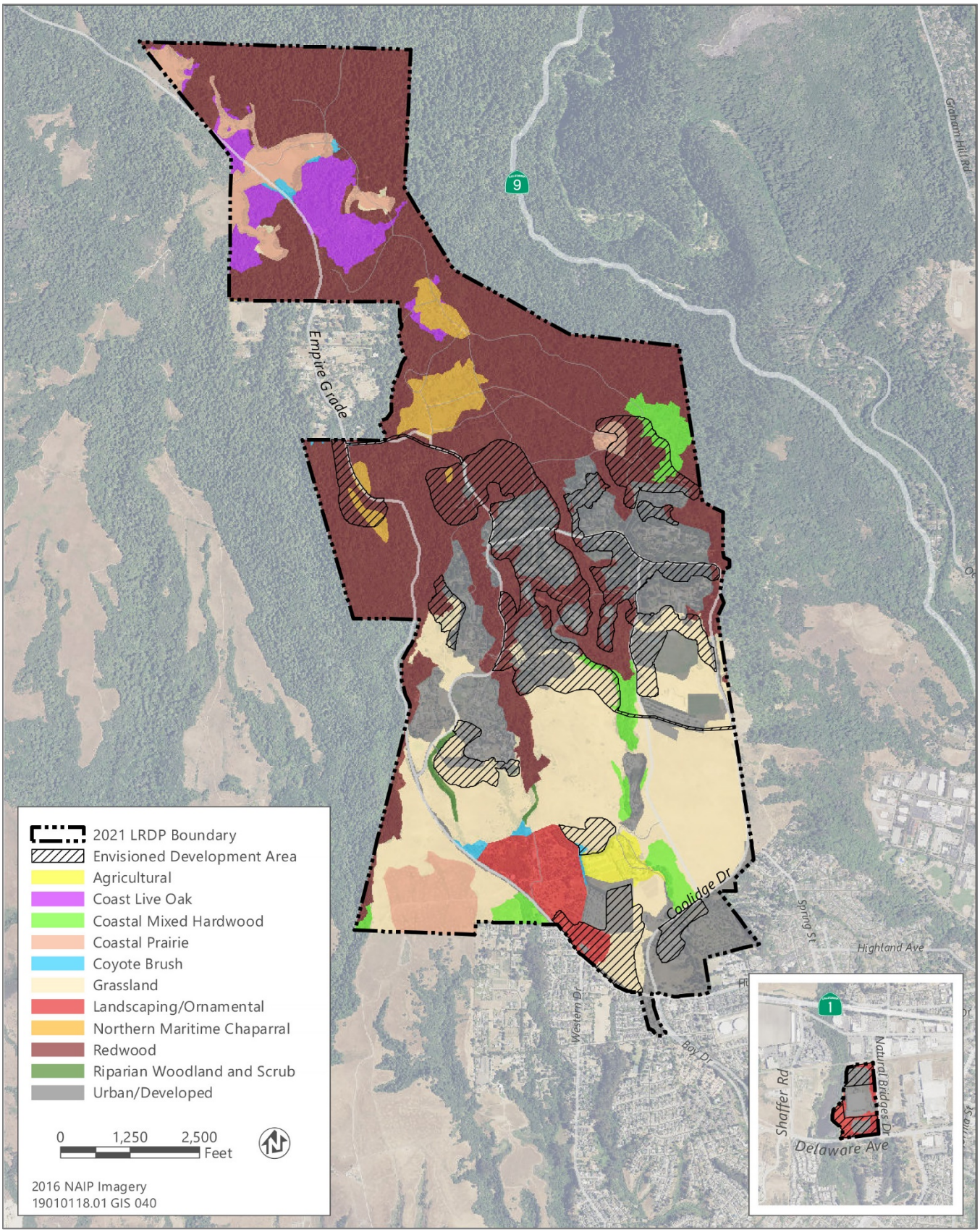
Due to the programmatic nature of this impact evaluation and the fact that focused surveys of future development sites under the 2021 LRDP would be required to verify habitat conditions in subsequent years during implementation of the 2021 LRDP, the envisioned impact acreages for each vegetation community are used as a proxy to assess potential impacts and the magnitude of impacts on wildlife and plant species associated with these communities. Vegetation community associations are provided for each special-status species or group of species (e.g., special-status plants) in this impact evaluation. Additional habitat assessments are provided for two special-status wildlife species: California tiger salamander and Ohlone tiger beetle.

Table 3.5-4 Impact Acreage for Natural Vegetation Communities and Urban/Developed Areas in the LRDP Area from Implementation of the 2021 LRDP

Vegetation Community	Impact Acreage	Impact Acreage as Percent of Total Vegetation Community Acreage within LRDP Area
Redwood	119.1	14%
Grassland	67.9	17%
Landscaping/Ornamental	15.7	25%
Coastal Mixed Hardwood	9.2	15%
Northern Maritime Chaparral	5.6	10%
Coastal Prairie	4.3	4%
Coyote Brush	0.5	7%
Agricultural	0.4	2%
Riparian Woodland and Scrub	0.1	2%
Total Natural Vegetation Community Impact Acreage	**222.8**	–
Urban/Developed	155.2	38%
Total Impact Acreage	**378**	–

Note: Table excludes urban/developed land cover type

Source: Data compiled by Ascent Environmental in 2020



Source: data downloaded from the Bay Area Open Space Council in 2019; adapted by Ascent Environmental in 2020

Figure 3.5-6 Envisioned Development Areas Overlay on Vegetation Communities in the LRDP Area

IMPACTS AND MITIGATION MEASURES

Impact 3.5-1: Result in Disturbance or Loss of Special-Status Plant Species

Potential land use conversion and development as part of implementation of the 2021 LRDP could result in disturbance to or loss of several special-status plant species if they are present. Additionally, development under the 2021 LRDP could result in introduction or spread of invasive plants during vegetation removal or ground disturbance, which could result in exclusion of special-status plants. Because the loss of special-status plants could substantially affect the abundance, distribution, and viability of local and regional populations of these species, this would be a **potentially significant** impact.

Table 3.5-2 provides a list of the special-status plant species that may occur or are known to occur within the LRDP area. Seven special-status plant species are known to occur within the LRDP area: Santa Cruz manzanita, deceiving sedge (*Carex saliniformis*), Point Reyes horkelia (*Horkelia marinensis*), marsh microseris (*Microseris paludosa*), San Francisco popcornflower (*Plagiobothrys diffusus*), Santa Cruz clover (*Trifolium buckwestiorum*), and Pacific Grove clover (*Trifolium polyodon*) (CNDDB 2020, CNPS 2020, Neubauer 2013, UC Santa Cruz 2005a). Twenty-eight additional special-status species may occur within the LRDP area:

- Blasdale's bent grass (*Agrostis blasdalei*)
- Bent-flowered fiddleneck (*Amsinckia lunaris*)
- Santa Cruz Mountains pussypaws (*Calyptridium parryi* var. *hesseae*)
- Bristly sedge (*Carex comosa*)
- Monterey spineflower (*Chorizanthe pungens* var. *pungens*)
- Scotts Valley spineflower (*Chorizanthe robusta* var. *hartwegii*)
- Robust spineflower (*Chorizanthe robusta* var. *robusta*)
- San Francisco collinsia (*Collinsia multicolor*)
- Tear drop moss (*Dacryophyllum falcifolium*)
- Minute pocket moss (*Fissidens pauperculus*)
- Vaginulate grimmia (*Grimmia vaginulata*)
- Short-leaved evax (*Hesperevax sparsiflora* var. *brevifolia*)
- Santa Cruz cypress
- Butano Ridge cypress (*Hesperocyparis abramsiana* var. *butanoensis*)
- Santa Cruz tarplant (*Holocarpha macradenia*)
- Arcuate bush-mallow (*Malacothamnus arcuatus*)
- Mt. Diablo cottonweed (*Micropus amphiboles*)
- Northern curly-leaved monardella (*Monardella sinuata* ssp. *nigrescens*)
- Woodland woollythreads (*Monolopia gracilens*)
- Kellman's bristle moss (*Orthotrichum kellmanii*)
- Dudley's lousewort (*Pedicularis dudleyi*)
- Santa Cruz Mountains beardtongue (*Penstemon rattanii* var. *kleei*)
- White-rayed pentachaeta (*Pentachaeta bellidiflora*)
- Monterey pine (*Pinus radiata*)
- White-flowered rein orchid (*Piperia candida*)
- Choris' popcornflower (*Plagiobothrys chorisianus* var. *chorisianus*)
- San Francisco campion (*Silene verecunda* ssp. *verecunda*)
- Santa Cruz microseris (*Stebbinsoseris decipiens*)

Implementation of the 2021 LRDP would result in development of approximately 378 acres of land within the LRDP area, approximately 38 percent of which would occur within urban/developed land cover types (Table 3.5-4, Figure 3.5-6). Although it is possible that some special-status plants could occur within certain previously developed areas (e.g., areas with ruderal grassland), these species are primarily associated with natural vegetation communities, including coastal prairie, woodland, forest, grassland, chaparral, and wetlands (Table 3.5-2). Most of the known occurrences of special-status plant species within the LRDP area are located in north campus within the Marshall Fields complex, where no development is proposed (Table 3.5-2). Additionally, planned development would occur

within approximately 16 acres of landscaping/ornamental habitat and approximately 0.4 acre of agricultural habitat, which would provide only marginal habitat for special-status plant species (Table 3.5-4). Because a large proportion of planned development would occur within areas where special-status plants are unlikely to occur, much of the anticipated development under the 2021 LRDP would not result in adverse effects on these species or special-status plant habitat.

As presented in Table 3.5-4 and Figure 3.5-6, some of the proposed development under the 2021 LRDP would occur within natural vegetation communities where special-status plants could potentially occur, including redwood, grassland, coastal mixed hardwood, northern maritime chaparral, coastal prairie, coyote brush, and riparian woodland and scrub. Implementation of projects under the 2021 LRDP may include ground disturbance, vegetation removal, and conversion of habitat within these natural vegetation communities. As a result, direct loss of special-status plants or indirect damage could occur through trampling or damage to root systems of these species, if present. Additionally, implementation of projects under the 2021 LRDP could result in inadvertent introduction or spread of nonnative plants which could result in adverse effects to special-status plants and special-status plant habitats through competition or degradation of habitat. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a: Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

During the early planning stages of projects under the 2021 LRDP, the following measure shall apply:

- A data review and biological reconnaissance survey will be conducted within a particular project site by a qualified biologist prior to project activities (e.g., ground disturbance, vegetation removal, staging, construction) and will be conducted no more than one year prior to project implementation. The qualified biologist must be familiar with the life histories and ecology of species in Santa Cruz County and must have experience conducting field surveys of relevant species or resources, including protocol-level surveys for individual species, if applicable. The data reviewed will include the biological resources setting, species tables, and habitat information in this EIR. It will also include review of the best available, current data for the area, including vegetation mapping data, species distribution/range information, CNDDB, CNPS Inventory of Rare and Endangered Plants of California, consultation with appropriate campus experts (e.g. Campus Natural Reserve Manager) to obtain information on biological resources that may not be captured in other databases, relevant Biogeographic Information and Observation System (BIOS) queries, and relevant general and regional plans. BIOS is a web-based system that enables the management and visualization of biogeographic data collected by CDFW and partner organizations. The qualified biologist will assess the habitat suitability of the project site for all special-status plant and wildlife species as well as sensitive habitats identified as having potential to occur in the LRDP area (refer to Section 3.5.2, "Environmental Setting"), and will identify any wildlife nursery sites (e.g., heron rookeries, bat maternity roosts, monarch butterfly overwintering colonies, deer fawning areas) within the LRDP area and potential ESHAs within project sites that fall within the coastal zone. The qualified biologist will also conduct a preliminary delineation of sensitive habitats (e.g., wetlands, streams, seeps, sensitive natural communities, ESHAs) within the project site. The biologist will provide a report to UC Santa Cruz with evidence to support a conclusion as to whether special-status species and sensitive habitats are present or are likely to occur within the project site.
- If the reconnaissance survey identifies no potential for special-status plant, wildlife species, or sensitive habitats to occur, UC Santa Cruz will not be required to apply any additional mitigation measures under Impact 3.5-1 through 3.5-4.
- If the qualified biologist determines that there is potential for special-status species or sensitive habitats to be present within the project site, the appropriate biological mitigation measures, identified herein shall be implemented.

Mitigation Measure 3.5-1b: Conduct Special-Status Plant Surveys and Implement Avoidance Measures and Mitigation

If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for special-status plant species is present within a particular project site, the following measures shall be implemented:

- Prior to implementation of project activities and during the blooming period for the special-status plant species with potential to occur in a particular project site, as determined during implementation of Mitigation Measure 3.5-1a, a qualified botanist will conduct protocol-level surveys for special-status plants within the project site following survey methods from CDFW's *Protocols for Surveying and Evaluating Impacts on Special-Status Native Plant Populations and Natural Communities* (CDFW 2018 or most recent version). The qualified botanist will: 1) be knowledgeable about plant taxonomy, 2) be familiar with plants of the Santa Cruz region, including special-status plants and sensitive natural communities, 3) have experience conducting floristic botanical field surveys as described in CDFW 2018, 4) be familiar with the *California Manual of Vegetation* (Sawyer et al. 2009 or current version, including updated natural communities data at http://vegetation.cnps.org/), and 5) be familiar with federal and state statutes and regulations related to plants and plant collecting.
- If special-status plants are not found, the botanist will document the findings in a report to UC Santa Cruz, and no further mitigation will be required.
- If special-status plant species are found, the plant will be avoided completely, if feasible (i.e., project objectives can still be met). This may include establishing a no-disturbance buffer around the plants and demarcation of this buffer by a qualified biologist or botanist using flagging or high-visibility construction fencing. The size of the buffer will be determined by the qualified biologist or botanist and will be large enough to avoid direct or indirect impacts on the plant.

Table MM3.5-1 Normal Blooming Period for Special-Status Plants That are Known to Occur or May Occur within the LRDP area

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Blasdale's bent grass					X	X	X					
Bent-flowered fiddleneck			X	X	X	X						
Santa Cruz manzanita	X	X	X	X	X						X	X
Santa Cruz Mountains pussypaws					X	X	X	X				
Bristly sedge					X	X	X	X	X	X	X	X
Deceiving sedge						X						
Monterey spineflower				X	X	X						
Scott's Valley spineflower				X	X	X	X					
Robust spineflower				X	X	X	X	X	X			
San Francisco collinsia			X	X	X							
Minute pocket moss[1]	–	–	–	–	–	–	–	–	–	–	–	–
Short-leaved evax			X	X	X	X						
Santa Cruz cypress[1]	–	–	–	–	–	–	–	–	–	–	–	–
Butano Ridge cypress[1]	–	–	–	–	–	–	–	–	–	–	–	–
Santa Cruz tarplant						X	X	X	X	X		
Point Reyes horkelia					X	X	X	X	X			
Arcuate bush-mallow				X	X	X	X	X	X			
Mt. Diablo cottonweed			X	X	X							
Marsh microseris				X	X	X						
Northern curly-leaved monardella					X	X	X					
Woodland woolythreads			X	X	X	X	X					

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Kellman's bristle moss	X	X										
Dudley's lousewort				X	X	X						
Santa Cruz Mountains beardtongue					X	X						
White-rayed pentachaeta			X	X	X							
Monterey pine[1]	–	–	–	–	–	–	–	–	–	–	–	–
White-flowered rein orchid					X	X	X	X	X			
Choris' popcornflower			X	X	X	X						
San Francisco popcornflower			X	X	X	X						
San Francisco campion			X	X	X	X						
Santa Cruz microseris				X	X							
Santa Cruz clover				X	X	X	X	X	X	X		
Pacific Grove clover				X	X	X						

[1] Non-blooming bryophyte or gymnosperm species

Source: Data compiled by Ascent Environmental in 2020; CNPS 2020

- If special-status plants are found during special-status plant surveys and cannot be avoided, UC Santa Cruz shall, in consultation with CDFW or USFWS as appropriate depending on the particular species, develop and implement a site-specific mitigation strategy to achieve no net loss of occupied habitat or individuals. Mitigation measures shall include, at a minimum, preserving and enhancing existing populations, establishing populations through seed collection or transplantation from the site that is to be affected, and/or restoring or creating habitat in sufficient quantities to achieve no net loss of occupied habitat or individuals. Potential mitigation sites could include suitable locations within or outside of the LRDP area, with a preference for on-site mitigation. Habitat and individual plants lost shall be mitigated at a minimum 1:1 ratio, considering acreage as well as function and value. Success criteria for preserved and compensatory populations will include:
  - The extent of occupied area and plant density (number of plants per unit area) in compensatory populations will be equal to or greater than the affected occupied habitat.
  - Compensatory and preserved populations will be self-producing. Populations will be considered self-producing when:
    - plants reestablish annually for a minimum of five years with no human intervention such as supplemental seeding; and
    - reestablished and preserved habitats contain an occupied area and flower density comparable to existing occupied habitat areas in similar habitat types in the project vicinity.
    - If off-site mitigation includes dedication of conservation easements, purchase of mitigation credits, or other off-site conservation measures, the details of these measures will be included in the mitigation plan, including information on responsible parties for long-term management, conservation easement holders, long-term management requirements, success criteria such as those listed above and other details, as appropriate to target the preservation of long term viable populations.

Mitigation Measure 3.5-1c: Implement Measures to Avoid Introduction or Spread of Invasive Plant Species and Plant Pathogens

The following measures shall be implemented prior to vegetation removal and ground disturbance activities to avoid the introduction or spread of plants classified as invasive plant species by the California Invasive Plant Council and plant pathogens including Sudden Oak Death:

- UC Santa Cruz shall develop educational information (e.g., brochures, pamphlets) regarding invasive plants and Sudden Oak Death, the implication of the spread of invasive plants and plant pathogens, and proper sanitation practices to prevent the spread of invasive plants and plant pathogens. Construction crews and crews conducting vegetation removal will be provided with this information and instruction from a qualified professional (e.g., arborist, biologist) prior to working in infested or potentially infested areas and will be required to abide by the sanitation practices therein.
- Prior to work within areas with species susceptible to Sudden Oak Death, UC Santa Cruz shall retain a qualified professional (e.g., arborist, biologist) who will assess the risk of project activities and will identify and implement measures to reduce or avoid the risk of pathogen spread, including quarantine areas and proper measures for disposal of infested materials (e.g., branches, split wood, wood chips).
- Sanitation and prevention measures implemented by UC Santa Cruz or by contractors as specified in contract specifications to reduce or avoid the risk of pathogen spread or proliferation of invasive plant species shall include, but not be limited to, the following and will be further developed and updated based on the best available science and project-specific conditions:
  - Crews that will be working in infested or potentially infested areas will be provided with or required to carry sanitation kits. Sanitation kits will contain the following: Chlorine bleach [10/90 mixture bleach to water] or Clorox Clean-up or Lysol, scrub brush, metal scraper, boot brush, and plastic gloves.
  - Shoes, pruning gear, and other equipment will be sanitized using the above-mentioned materials before and after working in areas with species susceptible to Sudden Oak Death.
  - Clothing, footwear, and equipment used during project activities will be cleaned of soil, seeds, vegetation, or other debris or seed-bearing material before entering the project site or when leaving an area with infestations of invasive plants and noxious weeds.
  - Heavy equipment and other machinery used in areas with infestations of invasive plant species or Sudden Oak Death will be inspected for the presence of invasive species before use on the project site and will be cleaned before entering the site, to reduce the risk of introducing invasive plant species or plant pathogens.
  - Equipment will be staged in areas free of invasive plant infestations.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a, 3.5-1b, and 3.5-1c would reduce significant impacts on special-status plants to a **less-than-significant** level by requiring reconnaissance-level surveys of projects under the 2021 LRDP to determine the likelihood of presence of special-status plants, protocol-level surveys for special-status plants if determined to be likely to occur, implementation of avoidance measures and compensation for impacts on special-status plants, and avoidance of the introduction or spread of invasive plants and plant pathogens, like Sudden Oak Death.

Impact 3.5-2: Result in Disturbance to or Loss of Special-Status Wildlife Species and Habitat

Implementation of the 2021 LRDP would include land use conversion and development activities including ground disturbance, vegetation removal, and overall conversion of wildlife habitat, which could result in disturbance, injury, or mortality of several special-status wildlife species if present, reduced breeding productivity of these species, and loss of species habitat. This would be a **potentially significant** impact.

Table 3.5-3 provides a list of the special-status wildlife species that may occur or are known to occur within the LRDP area. Nineteen special-status wildlife species have been previously documented in the LRDP area: California giant salamander (*Dicamptodon ensatus*), California red-legged frog, foothill yellow-legged frog (*Rana boylii*), Santa Cruz black salamander (*Aneides niger*), southwestern pond turtle (*Actinemys pallida*), Bryant's savannah sparrow (*Passerculus sandwichensis alaudinus*), burrowing owl (*Athene cunicularia*), olive-sided flycatcher (*Contopus cooperi*), white-tailed kite (*Elanus leucurus*), Dolloff cave spider (*Meta dolloff*), Empire Cave amphipod (*Stygobromus imperialis*), Empire Cave pseudoscorpion (*Fissilicreagris imperialis*), MacKenzie's Cave amphipod (*Stygobromus mackenziei*),

monarch butterfly - California overwintering population (*Danaus plexippus* pop. 1), Santa Cruz telemid spider (*Telema* sp.), Ohlone tiger beetle, American badger (*Taxidea taxus*), mountain lion (*Puma concolor*), and San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), (Jones, pers. comm., 2020, CNDDB 2020, UC Santa Cruz 2005a, Santa Cruz Puma Project 2020). Sixteen additional special-status wildlife species may occur within the LRDP area:

- Coast horned lizard (*Phrynosoma blainvillii*)
- American peregrine falcon (*Falco peregrinus anatum*; breeding)
- Bald eagle (*Haliaeetus leucocephalus*; breeding)
- Black swift (*Cypseloides niger*)
- Golden eagle (*Aquila chrysaetos*; breeding)
- Loggerhead shrike (*Lanius ludovicianus*)
- Northern harrier (*Circus hudsonius*; breeding)
- Purple martin (*Progne subis*)
- Tricolored blackbird (*Agelaius tricolor*)
- Vaux's swift (*Chaetura vauxi*)
- Yellow warbler (*Setophaga petechia*)
- Yellow-breasted chat (*Icteria virens*)
- Pallid bat (*Antrozous pallidus*)
- Ringtail (*Bassariscus astustus*)
- Townsend's big-eared bat (*Corynorhinus townsendii*)
- Western red bat (*Lasiurus blossevillii*)

Implementation of the 2021 LRDP would result in development of approximately 378 acres of land within the LRDP area, approximately 41 percent of which would occur within urban/developed land cover types (Table 3.5-4, Figure 3.5-6). Although it is possible that some special-status wildlife species could occur within certain previously developed areas (e.g., nesting raptors within landscape trees, burrowing owls within ruderal grassland areas), these species are primarily associated with natural vegetation communities, including coastal prairie, woodland, forest, grassland, chaparral, streams, and wetlands (Table 3.5-3). Most of the known occurrences of special-status plant species within the LRDP area are located in north campus within the Marshall Fields complex, other portions of the Campus Natural Preserve, caves, grassland and coastal prairie habitat in lower campus, or in the UC Santa Cruz Arboretum and Botanic Garden, where little or no development is proposed (Table 3.5-3). Because a large proportion of planned development would occur within areas where special-status wildlife species are unlikely to occur, that majority of development within the envisioned development areas of the 2021 LRDP would not result in adverse effects on these species or special-status wildlife habitat.

As presented in Table 3.5-4 and Figure 3.5-6, some of the proposed development under the 2021 LRDP would occur within natural vegetation communities where special-status wildlife species could potentially occur, including redwood, grassland, coastal mixed hardwood, northern maritime chaparral, coastal prairie, coyote brush, and riparian woodland and scrub. Potential impacts on special-status wildlife species with potential to occur in the LRDP area are described below.

California Red-Legged Frog

California red-legged frog is listed as threatened under ESA and is a CDFW species of special concern. California red-legged frog occurs along the Coast Ranges from Mendocino County south to Los Angeles County, and in portions of the Sierra Nevada and Cascade Ranges (CDFW 2008). This species is most abundant within the inner Coast Ranges from Point Reyes, Marin County to southern Santa Barbara County, and within eastern Contra Costa and Alameda Counties (Thomson et al. 2016). Habitat suitable for California red-legged frog is typically characterized by aquatic breeding area (e.g., pools within streams and creeks, ponds, marshes, stock ponds) within a matrix of riparian and upland refugia and dispersal habitat (USFWS 2002b). Adult frogs are nearly always associated with permanent bodies of water (Amphibiaweb 2020). During rainy weather, California red-legged frogs may move overland through upland habitat; however, in general, the species is rarely observed far from water (USFWS 2002b).

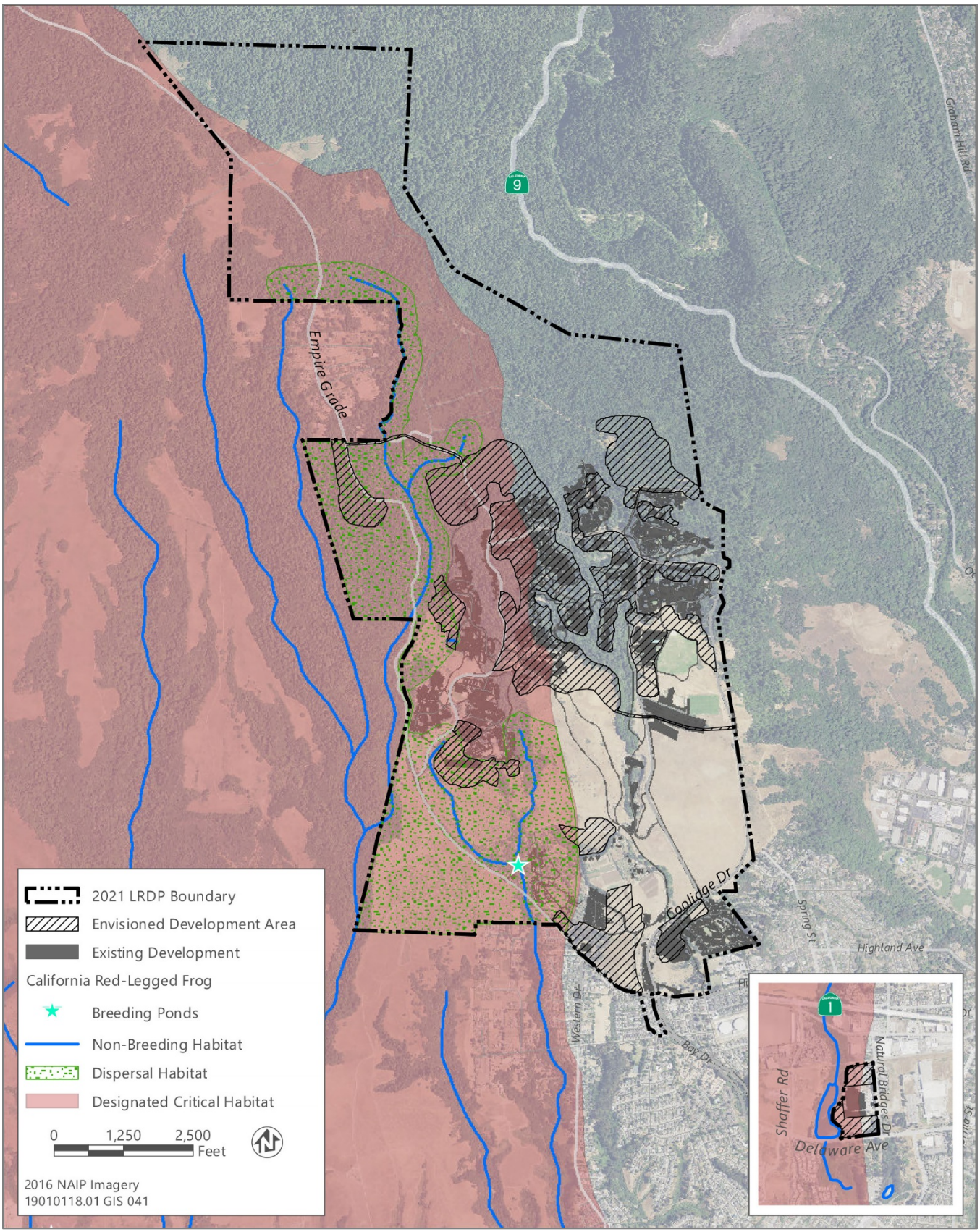
California red-legged frog is known to occur within numerous locations in the southwestern portion of the LRDP area (e.g., within Moore Creek), and is known to breed in the Arboretum Pond (Biosearch Environmental Consulting 2020, CNDDB 2020). No other breeding habitat is known within the LRDP area (Biosearch Environmental Consulting 2020). There are several known occurrences of California red-legged frog within 1 mile of the LRDP area, and the nearest

breeding pond outside of the LRDP area is in Upper Dairy Gulch at the Wilder Sand Quarry, approximately 1.2 miles southwest of the LRDP area (Biosearch Environmental Consulting 2020).

Adult and juvenile California red-legged frog are known to travel through upland habitat (e.g., riparian, woodland, grassland) to move between breeding and nonbreeding sites (e.g., other ponds, deep pools in streams, moist and cool riparian understory, burrows) for access to upland refugia and foraging habitat, or to disperse to new breeding locations. The LRDP area contains upland refugia and dispersal habitat potentially suitable for the species within grasslands, coastal prairie, redwood forest, coastal mixed hardwood, coast oak woodland, northern maritime and shrub, riparian woodland and scrub, and some urban/developed and landscaped areas that contain ruderal grassland (Biosearch Environmental Consulting 2020). Additionally, the LRDP area contains approximately 970 acres of federally designated critical habitat for California red-legged frog (Figure 3.5-4).

Studies have demonstrated that California red-legged frogs remain very close to breeding ponds during the nonbreeding season and typically do not move more than approximately 500 feet into upland refugia habitats (Bulger et al. 2003; Fellers and Kleeman 2007). All known California red-legged frog observations on the UC Santa Cruz campus have been within 300 feet of aquatic habitats (Biosearch Environmental Consulting 2020). However, during migration to other suitable ponds in the region, California red-legged frogs may disperse long distances from aquatic habitat (i.e., greater than 1,600 feet) and typically travel in straight lines irrespective of vegetation types and have been documented to move over 1.7 miles between aquatic habitat sites (Bulger et al. 2003). California red-legged frogs breeding within the Arboretum Pond are expected to migrate to aquatic habitat suitable for the species within and outside of the LRDP area because the Arboretum Pond is not perennial (Biosearch Environmental Consulting 2020). California red-legged frog migratory and dispersal movements from the Arboretum Pond to other aquatic habitats are expected to be primarily along Moore Creek both upstream and downstream, and overland to the southwest, west or northwest to aquatic habitats in the Wilder Creek watershed (Biosearch Environmental Consulting 2020, Figure 3.5-7). Movements to the east of the Arboretum pond are not as likely to occur due to the lack of aquatic habitat suitable for California red-legged frog in Jordan Gulch, the City of Santa Cruz, and the lower San Lorenzo River watershed, and the presence of developed areas which would likely impede movement (Biosearch Environmental Consulting 2020, Figure 3.5-7). Additionally, developed areas of the UC Santa Cruz campus contain numerous potential barriers to overland movements (e.g., buildings, retaining walls, decorative walls, parking lots, roads, paths), and while frogs may be able to cross roads, paths, and parking lots, the cumulative barriers and hazards presented by developed areas reduce the likelihood that California red-legged frogs would be present within these areas (Biosearch Environmental Consulting 2020).

Development of new land uses (e.g., buildings, impervious surfaces) under the 2021 LRDP is not planned within the UC Santa Cruz Arboretum and Botanic Garden, or within 500 feet of the Arboretum Pond, so project implementation is not expected to result in loss of breeding habitat for California red-legged frogs or impacts on individual California red-legged frogs while breeding in the Arboretum Pond. However, 2021 LRDP development is planned within grassland, redwood, and northern maritime chaparral habitats north and northwest of the Arboretum Pond near Empire Grade in lower and central campus, in areas that are likely used by California red-legged frogs for upland migration, dispersal, and refuge (Figure 3.5-6, Figure 3.5-7). Implementation of projects under the 2021 LRDP would include ground disturbance, vegetation removal, and land development in several habitats that may provide upland refugia and dispersal habitat suitable for California red-legged frog as described above (Table 3.5-4). These activities could result in loss of or injury to California red-legged frogs if present within upland refugia or dispersal habitat within the project site, as well as loss of habitat for the species. This would be a **potentially significant** impact.



Source: Data received from Biosearch Environmental Consulting in 2020

Figure 3.5-7 Envisioned Development Areas Overlay of California Red-Legged Frog Potential Sensitive Habitat in the LRDP Area

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2a: Conduct Site-Specific Habitat Suitability Analysis for California Red-Legged Frog, Obtain Incidental Take Authorization through Consultation with USFWS, Implement Minimization Measures

If it is determined through implementation of Mitigation Measure 3.5-1a that aquatic or upland habitat determined to be suitable for California red-legged frog migration, dispersal, foraging, or refuge is present within a particular project site, the following measures shall be implemented during the planning stages for each individual project under the 2021 LRDP:

- A qualified biologist will conduct a site-specific habitat suitability verification analysis to confirm the likelihood of the species to be present. To be qualified, the biologist will: 1) be knowledgeable in California red-legged frog life history and ecology, 2) be able to correctly identify California red-legged frogs and habitats, 3) have experience conducting field surveys of relevant resources, 4) be knowledgeable about state and federal laws regarding the protection of special-status species, and 5) have experience using CDFW's CNDDB. The habitat assessment will include, but will not be limited to:
  - Identification or verification of the vegetation communities present in the project site.
  - Consideration of known occurrences within the LRDP area;
  - Description of the project, including proposed project construction activities;
  - Analysis of the type and likelihood of impacts on California red-legged frog as a result of project implementation; and
  - Potential project modifications or additional measures that may avoid and minimize mortality, injury, and disturbance of California red-legged frog and habitat.
- Results of the site-specific habitat suitability verification analysis will be submitted to UC Santa Cruz for review and consideration.
- Based on the results of the site-specific habitat suitability verification analysis, a qualified biologist will determine if any of the following would occur: injury or mortality of California red-legged frog; or disturbance of individuals or adverse effects on California red-legged frog breeding, upland refugia, or dispersal habitat.
  - If a qualified biologist determines that the individual project would have no substantial adverse effect on red-legged frog or its habitat and would not result in any injury or mortality, implementation of that individual project may proceed.
  - For those areas where adverse modification of critical habitat or disturbance, injury, or mortality of California red-legged frog cannot be avoided, UC Santa Cruz shall, in consultation with USFWS, implement impact minimization for construction-related impacts (e.g., installation of exclusion fencing around the project construction site) and compensatory actions for habitat impacts, including purchase of credits at a conservation bank or creation of additional habitat at a minimum 1:1 mitigation ratio, as well as adaptive management[1] strategies to ensure long-term conservation of mitigation lands. No actions that could adversely affect California red-legged frog will be allowed if adverse effects would result, unless consultation with USFWS is completed and additional measures are implemented.

[1] Adaptive management is defined as "…a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders" (Department of the Interior 2009).

To the extent the project may result in "take" of the species, UC Santa Cruz shall pursue incidental take coverage by either pursuing consultation and biological opinion under Section 7 of the federal ESA (where there is some federal nexus) or by developing an HCP, which would require authorization by USFWS under Section 10 of the ESA. Such an HCP could provide long-term conservation and incidental take coverage for species listed under ESA with potential to occur in the LRDP area: California red-legged frog and Ohlone tiger beetle. Typically, HCPs include the following:

- Measures that UC Santa Cruz will undertake to monitor, minimize, and mitigate for such impacts, the funding available to implement such measures, and the procedures to deal with unforeseen or extraordinary circumstances.
- Alternative actions to the taking analyzed by UC Santa Cruz, and the reasons why the alternatives were not adopted.
- Biological goals and objectives, which would define the expected biological outcome for each species covered by the HCP.
- Adaptive management, which includes methods for addressing uncertainty and also monitoring and feedback to biological goals and objectives.
- Monitoring for compliance, effectiveness, and effects.
- Permit duration which is determined by the time-span of the project and designed to provide the time needed to achieve biological goals and address biological uncertainty.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a and 3.5-2a would reduce potential impacts on California red-legged frog to a **less than significant** level by requiring reconnaissance-level surveys for projects under the 2021 LRDP to determine the likelihood of presence of California red-legged frogs or aquatic or upland habitat suitable for the species, a site-specific habitat suitability verification analysis for projects within habitat suitable for the species, incidental take authorization and implementation of minimization and compensatory measures if impacts on California red-legged frogs are unavoidable, and/or development of a comprehensive HCP to cover future impacts on California red-legged frogs.

California Giant Salamander, Foothill Yellow-Legged Frog, Santa Cruz Black Salamander

California giant salamander and Santa Cruz black salamander are CDFW species of special concern, and the foothill yellow-legged frog west/central coast clade is listed as endangered under CESA. California giant salamander (Jones, pers. comm., 2020) and foothill yellow-legged frog (CNDDB 2020) have been observed within aquatic habitat in Cave Gulch and its tributaries, as well as upland wet forest habitat near aquatic features within the LRDP. Additionally, paedomorphic California giant salamanders, or salamanders that have retained juvenile or larval characteristics, have been observed within cave habitats in the LRDP area, including Empire Cave, and it is suspected that these individuals may represent a distinct subspecies (UC Santa Cruz 2005a). Santa Cruz black salamander has been observed within redwood habitat near intermittent drainages in the LRDP area (Jones, pers. comm., 2020, CNDDB 2020). Habitat potentially suitable for all of these species is present within or near aquatic habitat in the LRDP area and in associated upland areas (e.g., wet forests, under logs). Development under the 2021 LRDP is proposed within forested areas in upper and central campus and could occur within or adjacent to drainages or other wet areas that have not been mapped at a project level.

Implementation of projects under the 2021 LRDP may include ground disturbance, vegetation removal, and land development in natural vegetation communities potentially used by these species. These activities could result in loss of or injury to special-status amphibians if the species occur within the project site. Further, removal of habitat suitable for foothill yellow-legged frog would also be an adverse effect. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2b: Conduct Preconstruction Surveys for Special-Status Amphibians and Implement Avoidance Measures

If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for California giant salamander, foothill yellow-legged frog, or Santa Cruz black salamander is present within a particular project site, the following measures shall be implemented no more than 48 hours prior to commencement of project activities (e.g., vegetation removal, ground disturbance, staging) of a project under the 2021 LRDP:

- A qualified biologist familiar with the life cycle of California giant salamander, foothill yellow-legged frog, and Santa Cruz black salamander will conduct preconstruction surveys within the project site. Preconstruction surveys for special-status amphibian species will be conducted throughout the project site and a 400-foot buffer around the project site. Surveys will consist of "walk and turn" surveys of areas beneath surface objects (e.g., rocks, leaf litter, moss mats, coarse woody debris) for salamanders, and visual searches for frogs. Preconstruction surveys will be conducted within the appropriate season to maximize potential for observation for each species, and appropriate surveys will be conducted for the applicable life stages (i.e., eggs, larvae, adults).
- If special-status amphibians are not detected during the preconstruction survey, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and further mitigation will not be required.
- If special-status amphibians are detected during the preconstruction survey, UC Santa Cruz shall, in consultation with CDFW, develop and institute, at a minimum, project design modifications (e.g., specific building materials and surfacing requirements), relocation of individual animals, installation of exclusionary fencing, and/or other measures recommended by CDFW as necessary to ensure that no injury to or mortality of these species would occur.
- If "take" of foothill yellow-legged frog under CESA is unavoidable, UC Santa Cruz shall seek and obtain an incidental take permit from CDFW and implement any additional measures necessary to minimize, compensate for, and fully mitigate impacts on foothill yellow-legged frog. These additional measures shall include, at a minimum, some combination of the following measures: installation of exclusion fencing around project sites, purchase of credits at a conservation bank, creation of additional habitat, and/or adaptive management strategies.

Mitigation Measure 3.10-5a: Implement Procedures for Building on Karst Where Groundwater Is Encountered and Where Pressure Grouting Is Required

(Refer to Section 3.10, "Hydrology and Water Quality")

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a, 3.5-2b, and 3.10-5a would reduce potential impacts on California giant salamander, foothill yellow-legged frog, and Santa Cruz black salamander to a **less than significant** level by requiring reconnaissance-level surveys for projects under the 2021 LRDP to determine the likelihood of presence of these species, focused surveys for these species if determined to be likely to occur, implementation of measures to avoid injury or mortality of the species if detected, incidental take authorization and providing habitat compensation to fully mitigate impacts on foothill yellow-legged frog (a listed species under CESA) if they are unavoidable, and implementation of measures to reduce impacts on karst cave ecosystems where paedomorphic California giant salamanders are known to occur.

Southwestern Pond Turtle

Southwestern pond turtle is a CDFW species of special concern. This species can be found in many different aquatic habitats, including ponds (natural or human-made), marshes, rivers, and irrigation ditches. Southwestern pond turtle uses upland habitat for basking and egg-laying. Upland habitat may include grasslands, scrub, or woodland habitats. Southwestern pond turtles are known to travel into uplands up to 0.3 mile (approximately 1,600 feet) from aquatic habitat (Reese and Welsh 1997). Southwestern pond turtles have been observed within the Arboretum Pond in the LRDP area (CNDDB 2020). The additional aquatic resources within the LRDP area (e.g., perennial and intermittent streams, Wilder Creek) also provide potential habitat for this species.

Development (e.g., buildings, impervious surfaces) under the 2021 LRDP is not planned within the UC Santa Cruz Arboretum and Botanic Garden, or within 500 feet of the Arboretum Pond, so project implementation is not expected to adversely affect southwestern pond turtles that may be present in or near the Arboretum Pond or result in loss of breeding habitat suitable for the species. However, implementation of projects under the 2021 LRDP may include ground disturbance, vegetation removal, and land development in grassland, coastal prairie, riparian, and forested areas adjacent and up to approximately 1,600 feet from streams and drainages that may provide upland habitat suitable for southwestern pond turtle (Table 3.5-4). Any reduction in upland habitat that would be potentially suitable for the species within the LRDP area is expected to be marginal (e.g., due to existing impediments to travel) and insubstantial; however, construction activities within approximately 1,600 feet of streams and drainages could result in loss of or injury to southwestern pond turtle if present within the project site. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2c: Conduct Preconstruction Surveys for Southwestern Pond Turtle, Implement Avoidance Measures, and Relocate Individuals

If it is determined through implementation of Mitigation Measure 3.5-1a that aquatic or upland habitat suitable for southwestern pond turtle is present or that southwestern pond turtle was otherwise determined to be historically present within a particular project site, the following measures shall be implemented no more than 48 hours prior to commencement of project activities (e.g., vegetation removal, ground disturbance, staging) of a project under the 2021 LRDP:

- A qualified biologist familiar with the life history of southwestern pond turtle and experienced in performing surveys for southwestern pond turtle will conduct a focused survey of habitat suitable for the species within the project site. If aquatic habitat potentially suitable for the species is present within a project site (e.g., streams, ponds, drainages), upland habitat within approximately 1,600 feet of this aquatic habitat will also be surveyed. The qualified biologist will inspect the project site for southwestern pond turtles as well as suitable burrow habitat.
- If southwestern pond turtles are not detected during the focused survey, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and further mitigation will not be required.
- If southwestern pond turtles are detected, a no-disturbance buffer of at least 100 feet will be established around any identified nest sites or overwintering sites. A qualified biologist with an appropriate CDFW Scientific Collecting Permit that allows handling of reptiles will be present during initial ground disturbance activities and will inspect the project site before initiation of project activities. If southwestern pond turtles are detected, the qualified biologist will move the turtles downstream and out of harm's way.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a and 3.5-2c would reduce potential impacts on southwestern pond turtle to a **less-than-significant** level by requiring reconnaissance-level surveys for projects under the 2021 LRDP to determine the likelihood of presence of the species, focused surveys for the species if determined to be likely to occur, implementation of measures to avoid injury or mortality of southwestern pond turtles if detected, and relocation of individual turtles by a qualified biologist with an appropriate CDFW Scientific Collecting Permit.

Coast Horned Lizard

Coast horned lizard is a CDFW species of special concern. Habitat suitable for this species typically contains some open areas with loose soil and scattered, low bushes for cover. Coast horned lizard has historically occurred on the UC Santa Cruz campus; however, the species has not been seen in recent years (Jones, pers. comm., 2020). Habitat potentially suitable for the species within the LRDP area includes northern maritime chaparral and coyote brush habitats (UC Santa Cruz 2016a). Proposed development within these vegetation communities would occur in north campus within northern maritime chaparral habitat along Empire Grade and Heller Drive and in lower campus within coyote brush habitat northeast of the UC Santa Cruz Arboretum and Botanic Garden (Figure 3.5-6). Proposed

development within northern maritime chaparral and coyote brush habitats accounts for approximately 2 percent of the total impact acreage in the LRDP area (Table 3.5-4).

Implementation of projects under the 2021 LRDP in the areas described above may include ground disturbance, vegetation removal, and land development in northern maritime chaparral and coyote brush habitats (Table 3.5-4). Although it is unlikely that coast horned lizard would be present within an individual project site because the species has not been detected in recent years, if present, these activities could result in loss of or injury to coast horned lizard. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2d: Conduct Preconstruction Surveys for Coast Horned Lizard, Implement Avoidance Measures, and Relocate Individuals

If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for coast horned lizard (e.g., chaparral, coyote brush) is present within a particular project site, the following measures shall be implemented no more than 48 hours prior to commencement of project activities (e.g., vegetation removal, ground disturbance, staging) of a particular project under the 2021 LRDP:

- A qualified biologist familiar with the life history of coast horned lizard and experienced in performing surveys for the species will conduct a focused visual survey of habitat suitable for the species within the project site, which will include walking linear transects of the project site.
- If coast horned lizards are not detected during the focused survey, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and further mitigation will not be required.
- If coast horned lizards are detected, a qualified biologist with an appropriate CDFW Scientific Collecting Permit that allows handling of reptiles will be present during initial ground disturbance activities and will inspect the project site before initiation of project activities. If coast horned lizards are detected, the qualified biologist will move the lizards into nearby habitat and out of harm's way.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a and 3.5-2d would reduce potential impacts on coast horned lizard to a **less-than-significant** level by requiring reconnaissance-level surveys for projects under the LRDP to determine the likelihood of presence of the species, focused visual surveys for the species if determined to be likely to occur, and relocation of individual lizards by a qualified biologist with an appropriate CDFW Scientific Collecting Permit, if detected.

Burrowing Owl

Burrowing owl is a CDFW species of special concern. Burrowing owls have been observed within coastal prairie and grassland habitat in the LRDP area (CNDDB 2020). Habitat suitable for burrowing owls is composed of grassland, including ruderal grassland and vacant lots, as well as shrubland where shrubs are sparse. Burrowing owls require habitat with sufficient burrows created by fossorial mammals, most commonly California ground squirrel (*Otospermophilus beecheyi*). The LRDP area contains grassland, coastal prairie, and chaparral habitat which may be suitable for this species, and several proposed development areas within central and lower campus overlap these vegetation communities (Figure 3.5-6)

Implementation of projects under the 2021 LRDP in areas that contain habitat suitable for burrowing owl may include ground disturbance, vegetation removal, and land development, including development on approximately 68 acres of grassland and 4 acres of coastal prairie habitat (Table 3.5-4). These activities could result in inadvertent disturbance, injury, or mortality of burrowing owl. If present, burrowing owls could be disturbed due to the presence of equipment and personnel and could be inadvertently injured or killed by heavy machinery or vehicles. Active burrows could be inadvertently crushed and destroyed, if present, potentially resulting in the loss of eggs or chicks. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2e: Conduct Protocol-Level Surveys for Burrowing Owl, Implement Avoidance Measures, and Compensate for Loss of Occupied Burrows

If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for burrowing owl is present within a project site, the following measures shall be implemented prior to and during construction of a particular project under the 2021 LRDP:

- A qualified biologist will conduct focused breeding and nonbreeding season surveys for burrowing owls in areas of habitat suitable for the species identified during the reconnaissance-level survey (e.g., ruderal grassland, successional grassland, scrub habitat with sparse shrub cover) on and within 1,500 feet of the project site. Surveys will be conducted before the start of project activities and in accordance with Appendix D of the *CDFW Staff Report on Burrowing Owl Mitigation* (CDFW 2012, or most current version) (CDFW Staff Report).
- If no occupied burrows are found, the qualified biologist will submit a report documenting the survey methods and results to UC Santa Cruz, and no further mitigation will be required.
- If an active burrow is found within 1,500 feet of pending construction activities that would occur during the nonbreeding season (September 1 through January 31), UC Santa Cruz shall establish and maintain a minimum protection buffer of 165 feet around the occupied burrow throughout construction. The protection buffer may be adjusted if, in consultation with CDFW, a qualified biologist determines that an alternative buffer will not disturb burrowing owl use of the burrow because of particular site features or other buffering measures. If occupied burrows are present that cannot be avoided or adequately protected with a no-disturbance buffer, a burrowing owl exclusion plan will be developed, as described in Appendix E of the CDFW Staff Report. Burrowing owls will not be excluded from occupied burrows until the project burrowing owl exclusion plan is approved by CDFW. The exclusion plan will include a compensatory habitat mitigation plan (see below).
- If an active burrow is found during the breeding season (February 1 through August 31), occupied burrows will not be disturbed and will be provided with a protective buffer at a minimum of 650 feet unless a qualified biologist verifies through noninvasive means that either: (1) the birds have not begun egg laying, or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. The size of the buffer may be adjusted depending on the time of year and level of disturbance as outlined in the CDFW Staff Report. The size of the buffer may be reduced if a broad-scale, long-term, monitoring program acceptable to CDFW is implemented so that burrowing owls are not adversely affected. Once the fledglings are capable of independent survival, the owls can be evicted and the burrow can be destroyed per the terms of a CDFW-approved burrowing owl exclusion plan developed in accordance with Appendix E of CDFW Staff Report.
- If burrowing owls are evicted from burrows and the burrows are destroyed by implementation of project activities, UC Santa Cruz will mitigate the loss of occupied habitat in accordance with guidance provided in the CDFW Staff Report, which states that permanent impacts on nesting, occupied and satellite burrows, and burrowing owl habitat (i.e., grassland habitat with suitable burrows) will be mitigated such that habitat acreage and number of burrows are replaced through permanent conservation of comparable or better habitat with similar vegetation communities and burrowing mammals (e.g., ground squirrels) present to provide for nesting, foraging, wintering, and dispersal. UC Santa Cruz will retain a qualified biologist to develop a burrowing owl mitigation and management plan that incorporates the following goals and standards:
    - Mitigation lands will be selected based on comparison of the habitat lost to the compensatory habitat, including type and structure of habitat, disturbance levels, potential for conflicts with humans, pets, and other wildlife, density of burrowing owls, and relative importance of the habitat to the species throughout its range.
    - If feasible, mitigation lands will be provided adjacent or proximate to the project site so that displaced owls can relocate with reduced risk of injury or mortality. Feasibility of providing mitigation adjacent or proximate

to the project site depends on availability of sufficient habitat to support displaced owls that may be preserved in perpetuity.

- If habitat suitable for burrowing owl is not available for conservation adjacent or proximate to the project site, mitigation lands can be secured off-site and will aim to consolidate and enlarge conservation areas outside of planned development areas and within foraging distance of other conservation lands. Mitigation may be also accomplished through purchase of mitigation credits at a CDFW-approved mitigation bank, if available. Alternative mitigation sites and acreages may also be determined in consultation with CDFW.
- If burrowing owl habitat mitigation is completed through permittee-responsible conservation lands, the mitigation plan will include mitigation objectives, site selection factors, site management roles and responsibilities, vegetation management goals, financial assurances and funding mechanisms, performance standards and success criteria, monitoring and reporting protocols, and adaptive management measures (e.g., measures required if performance standards and success criteria are not met). Success will be based on the number of adult burrowing owls and pairs using the site and if the numbers are maintained over time. Measures of success, as suggested in the CDFW Staff Report, will include site tenacity, number of adult owls present and reproducing, colonization by burrowing owls from elsewhere, changes in distribution, and trends in stressors.

Significance after Mitigation

While burrowing owls are unlikely to occur in much of the LRDP area, implementation of Mitigation Measures 3.5-1a and 3.5-2e would reduce potential impacts on burrowing owl to a **less-than-significant** level by requiring reconnaissance or protocol-level surveys for individual projects under the 2021 LRDP to confirm whether the species may occur and, if so, implementation of measures to avoid injury or mortality of burrowing owls and destruction of active burrows if detected, and compensation if burrows cannot be avoided.

American Peregrine Falcon, Bald Eagle, Black Swift, Bryant's Savannah Sparrow, Golden Eagle, Loggerhead Shrike, Northern Harrier, Olive-Sided Flycatcher, Purple Martin, Tricolored Blackbird, Vaux's Swift, White-Tailed Kite, Yellow Warbler, Yellow-Breasted Chat, and Other Native Nesting Birds

Fourteen special-status bird species are known to or are likely to occur in the LRDP area. Of these bird species, American peregrine falcon, bald eagle, golden eagle, and white-tailed kite are fully protected under California Fish and Game Code. Bald eagles are also listed as endangered under CESA, and both bald and golden eagles are also protected under the Bald and Golden Eagle Protection Act. Tricolored blackbird is listed as threatened under CESA. Bryant's savannah sparrow, loggerhead shrike, northern harrier, olive-sided flycatcher, purple martin, Vaux's swift, yellow warbler, and yellow-breasted chat are CDFW species of special concern. Additionally, other raptor species (e.g., Cooper's hawk [*Accipiter cooperi*], red-tailed hawk [*Buteo jamaicensis*], red-shouldered hawk [*Buteo lineatus*]) and other native nesting birds are known to nest within the LRDP area, and these species and their nests are protected under California Fish and Game Code.

While black swift may forage within the LRDP area, there is no suitable nesting habitat in the LRDP area (e.g., ocean-facing ledges). Implementation of the 2021 LRDP would not result in significant loss of foraging habitat or a substantial change in the character of the foraging habitat within the LRDP area. Because 2021 LRDP implementation would not result in direct loss of black swifts or nests because nesting habitat is not present in the LRDP area, this species is not discussed further.

The 13 special-status bird species that could nest in the LRDP area could nest in a variety of different habitats. American peregrine falcon may nest on human-made structures (e.g., buildings) or ledges, if present within the LRDP area. Nesting habitat potentially suitable for bald eagle, golden eagle, olive-sided flycatcher, purple martin, Vaux's swift, and white-tailed kite is present within trees in forested areas of the LRDP area (e.g., redwood, coastal mixed hardwood, coast live oak, UC Santa Cruz Arboretum and Botanic Garden). Olive-sided flycatcher and white-tailed kite have been documented nesting within the LRDP area (Jones, pers. comm., 2020, CNDDB 2020). Loggerhead shrikes nest within shrub habitat and could use northern maritime chaparral habitat or coyote brush habitat within the LRDP

area. Bryant's savannah sparrow has been observed nesting and breeding within IAA, Great Meadow, and East Meadow (Jones, pers. comm., 2020), and northern harrier nests within grassland habitat, which is present throughout the LRDP area. Yellow warbler, yellow-breasted chat, and tricolored blackbird are associated with streams, ponds, or other wet areas, and could nest within riparian habitat or emergent vegetation in the LRDP area.

Common native raptors and other birds could nest within habitat throughout the LRDP area, including forest habitat, shrub habitat, and grassland habitat. Although special-status birds and common raptors and other native birds often nest within habitat in natural vegetation communities, many common birds that build stick nests (e.g., mourning dove [*Zenaida macroura*], house finch [*Haemorhous mexicanus*]) often select nest sites on human-made structures. These species, and others, often utilize ledges, eaves, crevices, and nooks on buildings. Bird species, like barn swallows (*Hirundo rustica*) and cliff swallows (*Petrochelidon pyrrhonota*), use mud to build their nests and as a result can build them on a vertical surface, like walls of buildings. As a result, urban/developed areas and landscaping/ornamental areas may also provide habitat suitable for nesting birds.

Implementation of projects under the 2021 LRDP may include ground disturbance, vegetation removal (e.g., trees, shrubs), building demolition, and land development in habitats that include redwood, grassland, landscaping/ornamental (which may provide suitable nesting habitat for some bird species), coastal mixed hardwood, northern maritime chaparral, coastal prairie, coyote brush, agricultural, and riparian woodland scrub (Table 3.5-4). These activities could result in inadvertent disturbance, injury, or mortality of nesting birds. If present, nesting birds, including special-status species and common native species, could be disturbed due to the presence of and noise from equipment and personnel in close proximity of a nest, potentially resulting in nest abandonment. Active nests could be inadvertently removed if trees or shrubs containing these nests are pruned or removed, potentially resulting in loss of eggs or chicks. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2f: Conduct Focused Surveys for Special-Status Birds, Nesting Raptors, and Other Native Nesting Birds and Implement Protective Buffers

If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for nesting birds is present within a project site, the following measures shall be implemented prior to and during construction of a project under the 2021 LRDP:

- To minimize the potential for loss of special-status bird species, raptors, and other native birds, project activities (e.g., tree removal, other vegetation removal, ground disturbance, staging) will be conducted during the nonbreeding season (approximately September 1-January 31, as determined by a qualified biologist), if feasible. If project activities are conducted during the nonbreeding season, no further mitigation will be required.
- Within 14 days before the onset of project activities during the breeding season (approximately February 1 through August 31, as determined by a qualified biologist), a qualified biologist familiar with birds of California and with experience conducting nesting bird surveys will conduct focused surveys for special-status birds, other nesting raptors, and other native birds and will identify active nests within 0.5 mile of the project site.
- Because the nests of olive-sided flycatcher, yellow warbler, and yellow-breasted chat are small and difficult to find, occupancy of habitat suitable for these species (i.e., riparian woodland) for these species will be determined by a qualified biologist familiar with the life history of olive-sided flycatcher, yellow warbler, and yellow-breasted chat and with experience identifying the calls of these species. If olive-sided flycatcher, yellow warblers, or yellow-breasted chats are observed calling, exhibiting territorial displays, carrying nest materials, carrying prey, or other signs of breeding behavior, the habitat will be considered occupied. This protocol for determining occupancy of a nest may be extended to other bird species with nests that are difficult to locate at the discretion of the qualified biologist.
- Impacts on nesting birds will be avoided by establishing appropriate buffers around active nest sites identified during focused surveys to prevent disturbance to the nest. Project activity will not commence within the buffer areas

until a qualified biologist has determined that the young have fledged, the nest is no longer active, or reducing the buffer will not likely result in nest abandonment. An avoidance buffer of a minimum of 0.25 mile will be implemented for American peregrine falcon, bald eagle, golden eagle, and white-tailed kite, in consultation with CDFW. For other species, a qualified biologist will determine the size of the buffer for non-raptor nests after a site- and nest-specific analysis. Buffers typically will be 500 feet for raptors (other than special-status raptors) and 100 feet for non-raptor species. Factors to be considered for determining buffer size will include presence of natural buffers provided by vegetation or topography, nest height above ground, baseline levels of noise and human activity, species sensitivity, and proposed project activities. The size of the buffer may be adjusted if a qualified biologist, determines that such an adjustment would not be likely to adversely affect the nest. Any buffer reduction for a special-status species will require consultation with CDFW. Periodic monitoring of the nest by a qualified biologist during project activities will be required if the activity has potential to adversely affect the nest, the buffer has been reduced, or if birds within active nests are showing behavioral signs of agitation (e.g., standing up from a brooding position, flying off the nest) during project activities, as determined by the qualified biologist.

- Removal of bald eagle and golden eagle nests is prohibited regardless of the occupancy status under the federal Bald and Golden Eagle Protection Act. If bald eagle or golden eagle nests are found during focused surveys, then the nest will not be removed.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a and 3.5-2f would reduce potential impacts on special-status birds, raptors, and other native nesting birds to a **less-than-significant** level by requiring reconnaissance-level surveys for projects under the 2021 LRDP to determine the likelihood of presence of nesting birds, focused surveys for the nesting birds if determined to be likely to occur, and implementation of measures to avoid disturbance, injury, or mortality of the species if nests are detected.

Cave Invertebrate Species

Five invertebrate species are considered rare and potentially endemic to two caves (Empire Cave and Dolloff Cave) within or near the LRDP area: Dolloff Cave spider, Empire Cave amphipod, Empire Cave psuedoscorpion, MacKenzie's cave amphipod, and Santa Cruz telemid spider. These species are not officially listed under CESA or ESA or considered CDFW species of special concern; however, very little is known about these species, and the extent of their rarity has not been fully assessed. It is assumed that these species are rare, and human impacts on the cave systems in the LRDP area pose a threat to the persistence of these species.

Habitat suitable for these cave invertebrate species is present within Empire Cave in central campus near Empire Grade, and Dolloff Cave, which is outside of the LRDP area. Additional habitat suitable for these species may also be present in the central and lower campus portions of the LRDP area, where small cave entrances and sinkholes connect to larger subterranean cavities. Dolloff Cave spiders have also been observed within soil pits in redwood forest habitat in the upper campus portion of the LRDP area, suggesting that this species may occur in habitats other than caves (Krohn and Jones 2020). Caves within the LRDP area were formed through years of water runoff that has dissolved pockets of marble and created an underground network of small and large caverns. Although these cave invertebrate species have only been observed in certain cave habitats in the LRDP area, there have been no surveys of most of the caves and sinkholes in the LRDP area, so these species have potential to occur in other open karst caves in the LRDP area.

Implementation of projects under the 2021 LRDP may include ground disturbance in areas where karst caves are present underground and potential changes in water runoff patterns and water quality as a result of development that could cause increase runoff into underground cave systems through crevices or channels in bedrock, as discussed in Section 3.10 "Hydrology and Water Quality." Additionally, 2021 LRDP implementation may result in an increase in the number of students living on the campus and a potential increase in trespassing within cave ecosystems, which could result in increased disturbance to Empire Cave and special-status cave invertebrates This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2g: Limit Human Disturbance of Cave Ecosystems

UC Santa Cruz shall continue to limit visitation of caves on campus and discourage activities by members of the public that could jeopardize the physical integrity, condition, or scientific value of the caves, through exclusion of access to the caves with bat-friendly fencing (i.e., fencing that allows unimpeded ingress and egress by bats), appropriate signage and educational literature, Campus Natural Reserve website information, or other appropriate measures.

Mitigation Measure 3.10-5a: Procedures for Building on Karst Where Groundwater Is Encountered and Where Pressure Grouting Is Required

(Refer to Section 3.10, "Hydrology and Water Quality")

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a, 3.5-2g, and 3.10-5a would reduce potential impacts on Dolloff Cave spider, Empire Cave amphipod, Empire Cave psuedoscorpion, MacKenzie's cave amphipod, and Santa Cruz telemid spider to a **less-than-significant** level by requiring reconnaissance-level surveys for projects under the 2021 LRDP to determine the likelihood of presence of habitat suitable for these species and implementing site-specific measures that would limit potential increases in runoff or the quality of runoff that could reach karst caves.

Monarch Butterfly

Monarch butterfly is not listed under CESA or ESA or considered a CDFW species of special concern; however, CDFW monitors overwintering colonies of this species because monarch populations in California have severely declined since the 1980s (Xerces 2017). The cause of this decline is thought to be loss of milkweed (*Asclepias* spp.) and nectar plants; loss and degradation of overwintering groves; and other stressors like disease, insecticides, and impacts of climate change (Xerces 2017). The monarch overwintering season is typically October to March.

There are 19 known overwintering sites in Santa Cruz County (Xerces 2016). One monarch overwintering colony is known to occur within the Eucalyptus grove at the UC Santa Cruz Arboretum and Botanic Garden, and there are several larger overwintering colonies within close proximity of the LRDP area (CNDDB 2020). The LRDP area contains potentially suitable overwintering habitat within coniferous forest and eucalyptus groves. Monarchs do not favor eucalyptus trees; however, most of the overwintering locations in California are within eucalyptus groves simply due to their abundance in coastal areas in the state (Xerces 2017). Eucalyptus groves tend to provide the dense foliage, wind protection, and microclimate conditions required by monarchs, although native trees also provide these conditions, and are the dominant tree species at some overwintering sites along the California coast (Xerces 2017). Within the LRDP area, native trees that could be used by overwintering monarchs include coast live oak and redwood (Xerces 2017). Development under the 2021 LRDP is proposed in redwood and coastal mixed hardwood vegetation communities in upper and central campus and within landscaping/ornamental habitat near the UC Santa Cruz Arboretum and Botanic Garden, where habitat potentially suitable for monarch butterfly may occur (Figure 3.5-6).

Implementation of projects under the 2021 LRDP may include vegetation removal (e.g., trees, shrubs) and land development in habitats that include redwood, landscaping/ornamental, coastal mixed hardwood, and riparian woodland and scrub (Table 3.5-4). These activities could result in inadvertent disturbance or loss of monarch overwintering colonies if present within tree stands in the LRDP area. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2h: Conduct Focused Surveys for Monarch Overwintering Colonies and Implement Avoidance Measures

If it is determined through implementation of Mitigation Measure 3.5-1a that a monarch overwintering colony or suitable overwintering habitat is present within a particular project site, the following measures shall be implemented:

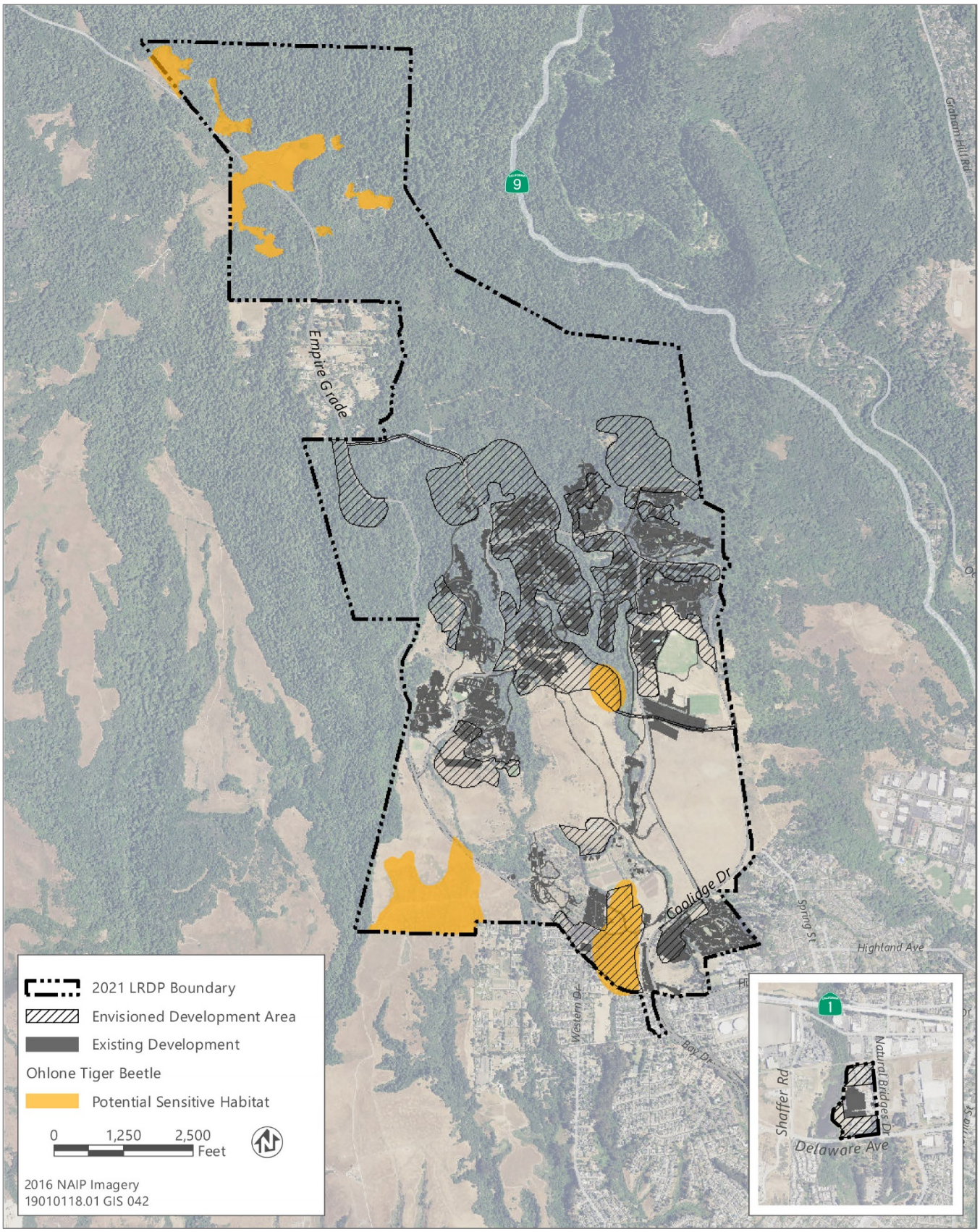
- To minimize the potential for loss of monarch overwintering colonies, project activities that include vegetation removal within suitable overwintering habitat (e.g., coniferous forest, eucalyptus forest) will be conducted from April through September to avoid the overwintering season (October through March), if feasible. If project activities are conducted outside of the overwintering season, no further mitigation will be required.
- Within 14 days before the onset of project activities that include vegetation removal between October 1st and March 31st, a qualified biologist familiar with monarchs and monarch overwintering habitat will conduct focused surveys for monarch colonies within habitat suitable for the species in the project site and will identify any colonies found within the project site.
- Monarch overwintering colonies that are identified within a project site will be demarcated with flagging or high-visibility construction fencing to prevent removal of the stand of trees containing the overwintering colony and encroachment by heavy machinery, vehicles, or personnel. Monarch overwintering colonies shall be protected throughout the duration of their presence within a project site.
- If modification or removal of a stand where overwintering monarchs have been identified is required for project implementation, and the project cannot be redesigned to avoid modification or removal of the stand, then UC Santa Cruz will prepare and implement a site-specific plan for the stand with the goal of maintaining habitat function for the monarch overwintering colony, following recommendations from *Protecting California's Butterfly Groves Management Guidelines for Monarch Butterfly Overwintering Habitat* (Xerces 2017). Examples of management strategies that could be considered include:
  - remove or trim hazard trees;
  - selectively remove or trim of trees to create a heterogeneous habitat that provides access to sunlight and shade for monarchs;
  - maintain suitable wind protection in the stand; and
  - replace removed trees with native trees in strategic locations to provide additional wind protection.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a and 3.5-2h would reduce potential impacts on monarch overwintering colonies to a **less-than-significant** level by requiring reconnaissance-level surveys for projects under the 2021 LRDP to determine the likelihood of presence of overwintering colonies, focused surveys for colonies if determined to be likely to occur, and implementation of measures to avoid disturbance or loss of monarch overwintering colonies if present.

Ohlone Tiger Beetle

Ohlone tiger beetle is listed as endangered under ESA. Ohlone tiger beetles are known to occur in lower campus within the grassland/coastal prairie area in the southwest corner of the LRDP area west of Empire Grade, including IAA (one of the preserves established for the Ranch View Terrace HCP), and within the Marshall Fields complex in north campus (Arnold 2020, Jones, pers. comm., 2020). Habitat assessments and surveys were performed in February of 2020 within the envisioned development areas of the 2021 LRDP, and no Ohlone tiger beetles were observed in these areas (Arnold 2020). While the beetles were not found in these areas, the LRDP area does contain habitat potentially suitable for the species, which is strictly associated with grasslands on Watsonville loam soils (Arnold 2020). Specifically, Ohlone tiger beetle is associated with coastal prairie habitat or other grassland habitat with native species (e.g., California oat grass) growing on Watsonville loam soils, where bare ground is evident and Mima mounds are usually present (Arnold 2020; Figure 3.5-8).



Source: Data received from Richard A. Arnold, Ph.D. in 2020

Figure 3.5-8 Envisioned Development Areas Overlay of Ohlone Tiger Beetle Potential Sensitive Habitat in the LRDP Area

The LRDP area contains approximately 399 acres of grassland habitat and 108 acres of coastal prairie habitat (Table 3.5-1); however, most of this habitat is not associated with Watsonville loam soils (Arnold 2020). Proposed development under the 2021 LRDP would not occur within Marshall Field or IAA, where Ohlone tiger beetle is known to occur. However, as currently envisioned, development under the 2021 LRDP would occur within two areas where grassland habitat and Watsonville loam soils overlap: one area is on the northern edge of the Great Meadow and the second area is within IAD (Arnold 2020, Figure 3.5-6, Figure 3.5-8). Implementation of projects under the 2021 LRDP may include ground disturbance or vegetation removal in these areas, which could result in inadvertent mortality of Ohlone tiger beetles if present within a project site, or adverse effects on habitat that could substantially disrupt essential behavior patterns (e.g., breeding, feeding, or sheltering) to such an extent that injury or mortality is likely. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2i: Conduct Site-Specific Habitat Suitability Analysis for Ohlone Tiger Beetle, Obtain Incidental Take Authorization through Consultation with USFWS, Implement Minimization Measures

If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for Ohlone tiger beetle is present within a particular project site (i.e., grassland or coastal prairie with Watsonville soils, Figure 3.5-8), the following measures shall be implemented during the planning stages of a project under the 2021 LRDP:

- A qualified biologist will conduct a site-specific habitat suitability verification analysis within a project site to determine the likelihood of the species to be present. To be qualified, the biologist will: 1) be knowledgeable in Ohlone tiger beetle life history and ecology, 2) be able to correctly identify Ohlone tiger beetles and habitats, 3) have experience conducting field surveys of relevant resources, 4) be knowledgeable about state and federal laws regarding the protection of special-status species, and 5) have experience using CDFW's CNDDB. The habitat assessment will include, but will not be limited to:
  - Identification or verification of the vegetation communities present in the project site.
  - Consideration of known occurrences within the LRDP area;
  - Description of the project, including proposed project construction activities;
  - Analysis of the type and likelihood of impacts on Ohlone tiger beetle as a result of project implementation; and
  - Potential project modifications or additional measures that may avoid and minimize mortality, injury, and disturbance of Ohlone tiger beetle and habitat.
- Results of the site-specific habitat suitability verification analysis will be submitted to UC Santa Cruz for review and consideration.
- Based on the results of the site-specific habitat suitability verification analysis, a qualified biologist will determine if any of the following would occur: loss of habitat function for Ohlone tiger beetle; injury or mortality of Ohlone tiger beetle; or disturbance of Ohlone tiger beetle that could substantially disrupt essential behavior patterns (e.g., breeding, feeding, or sheltering) to such an extent that injury or mortality is likely.
  - If a qualified biologist determines that the individual project would have no substantial adverse effect on Ohlone tiger beetle or its habitat and would not result in any injury or mortality, implementation of that individual project may proceed.
  - For those areas where disturbance, injury, or mortality of Ohlone tiger beetle cannot be avoided, UC Santa Cruz shall, in consultation with USFWS, implement impact minimization (e.g., preconstruction surveys and biological monitoring) and compensatory actions, including purchase of credits at a conservation bank, creation of additional habitat, and adaptive management strategies. No actions that could adversely affect

Ohlone tiger beetle will be allowed if adverse effects would result, unless consultation with USFWS is completed and additional measures, as required by USFWS, are implemented.

To the extent the project may result in "take" of the species, UC Santa Cruz may pursue incidental take coverage either by pursuing consultation and biological opinion under Section 7 of the federal ESA (where there is some federal nexus) or by developing an HCP, as described in Mitigation Measure 3.5-2a, which would require authorization by USFWS under Section 10 of the ESA. Such an HCP would provide incidental take coverage for species listed under ESA with potential to occur in the LRDP area: California red-legged frog and Ohlone tiger beetle. Typically, HCPs include the following elements, among others:

- Measures that UC Santa Cruz will undertake to monitor, minimize, and mitigate for such impacts, the funding available to implement such measures, and the procedures to deal with unforeseen or extraordinary circumstances.
- Additional measures that USFWS may require.
- Biological goals and objectives, which would define the expected biological outcome for each species covered by the HCP.
- Adaptive management, which includes methods for addressing uncertainty and also monitoring and feedback to biological goals and objectives.
- Monitoring for compliance, effectiveness, and effects.
- Permit duration which is determined by the time-span of the project and designed to provide the time needed to achieve biological goals and address biological uncertainty.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a and 3.5-2i would reduce potential impacts on Ohlone tiger beetle to a **less than significant** level by requiring reconnaissance-level surveys for projects under the 2021 LRDP to determine the likelihood of presence of Ohlone tiger beetles or habitat suitable for the species, a site-specific habitat suitability verification analysis for projects within habitat suitable for the species, incidental take authorization and implementation of minimization measures if impacts on Ohlone tiger beetle are unavoidable, or development of a comprehensive HCP to cover future impacts on Ohlone tiger beetle.

American Badger

American badger is a CDFW species of special concern. This species occurs throughout California and is associated with various habitat types, including shrubland, woodland, forest, and grassland habitats, with friable soils. Over 100 feeding digs associated with American badgers have been observed within the LRDP area, including within Great Meadow and the UC Santa Cruz Arboretum and Botanical Garden in lower campus (Jones, pers. comm., 2020). Additionally, a badger carcass was recovered in 2004, within grassland habitat in the LRDP area (CNDDB 2020). The LRDP area contains grassland, chaparral, and forest habitat potentially suitable for this species, and several proposed development areas within central and lower campus overlap these vegetation communities (Figure 3.5-6).

Implementation of projects under the 2021 LRDP may include ground disturbance, vegetation removal, and land development in several habitat types that may provide habitat suitable for American badger (Table 3.5-4). These activities could result in inadvertent disturbance, injury, or mortality of American badgers or destruction of active dens. Proposed development areas with the greatest potential for adverse effects on American badger would be those within grassland habitat near Great Meadow where the species has been observed (Figure 3.5-6). If present, badgers could be disturbed due to the presence of equipment and personnel in close proximity to a den, potentially resulting in abandonment of the den. Active dens could be inadvertently crushed and destroyed, if present, potentially resulting in the loss of young. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2j: Conduct Focused American Badger Survey and Establish Protective Buffers

If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for American badger is present within a particular project site, the following measures shall be implemented:

- Within 30 days before commencement of project activities, a qualified wildlife biologist with familiarity with American badger and experience using survey methods for the species will conduct focused surveys of habitat suitable for the species within the project site to identify any American badger dens.
- If occupied dens are not found, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and further mitigation will not be required.
- If occupied dens are found, impacts on active badger dens will be avoided by establishing exclusion zones around all active badger dens, the size of which will be determined by the qualified biologist. No project activities (e.g., vegetation removal, ground disturbance, staging) will occur within the exclusion zone until denning activities are complete or the den is abandoned, as confirmed by a qualified biologist. The qualified biologist will monitor each den once per week to track the status of the den and to determine when it is no longer occupied. When it is no longer occupied, project activities within the exclusion zone may occur.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a and 3.5-2j would reduce potential impacts on American badger to a **less-than-significant** level by requiring reconnaissance-level surveys for projects under the 2021 LRDP to determine the likelihood of presence of the species, focused surveys for the species if determined to be likely to occur, and implementation of measures to avoid injury or mortality of American badger and destruction of active dens if detected.

Mountain Lion

In April of 2020, the California Fish and Game Commission determined that listing of the Central Coast and Southern California ESU of mountain lion under CESA may be warranted. As a result, mountain lions within these ESUs are candidates for listing, and are thus protected under CESA. The LRDP area is within the Central Coast North ESU, which includes mountain lions in the Santa Cruz Mountains and the East Bay Hills. Mountain lions occupy a variety of habitats but are most abundant in riparian habitats. Habitat use is typically associated with prey availability (e.g., mule deer). Mountain lion home ranges can be greater than 200 square miles, though home ranges typically range from 5 to 100 square miles (Allen et al. 2015). Mountain lions are primarily nocturnal and are typically most active during dawn and dusk.

The Santa Cruz Puma Project is a partnership between UC Santa Cruz and CDFW that began in 2008 in an effort to better understand the physiology, behavior, ecology, and movement of mountain lions in the region, as well as to examine the impacts of habitat fragmentation from human development. This research has included radio collaring numerous mountain lions in the Santa Cruz Mountains. The tracks and home ranges of these radio collared lions, which are available on the Santa Cruz Puma Project's "Puma Tracker" application, demonstrate that lions are traversing through the LRDP area regularly and that many of the lions' home ranges overlap the LRDP area (Santa Cruz Puma Project 2020). Only a subset of mountain lions in the Santa Cruz Mountains are radio collared, and uncollared lions are often detected using camera traps on campus, so it is probable that additional mountain lions also occur within the LRDP area (Jones, pers. comm., 2020).

The LRDP area contains large areas of relatively undeveloped habitat within north campus and portions of central campus. The LRDP area is surrounded by undeveloped natural habitat (e.g., Wilder Ranch State Park, Henry Cowell Redwoods State Park), and provides connectivity between these habitats (Santa Cruz Puma Project 2020). Suitable denning habitat for mountain lions includes caves, other natural cavities, and thickets. Mountain lions are known to den within nearby Wilder Ranch State Park (Santa Cruz Puma Project 2015).

While some areas of the LRDP area may have relatively heavy human use (e.g., vehicles, pedestrians) compared to surrounding State Parks, some of the undeveloped areas may provide suitable denning habitat for this species. Because of the existing baseline of human disturbance on the UC Santa Cruz campus, it is probable that mountain lion denning would be limited to undeveloped areas of upper campus within the Campus Natural Reserve. Most of

the proposed development under the 2021 LRDP would occur within central and lower campus, where den habitat suitable for mountain lions does not occur. However, proposed projects in forested areas in upper campus (e.g., along Empire Grade, along Heller Drive) may contain den habitat suitable for the species.

Implementation of projects under the 2021 LRDP may include ground disturbance, vegetation removal, and land development in habitats, including redwood habitat and other vegetation communities in upper campus that may provide connectivity to other surrounding natural habitats (Table 3.5-4). These activities could result in inadvertent disturbance, injury, or mortality of mountain lions and cubs or destruction of active dens. If a mountain lion den is present within the LRDP area, mountain lions and cubs could be disturbed due to the presence of equipment and personnel and could be inadvertently injured or killed by heavy machinery and vehicles. Active dens could be inadvertently crushed and destroyed, if present, potentially resulting in the loss of cubs. This impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2k: Conduct Focused Noninvasive Surveys for Mountain Lion Dens and Implement Avoidance Measures

If it is determined through implementation of Mitigation Measure 3.5-1a that den habitat potentially suitable for mountain lion is present within a particular project site (e.g., caves, other large natural cavities, thickets) or signs of mountain lion activities are observed (e.g., tracks, scat, carcasses or bones of prey species), the following measures shall be implemented to avoid take of mountain lions or destruction of den habitat:

- Within 30 days before commencement of project activities, a qualified wildlife biologist with familiarity with mountain lion and experience using survey methods for the species will conduct focused surveys of habitat suitable for the species within the project site to identify any potential mountain lion dens. Potential mountain lion dens will include caves, large natural cavities within rocky areas, or thickets deemed appropriate for use by mountain lions based on size and other characteristics (e.g., proximity to human development, surrounding habitat). The qualified wildlife biologist will also survey for signs of mountain lion (e.g., tracks, scat, prey items) in the vicinity of the cave, cavity, or thicket to help determine whether the den may be occupied by mountain lions. If the start of project activities lapses and more than 30 days pass since the survey was completed, an additional survey shall be conducted.
- If no potential dens are found, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and no further mitigation will be required.
- If potential dens are found, further investigation will be required to determine if the den is being used by a mountain lion or another carnivore species (e.g., coyote [*Canis latrans*], bobcat [*Lynx rufus*], gray fox [*Urocyon cinreoargenteus*]). Survey methods will include the use of trail cameras, track plates, hair snares, or other noninvasive methods. Surveys using these noninvasive methods will be conducted for three days and three nights to determine whether the den is occupied by mountain lions.
    - If the den is determined to be unoccupied by any carnivore species, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and no further mitigation will be required.
    - If the den is determined to be unoccupied by mountain lion, but is occupied by another carnivore species, the den will not be disturbed while the young of any species are dependent on the den for shelter.
    - If the den is determined to be occupied by mountain lion, a no-disturbance buffer of at least 2,000 feet will be established around the occupied den within which no project activities will occur, and UC Santa Cruz will notify and consult with CDFW to identify additional adequate seasonal restrictions and/or no disturbance buffers to avoid disturbance, injury, or mortality of mountain lion.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a and 3.5-2k would reduce potential impacts on mountain lion to a **less-than-significant** level by requiring reconnaissance-level surveys for projects under the 2021 LRDP to determine the likelihood of presence of the species, focused surveys for mountain lion dens if determined to be likely to occur, and consultation with CDFW if active mountain lion dens are present within a project site.

Ringtail

Ringtail is a fully protected species under California Fish and Game Code. Ringtail is typically associated with riparian, forest, and shrub habitats and is typically found within approximately 0.6 mile of a permanent water source (e.g., perennial streams, longer-lasting intermittent streams). Habitat potentially suitable for ringtail is present within forest (e.g., redwood, mixed coastal hardwood, coast live oak), riparian woodland, and northern maritime chaparral habitat in the LRDP area. Ringtail use a variety of habitats for denning, including rock crevices, snags, and tree hollows, all of which may be present within the LRDP area. Development within these vegetation communities is primarily within upper campus and in portions of central campus (Figure 3.5-6).

Implementation of projects under the 2021 LRDP may include ground disturbance, vegetation removal, and land development in habitats, including riparian woodland and scrub, northern maritime chaparral, redwood, and coastal mixed hardwood habitats (Table 3.5-4). If these activities occur within habitat suitable for ringtail, they could result in inadvertent disturbance, injury, or mortality of ringtail or removal of dens. If present, ringtails could be disturbed due to the presence of equipment and personnel in close proximity to a den, potentially resulting in abandonment of the den. Active dens could be inadvertently removed during vegetation removal activities, if present, potentially resulting in the loss of young. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2l: Conduct Focused Surveys for Ringtail

If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for ringtail is present within a particular project site (e.g., forest or chaparral habitat within 0.6 mile of a permanent water source), the following measures shall be implemented:

- To minimize the potential for loss of ringtail and active ringtail dens, project activities (e.g., tree removal, other vegetation removal, ground disturbance, staging) within potentially suitable ringtail habitat will be conducted outside of the ringtail breeding season (not well defined, but likely approximately March 1 to July 31), if feasible.
- Within seven days before initiation of project activities within potentially suitable ringtail habitat, a qualified biologist with familiarity with ringtail and experience conducting ringtail surveys will conduct a focused survey for potential ringtail dens (e.g., hollow trees, snags, rock crevices) within the project site. The qualified biologist will identify sightings of individual ringtails, as well as potential dens.
- If individuals or potential or occupied dens are not found, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and further mitigation will not be required.
- If ringtails are identified or if potential dens are located, an appropriate method will be used by the qualified wildlife biologist to confirm whether a ringtail is occupying the den. This may include use of remote field cameras, track plates, or hair snares. Other devices, such as a fiber optic scope, may be utilized to determine occupancy.
    - If no ringtail occupies the potential den, the entrance will be temporarily blocked so that no other animals occupy the project site during project activities, but only after it has been fully inspected. The blockage will be removed once the project activities are completed.
    - If a den is found to be occupied by a ringtail, a no-disturbance buffer will be established around the occupied den. The no-disturbance buffer will include the den tree (or other structure) plus a suitable buffer as determined

by the biologist in coordination with CDFW. Project activities in the no-disturbance buffer will be avoided until the den is unoccupied as determined by the qualified wildlife biologist in coordination with CDFW.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a and 3.5-2l would reduce potential impacts on ringtail to a **less-than-significant** level by requiring reconnaissance-level surveys for projects under the 2021 LRDP to determine the likelihood of presence of the species, focused surveys for ringtail and ringtail dens if determined to be likely to occur, and implementation of measures to avoid injury or mortality of ringtail and removal of active dens, in consultation with CDFW, if detected.

San Francisco Dusky-Footed Woodrat

San Francisco dusky-footed woodrat is a CDFW species of special concern. This subspecies occurs from the San Francisco Bay Area south throughout the northern Monterey Bay region (Matocq 2002). Habitat suitable for this species includes forest, woodland, scrub, and chaparral habitats with moderate canopy coverage and moderate to dense understory density. Woodrats construct nests, which are also known as houses or middens, with shredded grass, leaves, and other material. These nests can persist for decades, and are used for nesting, denning, and food storage. Habitat suitable for San Francisco dusky-footed woodrat, including forest (e.g., redwood, mixed coastal hardwood, coast live oak) and northern maritime chaparral, is present within the upper and central campus portions of the LRDP area, and woodrat nests have been observed throughout these habitat types in the LRDP area.

Implementation of projects under the 2021 LRDP within upper and central campus may include ground disturbance, vegetation removal, and land development in forest and chaparral habitats (Table 3.5-4). These activities could result in inadvertent disturbance, injury, or mortality of San Francisco dusky-footed woodrats or destruction of active nests. If present, San Francisco dusky-footed woodrats could be disturbed due to the presence of equipment and personnel in close proximity to a nest, potentially resulting in abandonment of the nest. Active nests could be inadvertently crushed and destroyed, if present, potentially resulting in the loss of young. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2m: Conduct Focused Surveys for San Francisco Dusky-Footed Woodrat, Implement Avoidance Measures, or Relocate Nests

If it is determined through implementation of Mitigation Measure 3.5-1a that habitat suitable for San Francisco dusky-footed woodrat is present within a particular project site, the following measures shall be implemented:

- Within seven days before initiation of project activities, a qualified biologist with familiarity with woodrats and experience conducting woodrat surveys will conduct a focused survey for San Francisco dusky-footed woodrat nests within the project site.
- If no woodrat nests are found during the focused survey, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and no further mitigation will be required.
- If woodrat nests are detected within the project site, the qualified biologist will determine whether the nest is active. The status of a nest is typically determined through the presence of large amounts of scat. If active woodrat nests are present that can be avoided, the perimeter of these nests will be demarcated with high-visibility construction fencing to prevent accidental encroachment by vehicles, equipment, or personnel.
- If active woodrat nests within a project site are detected that cannot be avoided, and project activities are planned to occur during the woodrat breeding season (April through June), these active nests must be avoided until the end of the breeding season.
- If active woodrat nests within a project site cannot be avoided, and project activities are planned to occur outside of the woodrat breeding season, a qualified biologist in consultation with CDFW will dismantle the woodrat nest by

hand, removing the materials layer by layer to allow adult woodrats to escape. If young are discovered during the disassembling process, the qualified biologist will leave the area for at least 24 hours to allow the adult woodrats to relocate their young on their own.

- When the disassembly process is completed, the nest materials will be collected and moved to another suitable nearby location to allow for nest reconstruction.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a and 3.5-2m would reduce potential impacts on San Francisco dusky-footed woodrat to a **less-than-significant** level by requiring reconnaissance-level surveys for projects under the 2021 LRDP to determine the likelihood of presence of the species, focused surveys for woodrat nests if determined to be likely to occur, implementation of measures to avoid injury or mortality of woodrats and removal of active nests, and relocation of nests during the nonbreeding season if they cannot be avoided.

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

Three special-status bat species could occur in the LRDP area: pallid bat, Townsend's big-eared bat, and western red bat. All of these species are CDFW species of special concern. These species use a variety of habitats to roost, including caves, crevices, mines, hollow trees, and buildings. Potentially suitable roosting habitat is present within and adjacent to the LRDP area within crevices (e.g., exfoliating bark, cracks and fissures in tree stems or branches, crevices in buildings), cavities (e.g., large tree hollows, unoccupied buildings, caves), and foliage (e.g., clusters of leaves found in California bay, eucalyptus, willow, other tree species). These types of habitats would be largely present within undeveloped forested areas in upper campus; however, some suitable roost habitat areas may also be present in central and lower campus, including empty buildings, barns, and bridges.

Implementation of projects under the 2021 LRDP may include vegetation removal (e.g., tree removal), building demolition, and land development in habitats that include redwood, coastal mixed hardwood, and landscaping/ornamental habitats (Table 3.5-4). These activities could result in inadvertent disturbance, injury, or mortality of pallid bat, Townsend's big-eared bat, and western red bat or destruction of active roosts. If present, these species could be disturbed due to the presence of equipment and personnel in close proximity to a roost, potentially resulting in abandonment of the roost. Active roosts, if present, could be inadvertently destroyed during tree removal or building demolition activities, potentially resulting in the loss of young. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-2n: Conduct Focused Bat Surveys and Implement Avoidance Measures

If it is determined through implementation of Mitigation Measure 3.5-1a that suitable roost habitat for pallid bat, Townsend's big-eared bat, and western red bat is present within a particular project site, the following measures shall be implemented:

- In the early planning stages of individual projects under the 2021 LRDP, a qualified biologist with familiarity with bats and bat ecology, and experienced in conducting bat surveys will conduct surveys for bat roosts in suitable habitat (e.g., large trees, crevices, cavities, exfoliating bark, bridges, unoccupied buildings) within and adjacent to the particular project site.
- If no evidence of bat roosts is found, the qualified biologist will submit a report summarizing the results of the survey to UC Santa Cruz, and no further study will be required.
- If evidence of bat roosts is observed, the species and number of bats using the roost will be determined. Bat detectors shall be used if deemed necessary to supplement survey efforts by the qualified biologist.
- A no-disturbance buffer of 250 feet will be established around active pallid bat, Townsend's big-eared bat, or western red bat roosts, and project activities will not occur within this buffer until after the roosts are unoccupied.

- If roosts of pallid bat, Townsend's big-eared bat, or western red bat are determined to be present and must be removed, the bats will be excluded from the roosting site before the tree, building, or other structure is removed. A program addressing compensation, exclusion methods, and roost removal procedures will be developed in consultation with CDFW before implementation. Exclusion methods may include use of one-way doors at roost entrances (bats may leave but not reenter) or sealing roost entrances when the site can be confirmed to contain no bats. Exclusion efforts may be restricted during periods of sensitive activity (e.g., during hibernation or while females in maternity colonies are nursing young). The loss of each roost (if any) will be replaced in consultation with CDFW and may require construction and installation of bat boxes suitable to the bat species and colony size excluded from the original roosting site. If determined necessary during consultation with CDFW, replacement roosts will be implemented before bats are excluded from the original roost sites. Once the replacement roosts are constructed and it is confirmed that bats are not present in the original roost site by a qualified biologist, the roost tree, building, or other structure may be removed.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a and 3.5-2n would reduce potential impacts on pallid bat, Townsend's big-eared bat, and western red bat to **less than significant** by requiring reconnaissance-level surveys for projects under the 2021 LRDP to determine the likelihood of presence of the species, focused surveys for bat roosts if determined to be likely to occur, and implementation of no-disturbance buffers around active special-status bat roosts.

Impact 3.5-3: Result in Degradation or Loss of Riparian Habitat or Other Sensitive Natural Communities

Implementation of projects under the 2021 LRDP would include potential land use conversion and development activities including ground disturbance, vegetation removal, and land development, which could result in the degradation or loss of riparian habitat, other sensitive natural communities, or ESHAs, or the reduction in the function of these habitats, if present. This would be a **potentially significant** impact.

Sensitive natural communities are identified at the alliance level using the *Manual of California Vegetation* (Sawyer et al. 2009 or current version, including updated natural communities data at http://vegetation.cnps.org/). Sensitive natural communities are defined by unique assemblages of vegetation that may include, or even be dominated by, relatively common species, but it is the assemblage of species that is rare. Coastal prairie, northern maritime chaparral, redwood, California bay, and purple needlegrass grassland habitats, which are considered sensitive natural communities, are present within the LRDP area. Additionally, other plant communities in the LRDP area may qualify as sensitive natural communities (e.g., arroyo willow thickets, black cottonwood forest and woodland) if the species assemblage, percent cover, and patch size are sufficient to meet membership rules and sensitive natural community requirements. Riparian woodland and scrub habitat are also present within the LRDP area, associated with perennial and intermittent drainages (Table 3.5-1, Figure 3.5-2). The dominant species in this vegetation community are willow (including arroyo willow) and black cottonwood, and the habitat also includes bigleaf maple and California hazelnut. Where these communities occur within the coastal zone, they may also be considered ESHAs under the CCA.

Implementation of the 2021 LRDP would result in development of approximately 378 acres of land within the LRDP area, approximately 41 percent of which would occur within urban/developed land cover types, where sensitive natural communities, riparian habitat, and ESHAs do not occur (Table 3.5-4, Figure 3.5-6). Known sensitive natural communities within the LRDP area, like coastal prairie and northern maritime chaparral, are located in undeveloped areas in lower and upper campus (Figure 3.5-2). Vegetation communities that may meet membership rules of a sensitive natural community are present within undeveloped areas in redwood, riparian woodland, coastal mixed hardwood, and coast live oak communities, primarily in the upper campus portion of the LRDP area (Figure 3.5-2). Additionally, planned development would occur within approximately 16 acres of landscaping/ornamental habitat and approximately 0.4 acre of agricultural habitat, where sensitive natural communities do not occur (Table 3.5-4). Because a large proportion of planned development would occur within areas where sensitive natural communities are unlikely to occur, many projects under the 2021 LRDP would not result in adverse effects on these habitats.

As presented in Table 3.5-4 and Figure 3.5-6, some of the proposed development under the 2021 LRDP would occur within natural vegetation communities where sensitive natural communities could potentially occur, including

redwood (approximately 119 acres of development), coastal mixed hardwood (approximately 9 acres of development), and riparian woodland and scrub (approximately 0.1 acre of development). Additionally, development is proposed to occur within approximately 6 acres of northern maritime scrub habitat and 4 acres of coastal prairie habitat during implementation of projects under the 2021 LRDP (Table 3.5-4, Figure 3.5-6). The potential development of known sensitive natural communities accounts for approximately 10 percent and 4 percent of the total northern maritime scrub habitat and coastal prairie in the LRDP area, respectively (Table 3.5-1, Table 3.5-4). Some proposed development would occur within the coastal zone where these sensitive natural communities may be considered ESHAs.

Implementation of projects under the 2021 LRDP may include ground disturbance, vegetation removal, and land development. These activities could result in degradation (e.g., reduction of vegetation cover, trampling, alteration of root structure) or removal of sensitive natural communities, riparian habitat, and ESHAs or reduction in the function of these habitats, if they are present within or adjacent to a particular project site. Implementation of projects under the 2021 LRDP could result in inadvertent introduction or spread of nonnative plants or plant pathogens (e.g., Sudden Oak Death), which could result in adverse effects to sensitive natural communities through competition or degradation of habitat. Additionally, implementation of projects under the 2021 LRDP could result in the use of herbicides during vegetation removal activities. Use of herbicide at the project level would require compliance with state and federal regulations to avoid adverse effects on sensitive habitats; however, inadvertent spray or herbicide drift could damage or kill non-target vegetation comprising riparian habitat or sensitive natural communities. Removal or degradation of sensitive natural communities, including riparian habitat, would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-1c: Implement Measures to Avoid Introduction or Spread of Invasive Plant Species and Plant Pathogens

Mitigation Measure 3.5-3a: Conduct Protocol-Level Surveys for Sensitive Natural Communities and Riparian Habitat and Implement Avoidance Measures

If it is determined through implementation of Mitigation Measure BIO-3.5-1a that sensitive natural communities or riparian habitat may be present within a particular project site, the following measures shall be implemented before implementation of project activities:

- A qualified botanist will perform a protocol-level survey of the project site for sensitive natural communities and sensitive habitats (including riparian habitat and ESHAs) following the CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018). Sensitive natural communities will be identified using the best available and current data, including keying them out using the most current edition of *A Manual of California Vegetation* (including updated natural communities data at http://vegetation.cnps.org/), or referring to relevant reports (e.g., reports found on the VegCAMP website).
- Before implementation of project activities, development setbacks will be established around all sensitive habitats identified during surveys, and these setbacks will be flagged or fenced with brightly visible construction flagging and/or fencing under the direction of the qualified biologist and no project activities (e.g., vegetation removal (including herbicide application), ground disturbance, staging) will occur within these areas. Setback distances will be dependent on various factors (e.g., presence of special-status wildlife or plant species) and determined by a qualified biologist in consultation with the appropriate agency (e.g., CDFW, CCC), but will generally be at minimum of 50 feet. Foot traffic by personnel will also be limited in these areas to prevent the introduction of invasive or weedy species or inadvertent crushing of plants. Periodic inspections during construction will be conducted by the monitoring biologist to maintain the integrity of exclusion fencing/flagging throughout the period of construction involving ground disturbance.

- If sensitive natural communities are identified within a project site that cannot be avoided, Mitigation Measure 3.5-3b shall apply.
- If project implementation cannot avoid and thus may adversely affect the bed, bank, channel, or associated riparian habitat subject to CDFW jurisdiction under California Fish and Game Code Section 1602, Mitigation Measure 3.5-3c shall apply.

Mitigation Measure 3.5-3b: Compensate for Unavoidable Loss of Sensitive Natural Communities

If after implementation of Mitigation Measure 3.5-3a sensitive natural communities are determined to be present within a particular project site and these habitats cannot be avoided, the following measures shall be implemented:

- Compensate for unavoidable loss of any sensitive natural community habitat function such that no net loss of habitat function occurs by:
  - restoring sensitive natural community habitat function within the project site (e.g., using locally collected seed or cuttings);
  - restoring degraded sensitive natural communities outside of the project site at a sufficient ratio to offset the loss of habitat function (at least 3:1 for coastal prairie and at least 1:1 for other sensitive natural communities); or
  - preserving existing sensitive natural communities of equal or better value to the sensitive natural community affected through a conservation easement at a sufficient ratio to offset the loss of habitat function (at least 3:1 for coastal prairie and at least 1:1 for other sensitive natural communities).
- Prepare and implement a Compensatory Mitigation Plan that includes the following:
  - For preserving existing habitat outside of the project site in perpetuity, the Compensatory Mitigation Plan will include a summary of the proposed compensation lands (e.g., the number and type of credits, location of mitigation bank or easement), parties responsible for the long-term management of the land, and the legal and funding mechanism for long-term conservation (e.g., holder of conservation easement or fee title). UC Santa Cruz will provide evidence in the plan that the necessary mitigation has been implemented or that UC Santa Cruz has entered into a legal agreement to implement it and that compensatory habitat will be preserved in perpetuity.
  - For restoring or enhancing habitat within the project site or outside of the project site, the Compensatory Mitigation Plan will include a description of the proposed habitat improvements, success criteria that demonstrate the performance standard of maintained habitat function has been met, legal and funding mechanisms, and parties responsible for long-term management and monitoring of the restored or enhanced habitat.
  - Success criteria required to maintain habitat function for preserved and compensatory populations would include:
    - The extent of occupied area and density of plants associated with the sensitive natural community (number of plants per unit area) in compensatory habitats would be equal to or greater than the affected occupied habitat.
    - Compensatory and preserved sensitive natural communities would be self-producing. Populations would be considered self-producing when:
    - Plants associated with sensitive natural communities reestablish annually for a minimum of five years with no human intervention such as supplemental seeding; and
    - Reestablished and preserved habitats contain an occupied area and density comparable to existing occupied habitat areas in similar habitat types in the project vicinity.
- Impacts on sensitive natural communities considered ESHAs within the coastal zone will require a coastal development permit pursuant to the CCA and compliance with any requirements therein.

Mitigation Measure 3.5-3c: Compensate for Unavoidable Loss of Riparian Habitat

If after implementation of Mitigation Measure 3.5-3a riparian habitat is determined to be present within a particular project site and the habitat cannot be avoided, the following measures shall be implemented:

- A Streambed Alteration Notification will be submitted to CDFW, pursuant to Section 1602 of the California Fish and Game Code. If proposed project activities are determined to be subject to CDFW jurisdiction, UC Santa Cruz will abide by the measures to protect fish and wildlife resources required by any executed agreement prior to any vegetation removal or activity that may affect the resource. Measures to protect fish and wildlife resources shall include, at a minimum, a combination of the following mitigation.
- UC Santa Cruz will compensate for the loss of riparian habitat such that no net loss of habitat function and values occurs by:
  - restoring riparian habitat function and value within the project site;
  - restoring degraded riparian habitat outside of the project site;
  - purchasing riparian habitat credits at a CDFW-approved mitigation bank; or
  - preserving existing riparian habitat of equal or better value to the affected riparian habitat through a conservation easement at a sufficient ratio to offset the loss of riparian habitat function (at least 1:1).
- UC Santa Cruz will prepare and implement a Compensatory Mitigation Plan that will include the following:
  - For preserving existing riparian habitat outside of the project site in perpetuity, the Compensatory Mitigation Plan will include a summary of the proposed compensation lands (e.g., the number and type of credits, location of mitigation bank or easement), parties responsible for the long-term management of the land, and the legal and funding mechanism for long-term conservation (e.g., holder of conservation easement or fee title). UC Santa Cruz will provide evidence in the plan that the necessary mitigation has been implemented or that UC Santa Cruz has entered into a legal agreement to implement it and that compensatory habitat will be preserved in perpetuity.
  - For restoring or enhancing riparian habitat within the project site or outside of the project site, the Compensatory Mitigation Plan will include a description of the proposed habitat improvements, success criteria that demonstrate the performance standard of maintained habitat function has been met, legal and funding mechanisms, and parties responsible for long-term management and monitoring of the restored or enhanced habitat.
  - Compensatory mitigation may be satisfied through compliance with permit conditions, or other authorizations obtained by UC Santa Cruz (e.g., Lake and Streambed Alteration Agreement), if these requirements are equally or more effective than the mitigation identified above.
- Impacts on riparian habitat considered an ESHA within the coastal zone will require a coastal development permit pursuant to the CCA and compliance with any requirements therein.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a, 3.5-1c, 3.5-3a, 3.5-3b, and 3.5-3c would reduce significant impacts on sensitive natural communities and riparian habitat to a **less-than-significant** level by requiring reconnaissance-level surveys of projects under the 2021 LRDP to determine the likelihood of presence of the habitats, prevention measures for the spread of invasive plant species and Sudden Oak Death, protocol-level surveys for sensitive natural communities and riparian habitat if determined to be likely to occur, implementation of avoidance measures, and compensation for permanent loss of these habitats such that there is no net loss, potentially including a streambed alteration agreement with CDFW.

Impact 3.5-4: Result in Degradation or Loss of State or Federally Protected Wetlands

Implementation of projects under the 2021 LRDP would include potential land use conversion and development activities including ground disturbance, vegetation removal, and land development, which could result in inadvertent alteration of wetland hydrology, removal of wetland vegetation, or inadvertent fill or dredging of wetlands. This would be a **potentially significant** impact.

Aquatic habitat within the LRDP area includes pond (e.g., UC Santa Cruz Arboretum Pond), stream (perennial and intermittent), swales, and seeps (Figure 3.5-3). While much of this habitat has been mapped, as shown in Figure 3.5-3, some features, including seeps, have not been previously mapped other than through a review of aerial imagery. Many of the aquatic habitats in the LRDP area are hydrologically connected to other streams that run into Monterey Bay, and would therefore be regulated by the US Army Corps of Engineers under the federal CWA. Additionally, these features and associated habitat are likely waters of the state and/or under the regulatory authority of CDFW pursuant to California Fish and Game Code 1600 et seq. Wetlands, swales, and seeps, would likely be considered state-protected wetland habitat.

Implementation of the 2021 LRDP would result in development of approximately 378 acres of land within the LRDP area, approximately 41 percent of which would occur within urban/developed land cover types where wetlands, seeps, and streams are less likely to occur than in undeveloped portions of the LRDP area (Table 3.5-4, Figure 3.5-6). While the majority of the development area would avoid mapped stream habitat, some development in central campus would be located in close proximity to streams associated with the Wilder and Moore Creek drainages. Additionally, proposed development areas in undeveloped portions of upper campus could contain wetland and seep habitat, which is known to occur in upper campus.

Implementation of projects under the 2021 LRDP may include ground disturbance, vegetation removal, and land development. These activities could adversely modify protected wetlands resulting in loss of wetland function and value by altering wetland hydrology, directly removing wetland vegetation, or filling or dredging wetlands, if these features are present within an individual project area. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-4: Identify State or Federally Protected Wetlands, Implement Avoidance Measures, and Obtain Permits for Unavoidable Impacts on Wetlands

If it is determined through implementation of Mitigation Measure BIO-3.5-1a that state or federally protected wetlands may be present within a particular project site, the following measures shall be implemented before implementation of project activities:

- UC Santa Cruz will retain a qualified biologist, hydrologist, or wetland ecologist to prepare a formal delineation of the boundaries of state or federally protected wetlands within the project site (including 1602 jurisdictional waterways) according to methods established in the USACE wetlands delineation manual (Environmental Laboratory 1987) and the Arid West regional supplement (USACE 2008). The qualified biologist will also delineate the boundaries of wetlands that may not meet the definition of waters of the United States, but would qualify as waters of the state, according to the state wetland procedures (SWRCB 2019). This delineation report will be submitted by UC Santa Cruz to USACE and a preliminary jurisdictional determination will be requested.
- If state or federally protected wetlands are determined to be present within a project site that can be avoided, the qualified biologist will establish a buffer around wetlands and mark the buffer boundary with high-visibility flagging, fencing, stakes, or clear, existing landscape demarcations (e.g., edge of a roadway). The buffer will be a minimum width of 25 feet but may be larger if deemed necessary. The appropriate size and shape of the buffer zone will be determined in coordination with the qualified biologist and will depend on the type of wetland present (e.g., stream, seep, pond), the timing of project activities (e.g., wet or dry time of year), whether any special-status species may

occupy the wetland and the species' vulnerability to the project activities, environmental conditions and terrain, and the project activity being implemented.

Project activities (e.g., ground disturbance, vegetation removal, staging) will be prohibited within the established buffer. The qualified biologist will periodically inspect the materials demarcating the buffer to confirm that they are intact and visible, and wetland impacts are being avoided.

- If it is determined that fill of waters of the United States would result from project implementation, authorization for such fill will be secured from USACE through the Section 404 permitting process. Any waters of the United States that would be affected by the project will be replaced or restored on a no-net-loss basis in accordance with the applicable USACE mitigation guidelines in place at the time of construction. In association with the Section 404 permit (if applicable) and prior to the issuance of any grading permit, Section 401 Water Quality Certification from the Central Coast RWQCB will be obtained. For impacts on waters of the state that may not be covered by the 401 Water Quality Certification, UC Santa Cruz will secure Waste Discharge Requirements, which are described in Section 3.10, "Hydrology and Water Quality."
- If it is determined that disturbance or fill of state protected streams or riparian habitat cannot be avoided, UC Santa Cruz will notify CDFW before commencing activity that may divert the natural flow or otherwise alter the bed, bank, or riparian corridor of any 1602 jurisdictional waterway. If project activities trigger the need for a Streambed Alteration Agreement, the proponent will obtain an agreement from CDFW before the activity commences. The applicant will conduct project construction activities in accordance with the agreement, including implementing reasonable measures in the agreement necessary to protect the fish and wildlife resources, when working within the bed or bank of waterways or in riparian habitats associated with those waterways. These measures may include but not be limited to demarcation of the construction area, biological monitoring, environmental awareness training for construction crews, and compensatory measures (e.g., restoration, long-term habitat management).
- Impacts on wetlands considered ESHAs within the coastal zone (if any) will require a coastal development permit pursuant to the CCA and compliance with any requirements therein.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a and 3.5-4 would reduce significant impacts on state and federally protected wetlands to a **less-than-significant** level by requiring reconnaissance-level surveys of projects under the 2021 LRDP to determine the likelihood of presence of these features, a formal delineation of wetland habitats, implementation of avoidance measures, and permitting and compensation for unavoidable impacts on state or federally protected wetlands such that there is no net loss of these resources.

Impact 3.5-5: Interfere with Wildlife Movement Corridors or Impede the Use of Wildlife Nurseries

Implementation of projects under the 2021 LRDP would include potential land use conversion and development activities including ground disturbance, vegetation removal, and land development, which could result in adverse effects on resident or migratory wildlife corridors through habitat fragmentation, degradation of aquatic habitat (e.g., streams), or blockage of important wildlife migration paths. These activities could also disturb wildlife nursery sites or degrade essential nursery habitat components. Impacts on movement corridors, habitat connectivity, and wildlife nursery sites would be **potentially significant**.

The LRDP area contains natural habitats, especially within north campus, which likely function as wildlife movement corridors. Aquatic habitats within the LRDP area, including perennial and intermittent streams, and associated riparian habitat likely serve as migratory corridors for fish, aquatic invertebrates, amphibians, and birds associated with riparian habitat. Terrestrial habitat within the north campus portion of the LRDP area has been identified as an ECA connecting natural landscape blocks to the north, west, and south (Figure 3.5-5). These areas are known movement corridors for mountain lions (see mountain lion discussion above under Impact 3.5-2, Santa Cruz Puma Project 2020) and likely are also used by bobcats (*Lynx rufus*), coyotes (*Canis latrans*), gray foxes, and mule deer.

Wildlife nursery sites include locations where fish and wildlife concentrate for hatching and/or raising young. Nursery sites that could occur within the LRDP area include bird rookeries (e.g., herons, cormorants), fawning areas for deer,

or maternal roosts for common bat species. Native nursery sites are not mapped on a regional scale and have generally not been mapped in the LRDP area. Nursery sites may be occupied by common wildlife species; however, these species may depend on these sites for important life history periods (e.g., breeding) and local nursery sites may have importance to wildlife populations at a regional level. Impacts on locally or regionally significant wildlife nursery sites may result in a substantial reduction in habitat for that species.

Noise or visual disturbance due to the presence of vehicles, equipment, or personnel or physical impediments, such as material storage or equipment staging during implementation of projects under the 2021 LRDP could cause resident or migratory wildlife to temporarily avoid or move out of the areas immediately surrounding project sites. These disturbances could temporarily disrupt the movement patterns of some wildlife species that may use project sites or adjacent lands for regular movements locally or for seasonal migrations. Additionally, access or use of any wildlife nursery sites (e.g., bat maternity roosts, deer fawning areas, bird rookeries, monarch overwintering sites) present within or adjacent to active project sites could be disturbed or impeded temporarily by project activities, as explained further below.

Much of the proposed development under the 2021 LRDP would be infill projects in already developed areas or in proximity to developed areas. The general types and levels of disturbance (e.g., vehicle and equipment noise, visual disturbance, human activity) from project construction activities near developed areas (e.g., buildings, public roads with consistent traffic) would likely be similar to existing disturbance levels in these areas. Wildlife near human development is likely accustomed to human presence and motorized vehicles (e.g., mule deer); therefore, any temporary incremental increases in noise and human disturbances from project activities in these areas are unlikely to substantially disrupt current movement patterns. Infill projects would likely not create any temporary or permanent barriers to wildlife movement in excess of surrounding development and existing barriers. Additionally, urban/developed areas within the LRDP area are less likely to contain sensitive wildlife nursery sites compared to undeveloped natural habitats.

Proposed development would occur within redwood, grassland, landscaping/ornamental (which may retain similar habitat function to natural habitats), northern maritime chaparral, coastal prairie, coyote brush, agricultural, and riparian woodland and scrub habitats (Table 3.5-4). Disturbance associated with project construction activities would likely result in noise and visual disturbance levels greater than existing conditions in these undeveloped areas and would also result in new temporary or permanent barriers to movement which could in temporary or permanent disruption of wildlife movement. Additionally, if nursery sites are present within project sites under the 2021 LRDP in these undeveloped or relatively undeveloped areas, project activities could potentially result removal or abandonment of a wildlife nursery. For example, project activities could remove trees containing a bat maternity roost or a bird nesting colony. In addition, project-related noise and human disturbance near nursery sites could result in temporary avoidance, changes in behavior, separation of adults and young, or, if the disturbance is severe, abandonment of the nursery site. These disturbances and behavioral responses could decrease the reproductive success of the affected population.

In addition to construction-related impacts, the placement and design of buildings and other infrastructure (e.g., fencing, lighting) could also result in adverse effects on wildlife movement or wildlife nursery sites, including bird strikes and wildlife entanglement. The amount of glass in a building, especially untreated glass, is the strongest predictor of the risk of bird collisions (American Bird Conservancy 2015). Under certain conditions, glass on buildings can form a mirror, reflecting sky, clouds, or nearby habitat attractive to birds. Under other conditions, glass may appear transparent or black, which birds may perceive as an unobstructed route (American Bird Conservancy 2015). If placed in front of ground level windows, landscaping (e.g., shrubs, trees) can be reflected in these windows, causing birds to collide with the building (American Bird Conservancy 2015). Bird-friendly building-design strategies include (1) using minimal glass, (2) placing glass behind some type of screening (e.g., netting, screens, grilles, shutters, exterior shades), and (3) using glass with inherent properties that reduce collisions (American Bird Conservancy 2015). Although most bird collisions occur during the day, some avian species migrate at night, and artificial night lighting on buildings may result in disorientation, potential collisions, changes in animal behavior (e.g., foraging behavior, communication), and an increased likelihood of predation. Certain fencing materials can impale or entangle wildlife,

including barbed, loose, or broken wires, and wrought iron fencing; and the height of fencing can result in snaring of legs or antlers of migrating deer, potentially result in injury or death.

Interference with wildlife movement corridors and disturbance or removal of wildlife nursery sites during construction or as a result of building or fencing design would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a (above): Conduct Project-Level Biological Reconnaissance Sensitive Species and Habitats Survey

Mitigation Measure 3.5-3a (above): Conduct Protocol-Level Surveys for Sensitive Natural Communities and Riparian Habitat and Implement Avoidance Measures

Mitigation Measure 3.5-3b (above): Compensate for Unavoidable Loss of Sensitive Natural Communities

Mitigation Measure 3.5-3c (above): Compensate for Unavoidable Loss of Riparian Habitat

Mitigation Measure 3.5-4 (above): Identify State or Federally Protected Wetlands, Implement Avoidance Measures, and Obtain Permits for Unavoidable Impacts on Wetlands

Mitigation Measures 3.5-5a: Utilize Wildlife-Friendly Building and Fencing Designs

The following measures shall be implemented during the early planning stages of projects under the 2021 LRDP:

- Buildings and other permanent structures that would be constructed during implementation of projects under the 2021 LRDP shall be designed to minimize impacts on wildlife, including disruption to wildlife movement, bird strikes, and wildlife entanglement.
  - Building design shall utilize guidelines regarding building height, materials, external lighting, and landscaping provided in the American Bird Conservancy's "Bird Friendly Building Design" (American Bird Conservancy 2015) or other appropriate resources (e.g., International Dark Sky Association). UC Santa Cruz shall require review of the design plans by a qualified biologist, who will determine whether the plans are sufficient to reduce the likelihood of bird strikes or recommend additional measures.
  - Fencing associated with new development under the 2021 LRDP will utilize wildlife-friendly fencing design to minimize the risk of entanglement or impalement of wildlife. UC Santa Cruz will require the review of fencing design by a qualified biologist prior to installation. The fencing design shall meet, but not be limited to the following standards:
    - Minimize the chance of wildlife entanglement by avoiding barbed wire, loose or broken wires, or any material that could impale, snag, or entrap a leaping animal (e.g., wrought iron fencing with spikes).
    - Allow wildlife to jump over easily without injury. Typically, fences should be no more than 40 inches high on flat ground to allow adult deer to jump over. The determination of appropriate fence height will consider slope, as steep slopes are more difficult for wildlife to pass.
    - Allow smaller wildlife to pass under easily without injury or entrapment.

Mitigation Measure 3.5-5b: Retain Wildlife Nursery Habitat and Implement Buffers to Avoid Wildlife Nursey Sites

If it is determined through implementation of Mitigation Measure 3.5-1a that wildlife nursery sites are present within a particular project site, the following measures shall be implemented prior to and during construction of a project:

- A qualified biologist will identify the important habitat features of the wildlife nursery and, prior to commencement of project activities (e.g., ground disturbance, vegetation removal, staging), will mark these features for avoidance and retention during project implementation to maintain the function of the nursery habitat.

- A no-disturbance buffer will be established around the nursery site if project activities are required while the nursery site is active/occupied. The appropriate size and shape of the buffer will be determined by a qualified biologist, based on potential effects of project-related habitat disturbance, noise, visual disturbance, and other factors, but will typically be a minimum of 100 feet. No project activity will commence within the buffer area until a qualified biologist confirms that the nursery site is no longer active/occupied. Monitoring of the effectiveness of the no-disturbance buffer around the nursery site by a qualified biologist during and after project activities will be required. If project activities cause agitated behavior of the individual(s), the buffer distance will be increased, or project activities modified until the agitated behavior stops. The qualified biologist will have the authority to stop any project activities that could result in potential adverse effects to wildlife nursery sites.

Significance after Mitigation

Implementation of Mitigation Measures 3.5-1a, 3.5-3a, 3.5-3b, 3.5-3c, 3.5-4, 3.5-5a, and 3.5-5b would reduce significant impacts on wildlife movement corridors and native wildlife nursery sites to a **less-than-significant** level by requiring reconnaissance-level surveys of projects under the 2021 LRDP to determine the likelihood of presence of wildlife nursery sites; sensitive natural communities, riparian habitats, and wetlands and measures to avoid or compensate for loss of these resources which may provide habitat connectivity or habitat for wildlife nursery sites; wildlife-friendly building and fencing design to minimize impacts on wildlife as a result of bird strikes or entanglement; and identification and avoidance of important habitat for wildlife nursery sites.

Impact 3.5-6: Conflict with Local Policies and Ordinances

There are several policies in the City of Santa Cruz 2030 General Plan and the County of Santa Cruz General Plan and LCP that protect biological resources. UC Santa Cruz is not subject to local governments' regulations; however, mitigation measures identified under Impacts 3.5-1, 3.5-2, 3.5-3, 3.5-4, and 3.5-5 would reduce impacts on resources protected by local policies to less than significant. Therefore, the impact related to potential conflict with local policies or ordinances protecting biological resources would be **less than significant**.

Appendix G of the State CEQA Guidelines suggests evaluating whether a project would "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, LCP, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect." Pursuant to the UC's constitutional autonomy, development and uses on property under control of the UC Santa Cruz that are in furtherance of its educational purposes are not subject to local land use regulation, including City of Santa Cruz and County of Santa Cruz General Plan policies regarding protection of biological resources. Although UC Santa Cruz is not subject to City and County policies and regulations, UC Santa Cruz strives to be consistent with local policies, where feasible.

The City of Santa Cruz 2030 General Plan and the County of Santa Cruz General Plan include policies protecting biological resources, such as rivers, streams, creeks, wetlands, riparian habitat, special-status plants, special-status wildlife, and sensitive habitats. As discussed above in Impacts 3.5-1, 3.5-2, 3.5-3, 3.5-4, and 3.5-5, while implementation of projects under the 2021 LRDP would affect these resources, mitigation measures would be implemented to reduce impacts to less than significant. No conflict with the policies protecting these resources would occur; therefore, the impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.5-7: Conflict with the Provisions of an Adopted Habitat Conservation Plan or Natural Community Conservation Plan

The Ranch View Terrace HCP plan area is located within the lower campus portion of the LRDP area. The HCP plan area includes two preserves: IAA and IAD. Development of IAD would result in a conflict with the provisions of the adopted HCP and incidental take permit granted by USFWS. This would be a **potentially significant** impact.

The Ranch View Terrace HCP was developed by the UC Regents to seek regulatory compliance for the construction and operations of the Ranch View Terrace project and a new Emergency Response Center and was approved in 2005 (UC Santa Cruz 2005b). The HCP plan area includes approximately 38.8 acres of the lower campus portion of the LRDP area (Figure 3.5-1). Two preserves were established to maintain habitat for Ohlone tiger beetle and California red-legged frog: IAA in the southwestern portion of the LRDP area and IAD directly south of the Ranch View Terrace project site (Figure 3.5-1).

Ohlone tiger beetles are known to occupy the grassland/coastal prairie area in the southwest corner of the LRDP area west of Empire Grade, including IAA (Arnold 2020, Jones, pers. comm., 2020) and the area likely provides habitat connectivity for California red-legged frogs dispersing from the Arboretum Pond breeding area to non-breeding areas, as discussed under the California red-legged frog discussion in Impact 3.5-2. IAD was not known to be occupied by either covered species when established in 2005. The conservation strategy for this preserve was to manage the vegetation within the preserve through grazing, hand removal of nonnative vegetation, and artificial scraping using heavy equipment to mimic bare ground conditions favored by Ohlone tiger beetle, until conditions approached those within IAA, such that the habitat would be suitable for and would attract Ohlone tiger beetle. The Ranch View Terrace HCP includes monitoring requirements of IAA (off-site of the Ranch View Terrace project site) and IAD (the on-site preserve) for effectiveness of vegetation management and presence/absence of Ohlone tiger beetle and California red-legged frog (UC Santa Cruz 2019). Despite 14 years of vegetation management and monitoring for Ohlone tiger beetle, the species has not colonized IAD (UC Santa Cruz 2019).

Proposed development under the 2021 LRDP includes potential development of IAD, under the condition that the HCP could be modified to allow it. As this area is currently a designated preserve under the Ranch View Terrace HCP, development of IAD would result in a conflict with the provisions of the adopted HCP and incidental take permit granted by USFWS. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-7: Establish Alternative Preserves to Replace Inclusion Area D, and Amend the Ranch View Terrace HCP with Approval from USFWS

The following measures shall be implemented prior to any development activities within IAD:

- UC Santa Cruz shall, in consultation with USFWS, seek an amendment to the Ranch View Terrace HCP to accommodate replacement of IAD with replacement habitat that may be suitable, created, or restored for Ohlone tiger beetle.
- In consultation with USFWS, UC Santa Cruz will determine whether a new preserve(s) could be established to replace IAD. New proposed preserves will be characterized by equal (12.5 acres) or greater size, and better habitat (e.g., intact coastal prairie, Watsonville loam soils, bare soil available, presence of Ohlone tiger beetle) than IAD.
- If USFWS concurs that replacement of IAD is appropriate, the Ranch View Terrace HCP will be amended to exclude IAD. Any new preserve(s) would be managed through yearly monitoring and vegetation management activities with the objective of fostering occupation by Ohlone tiger beetle.
- If USFWS does not concur that replacement of IAD is appropriate, the existing incidental take permit and associated measures in the Ranch View Terrace HCP will apply, and no development will occur within IAD.
- As noted in Mitigation Measures 3.5-2a and 3.5-2i, UC Santa Cruz may elect to pursue a comprehensive HCP, which shall be accomplished either by amending the Ranch View Terrace HCP or by incorporating and replacing the existing Ranch View Terrace HCP.

Significance after Mitigation

Implementation of Mitigation Measure 3.5-7 would reduce significant impacts resulting from conflict with the provisions of the Ranch View Terrace HCP to a **less-than-significant** level by requiring consultation with USFWS, identification and protection of alternative preserves, or amendment of the existing HCP or preparation of a new more comprehensive HCP, or prohibition of development in IAD if the HCP cannot be amended.

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3.6 ENERGY

This section was prepared pursuant to CEQA Guidelines Section 15126 and Appendix G of the CEQA Guidelines, which require that EIRs include a discussion of the potential energy impacts of projects, with emphasis on considering whether implementation of the 2021 LRDP would result in inefficient, wasteful, and unnecessary consumption of energy. The section discusses the energy impacts from the implementation of the 2021 LRDP. Detailed calculations and results can be found in Appendix F of this EIR.

Energy related to land development is primarily associated with direct energy consumption for space heating and cooling, and indirect energy consumed in generation of electricity at power plants. Transportation energy use is related to the efficiency of cars, trucks, and public transportation; choice of travel modes (e.g., automobile, carpool, vanpool, and transit); and miles traveled by these modes. Energy is also consumed during construction and routine operation and maintenance of land uses.

Comments received on the NOP (see Appendix B) expressed interest in the 2021 LRDP's consideration of energy efficiency, renewable energy use, and compliance with the City of Santa Cruz's (City) Electrification Ordinance for all new construction. As a state entity, UC Santa Cruz follows energy efficiency guidelines presented in the University of California (UC) Sustainable Practices Policy, which is considered consistent with the local ordinance. The UC's and UC Santa Cruz's energy efficiency policies are discussed in more detail below.

3.6.1 Regulatory Setting

FEDERAL

Energy Policy and Conservation Act, and CAFE Standards

The Energy Policy and Conservation Act of 1975 established nationwide fuel economy standards to conserve oil. Pursuant to this Act, the National Highway Traffic and Safety Administration, part of the U.S. Department of Transportation (DOT), is responsible for revising existing fuel economy standards and establishing new vehicle economy standards.

In October 2012, the U.S. Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHSTA), on behalf of the Department of Transportation, issued final rules to further reduce greenhouse gas (GHG) emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 FR 62624). NHTSA's CAFE standards have been enacted under the Energy Policy and Conservation Act since 1978. This national program requires automobile manufacturers to build a single light-duty national fleet that meets all requirements under both federal programs and the standards of California and other states. This program would increase fuel economy to the equivalent of 54.5 miles per gallon (mpg) limiting vehicle emissions to 163 grams of carbon dioxide (CO_2) per mile for the fleet of cars and light-duty trucks by model year 2025 (77 FR 62630).

Safer Affordable Fuel-Efficient Vehicles Rule

On August 2, 2018, NHTSA and EPA proposed the Safer Affordable Fuel-Efficient Vehicle Rule (SAFE Rule). This rule addresses emissions and fuel economy standards for motor vehicles and is separated in two parts. Part One addresses emission standards, while Part Two addresses CAFE standards for passenger cars and light trucks for model years 2021 to 2026. This rulemaking proposes new CAFE standards for model years 2022 through 2026 and would amend existing CAFE standards for model year 2021. The proposal would retain the model year 2020 standards (specifically, the footprint target curves for passenger cars and light trucks) through model year 2026, but comment is sought on a range of alternatives discussed throughout the proposed rule. The final SAFE Rule Part Two was released on March 31, 2020. The outcome of any pending or potential lawsuits (and how such lawsuits could delay or affect its implementation) are unknown at this time.

Energy Policy Act of 1992 and 2005

The Energy Policy Act of 1992 was passed to reduce the country's dependence on foreign petroleum and improve air quality. The act includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. The act requires certain federal, state, and local government and private fleets to purchase a percentage of light-duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are also included in the act. Federal tax deductions are allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs. The Energy Policy Act of 2005 provides renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 is designed to improve vehicle fuel economy and help reduce U.S. dependence on oil. It represents a major step forward in expanding the production of renewable fuels, reducing dependence on oil, and confronting global climate change. The act increases the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel in 2022, which represents a nearly fivefold increase over current levels; and reduces U.S. demand for oil by setting a national fuel economy standard of 35 mpg by 2020—an increase in fuel economy standards of 40 percent.

By addressing renewable fuels and the CAFE standards, the Energy Independence and Security Act of 2007 builds upon progress made by the Energy Policy Act of 2005 in setting out a comprehensive national energy strategy for the 21st century.

STATE

Warren-Alquist Act

The 1974 Warren-Alquist Act established the California Energy Resources Conservation and Development Commission, now known as the California Energy Commission (CEC). The creation of the act occurred as a response to the state legislature's review of studies projecting an increase in statewide energy demand, which would potentially encourage the development of power plants in environmentally sensitive areas. The act introduced State policy for siting power plants to reduce potential environmental impacts, and additionally sought to reduce demand for these facilities by directing CEC to develop statewide energy conservation measures to reduce wasteful, inefficient, and unnecessary uses of energy. Conservation measures recommended establishing design standards for energy conservation in buildings that ultimately resulted in the creation of the Title 24 Building Energy Efficiency Standards (California Energy Code), which have been updated regularly and remain in effect today. The act additionally directed CEC to cooperate with the Office of Planning and Research (OPR), the California Natural Resources Agency (CNRA), and other interested parties in ensuring that a discussion of wasteful, inefficient, and unnecessary consumption of energy is included in all environmental impact reports required on local projects.

Assembly Bill 2076: Reducing Dependence on Petroleum

Pursuant to Assembly Bill (AB) 2076 (Chapter 936, Statutes of 2000), CEC and the California Air Resources Board (CARB) prepared and adopted a joint agency report in 2003, *Reducing California's Petroleum Dependence.* This report includes recommendations to increase the use of alternative fuels to 20 percent of on-road transportation fuel use 30 percent by 2030, significantly increase the efficiency of motor vehicles, and reduce per capita vehicle miles traveled (VMT) (CEC and CARB 2003). Further, in response to CEC's 2003 and 2005 *Integrated Energy Policy Reports* (IEPR), the Governor directed CEC to develop a long-term plan to increase alternative fuel use. A performance-based goal of AB 2076 was to reduce the State's petroleum demand to 15 percent below 2003 demand by 2030.

Integrated Energy Policy Report

Senate Bill (SB) 1389 (Chapter 568, Statutes of 2002) required CEC to: "conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The Energy Commission shall use these assessments and forecasts to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety" (Public Resources Code Section 25301(a)). This work culminated in the IEPR. CEC adopts an IEPR every two years and an update every other year. The 2019 IEPR is the most recent IEPR, which was adopted January 21, 2020. The 2019 IEPR provides a summary of priority energy issues currently facing the State, outlining strategies and recommendations to further the State's goal of ensuring reliable, affordable, and environmentally responsible energy sources.

Renewables Portfolio Standard

The State passed legislation referred to as the Renewables Portfolio Standard (RPS) that requires increasing use of renewable energy to produce electricity for consumers. California utilities are required to generate 33 percent of their electricity from renewables by 2020 (SB X1-2 of 2011); 52 percent by 2027 (SB 100 of 2018); 60 percent by 2030 (also SB 100 of 2018); and 100 percent by 2045 (also SB 100 of 2018). More detail about these regulations is provided in Section 3.8, "Greenhouse Gas Emissions."

Senate Bill 350: Clean Energy and Pollution Reduction Act of 2015

The Clean Energy and Pollution Reduction Act of 2015 (SB 350) requires that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50 percent by December 31, 2030. It also establishes energy efficiency targets that achieve statewide, cumulative doubling of the energy efficiency savings in electricity and natural gas end uses by the end of 2030.

Assembly Bill 1007: State Alternative Fuels Plan

AB 1007 (Chapter 371, Statutes of 2005) required CEC to prepare a State plan to increase the use of alternative fuels in California. CEC prepared the State Alternative Fuels Plan in partnership with CARB and in consultation with other State, federal, and local agencies. The plan presents strategies and actions California must take to increase the use of alternative non-petroleum fuels in a manner that minimizes the costs to California and maximizes the economic benefits of in-state production. The plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuel use, reduce GHG emissions, and increase in-state production of biofuels without causing a significant degradation to public health and environmental quality.

Executive Order S-06-06

Executive Order S-06-06, signed on April 25, 2006, establishes targets for the use and production of biofuels and biopower, and directs State agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The Executive Order establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 75 percent of its biofuels within California by 2050. The Executive Order also calls for the State to meet a target for use of biomass electricity. The 2011 Bioenergy Action Plan identifies those barriers and recommends actions to address them so that the State can meet its clean energy, waste reduction, and climate protection goals. The 2012 Bioenergy Action Plan updates the 2011 plan and provides a more detailed action plan to achieve the following goals:

- increase environmentally- and economically-sustainable energy production from organic waste;
- encourage development of diverse bioenergy technologies that increase local electricity generation, combined heat and power facilities, renewable natural gas, and renewable liquid fuels for transportation and fuel cell applications;
- create jobs and stimulate economic development, especially in rural regions of the state; and
- reduce fire danger, improve air and water quality, and reduce waste.

As of 2018, 2.4 percent of the total electricity system power in California was derived from biomass (CEC 2019a).

California Energy Efficiency Action Plan

The 2019 California Energy Efficiency Action Plan has three primary goals for the State: double energy efficiency savings by 2030 relative to a 2015 base year (per SB 350), expand energy efficiency in low-income and disadvantaged communities, and reduce GHG emissions from buildings. This plan provides guiding principles and recommendations on how the State would achieve those goals. These recommendations include:

- identifying funding sources that support energy efficiency programs,
- identifying opportunities to improve energy efficiency through data analysis,
- using program designs as a way to encourage increased energy efficiency on the consumer end,
- improving energy efficiency through workforce education and training, and
- supporting rulemaking and programs that incorporate energy demand flexibility and building decarbonization (CEC 2019b).

California Building Energy Efficiency Standards (Title 24, Part 6)

The energy consumption of new residential and nonresidential buildings in California is regulated by the State's Title 24, Part 6, Building Energy Efficiency Standards (California Energy Code). The California Energy Code was established by CEC in 1978 in response to a legislative mandate to create uniform building codes to reduce California's energy consumption and provide energy efficiency standards for residential and non-residential buildings. CEC updates the California Energy Code every 3 years with more stringent design requirements for reduced energy consumption, which results in the generation of fewer GHG emissions.

The 2019 California Energy Code was adopted by CEC on May 9, 2018 and applies to projects constructed after January 1, 2020. The 2019 California Energy Code is designed to move the State closer to its zero-net energy goals for new residential development. It does so by requiring all new residences to install enough renewable energy to offset all the electricity needs of each residential unit (CCR, Title 24, Part 6, Section 150.1(c)4). CEC estimates that the combination of mandatory on-site renewable energy and prescriptively required energy efficiency standards will result in a 53 percent reduction in energy consumption in new residential construction as compared to the 2016 California Energy Code. Non-residential buildings are anticipated to reduce energy consumption by 30 percent as compared to the 2016 California Energy Code primarily through prescriptive requirements for high-efficiency lighting (CEC 2018). The California Energy Code is enforced through the local plan check and building permit process. Local government agencies may adopt and enforce additional energy standards for new buildings as reasonably necessary due to local climatologic, geologic, or topographic conditions, provided that these standards exceed those provided in the California Energy Code.

Assembly Bill 32, Senate Bill 32, and Climate Change Scoping Plan and Update

In December 2008, CARB adopted its Climate Change Scoping Plan, which contains the main strategies California will implement to achieve reduction of approximately 118 million metric tons (MMT) of carbon dioxide equivalent (CO_2e) emissions, or approximately 21.7 percent from the state's projected 2020 emission level of 545 $MMTCO_2e$ under a business-as-usual scenario (this is a reduction of 47 $MMTCO_2e$, or almost 10 percent, from 2008 emissions). In May 2014, CARB released and has since adopted the *First Update to the Climate Change Scoping Plan* to identify the next steps in reaching AB 32 goals and evaluate progress that has been made between 2000 and 2012 (CARB 2014). According to the update, California is on track to meet the near-term 2020 GHG limit and is well positioned to maintain and continue reductions beyond 2020 (CARB 2014). The update also reports the trends in GHG emissions from various emission sectors (e.g., transportation, building energy, agriculture).

In August 2016, SB 32 and AB 197, which serve to extend California's GHG reduction programs beyond 2020, were signed into law. SB 32 amended the Health and Safety Code to include Section 38566, which contains language to authorize CARB to achieve a statewide GHG emission reduction to at least 40 percent below 1990 levels by no later than December 31, 2030. SB 32 codified the targets established by Executive Order B-30-15 for 2030, which set the next interim step in the State's continued efforts to pursue the long-term target expressed in Executive Orders S-3-05 and B-30-15 of 80 percent below 1990 emission levels by 2050. Achievement of these goals will have the co-benefit

of reducing California's dependence on fossil fuels and making land use development and transportation systems more energy efficient.

California's 2017 Climate Change Scoping Plan (2017 Scoping Plan), prepared by CARB, outlines the main strategies California will implement to achieve the legislated GHG emission target for 2030 and "substantially advance toward our 2050 climate goals" (CARB 2017:1, 3, 5, 20, 25–26). It identifies the reductions needed by each GHG emission sector (e.g., transportation, industry, electricity generation, agriculture, commercial and residential, pollutants with high global warming potential, and recycling and waste). The State is on target to meet the SB X1-2 33-percent renewable energy target by 2020 and will continue to increase statewide renewable electricity to 60 percent by 2030 and to 100-percent carbon-free electricity by 2045, pursuant to SB 100 of 2018. Additionally, the State will further its climate goals through improving the energy efficiency of residential and nonresidential buildings by continual updates (i.e., every 3 years) to the California Energy Code, which contains mandatory and prescriptive energy efficiency standards for all new construction.

More details about the statewide GHG reduction goals and 2017 Scoping Plan measures are provided in the regulatory setting in Section 3.8, "Greenhouse Gas Emissions," of this Draft EIR.

Senate Bill 375 of 2008

SB 375, signed into law in September 2008, aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. It requires metropolitan planning organizations (MPOs) to adopt a Sustainable Communities Strategy or Alternative Planning Strategy, showing prescribed land use allocation in each MPO's Regional Transportation Plan. CARB, in consultation with the MPOs, is to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks for 2020 and 2035. Implementation of SB 375 will have the co-benefit of reducing California's dependence on fossil fuels and making land use development and transportation systems more energy efficient.

Executive Order B-18-12: Green Building Action Plan

In April 2012, Executive Order B-18-12 was issued, which requires State agencies to implement green building practices to improve energy, water, and materials efficiency; improve air quality and working conditions for State employees; reduce costs to the State; and reduce environmental impacts from State operations. Among other actions, Executive Order B-18-12 requires State agencies to reduce agency-wide water use by 10 percent by 2015 and 20 percent by 2020, as measured against a 2010 baseline. The Executive Order directs new State buildings designed after 2025 to be constructed as Zero Net Energy (ZNE) facilities, with an interim target of 50 percent of new facilities beginning design after 2020 to be ZNE. The Executive Order also calls for State agencies to identify and pursue opportunities to provide electric vehicle charging stations at employee parking facilities in new buildings.

Senate Bill 743 of 2013

SB 743 of 2013 required that the Governor's OPR propose changes to the State CEQA Guidelines to address transportation impacts in transit priority areas and other areas of the state. In response, Section 15064.3, which requires that transportation impacts no longer consider congestion but instead focus on the impacts of VMT, was added to the State CEQA Guidelines in December 2018. In support of these changes, OPR published its *Technical Advisory on Evaluating Transportation Impacts in CEQA*, which recommends that the transportation impact of a project be based on whether the project would generate a level of VMT per capita (or VMT per employee or some other metric) that is 15 percent lower than that of existing development in the region (OPR 2017:12–13) or that a different threshold based on substantial evidence be used. OPR's technical advisory explains that this criterion is consistent with Public Resources Code (PRC) Section 21099, which states that the criteria for determining significance must "promote the reduction in greenhouse gas emissions" (OPR 2017:18). More detail about SB 743 is provided in the regulatory setting of Section 3.16, "Transportation, Circulation, and Parking."

Executive Order B-48-18: Zero-Emission Vehicles

On January 26, 2018, Governor Brown signed Executive Order B-48-18 requiring all State entities to work with the private sector to have at least 5 million zero-emission vehicles (ZEVs) on the road by 2030, as well as install 200

hydrogen fueling stations and 250,000 electric vehicle (EV) charging stations by 2025. It specifies that 10,000 of the EV charging stations should be direct current fast chargers. This order also requires all State entities to continue to partner with local and regional governments to streamline the installation of ZEV infrastructure. The Governor's Office of Business and Economic Development is required to publish a *Plug-in Charging Station Design Guidebook* and update the *2015 Hydrogen Station Permitting Guidebook* (Eckerle and Jones 2015) to aid in these efforts. All State entities are required to participate in updating the *2016 Zero-Emissions Vehicle Action Plan*, along with the *2018 ZEV Action Plan Priorities Update*, which includes and extends the 2016 ZEV Action Plan (Governor's Interagency Working Group on Zero-Emission Vehicles 2016, 2018), to help expand private investment in ZEV infrastructure with a focus on serving low-income and disadvantaged communities.

Executive Order N-79-20

Governor Gavin Newsom signed Executive Order N-79-20 in September 2020, which sets a statewide goal that 100 percent of all new passenger car and truck sales in the state will be zero-emissions by 2035. It also sets a goal that 100 percent of statewide new sales of medium- and heavy-duty vehicles will be zero emissions by 2045, where feasible, and for all new sales of drayage trucks to be zero emissions by 2035. Additionally, the Executive Order targets 100 percent of new off-road vehicle sales in the state to be zero emission by 2035. CARB is responsible for implementing the new vehicle sales regulation.

UNIVERSITY OF CALIFORNIA

UC Santa Cruz Climate and Energy Strategy

UC Santa Cruz's 2017 Climate and Energy Strategy (CES) serves as the campus's climate action plan and addresses how the campus would achieve its two climate and energy goals: achieving carbon neutrality by 2025 from Scope 1 and Scope 2 sources and mitigating the impacts of the Cap and Trade Regulation (UCSC 2017). The strategies to meet these goals include the following:

- Double the pace of implementation of energy efficiency projects that qualify for funding through the Higher Education Energy Efficiency Partnership (Strategic Energy Partnership) program.
- Install up to 4.4 megawatts (MW) solar photovoltaic panels (3.3 MW of which would be installed on main residential campus, with an additional 1.1 MW at Westside Research Park and the Long Marine Lab at the Coastal Science Campus) through execution of a Power Purchase Agreement.
- Establish energy use intensity (EUI) targets for new capital projects that achieve the UC Sustainable Practices Policy "stretch targets" at a minimum, and strive to achieve a 60 percent reduction in EUI below 1999 benchmarks (by building type) in conjunction with achieving Net Zero Site Source targets for major capital projects.

University of California Sustainable Practices Policy

At the direction of The Regents of the University of California, UCOP developed a Sustainable Practices Policy which establishes sustainability goals to be achieved by all campuses, medical centers, and the Lawrence Berkeley National Laboratory within the UC system. The policy is regularly updated, with the most recent update occurring in July 2020. The policy goals encompass nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, sustainable water systems (UCOP 2020). The policy includes the following provisions relevant to the reduction of GHG emissions:

A. Green Building Design

New Buildings

1. All new building projects, other than acute care facilities, shall be designed, constructed, and commissioned to outperform the California Energy Code energy-efficiency standards by at least 20 percent or meet the whole-building energy performance targets listed in Table 1 of Section V.A.3 in the SPP (summarized in Table 3.6-1, below).

Table 3.6-1 UC Whole Building Energy Performance Targets (Excerpt of Table 1 of Section V.A.3, UCOP SPP)

Years Budget Approved	Compliance Target	Stretch Target
2019-2020	55%	40%
2021-2022	50%	35%
2023-2024	45%	30%
2025 or after	40%	25%

These targets are set relative to benchmarks published in *UC Building 1999 Energy Benchmarks by Campus* (e.g., 40% compliance target means a 60% reduction from the 1999 energy benchmarks) (Sahai et al. 2014)

Source: UCOP 2020

The whole-building energy performance targets are expressed as a percentage of the sum of the Annual Electricity and Annual Thermal targets (converted to thousand British Thermal Units per gross square feet per year [kBTU/gsf-yr]) presented in Table 1 of *UC Building 1999 Energy Benchmarks by Campus* (Sahai et al. 2014). While "compliance targets" reflect the required increase in efficiency, "stretch targets" are much more ambitious goals and may require a fundamental change in approach to achieve.

The UC will strive to design, construct, and commission buildings that outperform California Energy Code energy efficiency standards by 30 percent or more, or meet the stretch whole-building energy performance targets listed in Table 3.6-1, whenever possible, within the constraints of program needs and standard budget parameters.

2. No new building or major renovation that is approved after June 30, 2019 shall use onsite fossil fuel combustion (e.g., natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure). Projects unable to meet this requirement shall document the rationale for this decision as described in Section V.A.4.
3. All new buildings will achieve a U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) "Silver" certification at a minimum. All new buildings will strive to achieve certification at a USGBC LEED "Gold" rating or higher, whenever possible within the constraints of program needs and standard budget parameters.
4. The University of California will design, construct, and commission new laboratory buildings to achieve a minimum of LEED "Silver" certification as well as meeting at least the prerequisites of the Laboratories for the 21st Century (Labs21) Environmental Performance Criteria (EPC)7. Laboratory spaces in new buildings also shall meet at least the prerequisites of Labs21 EPC. Design, construction, and commissioning processes shall strive to optimize the energy efficiency of systems not addressed by the California Energy Code energy efficiency standards.
5. All new building projects will achieve at least two points within the available credits in LEED-BD+C's Water Efficiency category.

B. Clean Energy

1. Energy Efficiency: Each location will implement energy efficiency actions in buildings and infrastructure systems to reduce the location's energy use intensity by an average of least 2 percent annually.
2. On-campus Renewable Electricity: Campuses and health locations will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of the location's Climate Action Plan or other goals.
3. Off-campus Clean Electricity: By 2025, each campus and health location will obtain 100 percent clean electricity. By 2018, the UC's Wholesale Power Program will provide 100 percent clean electricity to participating locations.

4. On-campus Combustion: By 2025, at least 40 percent of the natural gas combusted on-site at each campus and health location will be biogas.

D. Sustainable Transportation

1. Each location will reduce GHG emissions from its fleet and report annually on its progress. Locations shall implement strategies to reduce fleet emissions and improve fuel efficiency of all university-owned or operated fleet vehicles and equipment where practical options exist through acquisition and fleet operation protocols.
    a. By 2025, zero emission vehicles or hybrid vehicles shall account for at least 50 percent of all new light-duty vehicle acquisitions.
2. The UC recognizes that single-occupant vehicle (SOV) commuting is a primary contributor to commute GHG emissions and localized transportation impacts.
    a. By 2025, each location shall strive to reduce its percentage of employees and students commuting by SOV by 10 percent relative to its 2015 SOV commute rates;
    b. By 2050, each location shall strive to have no more 40 percent of its employees and no more than 30 percent of all employees and students commuting to the location by SOV.
3. Consistent with the State of California goal of increasing alternative fuel – specifically electric vehicle usage, the UC shall promote purchases and support investment in alternative fuel infrastructure at each location.
    a. By 2025, each location shall strive to have at least 4.5% of commuter vehicles be Zero Emission Vehicles (ZEV).
    b. By 2050, each location shall strive to have at least 30% of commuter vehicles be ZEV.

In particular, through targets established with respect to Green Building Design, UC Santa Cruz is committed to achieving a USGBC LEED "Silver" certification or higher with new construction, which would carry forward to structures and facilities constructed under the 2021 LRDP.

UC Santa Cruz Energy Efficiency Programs

The UC Santa Cruz Energy Management department is currently leading several efforts related to energy efficiency for LRDP area. These efforts focus on energy efficiency projects, building commissioning, behavioral change towards higher conservation, installation of onsite renewable generation, and procurement of renewable energy. The main residential campus is currently in Year 3 of a multi-year project to retrofit all campus buildings to high efficiency LED lighting with integrated daylighting/ occupancy controls. These projects will substantially reduce campus energy usage, especially during times of peak demand for the campus and the state. A co-benefit of these LED projects will be decreased maintenance (waste reduction) and increased lighting quality (daylighting and higher quality lighting) for occupants.

UC Santa Cruz is also focusing on the commissioning and renovation of its district utility systems, specifically to improve the operation of the main residential campus' campus-wide heating and cooling loops, through a combination equipment upgrades and system optimization. These systems are two of the highest energy using systems on the main residential campus, and these projects will result in significant energy/carbon savings.

In 2019, UC Santa Cruz vehicles consumed approximately 72,000 gallons of diesel. In recognition of the need for greater sustainability, UC Santa Cruz transferred to using biodiesel. Biodiesel is generally characterized as a renewable fuel derived from agricultural waste, like corn stalks and grain chaffs. Biodiesel emits between 50 and 90 percent less carbon than traditional diesel, so this shift in fuel type reduces UC Santa Cruz's annual fleet emissions by at least 25 percent annually. A typical blend might be "B20" (i.e., 20 percent biodiesel and 80 percent diesel). UC Santa Cruz is using a higher-quality product called RD99, which is 99 percent biofuel.

To encourage the use of electric (zero-emission) vehicles, UC Santa Cruz's Transportation and Parking Services (TAPS) has installed a number of EV charging stations on campus. Fourteen EV charging stations are located at the Core West Parking Structure, eight EV charging stations are located at the Coastal Science Campus, and 40 new EV charging stations were installed in the East Remote parking lot. TAPS will be required to electrify the campus shuttle fleet by 2040.

The UC Santa Cruz Energy Department is also continuing its work on improving measurement and monitoring of campus utility usage, through its SkySpark Analytics platform and Beacon AMA water analytics systems. These analytical packages are being expanded to capture electricity, natural gas, sewer, and water usage in higher granularity, resulting in improved analytics to identify and resolve efficiency issues on campus. The SkySpark system is configured with automated "sparks", which will allow campus personnel to identify energy waste faster, while the Beacon AMA system performs the same function on water usage.

UC Santa Cruz Campus Standards Handbook

UC Santa Cruz's Campus Standards Handbook contains building design standards for all buildings constructed and operated by the university. These include design guidelines for construction materials, finishes, furnishings, emergency response, plumbing, heating and ventilation, automation, electrical, and communications. The design guides require new buildings to be energy efficient to meet the most stringent standards available under Title 24. The handbook also requires that any buildings achieving LEED certification, achieve no less than LEED Silver level. (UCSC 2019).

LOCAL

As noted in Section 1.1 of the Introduction, UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the university's education purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

3.6.2 Environmental Setting

ENERGY USE, FACILITIES AND SERVICES IN THE LRDP AREA

During the 2018 calendar year, the UC Santa Cruz campus used a total of 48.5 gigawatt-hours (GWh) of electricity (33.2 GWh campus-generated and 15.3 GWh imported) and 4,954,650 therms of natural gas. The average daily energy usage was 132,821 kWh/day of electricity and 13,574 therms/day of natural gas (UCSC 2020).

Electric and natural gas services in UC Santa Cruz are purchased from Pacific Gas and Electric Company (PG&E). A natural gas turbine engine located at the Central Heat Plant, a canopy solar panel array located in the East Remote Parking lot, and a solar panel array located on top of McHenry Library, also generate electricity on the main residential campus. The natural gas turbine operates on natural gas purchased from PG&E, and produces enough electricity to meet about half of the main residential campus demand. The turbine operates as a cogeneration unit and generates both power and heat. Captured waste heat produced by the turbine during electricity generation provides heat to campus buildings on Science Hill and in parts of the central portion of the main residential campus (UCSC 2020). The cogeneration unit provides backup electricity for emergencies, as well as supplements the electricity purchased from PG&E. Power provided by PG&E enters the Slug Substation, which is located at the southeastern edge of campus, at 21 kilovolts (kV) and is routed to the Merrill Substation, which utilizes two transformers to reduce the voltage to 12 kV, which is then distributed to campus buildings via four feeders (UCSC 2017, 2020). Electrical power is provided to Westside Research Park via a 21 kV line located in Natural Bridges Drive. The UC Santa Cruz Energy Services Unit manages the utility bills and master meters data for PG&E natural gas and electricity entering the main residential campus.

Natural gas is used by UC Santa Cruz to run the cogeneration unit on the main residential campus, as well as its two natural gas compressors, which maximize the turbine's fuel efficiency. Natural gas is delivered to the campus from PG&E through a high-pressure transmission line running south of Mission Street, along the railroad tracks, which feeds an 8-inch line running along the west side of the campus to the cogeneration plant (UCSC 2011). PG&E also provides natural gas service to Westside Research Park.

ALTERNATIVE FUELS

A variety of alternative fuels are used to reduce demand for petroleum-based fuel. The use of these fuels is encouraged through various statewide regulations and plans (e.g., Low Carbon Fuel Standard, AB 32 Scoping Plan). Conventional gasoline and diesel may be replaced (depending on the capability of the vehicle) with many transportation fuels, including:

- biodiesel,
- electricity,
- ethanol (E-10 and E-85),
- hydrogen,
- natural gas (methane in the form of compressed and liquefied natural gas),
- propane,
- renewable diesel (including biomass-to-liquid),
- synthetic fuels, and
- gas-to-liquid and coal-to-liquid fuels.

California has a growing number of alternative fuel vehicles through the joint efforts of CEC, CARB, local air districts, federal government, transit agencies, utilities, and other public and private entities. As of July 2020, California contained approximately 27,000 alterative fueling stations, of which 578 are within 30 miles of UC Santa Cruz (AFDC 2020).

UC Santa Cruz is also undertaking numerous steps towards alternative fuels and energy sources. Currently, all of UC Santa Cruz's diesel fleet utilizes renewable diesel. Of the 250 light-duty vehicles (less than 8,300 lb gross vehicle weight [GVWR]) that are operated by the campus, 80 are electric or gasoline-hybrids (Diamantopoulos, pers. comm., 2020). UC Santa Cruz is also currently in the process of converting its light-duty fleet vehicles to zero emission or hybrid vehicles. In addition, a 2.1 megawatt (MW) facility is nearing operation at the East Remote parking lot of the main residential campus to offset electricity demands of the campus.

EXISTING UCSC MEDIUM VOLTAGE POWER DISTRIBUTION SYSTEMS

The UCSC campus is served from the off-campus utility provider, Pacific Gas & Electric (PG&E), at 21,600 volts (21 kV nominal), three-phase, via two separate feeders terminating outside the SLUG-1 Substation located at the southeastern edge of the campus. Existing peak electrical demands are approximately 11.3 mega volt ampere (MVA). Of that demand, approximately 4.1 MW is generated onsite by the campus Fackler Cogeneration Plant. Based on the preliminary 2021 LRDP space projections, the 2040 campus peak electrical demand is estimated to be 27 MVA. The campus has decided that all new buildings will be entirely electric with no gas heating or hot water. This has been accounted for in the future demand estimates. The existing 12 kV feeder has a peak capacity of approximately 16 MVA so additional capacity will be required to support the planned campus growth.

3.6.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, 2021 LRDP implementation would result in a significant energy impact if it would:

- result in the wasteful, inefficient, or unnecessary consumption of energy, or wasteful use of energy resources during project construction or operation; or

- conflict, or create an inconsistency, with any applicable plan, policy, or regulation adopted for the purpose of avoiding or mitigating environmental effects related to energy use.

ANALYSIS METHODOLOGY

Construction

Regarding energy use (e.g., fuel use) during construction, it is assumed that only diesel fuel would be used in construction equipment, vendor trucks, and haul trucks and gasoline fuel in on-road vehicles for worker commute trips, based on modeling described in the air quality and greenhouse gas analyses in Section 3.3,"Air Quality" and Section 3.8 "Greenhouse Gas Emissions and Climate Change". Diesel and gasoline fuel use from construction was estimated by dividing the CO_2 emission results from the modeling conducted by a factor of 10.21 kg CO_2 per gallon for diesel and 8.78 kg CO_2e per gallon for gasoline, available from the Climate Registry Default Emission Factors (The Climate Registry 2020).

Operations

Operation of campus buildings and other facilities anticipated under the 2021 LRDP would require electricity and natural gas usage for lighting, space and water heating, appliances, lab equipment, water conveyance, and landscaping maintenance equipment. Project operation would include consumption of diesel and gasoline fuel from on-road vehicles. Building energy use was mainly estimated using CalEEMod v. 2016.3.2 (CAPCOA 2016), assuming that the land uses within the campus would meet the 2019 Title 24 standards. This standard was chosen because the UCOP Sustainable Practices Policy allows campuses to choose between achieving energy usage rate 20 percent better than the current Title 24 building energy efficiency standards or meeting the UC Whole Building Performance Targets. A comparison of the energy usage rates of these two standards shows that the 2019 Title 24 standards would result in lower total energy use than the performance targets under UCOP's Sustainable Practices Policy, as shown in Table 3.6-2 (UCOP 2020). Thus, using the 2019 Title 24 standards in the energy modeling conservatively represents the minimum building energy efficiency standards that the 2021 LRDP would need to achieve.

Table 3.6-2 Comparison of Energy Efficiency Standards for Buildings Operating under the 2021 LRDP

Land Use	Gross Square Feet	2019 Title 24 Standards (kWh/gsf/yr)	2019 Title 24 Standards (therms/gsf/yr)	UC Whole Building Performance Target for Buildings Built in 2025 and beyond (60% below 1999 energy benchmarks) (kWh/gsf/yr)	UC Whole Building Performance Target for Buildings Built in 2025 and beyond (60% below 1999 energy benchmarks) (therms/gsf/yr)
Faculty Housing	676,923	2.75	0.06	3.12	0.13
Student Housing	1,933,846	2.61	0.05	3.12	0.13
Facilities and Operations	89,082	5.32	0.18	4.44	0.09
Student Support Services	935,554	5.32	0.18	4.44	0.09
Parking Lot	1,876,275	0.35	0.00	0.35	0.00
Instruction & Research	1,734,420	5.32	0.18	14.40	0.74
Academic & Admin Support	1,985,289	5.05	0.16	4.44	0.09
Weighted Average		3.5	0.10	5.11	0.21

Notes: kWh = kilowatt hours, gsf = gross square feet, yr = year

See Appendix C for additional calculation details.

Source: UCOP 2020, Data modeled and compiled by Ascent Environmental in 2020, based on modeling conducted in CalEEMod Version 2016.3.2.

While the UC Sustainable Practices Policy requires all new buildings to be fully electric and not heated using natural gas, the policy includes exceptions for "projects connected to an existing central thermal infrastructure" and projects unable to meet the requirement use must provide a rationale of the decision behind the use of natural gas (UCOP

2020:9). Due to these exceptions, it was assumed that the natural gas turbine located in the Central Plant cogeneration facility, which provides both electricity and heat, would increase natural gas consumption in proportion to the total anticipated increase in energy use (i.e., total BTU increase in electricity and natural gas demand) (See Table 3.3-5 in Section 3.3, "Air Quality"). Conservatively, three new natural gas boilers were assumed to operate to supply heat for the new facilities under the 2021 LRDP. Twenty-four natural gas new emergency generators and three new natural gas standby generators would be operated under the 2021 LRDP on a temporary basis and provide electricity during power outages. Appendix D2 discusses the detailed methodology on how the number of new equipment and increase in energy use at the existing natural gas turbine were determined.

Transportation fuel-use estimates were calculated by applying average fuel usage rates per vehicle mile to VMT data related to the 2021 LRDP (see Section 3.16, "Transportation," for an explanation of the assumptions behind the VMT modeling). CARB's EMFAC model includes average fuel usage rates by vehicle class, fuel type (e.g., diesel, gasoline, electric, and natural gas), speed bin, calendar year, and county. EMFAC also estimates vehicle activity rates by vehicle class and fuel types (e.g., heavy-duty diesel VMT, light-duty natural gas VMT). The project traffic consultant provided daily VMT attributable to the trips entering and exiting the UC Santa Cruz campus. See Appendix F of this EIR for calculation details.

Diesel fuel use in the new emergency generators operating under the 2021 LRDP was based on the CalEEMod default assumptions. Although CalEEMod was used to calculate emissions from emergency generators, CalEEMod does not provide fuel estimates for these equipment types. Like the construction fuel estimates, fuel use related to the occasional operation of emergency generators was estimated based on a factor of 0.05 gallons of diesel fuel per horsepower-hour available from the SCAQMD's CEQA Air Quality Handbook (SCAQMD 1993: Table A9-3E). See Section 3.3 "Air Quality" for a description of assumptions used for stationary sources.

Up to 4 megawatts (MW) of on-campus solar photovoltaic electricity generation, producing an estimated 5,718 MWh/year assuming a yield of 1,448 kWh/kWdc, is also being considered for the Campus under the CES (UC Santa Cruz 2017). UC Santa Cruz is also in the process of installing the aforementioned, on-site (2.1 MW) solar array above the East Remote parking lot. Solar arrays would also be installed on the campus as part of the Student Housing West project to provide some of the electricity needed in the new housing. Though solar facilities may be installed on campus as part of the 2021 LRDP, it is conservatively assumed that those facilities would not be operated as part of the analysis in this section.

ISSUES NOT EVALUATED FURTHER

All issues related to energy listed under the significance criteria above are addressed in this section.

IMPACTS AND MITIGATION MEASURES

Impact 3.6-1: Result in Unnecessary, Inefficient, and Wasteful Use of Energy

Implementation of the 2021 LRDP would increase electricity and natural gas consumption in the LRDP area relative to existing conditions during construction, as well as long-term operation of the main residential campus and Westside Research Park. The 2021 LRDP is committed to meeting the UC Sustainable Practices Policy and the UC Santa Cruz Campus Standards Handbook (including achievement of LEED Silver standards at minimum) in all new/renovated facilities, which is designed to reduce the wasteful use of materials (through recycling building materials) and increase building energy efficiency (i.e., 60 percent more efficient than the *1999 Energy Benchmarks*). Therefore, implementation of the 2021 LRDP would not result in wasteful, inefficient, and unnecessary consumption of energy, and impacts would be **less than significant**.

Appendix G of the State CEQA Guidelines requires the consideration of the energy implications of a project. CEQA requires mitigation measures to reduce "wasteful, inefficient and unnecessary" energy usage (PRC Section 21100, subdivision (b)(3)). Neither the law nor the State CEQA Guidelines establish criteria that define wasteful, inefficient, or unnecessary use. Compliance with CCR Title 24 Energy Efficiency Standards would result in energy-efficient buildings,

and as described below, UC Santa Cruz is committed to achievement of higher standards. However, compliance with building codes does not adequately address all potential energy impacts during construction and operation. For example, energy would be required to transport people and goods to and from the project site. Energy use is discussed by anticipated use type below.

Construction-Related Energy

Energy would be required to construct or renovate buildings and modify facilities under the 2021 LRDP, operate and maintain construction equipment, and transport construction materials. The one-time energy expenditure required to construct buildings and infrastructure associated with the 2021 LRDP would be non-recoverable. Most energy consumption during construction would result from operation of off-road construction equipment and on-road vehicle trips associated with commutes by construction workers and haul trucks trips. An estimated 172,000 gallons of diesel and 22,000 gallons of gasoline would be consumed to enable construction of new land uses, including academic and administrative space and other facilities that could be developed under the 2021 LRDP.

Construction equipment use and associated energy consumption would be typical of that associated with construction of new residential and educational land uses. In other words, there are no unusual project characteristics that would necessitate the use of construction equipment that would be less energy efficient than those used at comparable construction sites in other parts of the State. Idling of on-site equipment during construction would be limited to no more than five minutes in accordance with California Code of Regulations Title 13, Section 2485, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. Further, on-site construction equipment may include alternatively-fueled vehicles (such as natural gas) where feasible.

Finally, the selected construction contractors would use the best available engineering techniques, construction and design practices, and equipment operating procedures, thereby ensuring that the wasteful consumption of fuels and use of energy would not occur. Energy efficiency is also expected for the off-site production of construction materials, based on the economic incentive for efficiency and cost savings. Non-renewable energy would not be consumed in a wasteful, inefficient, or unnecessary manner when compared to other construction sites in the region.

Operational Building Energy and Stationary Sources

Campus development under the 2021 LRDP would increase electricity and natural gas consumption in the LRDP area relative to existing conditions. Table 3.6-3 summarizes the levels of energy consumption associated with the operation of new facilities built under the 2021 LRDP.

Table 3.6-3 Net Building Energy Consumption associated with 2021 LRDP Implementation

New Facilities under the 2021 LRDP	Electricity[1] (MWh/year)	Natural Gas[1] (therms/year)
Faculty & Staff Housing	1,860	34,643
Student Housing	5,051	85,841
Facilities & Operations	474	14,705
Student Support and Public Services	4,980	154,436
Parking Lots	657	—
Instruction and Research	9,233	286,308
Academic and Administrative Support	10,027	298,033
Total Energy Consumption	32,283	873,967

Notes: Totals may not sum due to rounding. gallons/year = gallons per year; MWh/year = megawatt-hours per year; LRDP = Long Range Development Plan

[1] Values based on UC Santa Cruz meeting 2019 Title 24 standards, as modeled in CalEEMod Version 2016.3.2.

Source: Calculations by Ascent Environmental in 2020.

As shown in Table 3.6-3, the 2021 LRDP would result in an increase of 32 GWh of electricity and 873,967 therms of natural gas per year related to the operation of new facilities built under the 2021 LRDP. In addition to on-site use of natural gas, such as in furnaces, a majority of the anticipated natural gas usage under the 2021 LRDP would be used

by three new natural gas boilers, a 25 percent increase in existing natural gas turbine use, and 27 new emergency and standby generators, as shown in Table 3.3-5 in Section 3.3, "Air Quality". The values shown in Table 3.6-3 break down the anticipated demand in energy by facility type, but this breakdown is not indicative of where the natural gas combustion would occur. The natural gas boilers and turbines centralize much of the natural gas use and provide distributed heat and electricity to multiple campus facilities.

The 2021 LRDP and development considered part of plan implementation would be subject to attainment of LEED Silver standards and meeting the building energy efficiency standards specified under the UC's Sustainable Practices Policy. The implementation of the UC Sustainable Practice Policy and UC Santa Cruz Campus Standards Handbook, which require UC Santa Cruz to build energy-efficient buildings that use less electricity, would reduce fossil fuel consumption (UCOP 2020). In addition, UC Santa Cruz would continue to implement the conservation and efficiency programs identified above and increase the use of renewable energy.

Operational Transportation Energy

Table 3.6-4 summarizes the projected gasoline, diesel, natural gas, and electricity usage associated with the net increase in transportation generated at build-out of the 2021 LRDP in 2040 compared to existing conditions. With full implementation, the 2021 LRDP would result in the net consumption of 980,939 gallons of gasoline per year, 171,906 gallons of diesel per year, 10,511 diesel equivalent gallons of natural gas, and 632,651 kWh per year.

Table 3.6-4 Net Transportation Energy Consumption with 2021 LRDP Implementation

Vehicle Category	Gasoline (gal/year)	Diesel (gal/year)	Natural Gas (DEG/year)	Electric (kWh/year)
Passenger Vehicles	939,553	18,558	7,840	632,651
Trucks with 2 axles	25,810	14,118	—	—
Trucks with 3 axles or more	15,576	139,230	2,670	—
Total (All Vehicle Types)	980,939	171,906	10,511	632,651

Notes: gal/year = gallons per year; DEG = diesel equivalent gallons; kWh = kilowatt hours

Source: Data provided by Ascent Environmental, Inc. in 2020 based on modeling using vehicle miles travelled data from Fehr and Peers and EMFAC2017 emission factors.

As shown in Table 3.6-4, trucks with two or more axles account for approximately 17 percent of total transportation-related gasoline and diesel use during operation of new development under the 2021 LRDP. The numbers reflected in Table 3.6-4 are based on the assumption that the mix of vehicle types would likely be similar to the 2018-2019 academic year. The analysis also includes an assumption that additional vehicle usage would be associated with all-electric vehicles. With most trips taken via non-vehicular modes of transportation, trips generated by operation of uses anticipated under the 2021 LRDP would not be considered inefficient, wasteful, and unnecessary. As discussed in Section 3.16, unmitigated "Transportation" VMT per capita for trips coming to and from the UC Santa Cruz campus would be 7.9 for the entire campus with implementation of the 2021 LRDP, which is 13 percent less than the existing VMT per capita average of 9.1, demonstrating that campus vehicle trips and the fuel/energy usage associated with them under the 2021 LRDP would be more efficient.

Summary

According to Appendix G of the State CEQA Guidelines, the means to achieve the goal of conserving energy include decreasing overall per capita energy consumption, decreasing reliance on natural gas and oil, and increasing reliance on renewable energy sources. Table 3.6-5 compares the per-capita energy consumptions between existing and 2021 LRDP conditions. Transportation diesel, natural gas and electricity use is excluded from the analysis here because the data for existing conditions was not readily available for comparison and they make up only a small portion of total energy use—the net increase in transportation diesel, natural gas, and electricity use under 2021 LRDP implementation account for less than five percent of total energy use.

Table 3.6-5 Per-Capita Annual Energy Consumption with 2021 LRDP Implementation Compared to Existing Conditions

Annual Energy Metrics	2019 Existing	2040 Net Increase (with 2021 LRDP)	Percent Change
Building Electricity Use (kWh)	48,479,557	32,282,652	67%
Building Natural Gas Use (therms)	4,954,650	873,967	18%
Transportation Gasoline Use (gal)[1]	2,580,660	980,939	38%
Total MMBTU[2]	983,050	320,033	33%
Population	22,344	12,830	57%
kWh per capita	2,170	2,516	16%
therms per capita	222	68	-69%
Gasoline gallons per capita	115	76	-34%
MMBTU per capita	44	25	-43%

Notes: gal = gallons; kWh = kilowatt hours; MMBTU = million British thermal units; NA = not applicable

[1] Includes both fleet and non-fleet mobile fuel use.

[2] Excludes transportation-related diesel, natural gas, and electricity use.

Source: Data provided by Ascent Environmental, Inc. in 2020.

As discussed above, energy would be required during the 2021 LRDP's construction and operational phases. Construction-related energy would be used during construction activities and not represent a long-term increase in demand. Additionally, construction activities conducted on-campus would not result in unusual or unique construction requirements that would result in potential wasteful energy use/consumption. Best available control technology would be used by contractors, as well as conformance to applicable requirements like MBARD requirements related to equipment idling, such that the inefficient or wasteful use in energy during construction would not occur.

Operational energy demand would result from building energy use and increases in vehicular traffic. However, as shown in Table 3.6-5, the per-capita energy consumption under the 2021 LRDP would be lower than existing conditions by approximately 43 percent. UC Santa Cruz would comply with the most current energy-efficient standard by achieving energy efficiency rates as required under the UC Sustainable Practice Policy Green Building targets. UC Santa Cruz is also committed to achieving LEED Silver status at minimum and is required to meet at the most current Title 24 building energy efficiency standards at minimum. Both the building energy efficiency and LEED targets are designed to reduce energy waste and increase building energy efficiently.

As demonstrated in the increase in electricity demand per capita compared to the decrease in natural gas demand per capita in Table 3.6-5, the energy designs standards would favor electric appliances over natural gas ones. This along with the additional on-campus solar energy generation considered under the 2021 LRDP and the utility-level renewables target under SB 100 would help the campus to reduce its dependence on fossil fuels and increase its reliance on renewable energy sources. The incorporation of design features, consistent with those mentioned above and in combination with State energy efficiency requirements, would reduce per-capita energy use related to the 2021 LRDP. For the reasons explained above, energy consumption under the 2021 LRDP through construction, building and facility operations, and transportation would not be considered wasteful, inefficient, or unnecessary. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.6-2: Conflict, or Create an Inconsistency, with any Applicable Plan, Policy, or Regulation Adopted for the Purpose of Avoiding or Mitigating Environmental Effects Related to Energy

Campus development under the 2021 LRDP would be required to comply with increasingly stringent building and vehicle efficiency standards that would reduce energy consumption to be consistent with applicable plans, policies, and regulations. New development under the 2021 LRDP would also include design features that would reflect UC Santa Cruz's goal to meet the UC Carbon Neutrality Initiative, as written into the UC Sustainable Practices Policy Green Building and Climate Action targets. Thus, this impact would be **less than significant**.

Development under the 2021 LRDP would, at minimum, meet the most current Title 24 building energy efficiency standards to reduce energy use, which establish minimum efficiency standards related to various building features, including appliances, water and space heating and cooling equipment, building installation and roofing, and lighting. The Western Area Power Administration, which provides energy service to the campus, is subject to California's Renewable Portfolio Standard (RPS) to increase procurement from eligible renewable energy resource to 50 percent of total procurement by 2030 and 100 percent by 2045 under SB 100. Furthermore, federal and State regulations including the Low Carbon Fuel Standard, Pavley Clean Car Standards, and Low Emission Vehicle Program would reduce the transportation fuel demand. Under the 2021 LRDP, design features that reduce energy use, improve energy efficiency, and increase reliance on renewable energy sources would be incorporated into new building projects to meet the goals of the UC Carbon Neutrality Initiative as written into the UC Sustainable Practices Policy, as well as meeting the whole-building energy performance targets listed in Table 1 of Section V.A.3 in the SPP.

The adherence to the increasingly stringent building and vehicle efficiency standards, as well as 2021 LRDP design features consistent with UC Carbon Neutrality goals and UC Santa Cruz's 2017 Climate & Energy Strategy (CES), would reduce energy consumption to be consistent with applicable plans, policies, and regulations adopted for avoiding or mitigating environmental effects related to energy. Therefore, the impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

3.7 GEOLOGY AND SOILS

This section describes the existing geology, soils, and paleontological and mineral resources at and in the vicinity of the LRDP area and analyzes the potential environmental effects of the 2021 LRDP related to these topics. For information on soil quality related to agricultural use, refer to Section 3.2, "Agriculture and Forestry Resources." For information related to flooding, drainage, and groundwater quality at the LRDP area, refer to Section 3.10, "Hydrology and Water Quality," of this EIR.

Public comments on the NOP (Appendix B) included concerns regarding erosion. These impacts are described and addressed, where appropriate, within this section.

3.7.1 Regulatory Setting

FEDERAL

National Earthquake Hazards Reduction Act

The National Earthquake Hazards Reduction Act was passed to reduce the risks to life and property resulting from earthquakes. The act established the National Earthquake Hazards Reduction Program (NEHRP). The mission of NEHRP includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improved building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improved mitigation capacity; and accelerated application of research results. NEHRP designates the Federal Emergency Management Agency as the lead agency of the program and assigns several planning, coordinating, and reporting responsibilities. Other NEHRP agencies include the National Institute of Standards and Technology, National Science Foundation, and the U.S. Geological Survey (USGS).

STATE

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code [PRC] Sections 2621-2630) (Alquist-Priolo Act or A-P Act) was originally named the "Alquist-Priolo Special Studies Zones Act" and was created in 1972 to reduce the risk to life and property from surface fault rupture during earthquakes by regulating construction in active fault corridors and prohibiting the location of most types of structures intended for human occupancy across the traces of active faults. The law addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. Amended in 1994, the Alquist-Priolo Act now includes a disclosure obligation for real estate licensees.

The LRDP area, including the Westside Research Park, is not located within an Alquist-Priolo active fault zone (Bryant and Hart 2007). The LRDP area does not lie within any State-mapped zones containing Holocene active faults (a fault that has moved in the last 10,000 years) or active faults, nor have any Holocene-active faults been mapped on the main residential campus or the Westside Research Park by any jurisdiction.

Seismic Hazards Mapping Act

The intent of the Seismic Hazards Mapping Act (PRC Section 2690–2699.6) is to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including ground shaking, liquefaction, seismically induced landslides and amplified ground shaking. The Seismic Hazards Mapping Act's provisions are similar in concept to those of the Alquist-Priolo Act: the State is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards, and cities and counties are required to regulate development within mapped Seismic Hazard Zones. Under the Seismic Hazards Mapping Act, permit review is the primary

mechanism for local regulation of development. Specifically, cities and counties are prohibited from issuing development permits for projects in Seismic Hazard Zones until appropriate site- specific geologic or geotechnical investigations have been carried out and measures to reduce potential damage have been incorporated into the development plans.

Programmatic mapping for the Seismic Hazards Mapping Act by the California Geological Survey is completed and published on USGS 7½-minute quadrangles. The LRDP area does not lie within any of the quadrangles thus far published by the State, so this statute and the resulting maps have no direct effect on the 2021 LRDP.

California Building Standards Code

The State of California provides minimum standards for building design through the California Building Standards Code (CBC) (California Code of Regulations, Title 24). Where no other building codes apply, Chapter 29 regulates excavation, foundations, and retaining walls.

The CBC has been modified from the International Building Code for California conditions with prescriptive code tailored to California conditions. The seismic shaking sections of the CBC ostensibly utilize guidance from publication ASCE/SEI 7, jointly published by the American Society of Civil Engineering and the Structural Engineering Institute (ASCE 2016). ASCE/SEI 7 identifies minimum prescriptive seismic factors that must be considered in structural design. These factors and the procedures outlined for deriving them are listed referenced in Chapters 16, 16a, 18 and 18a of the CBC, all of which provide minimum prescriptive minimum design guidance for the geotechnical design of excavations, foundations, and retaining walls. (The primary difference between the "a" and "non-a" chapters is that the "a" chapters are primarily intended for structures regulated by the State of California Division of the State Architect.) Appendix J of the CBC provides further guidance for grading activities, including drainage and erosion control. CBC Section 1803A.3 also requires the completion of a geotechnical investigation report with the following basis of investigation:

> *Soil classification shall be based on observation and any necessary tests of the materials disclosed by borings, test pits or other subsurface exploration made in appropriate locations. Additional studies shall be made as necessary to evaluate slope stability, soil strength, position and adequacy of load-bearing soils, the effect of moisture variation on soil-bearing capacity, compressibility, liquefaction and expansiveness.*

It is important to note that there is no specific guidance or mention in the CBC of the hazards and risks related to the unique geological features underlying the main residential campus, primarily karst topography and marble bedrock. Karst topography is characterized by irregular surfaces resulting from subsidence or collapse of the bedrock and sediment into those subterranean cavities that have developed within the marble bedrock. Past development on the main residential campus has been supported by robust geotechnical and geological investigations that provide focused evaluation of the risks related to design and construction in geological terrane with karst-related risks.

Surface Mining and Reclamation Act of 1975

The Surface Mining and Reclamation Act of 1975 (PRC Sections 2710-2796.5) (SMARA) regulates surface mining operations and assures that adverse environmental impacts are minimized and mined lands are reclaimed to a usable condition via a comprehensive policy for surface mining and reclamation.

SMARA also encourages the production, conservation, and protection of the state's mineral resources through annual mining reporting requirements for mines and by tying it to the development of statewide standards by the State Water Resources Control Board (SWRCB) for permitting and operation of Onsite Wastewater Treatment Systems (otherwise known as septic systems).

UNIVERSITY OF CALIFORNIA

University of California Seismic Safety Policy

The UC Seismic Safety Policy was crafted to provide an acceptable level of earthquake safety for students, employees, and the public who occupy UC facilities and leased facilities, to the extent feasible by present earthquake engineering

practice. Feasibility is determined by balancing the practicality and the cost of protective measures, depending on the forecasted severity and probability of injury resulting from seismic activity.

UC Santa Cruz Campus Standards Handbook

The UC Santa Cruz Campus Standards Handbook outlines required products and mandatory design constraints for all construction on the campus (UC Santa Cruz 2017). The standards are meant to ensure that UC Santa Cruz constructs functional and durable buildings, based on experience with existing campus buildings. The standards are complementary to project-specific requirements and can be modified, as necessary, at the discretion of the UC Santa Cruz project manager based on site-specific geotechnical investigations. UC Santa Cruz requires:

- review of schematic, design development, 50 percent, 100 percent construction documents, and 100 percent backcheck submittals;
- compliance with federal, State, and regional codes or acts; in the case of conflict between codes, the more stringent code conditions apply;
- soil investigation reports, as necessary, for projects;
- site survey information;
- consultation with the Design Advisory Board, normally at the beginning of schematic design, midway through schematic design, and midway through design development;
- review by the Campus Physical Planning Advisory Committee after the end of schematic design;
- design review approval for applicable projects by the UC Regents;
- review and approval by the State Fire Marshal and Division of the State Architect at construction document completion;
- approval of completed design development documents by the State Public Works Board for major State-funded projects;
- independent reviews are required by the UC Regents for cost, design, and seismic safety; and
- design compliance with current LRDP EIR mitigation measures and any project-specific mitigation measures.

The UC Santa Cruz Campus Standards Handbook also includes Section 01 57 23-Storm Water Pollution Control which requires projects greater than 1 acre to comply with the Construction General Permit (CGP) and for projects under 1 acre to comply with UC Santa Cruz Erosion and Sediment Control Standards and Best Management Practices for construction projects less than 1 acre in area involving soil disturbance greater than 50 cubic yards (UC Santa Cruz 2014). Best Management Practices are outlined in Appendix D of the UC Santa Cruz Campus Standards Handbook and include runoff controls, sediment capture, spill prevention, and tracking control (UC Santa Cruz 2017). UC Santa Cruz reviews all permit registration documents before submitting for coverage under the CGP.

LOCAL

As noted in Section 3.0.1, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of its education purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies for the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts. No local plans or policies are considered relevant to the 2021 LRDP with respect to geology and soils.

3.7.2 Environmental Setting

REGIONAL GEOLOGY

The LRDP area is situated on the western flank of the Santa Cruz Mountains, in the central portion of the Coast Ranges Physiographic Province of California (Coast Ranges Province). The Coast Ranges Province consists of a series of coastal mountain chains paralleling the pronounced northwest-southeast structural grain of central California geology. The structural grain is controlled by a complex of active faults and faults with pre-Holocene activity, that form the San Andreas Fault system. Southwest of the San Andreas Fault, the Coast Ranges including the Santa Cruz Mountains are underlain by a large, northwest-trending, fault-bounded, elongate prism of granitic and metamorphic basement rocks, collectively known as the Salinian Block. The Salinian Block is separated from contrasting basement rock types to the northeast and the southwest by the San Andreas and the Sur-Nacimiento Fault systems, respectively, as shown in Figure 3.7-1. Overlying the granitic and metamorphic basement rocks is a sequence of dominantly marine sediments of Tertiary age and non-marine sediments of Pliocene to Pleistocene age. As shown in Figure 3.7-1, the Tertiary and younger rocks within the LRDP area occur only as thin, scattered patches of deposits that overlie the exposed metamorphic and granitic basement complex.

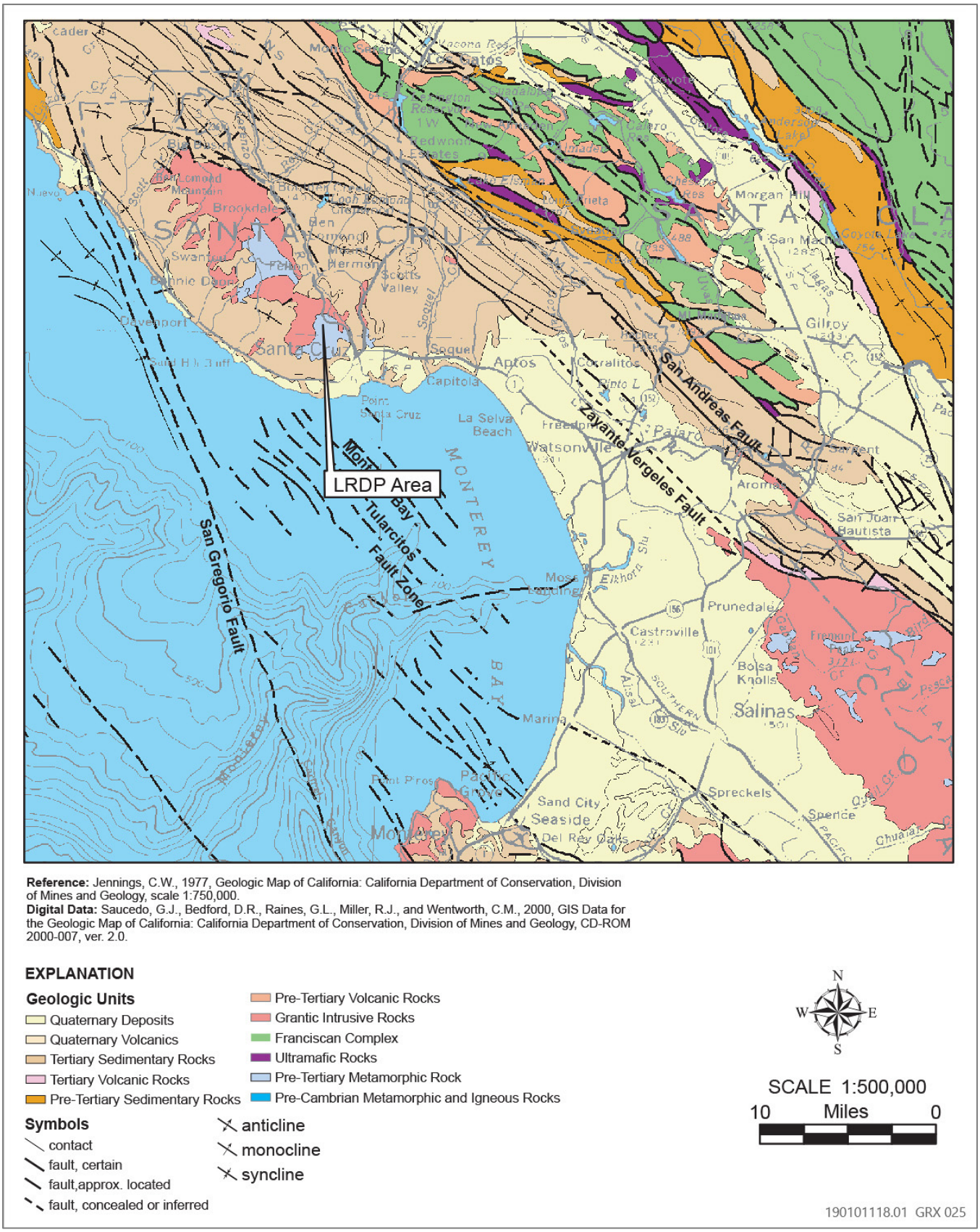
LOCAL GEOLOGY

The main residential campus is located at the southeast end of the crest of Ben Lomond Mountain, in Santa Cruz County, California (Figure 3.7-2). Ben Lomond Mountain is a large granitic massif that has been uplifted and tilted toward the southwest along the Ben Lomond Fault, which bounds the mountain to the northeast. The northeastern edge of the block drops steeply into the valley of the San Lorenzo River. The south- to southwest-facing flank of Ben Lomond Mountain is broad with a relatively gentle to moderate slope. This slope is notched by a series of Pleistocene marine terraces that give the mountain a stair-step like appearance. The developed portion of the main residential campus lies on this gently sloping, south facing hillside. The southern half of the main residential campus, including most of the developed portion of campus, is largely underlain by marble bedrock. Dissolution of the marble by percolating ground water has dimpled the terrain with closed depressions due to sinkhole formation, a process which is illustrated in Figure 3.7-3. The main residential campus is cut by several steep walled, north-south flowing streams, but an integrated drainage system has not formed due to sporadic stream flow capture by sinkholes. Elevations on the main residential campus vary from about 300 feet at the southern edge of campus, to almost 1,200 feet at the northwestern boundary. Relief is typically low to moderate, except along the steep east-facing escarpment on the eastern side of campus and along the sides of some campus drainages.

The Westside Research Park is located within the Coast Ranges Geomorphic Province, which extend about 600 miles from the Oregon border to central coastal California. The area of the site is generally underlain by Holocene deposits of alluvial origin. These materials consist of well sorted silt, sand and gravel. Underlying these alluvial deposits is Pleistocene alluvium and bedrock. Elevation on the Westside Research Park is approximately 60 feet above mean sea level. The site is generally flat with the exception of a 3-foot rise from Delaware Avenue on the southern perimeter of the site rising to approximately 5-feet on the northern boundaries of the site.

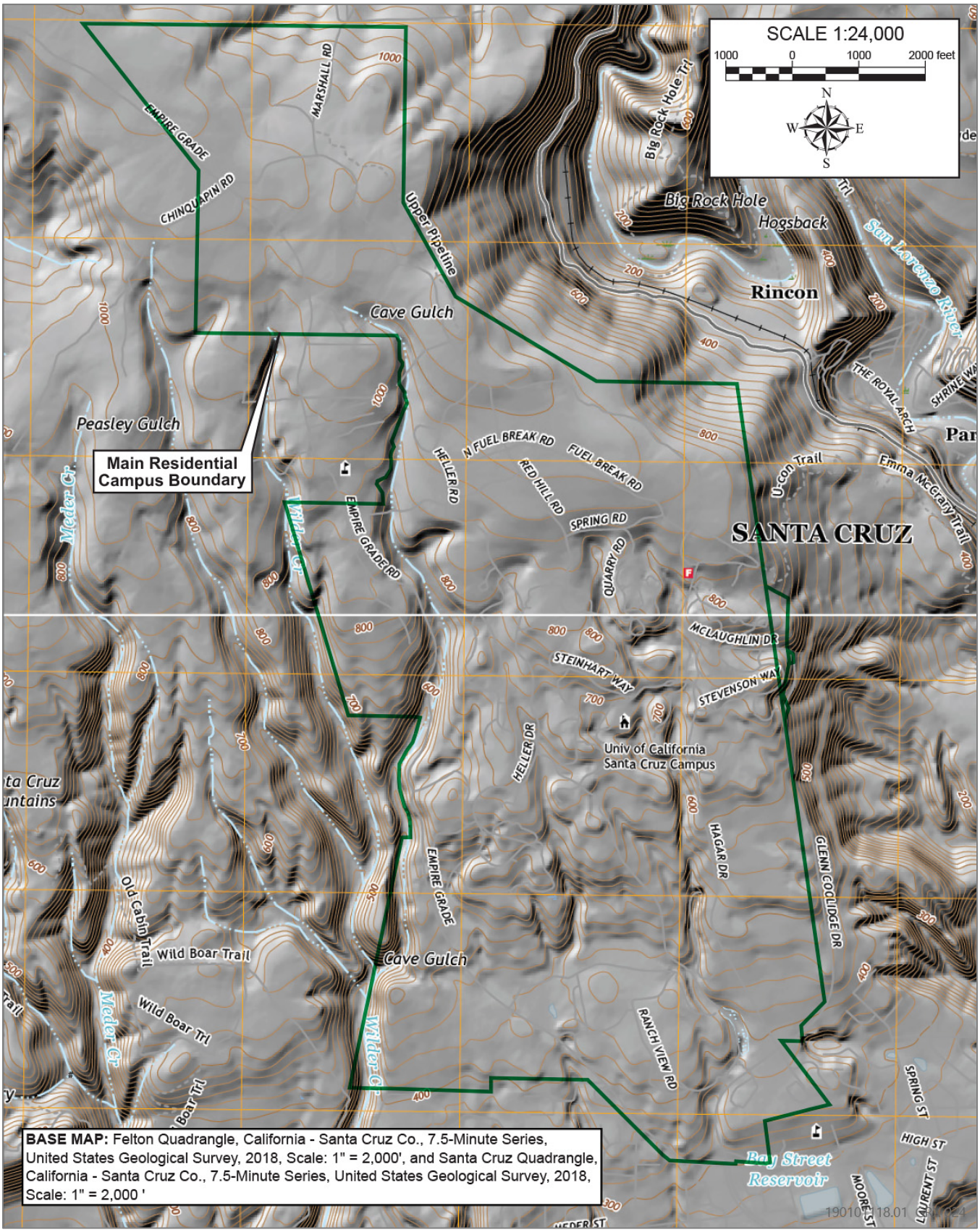
Soils

There are a large variety of soil types with variable composition, texture and thicknesses, which are directly correlative from the highly variable bedrock from which they are weathered and developed. The last time Soil Conservation Service (SCS) soil map, which is now known as the Natural Resources Conservation Service (NRCS), were published for Santa Cruz County 1980 (SCS 1980). The Santa Cruz County soil map includes the LRDP area. The Santa Cruz County soils map identified 12 different soil types in the LRDP area, as shown in Figure 3.7-4 (SCS 1980). Seven of the soil types are dominant, with the greatest areal extent on the main residential campus, as well as additional soil types of relatively minor aerial extent. The major soil types are discussed below by the geographic areas of the 2021 LRDP.



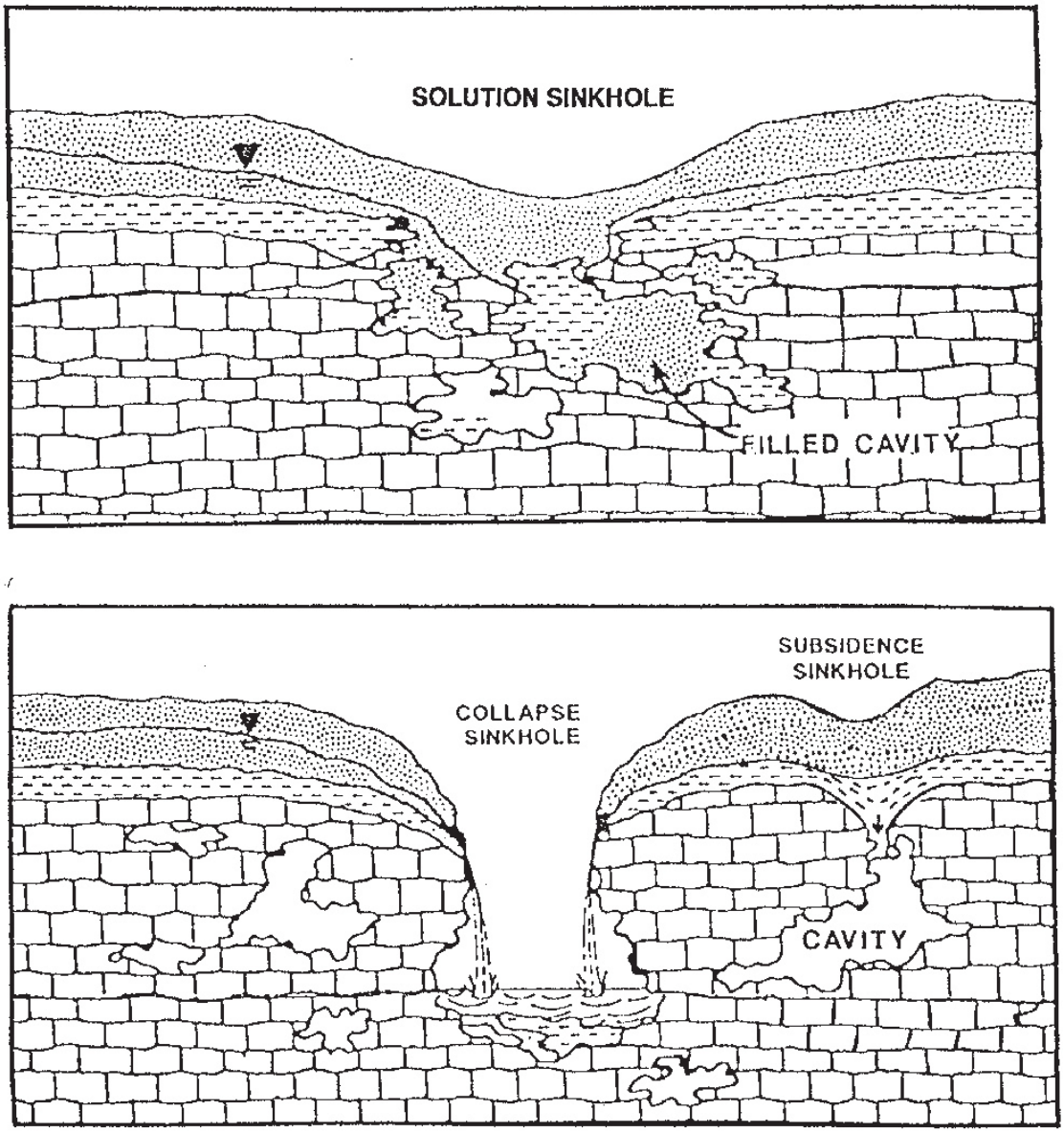
Source: Figure produced and provided by Zinn Geology in 2020

Figure 3.7-1 Regional Geologic Map



Source: Figure produced and provided by Zinn Geology in 2020

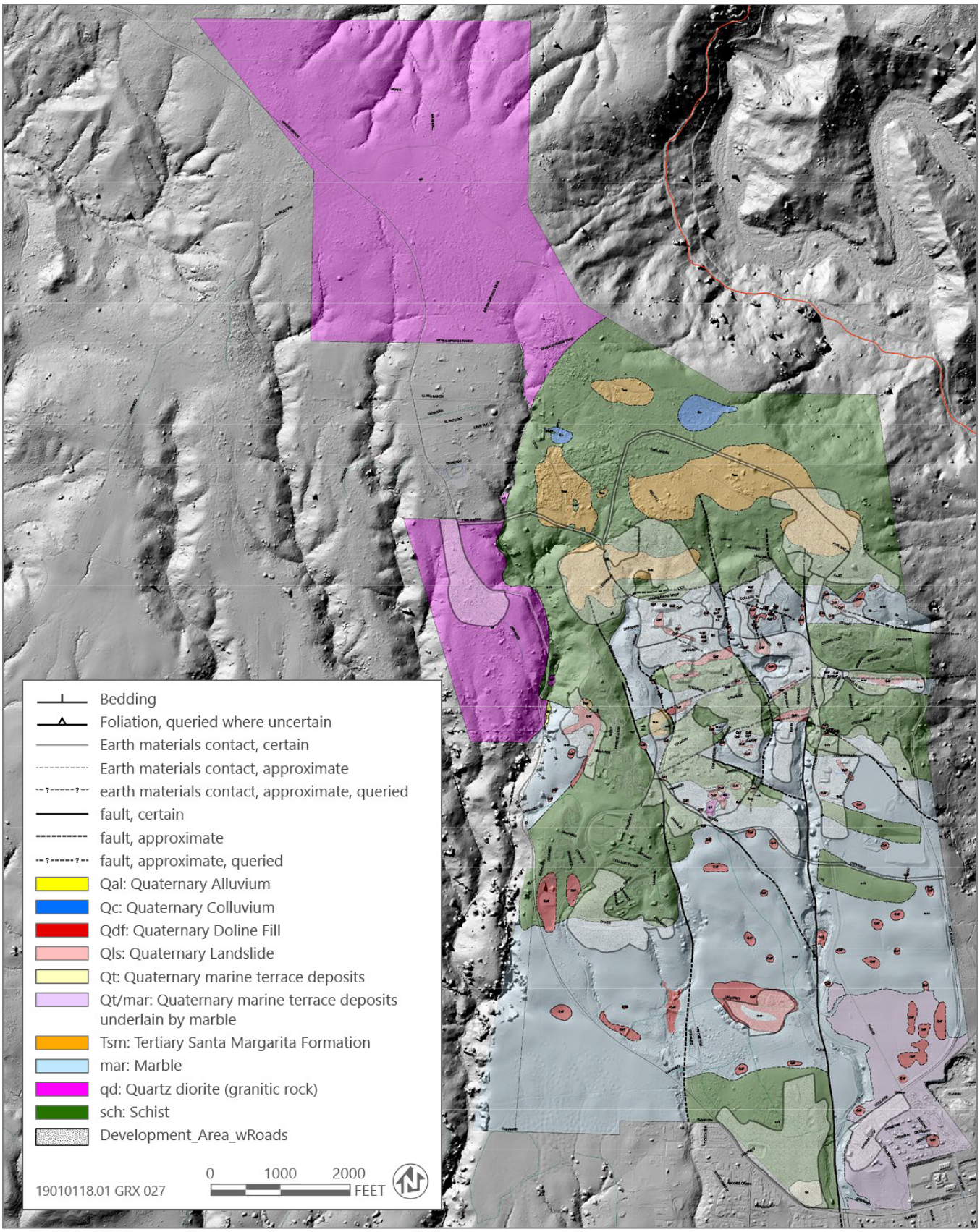
Figure 3.7-2 Topographic Map for the Main Residential Campus



190101118.01 GRX 029

Source: Figure adapted from Destephen, R.A., and Wargo R.H. 1992

Figure 3.7-3 Sinkhole Formation Process



Source: Figure produced and provided by Zinn Geology in 2020

Figure 3.7-4 Main Residential Campus Geologic Map

It is important to note that the distribution of soils depicted on the NRCS soil maps that cover the main residential campus are inaccurate and imprecise from the geological and geotechnical engineering perspective. This is because the NRCS maps do not present a level of detail that can reflect the complex structure and composition of the bedrock that underlies the UC Santa Cruz campus. Since soil is derived from the underlying bedrock, soil composition and distribution are predominantly controlled by the composition and distribution of the underlying bedrock. It is considered acceptable to use the maps for regional planning purposes and initial reconnaissance design level work, but due to the complexity of the soils on the main residential campus, UC Santa Cruz requires site-specific investigations with robust subsurface work by geologists, geotechnical engineers, and civil engineers for development and related activities.

Main Residential Campus

Upper/North Campus Soils

The predominant soil types on the upper/north portion of the main residential campus are Watsonville loam, Lompico-Felton complex, and Aptos loam. Watsonville loam is found on coastal terraces and formed in alluvium. The thickness of this unit is about 4 to 5 feet. Watsonville loam has very low permeability and the erosion hazard is slight to moderate. The Lompico-Felton complex is found at the base of slopes and near ridge tops and is composed of material weathered from sandstone, shale, siltstone, mudstone or schist. It is typically 3 feet thick. Permeability of the Lompico-Felton complex soil is moderate, and the erosion hazard is very high. Aptos loam is found on hills and mountains and is composed of material weathered from sandstone, siltstone, or shale. It is typically about 3 feet thick and found overlying a weathered fractured shale. Aptos loam has moderate permeability and erosion potential.

Central/Lower Campus Soils

The predominant soil type in the central campus is the Nisene-Aptos complex and the distributed soil types in the lower campus are predominantly Elkhorn sandy loam, Los Osos loam, Ben Lomond-Felton complex, and Watsonville loam. The Nisene-Aptos complex is mainly found on the lower slopes of the Santa Cruz Mountains and is composed of material derived from sandstone, siltstone, or shale. It is typically about 5 to 9 feet thick. Permeability of Nisene-Aptos soil is moderate, and the erosion hazard is high. Elkhorn sandy loam is found on old alluvial fans and marine terraces and is typically about 2 to 5 feet thick. Elkhorn sandy loam has moderately low permeability and slight to moderate erosion hazard. Los Osos loam is found on wide ridges on hills and mountains and is composed of material weathered from sandstone or shale. Typically, it is about 8 to 17 inches thick. Los Osos loam generally has low permeability and moderate erosion potential. The Ben Lomond-Felton complex is typically found in valleys and low areas near drainage ways and is composed of material eroded from sandstone, shale, siltstone, schist, or granite. It is typically about 4 feet thick. The permeability of the Ben Lomond-Felton complex is moderately low and the erosion potential varies from slight to very high. As stated above, Watsonville loam is found on coastal terraces and formed in alluvium. The thickness of this unit is about 4 to 5 feet. Watsonville loam has very low permeability and the erosion hazard is slight to moderate.

Westside Research Park

The predominant soil types on the Westside Research Park campus are Watsonville loam, which are found on coastal terraces and formed in alluvium. The thickness of this unit is about 4 to 5 feet. Watsonville loam has very low permeability and the erosion hazard is slight to moderate (Stanford Libraries 2020).

Expansive Soils

Expansive soils (soils that shrink and swell depending on moisture level) are present in scattered sections of the LRDP area. The distribution of expansive soils can be highly variable across building sites due to the derivation of the soils from the weathering of the highly faulted and folded layers of metamorphic rock. Expansive soils can damage building foundations if they are inadequately designed for a soil's expansive properties. Table 3.7-1, below, presents the shrink-swell potential of the soils in the LRDP area.

Table 3.7-1 Shrink-Swell Potential for Soils in the UC Santa Cruz LDRP Plan Area

Soil Type	Depth (Inches)	Shrink-Swell Potential
Aptos	0-23 >23	Low Moderate
Ben Lomond	All depths	Low
Bonnvdoon	All depths	Moderate
Catelli	All depths	Low
Danville	0-17 17-29 >29	Moderate High Moderate
Elkhorn	0-21 >21	Low Moderate
Felton	0-11 11-43 >43	Low Moderate Low
Lompico	0-5 >5	Low Moderate
Los Osos	0-19 19-36	Moderate High
Nisene	0-10 10-58	Low Moderate
Sur	All depths	Low
Tierra	0-14 >14	Low High
Watsonville	0-18 18-39 >39	Low High Moderate

Source: SCS 1980

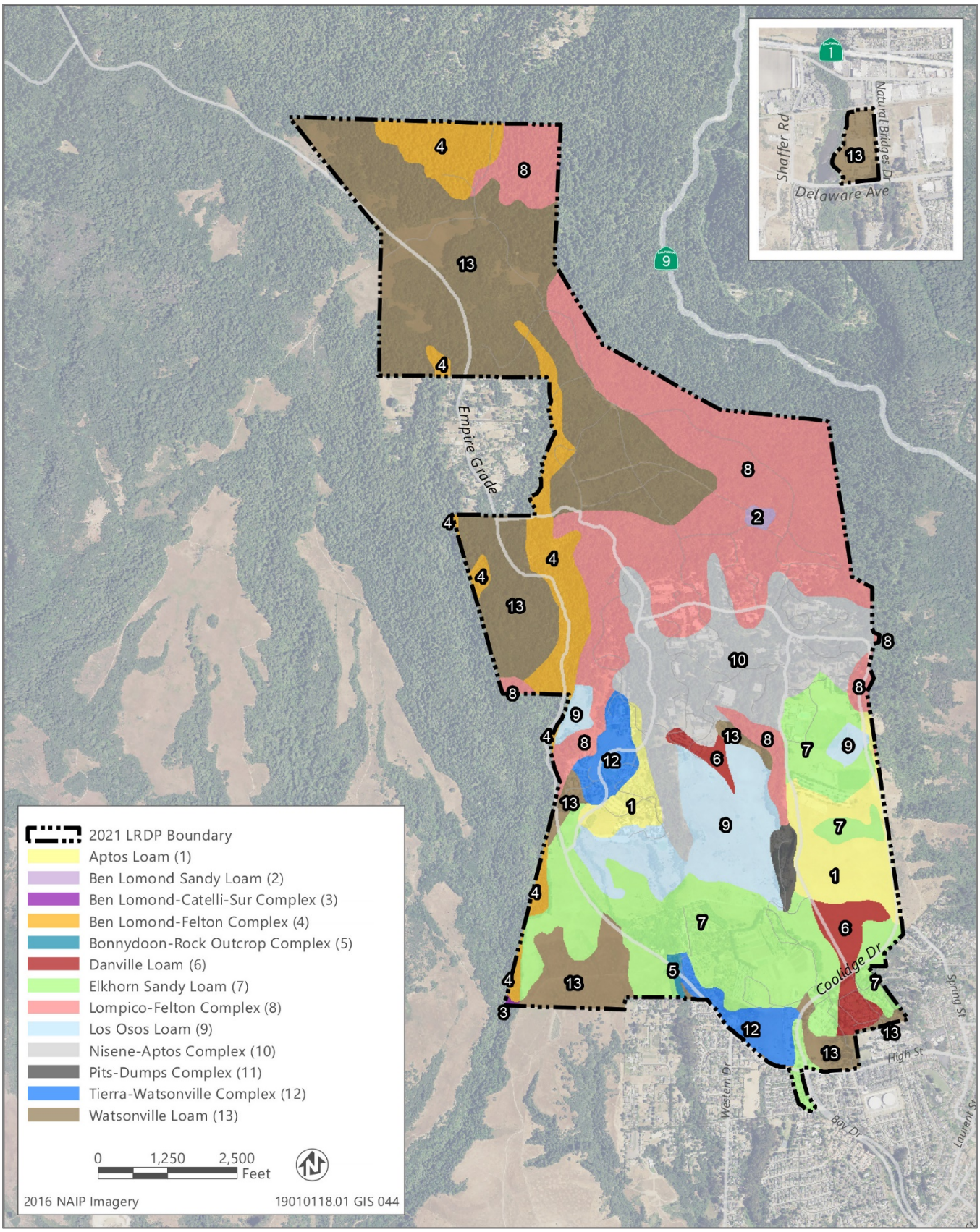
Erosion

As noted in the "Soils" section, above, the soils have been classified for susceptibility to erosion, based on soil characteristics and site slope (SCS 1980). As indicated in Table 3.7-2, cross-referenced with Figure 3.7-5, large portions of the north campus contain soils with a slight to moderate erosion potential, and significant pockets of soils with a high to very high erosion potential are present in the upper, central, and lower areas of the main residential campus. The Westside Research Park contains soils with a slight to moderate erosion potential.

Table 3.7-2 Erosion Potential for Soils in the UC Santa Cruz LRDP Plan Area

Soil Type	Erosion Potential
Nisene-Aptos Complex	Moderate
Lompico-Felton Complex	Very High
Watsonville Loam	Slight to Moderate
Danville Loam	Slight to Moderate
Elkhorn Sandy Loam	Slight to Moderate
Tierra-Watsonville Complex	High
Los Osos Loam	Moderate
Ben Lomond Sandy Loam	Very High
Ben Lomond-Felton Complex	Slight to Very High
Aptos Loam	Slight to Moderate

Source: SCS 1980.



Source: data downloaded from NRCS in 2020

Figure 3.7-5 Soils at the Main Residential Campus

The portion of the main residential campus underlain by karst is pockmarked with dolines (or sinkhole), with some of the sinkholes present in the drainages (i.e., swallow holes). Erosion, sedimentation, and infiltration, both natural and man-made, can have complex interactions. Some sinkholes have been filled by infiltration of fine-grained sediments or by wall collapse, which can exacerbate erosion problems. In other locations, the sinkholes have enlarged and capture a majority of the sediment and a portion or all of the drainage water, resulting in very little erosion downstream. These issues are discussed in more detail in Section 3.10, "Hydrology and Water Quality," along with evaluation of 2021 LRDP effects on stormwater runoff patterns, flooding, and drainage.

UC Santa Cruz has developed standards to comply with both the Statewide Construction General Permit and the Statewide Phase II MS4 Permit. These standards are included in the Campus Standards Handbook and incorporated by reference in the specifications for campus development projects.

Seismicity

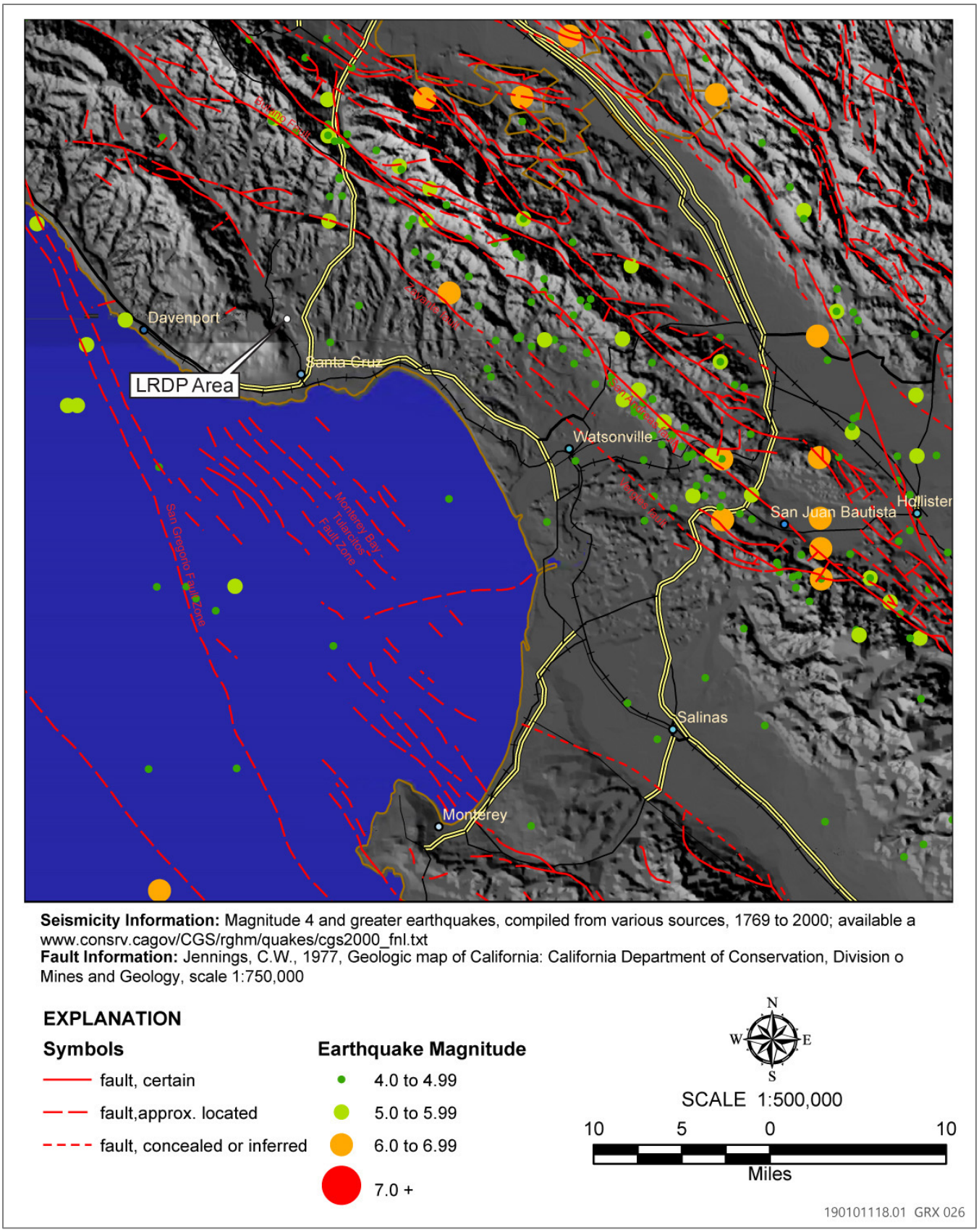
Throughout the late Cenozoic Era (approximately the past 25 million years), central California has been dominated by tectonic forces associated with lateral or "transform" motion between the North American and Pacific crustal plates, producing a complex system of northwest-trending faults (e.g., the San Andreas Fault system). These faults show horizontal displacements measured in tens to hundreds of miles. Uplift, deformation, erosion, and subsequent re-deposition of sedimentary rocks have been driven primarily by the northwest-directed, horizontal (strike-slip) movement of the plates and the associated southwest to northeast-oriented compressive stress. The region continues to be characterized by moderate to high rates of tectonic and seismic activity (Figure 3.7-6).

The State of California has addressed these hazards to public safety and property through identifying areas presenting geologic risk and imposing regulations. More specifically, the California Geological Survey is responsible for the preparation and maintenance of programmatic mapping of these areas, as required by the Seismic Hazards Mapping Act. Zones of required investigation for possible earthquake faulting, landslides, and liquefaction are delineated and distributed to cities, counties, and State construction agencies to help identify where higher building standards may be necessary for safe development. Seismic hazards resulting from earthquakes include ground rupture along a fault line (also called surface rupture) ground shaking, liquefaction, subsidence, and mass wasting. Each of these potential hazards is discussed below.

Faults

Most earthquakes originate along fault lines. A fault is a fracture in the Earth's crust along which rocks on one side are displaced relative to those on the other side due to plate tectonics. Most faults are the result of repeated displacement that may have taken place suddenly and/or by slow creep (California Geological Survey 2018). The State of California has developed a classification system that defines an active fault as one that have had surface displacement in in Holocene time. The following passage from CGS SP42 Section 5.2 explains the rationale as follows:

> *For the purposes of the A-P Act, an active fault is defined as one which has "had surface displacement within Holocene time" (the last 11,700 years). This definition does not mean that faults lacking evidence for surface displacement within Holocene time are necessarily inactive. A fault may only be presumed to be inactive based on satisfactory geologic evidence; however, the evidence necessary to prove inactivity sometimes is difficult to obtain and locally may not exist. By virtue that fault investigations are required by the A-P Act to assess the recency of fault movement implies that faults within an EFZ are presumed to be active until determined otherwise.*
>
> *Terms such as "potentially active" and "inactive" have been commonly used in the past to describe faults that do not meet the SMGB definition of "active fault." However, these terms have the potential to cause confusion from a regulatory perspective, as they are not defined in the A-P Act, and may have other non-regulatory meanings in the scientific literature or in other regulatory environments. In order to avoid these issues, introduced below are terms that provide added precision when used in classifying faults regulated by the A-P Act. Faults are classified into three categories on the basis of the absolute age of their most recent movement…on a hypothetical trench log:*



Source: Figure produced and provided by Zinn Geology in 2020

Figure 3.7-6 Area Faults and Historic Seismic Activity

1) Holocene-active faults: Faults that have moved during the past 11,700 years. This age boundary is an absolute age (number of years before present) and is not a radiocarbon (14C) age determination, which requires calibration in order to derive an absolute age.

2) Pre-Holocene faults: Faults that have not moved in the past 11,700 years, thus do not meet the criteria of "Holocene-active fault" as defined in the A-P Act and SMGB regulations. This class of fault may be still capable of surface rupture, but is not regulated under the A-P Act. Depending on available site-specific and regional data such as proximity to other active faults, average recurrence, variability in recurrence, the timing of the most recent surface rupturing earthquake, and case studies from other surface rupturing earthquakes, the project geologist may, but is not required to, recommend setbacks. Engineered solutions can also be considered by a licensed engineer operating within his or her field of practice.

3) Age-undetermined faults: Faults where the recency of fault movement has not been determined. Faults can be "age-undetermined" if the fault in question has simply not been studied in order to determine its recency of movement. Faults can also be age-undetermined due to limitations in the ability to constrain the timing of the recency of faulting. Examples of such faults are instances where datable materials are not present in the geologic record, or where evidence of recency of movement does not exist due to stripping (either by natural or anthropogenic processes) of Holocene-age deposits. Within the framework of the A-P Act, age-undetermined faults within regulatory Earthquake Fault Zones are considered Holocene-active until proved otherwise.

It is worth reiterating that a project located outside of an Earthquake Fault Zone is still regulated by the A-P Act if a Holocene-active fault is found at that site. This can happen if a lead agency has established its own regulatory zone requiring an assessment of surface fault rupture hazard or in a situation where a Holocene-active fault is discovered during a geologic investigation for that project. If located outside of an Earthquake Fault Zone, age-undetermined faults are not regulated by the A-P Act. However, the project geologist may want to consider all available data and provide recommendations regarding whether setbacks or other engineered solutions should be considered in the placement or design of a structure crossing these faults.

Regional Faults

The following sections present information on the active and potentially active faults in the region. The descriptions are taken primarily from Nolan, Zinn and Associates (2005) and from the USGS Quaternary Faults database. The faults are shown on Figure 3.7-6.

Ben Lomond Fault

The Ben Lomond Fault is the nearest mapped large fault to the main residential campus and Westside Research Park. In the immediate vicinity of the campus, this fault is inferred to trend approximately north/south along the eastern boundary of the campus. It is a bedrock fault, which had significant vertical movement in the Tertiary Period. Twelve miles of the fault trace have been mapped along the San Lorenzo River Valley. The Ben Lomond Fault is not mapped as active by either the State or Santa Cruz County, although it appears to join the active Zayante Fault at its northwest end (Nolan, Zinn and Associates 2005).

San Andreas Fault System

The San Andreas Fault, located approximately 11 miles northeast of the main residential campus in the Santa Cruz Mountains, is an active fault and is a major seismic hazard in northern California (Working Group on Northern California Earthquake Potential [NCEP] 1996). The main trace of the fault trends northwest-southeast, extending over 700 miles from the Gulf of California through the Coast Ranges to Point Arena, where the fault extends offshore.

Geologic evidence suggests that the San Andreas Fault has experienced right-lateral, strike-slip movement throughout the latter portion of Cenozoic time (the past 20 to 30 million years), with cumulative offset of hundreds of miles. Surface rupture during historical earthquakes, fault creep, and historical seismicity confirm that the San Andreas Fault and its branches, the Hayward, Calaveras, and San Gregorio Faults, are all active today.

Historical earthquakes along the San Andreas Fault and its branches have caused significant seismic shaking in the Monterey Bay area. The two largest historical earthquakes on the San Andreas Fault to affect the area were the

moment magnitude (Mw) 7.9 San Francisco earthquake of April 18, 1906 (centered near Olema to the north of San Francisco) and the Mw 6.9 Loma Prieta earthquake of October 17, 1989. The San Francisco earthquake caused severe seismic shaking and structural damage to many buildings in the Monterey Bay area. The Loma Prieta earthquake appears to have caused more intense seismic shaking than the 1906 event in localized areas of the Santa Cruz Mountains, even though its regional effects were not as extensive. Based on records from the 1906 San Francisco earthquake, it is estimated that the maximum credible earthquake likely to occur along the San Andreas Fault would equal 8.3 Mw, which represents more than 30 times the energy released by the 1989 Loma Prieta Earthquake. There were also significant earthquakes in northern California along or near the San Andreas Fault in 1838, 1865 and possibly 1890 (Sykes and Nishenko 1984; NCEP 1996).

Geologists have recognized that the San Andreas Fault system can be divided into segments with "characteristic" earthquakes of different magnitudes and recurrence intervals (Working Group on California Earthquake Probabilities [WG], 1988 and 1990). A study by NCEP in 1996 has redefined the segments and the characteristic earthquakes for the San Andreas Fault system in northern and central California. Two "locked" overlapping segments of the San Andreas Fault system represent the greatest potential hazard to the campus.

The first segment is defined by the rupture that occurred from Cape Mendocino to San Juan Bautista along the San Andreas Fault during the great Mw 7.9 earthquake of 1906. The NCEP (1996) has hypothesized that this "1906 rupture" segment experiences earthquakes with comparable magnitudes at intervals of about two hundred years.

The second segment is defined by the rupture zone of the Mw 6.9 Loma Prieta earthquake. Although it is uncertain whether this "Santa Cruz Mountains" segment has a characteristic earthquake independent of great San Andreas Fault earthquakes, the NCEP (1996) has assumed an "idealized" earthquake of Mw 7.0 with the same right-lateral slip as the 1989 Loma Prieta earthquake, but having an independent segment recurrence interval of 138 years and a multi-segment recurrence interval of 400 years.

The USGS Working Group on California Earthquake Probabilities 2002 (2002 WG) re-evaluated the geologic data and characterized the earthquake sources for the San Francisco Bay Region, which includes Santa Cruz, in the *Earthquake Probabilities in the San Francisco Bay Region: 2002-2031*. The segmentation model utilized in this study is largely similar to that adopted by NCEP in 1996, although the 2002 WG added far more complexity to the model, and reduced the forecasted magnitudes for the different segments (USGS 2003). The study is appropriate for use in estimating seismic hazard in Santa Cruz and estimating the intensity of ground shaking expected for specified scenario earthquakes. The study determined that there is a 62 percent probability of at least one magnitude 6.7 or greater (M≥6.7) earthquake in the 3-decade interval 2002-2031 in the San Francisco Bay Region. For the San Andreas Fault there is a 21 percent probability of a M≥6.7 in the 2002-2031 period. Furthermore, the San Andreas Fault system has one of the highest probabilities of generating a M≥6.7 earthquake before 2032, and this fault has sufficient length to generate a large earthquake of M7.5 or larger (USGS 2003). The 2002 California probabilistic seismic hazard maps issued by the California Geological Survey (Cao et al. 2003) appear to have largely adopted the earthquake magnitudes issued by the 2002 WG. The most significant change in modeling the San Andreas Fault Zone by Cao et al. (2003) is the elimination of a singular listing of the penultimate event, the 1906 Mw 7.9 earthquake (although such an event can be derived by looking at the aggregate probability of the individual segments rupturing together, as they did in 1906).

In spite of the increasing complexity of the models addressing different size earthquakes with different recurrence intervals on the sundry segments of this fault, it is undeniable that the 1906 Mw 7.9 earthquake still eclipses all other events which have occurred on the San Andreas Fault in this region.

Zayante-Vergeles Fault

The Zayante-Vergeles Fault is west of the San Andreas Fault, located approximately 8 miles northeast of the main residential campus. It lies west of the San Andreas Fault and trends about 50 miles northwest from the Watsonville lowlands into the Santa Cruz Mountains. The southern extension of the Zayante Fault, known as the Vergeles Fault, merges with the San Andreas Fault south of San Juan Bautista.

The Zayante-Vergeles Fault has undergone late Pleistocene and Holocene movement (1.8 million years ago to present) and is potentially active. Movement has been vertical and probably accompanied by right-lateral, strike-slip movement (Nolan, Zinn and Associates 2005).

The Zayante Fault may have undergone sympathetic (secondary) fault movement during the 1906 earthquake centered on the San Andreas Fault, although this evidence is equivocal. Seismic records strongly suggest that a section of the Zayante Fault, approximately 3 miles long, underwent sympathetic movement in the 1989 earthquake. The earthquakes tentatively correlated to the Zayante Fault were centered at a depth of 5 miles; no instances of surface rupture on the fault have been reported. The fault, which is considered potentially active, is capable of generating a Mw 6.8 earthquake with an effective recurrence interval of 10,000 years, or a Mw earthquake of 7.0 with no stated recurrence (Nolan, Zinn and Associates 2005).

San Gregorio Fault

The San Gregorio Fault runs mostly offshore in the vicinity of the Santa Cruz County coastline, cutting across the land for a short distance at Point Año Nuevo and then heads offshore and northwest where it intersects with the San Andreas Fault near Bolinas. The portion of the fault nearest the main residential campus is approximately 8.5 miles to the southwest. The Point Año Nuevo portion of the fault displays evidence of predominantly right-lateral strike slip displacement throughout the late Pleistocene and Holocene. The most recent earthquake along the San Gregorio Fault zone occurred after 1270 AD to 1400 AD, but prior to the arrival of Spanish missionaries in 1775 AD (USGS Quaternary Fault and Fold Database of the United States).

Monterey Bay-Tularcitos Fault Zone

The northwest-trending Monterey Bay-Tularcitos Fault zone, located approximately 5 miles south of the campus, is approximately 25 miles long and 6 to 9 miles wide and consists of numerous small offset (en echelon) faults.

The fault zone intersects the coast in the vicinity of Seaside and Ford Ord, where several onshore fault traces have been tentatively correlated with offshore traces. Movement in the fault zone appears to be predominantly right-lateral, and strike-slip. Fault traces show evidence of Quaternary (less than 1.8 million years ago) movement both onshore and offshore and, therefore, they are considered potentially active (Rosenberg and Clark 1994).

Historical earthquakes have been tentatively located in the Monterey Bay-Tularcitos Fault zone including two events, estimated at 6.2 on the Richter Scale in October 1926. Because of possible inaccuracies in locating the epicenters of these earthquakes, it is possible that they actually occurred on the nearby San Gregorio Fault zone. Another earthquake in April 1890 might be attributed to the Monterey Bay-Tularcitos Fault zone.

On-Campus Faults

There are no faults that underly the Westside Research Park. On the main residential campus, the older metamorphic bedrock is cut by a series of north-south and east-west trending faults. Some have located in the field by geologists as part of mapping programs or grading observation, but many are inferred by the secondary development of erosional valleys, depressions and sinkholes or because the faults juxtapose dissimilar rock types across narrow zones. Jordan Gulch and Moore Creek are underlain by the two north-south trending faults and define the three structural blocks that underlie central and lower campus. These faults are not apparent on the north and upper campus and do not appear to cut the Tertiary age Santa Margarita Formation located on the north campus. The faults on the main residential campus are clearly not Holocene-active, given that the faults do not appear to cut bedrock that is 1.8 million years old, along with the geometry of the faults with respect to the neotectonics setting in this region. There is no need to consider setbacks or investigations of the faults, at least with respect to surface fault ground rupture hazard.

The old east-west trending faults on the main residential campus appear to be offset or truncated by the north-south faults indicating that they are even older than the north-south faults and are therefore are not Holocene-active (Nolan, Zinn and Associates 2005).

Primary Seismic Hazards

The current CBC requirements for seismic shaking analysis for buildings and infrastructure now rely upon incredibly complex time dependent and time independent models issued by the USGS that are a hybrid of deterministic and probabilistic hazards analyses of faults, both real and artificial. The previous method of assigning moment magnitude earthquake values to discretized segments of faults along with "characteristic" earthquakes has been discarded in favor of much more robust statistical analyses that are appropriate for use in risk-based analyses. The protocols for developing minimum prescriptive seismic structure dependent shaking values are given in the ASCE/SEI 7 manual and those protocols are referenced in the current CBC, as described above. The regional faults located in the region of UC Santa Cruz are shown on Figure 3.7-6.

Surface Fault Rupture

Surface rupture is the surface expression of movement along a fault. Structures built over an active fault can be torn apart if the ground ruptures. The potential for surface rupture is based on the concepts of recency and recurrence. Surface rupture along faults is generally limited to a linear zone a few meters wide. The Alquist-Priolo Act (see the Regulatory Setting discussion, above) was created to prohibit the location of structures designed for human occupancy across, or within 50 feet of, an active fault, thereby reducing the loss of life and property from an earthquake. The LRDP area is not located within an Alquist-Priolo active fault zone (Bryant and Hart 2007).

Ground Shaking

The LRDP area lies within one of the most seismically active areas in the western United States. Strong seismic shaking has occurred and will occur again on campus within the next 100 years (which is the CBC design life of campus structures). The intensity of seismic shaking, or strong ground motion, during an earthquake is dependent on the distance and direction from the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions of the surrounding area. Ground shaking could potentially result in the damage or collapse of buildings and other structures.

As noted above, current CBC requirements for seismic shaking analysis for buildings and infrastructure now rely upon incredibly complex models and protocols for developing minimum prescriptive seismic structure dependent shaking values given in the ASCE/SEI 7 manual and those protocols are referenced in the current CBC. It should be noted that there is a campus-specific dilemma encountered when using the ASCE/SEI 7 seismic design criteria in determining site class, which is based on the site soil properties when designing structures in the karst where marble bedrock underlies the site. Most relationships are based on average shear wave velocities for the upper 100 feet of earth materials. The difficulty in deciding which relationship to choose arises when the planned foundation of the building will simultaneously rest upon pinnacles of crystalline marble as well as extremely deep pockets of soft soil filling old dolines. Research literature that addresses this topic is unavailable, so it is important for geologists and other design professionals to collaborate on construction issues.

Karst Hazard and Subsidence

In areas that are underlain by water soluble rocks such as the marble bedrock found at the main residential campus, dissolution over hundreds of thousands of years from surface water and groundwater often produces a complex network of interconnected underground channels and caverns as well as karst topography. Such topography is characterized by irregular surfaces resulting from subsidence or collapse of the bedrock and sediment into those subterranean cavities that have developed within the marble bedrock.

Depressions in the land surface resulting from the intersection with a zone of collapse of overlying sediments into a void, are called "sinkholes" or "dolines." There are three types of dolines. Solution dolines are formed by gradual settling of surficial sediments into a solution cavity while solution is occurring. These dolines are characterized by gently sloping sides and an absence of rock outcrops along the walls. Such dolines do not have extensive caverns or experience rapid large-scale collapse. Collapse dolines are formed by the sudden collapse of the roof of an underground void. They have steep sides and rocky, irregular walls. Subsidence dolines are similar to solution dolines but are formed when surface sediments are washed into existing subsurface cavities. The overlying soils subside since some of their volume has been washed into the adjacent void.

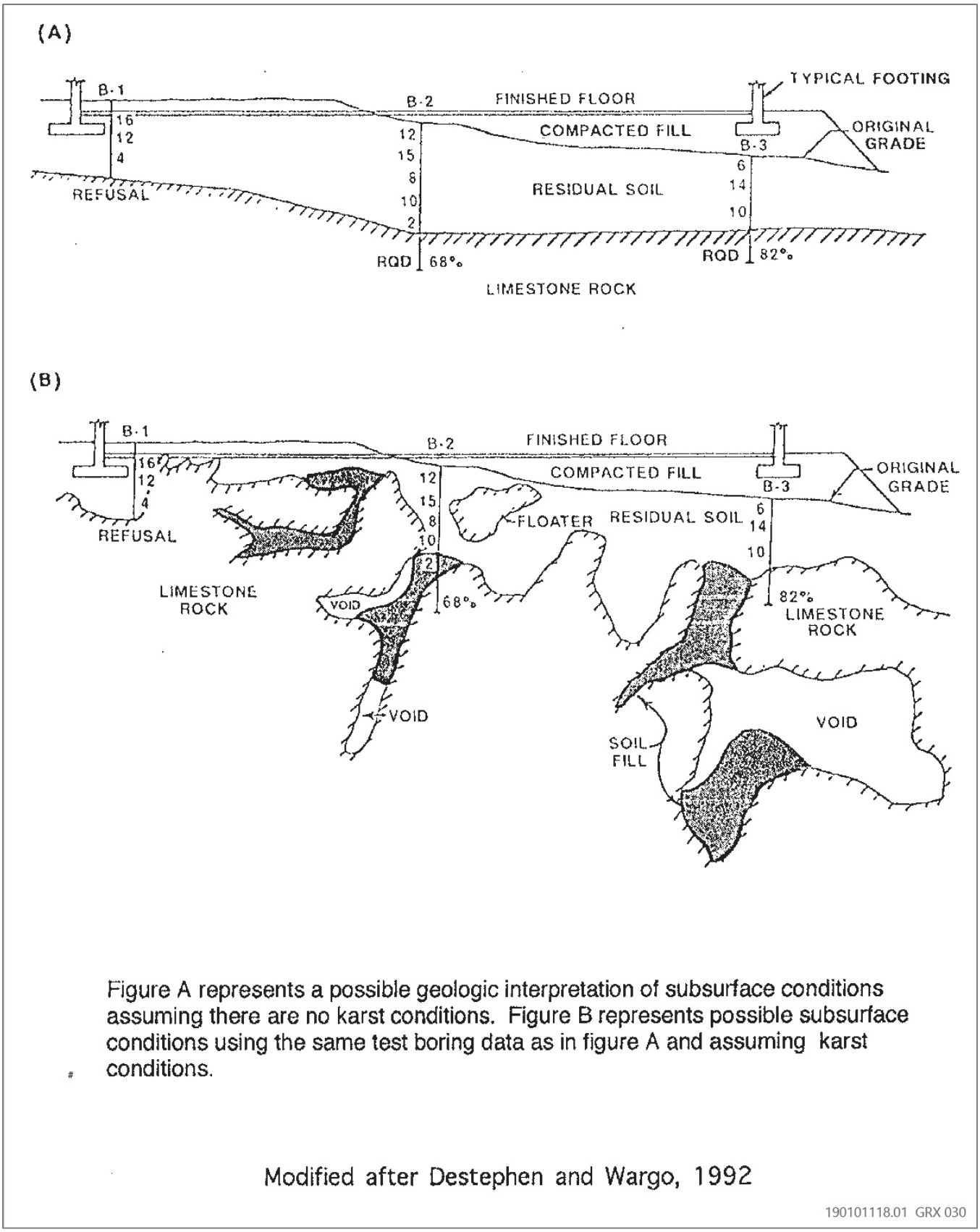
The karst topography on the main residential campus has not been subject historically to catastrophic collapse of large underground voids, as is occasionally seen in karst regions in the eastern United States. Neither is there geologic evidence for prehistoric large-scale cavern collapse on campus. Most dolines present on the campus appear to be solution dolines. The relative absence of large-scale collapse features is most likely a result of the limited lateral extent and thickness of the marble section on campus. However, the weathering processes associated with marble bedrock create special problems for the siting and founding of buildings, with or without sudden doline collapse. These potential problems must be recognized in the site investigation and design programs. Therefore, the hazards discussed below deal with problems encountered in investigating building sites and designing foundations, rather than immediate threats to life or potential structural collapse of buildings.

One of the principal problems of developing areas underlain by karst is the extreme irregularity of the karst features, and consequently the lack of predictability of subsurface conditions. Because of this unpredictability, some level of risk is inherent in developing in karst regions, as no amount of site investigation can reveal every detail of the subsurface. The surface of the marble bedrock can be highly irregular. Boring data from prior investigations on the campus for the last decade show a variation in the elevation of the marble surface of more than 100 feet over a horizontal distance of 10 feet or less. This variability can easily be missed in an otherwise competent geotechnical site investigation. A building can be sited with a portion of the foundation resting on a solid marble pillar while the adjacent portion of the structure is resting on over 100 feet of poorly consolidated doline fill. Depending upon the loads placed on a foundation, such conditions could lead to structural failure. Similarly, caverns and small underground voids can easily be missed even with an aggressive drilling and exploration program. Loading of the ceiling of a cavern could lead to partial collapse or subsidence of the cavern ceiling and the foundation into the void.

In addition to cavern collapse and subsidence of soils into voids, there is widespread dissolution of the marble surface below the overlying deposits. This dissolution creates areas of weak or soft soils in a thick zone that directly overlies the marble surface. These zones are composed of marble fragments in a matrix of silt, sand, and clay. The marble fragments may or may not be in point-to-point contact and the soil matrix is generally soft and poorly consolidated. Caverns or large voids are always present in these soft zones, and the zones are usually not associated with evidence for doline formation or collapse. Such zones may have inadequate bearing strength and may present hazards to construction unless recognized. Figure 3.7-7 shows the type of subsurface conditions that can be encountered in an area of solution cavities, and two types of interpretations derived from the data; one interpretation incorrectly assumes “layer cake” stratigraphic conditions while the second interpretation assumes a much more complicated karst terrain stratigraphy.

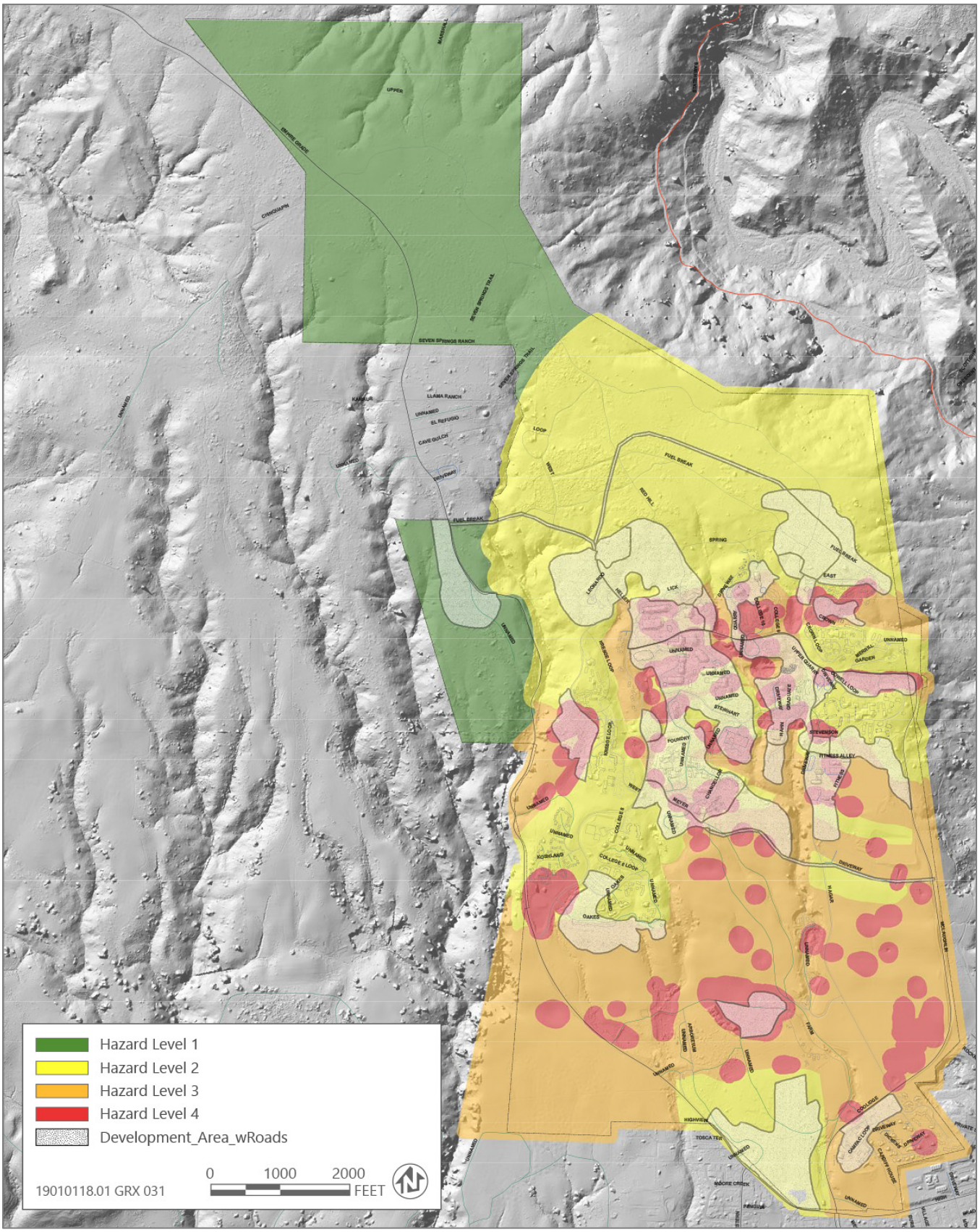
The karst hazard zone map (Figure 3.7-8) separates the main residential campus into four hazard level zones based on the character of bedrock and the results of previous geotechnical investigations. The zones are defined as:

- Zone 1 - Areas underlain by granitic rocks with no karst-related hazards. No special precautions or recommendations specific to karst processes are necessary. This zone encompasses areas underlain by granitic rocks.
- Zone 2 - Areas with low potential for karst-related hazards. These are underlain by schist, where no marble or evidence for sinkhole activity has been observed, either in boreholes or at the surface. This zone was created by applying a 100-foot buffer beyond the contacts for the applicable earth material units as shown on the current campus geologic map. The buffers were included to account for the inherent uncertainty in locating borings and earth materials contacts portrayed by consultants in the many previous reports on which the compilation map is based. Zone 2 represents areas with a higher hazard level than Zone 1, because marble can occur as isolated lenses or pods, or may occur at depth.
- Zone 3 - Zone 3 includes areas underlain directly or at shallow depth by marble, but that lack any direct indication of doline formation or other solution collapse of site soils in either surface or surface data. Site investigations in this zone should include subsurface investigations appropriate for this geologic setting. A 100-foot buffer has been applied to the margins of the zone as described above.
- Zone 4 - Areas with a high potential for hazards due to karst conditions. This includes areas underlain by marble with evidence of doline formation. A 100-foot buffer has been applied to the margins of the zone as described above (Nolan, Zinn and Associates (2005) and Zinn Geology [in press]).



Source: Figure adapted from Destephen, R.A., and Wargo R.H. 1992

Figure 3.7-7 Geologic Interpretation In Karst Terrain



Source: Figure produced and provided by Zinn Geology in 2020

Figure 3.7-8 Karst Hazards

Most of the existing main residential campus core buildings are located in Karst Hazard Zones 3 and 4. To address the karst hazard, most existing construction on the UC Santa Cruz campus includes conventional spread footing foundations, which are adequate where building pressures are light and low-density zones or solution cavities are relatively deep. Other foundation construction techniques that have been used in karst areas include spread footings with grade beams to span low-density zones, structural mats and post-tensioned slabs, pier and grade beam foundations with either end-bearing or side-wall friction for support, driven piles, geotextile-reinforced compacted fill, pressure or compaction grouting of underlying sediments combined with the aforementioned footings, and deep dynamic compaction (Nolan, Zinn and Associates 2005).

Liquefaction and Lateral Spreading

The soils on the main residential campus and Westside Research Park have been characterized by Dupré (1975) as having a low susceptibility to liquefaction. There are no reports of liquefaction and its attendant effects on the campus as a result of the 1989 Loma Prieta Earthquake or the 1906 Earthquake (Youd and Hoose 1978; Lawson 1908), but the population and anecdotal reports were so sparse in this region in 1906, it is possible that any damage sustained on what is now the campus area during the 1906 earthquake could have gone unnoticed.

Only one past geotechnical engineering investigation on the main residential campus, for the north campus (Steven Raas and Associates 2000), identified potentially liquefiable deposits. Liquefiable deposits were identified in two of the 34 borings advanced as part of that investigation. The liquefiable deposits were found between depths of 4 and 16 feet below the ground surface, with a corresponding calculated liquefaction-induced settlement of up to 2.5 inches. The liquefiable deposits appear to be within weathered schist bedrock, near the contact with Santa Margarita Formation sand.

Mass Wasting and Landslides

Mass wasting refers to the collective group of processes that characterize down slope movement of rock and unconsolidated sediment overlying bedrock. These processes include landslides, slumps, rockfalls, flows, and creeps. Many factors contribute to the potential for mass wasting, including geologic conditions as well as the drainage, slope, and vegetation of the site. Landslide deposits on the main residential campus are located along Cave Gulch near the western boundary. The lack of landslides is likely due to the presence of hard, stable, granitic and metamorphic rocks that underlie the main residential campus and Westside Research Park. Potential hazards from landslides are present in limited areas where steep slopes are overlain by substantial thicknesses of colluvium and soil, generally along the larger stream drainages and in the old marble quarries.

Mineral Resources

Marble quarrying of the main residential campus was historically extensive and tied to production of cement. However, UC Santa Cruz does not actively mine or quarry the primary mineral resource in the LRDP area, marble bedrock, nor is there any plan to do so in the future. The marble bedrock is extensive across the main residential campus.

Paleontological Setting

Significant nonrenewable vertebrate and invertebrate fossils and unique geologic units have been documented throughout California. The fossil yielding potential of a particular area is highly dependent on the geologic age and origin of the underlying rocks. Paleontological potential refers to the likelihood that a rock unit will yield a unique or significant paleontological resource. All sedimentary rocks, some volcanic rocks, and some low-grade metamorphic rocks have potential to yield significant paleontological resources. Depending on location, the paleontological potential of subsurface materials generally increases with depth beneath the surface, as well as with proximity to known fossiliferous deposits.

Marine formations in Santa Cruz County have yielded significant invertebrate and vertebrate fossils, including several taxa of marine mammals. Potential fossil-bearing formations in the LRDP area include marine formations (Santa Margarita sandstones, Santa Cruz mudstone, and Quaternary marine terrace deposits) and sedimentary formations (Quaternary non-marine terrace deposits and doline deposits).

Santa Margarita sandstones in the Santa Cruz region have yielded significant marine vertebrate fossils. Outcrops of the Santa Margarita formation, late Miocene age through early Pliocene age marine sediments, primarily sandstone, occur in small patches in the northern portion of the main residential campus. The Santa Margarita formation evidences a range of marine environments. The lower strata often contain abraded vertebrate fossils of primarily Clarendonian age marine mammals (13 to 9 million years ago) with some terrestrial mammal remains, including horses and gomphotheres. Complete skeletons of large marine mammals such as sea cows, whales, and sea lion- and walrus-like pinnipeds have been recovered in some localities. Deposits of the Santa Margarita formation in the central Santa Cruz Mountains have yielded invertebrate fossils that occur only in Pliocene age deposits (Clark 1981), which suggests a depositional history that spans Late Miocene through early Pliocene time (13 to 2 million years ago). Although no finds have been made in the Santa Margarita sandstones on the UC Santa Cruz campus, this may be because there has been no development in the Santa Margarita formation. The Santa Margarita sandstone formations in the LRDP area are considered to have high potential to include significant fossils.

Quaternary marine terrace deposits, which are remnants of high marine terraces, have been mapped in the southeastern portion of the main residential campus, where they overlie marble and schist. The marine terrace deposits are sediments deposited on wave-cut platforms, with a wedge of non-marine deposits backed against an ancient sea cliff. These consist of unconsolidated deposits of silt, sand, clay, and gravel, around 900,000 years old. Although deposits of this kind may preserve fossils, no fossil finds have been documented in doline fill deposits and Quaternary marine terrace sediments in the region, nor have any fossil finds been made on campus, despite extensive development in areas underlain by Quaternary marine and on-marine terrace deposits. While these deposits may have some potential to yield fossils, the potential to encounter fossils in these formations in the LRDP area is considered low.

Dolines, which developed in the main residential campus area during the Pleistocene and Holocene as the result of dissolution of marble, which is water soluble. Dolines, once formed, act as surface drains and tend to collect sediment and decomposed rock. Although there have been no finds to date in the coastal California region, some of the best preserved late Pleistocene vertebrate fossils recovered from regions of high precipitation or dense vegetation elsewhere in California have been from caves developed in limestone and marble. Remains of animals trapped in or washed into a sinkhole or transported into an underground cavern by flowing water or as a result of collapse, may be mineralized and preserved. Mineralized remains would not be expected to occur in recent near-surface fill deposits in dolines. However, fossil remains may occur in interstices and caverns in the karst material, or in the older levels of sinkhole deposits. Dolines occur in numerous locations on the central and lower portions of the main residential campus and there has been extensive development in these areas. This suggests that this setting is not paleontologically sensitive on campus, or that fossils in this setting are rare. Therefore, the potential to encounter fossils in dolines in the LRDP area is considered low.

The immediate surface formations at 2300 Delaware Avenue, the site of the Westside Research Park, are relatively recent emergent coastal terrace deposits, which generally are not paleontologically sensitive because of their recent age. Locally, these deposits are underlain by Santa Cruz mudstone, a Plio-Pleistocene marine deposit formation that has yielded marine vertebrate fossils, including sea mammals, fish, and birds, in the Santa Cruz region (UCMP 2010). This formation, which could be exposed by excavation at this site, is considered to have high paleontological potential.

3.7.3 Environmental Impacts and Mitigation Measures

ANALYSIS METHODOLOGY

To evaluate project impacts, resource conditions that could pose a risk to the 2021 LRDP were identified through review of documents pertaining to these topics within the LRDP area. Sources consulted include USGS and CGS technical maps and guides; the NRCS Soil Survey (available through the Soil Survey Geographic Database [SSURGO]); the Santa Cruz County Soils Survey (Stanford Libraries 2020); previous environmental impact reports; background reports prepared for nearby plans and projects; and published geologic literature. The information obtained from these sources was reviewed and summarized to establish the existing conditions (described above) and identify potential environmental hazards. In determining level of significance, the analysis assumes that the project alternatives would comply with relevant laws, regulations, guidelines, and project-specific geotechnical studies.

SIGNIFICANCE CRITERIA

Thresholds of significance are based on Appendix G of the State CEQA Guidelines. 2021 LRDP implementation would result in a significant impact on geology, soils, paleontological, or mineral resources if it would:

- directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
    1. 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,
    2. strong seismic ground shaking,
    3. seismic-related ground failure, including liquefaction, or
    4. landslides;
- result in substantial soil erosion or the loss of topsoil;
- 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 landslides, lateral spreading, subsidence, liquefaction or collapse;
- be located on expansive soil creating substantial risks to life or property;
- have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the purposes of the disposal of wastewater;
- directly or indirectly destroy a unique paleontological resource or site or unique geologic feature;
- 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; or
- 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.

ISSUES NOT EVALUATED FURTHER

Surface Fault Rupture

Although UC Santa Cruz is located in a seismically active region that includes several active earthquake faults of local and regional significance, the LRDP area is not located within a designated Alquist-Priolo Earthquake Fault Zone. The faults mapped on campus do not appear to cut bedrock that is 1.8 million years old and their geometry with respect to the regional neotectonics setting makes it unlikely that they will rupture the ground surface within the design life of any buildings or infrastructure on the camps. There is no need to consider setbacks or investigations of the faults with respect to surface fault ground rupture hazard. Compliance with the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook would minimize any potential impacts related to fault rupture. Thus, implementation of the 2021 LRDP would not expose people or structures to potential substantial adverse effects related to the rupture of a known earthquake fault; and this issue is not evaluated further.

Septic Systems

There are no septic systems or alternative wastewater systems within the LRDP area and future development associated with the 2021 LRDP would not include the construction or use of septic facilities; therefore, no impact would occur and this issue is not evaluated further. This issue would only be important if wastewater processing that relied on soils for effluent treatment was proposed, and it is not.

Mineral Resources

The LRDP area is within an area designated as a Mineral Resource Zone (MRZ) due to the presence of subsurface limestone marble. The area is classified as MRZ-3a, defined as an area where mineral resources are known to exist, but where insufficient information is available to determine the value of those resources (Santa Cruz County 2020). Although the marble quarrying history of the campus was historically extensive and tied to the production of cement in the past, UC Santa Cruz does not actively mine or quarry its primary mineral resource, marble bedrock, nor is there any plan to do so in the future. The marble bedrock is extensive across the main residential campus. Therefore, existing and proposed 2021 LRDP development does not preclude potential quarry activities in the future if the campus were to choose to do so. Implementation of the 2021 LRDP would not result in the loss of availability of mineral resources and this issue is not evaluated further.

IMPACTS AND MITIGATION MEASURES

Impact 3.7-1: Increase the Risk of Exposure of People or Buildings to Seismic Ground Shaking

The LRDP area is in a seismically active region that includes several active earthquake faults of local and regional significance. All structures proposed to be constructed or redeveloped would be required to comply with regulatory mandates in the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook to ensure that new and modified buildings and infrastructure would be capable of withstanding anticipated levels of ground shaking. For this reason, the potential impact related to ground shaking would be **less than significant**.

As discussed in Section 3.7.2, the LRDP area is located in a seismically active region that includes several active earthquake faults of local and regional significance, including the San Andreas Fault. As stated above, the E*arthquake Probabilities in the San Francisco Bay Region: 2002-2031* determined that there is a 62 percent probability of at least one magnitude 6.7 or greater (M≥6.7) earthquake in the 3-decade interval 2002-2031 in the San Francisco Bay Region. For the San Andreas Fault there is a 21 percent probability of a M≥6.7 in the 2002-2031 period. Furthermore, the San Andreas Fault system has one of the highest probabilities of generating a M≥6.7 earthquake before 2032 and this fault has sufficient length to generate a large earthquake of M7.5 or larger (USGS 2003). High accelerations generated from large magnitude earthquakes on any of the nearby active faults in the region could lead to structural damage of buildings and infrastructure if they are not designed to withstand the forces generated from those accelerations, which in turn would result in exposure of the occupants to those hazards.

As noted above, current CBC requirements for seismic shaking analysis for buildings and infrastructure now rely upon incredibly complex models and protocols for developing minimum prescriptive seismic structure dependent shaking values given in the ASCE/SEI 7 manual and those protocols are referenced in the current CBC. Design professionals generating site specific seismic shaking data for building designs would consult the latest guidelines and protocols outlined in the CBC and the ASCE/SEI 7.

The UC Seismic Safety Policy was crafted to provide an acceptable level of earthquake safety for students, employees, and the public who occupy UC facilities and leased facilities, to the extent feasible by present earthquake engineering practice. Feasibility is determined by balancing the practicality and the cost of protective measures, depending on the forecasted severity and probability of injury resulting from seismic activity. The Campus Standards Handbook outlines required products and mandatory design constraints for all construction on the UC Santa Cruz campus (UC Santa Cruz 2017). The Handbook contains a set of standards that are provided to UC Santa Cruz consultants for guidance in the preparation of construction documents. The Handbook includes building and site requirements, and standards for soil treatment, earthwork, and erosion control.

The UC Seismic Safety Policy, to which the campus adheres, requires anchorage for seismic resistance of nonstructural building elements such as furnishings, fixtures, material storage facilities, and utilities that could create a hazard if dislodged during an earthquake. Campus Environmental Health and Safety provides guidance for preparing department-level Illness and Injury Prevention Plans that emphasizes methods for minimizing seismic hazards in laboratories, for example, by properly securing chemical containers and gas cylinders. Each department has a Safety Coordinator who develops and maintains a departmental emergency response plan. The departmental emergency

response plans must be submitted to the Emergency Preparedness Policy Group for annual review to ensure consistency with the campus Emergency Operations Plan, which includes seismic safety and building evacuation procedures. The emergency procedures incorporated into the departmental emergency response plans further reduce the hazards from seismic shaking by preparing faculty, staff, and students for emergencies. In addition, and consistent with changes to the UC Seismic Safety Policy in 2017, UC Santa Cruz has an ongoing program to upgrade or replace existing buildings not adequately prepared to withstand currently assessed seismic hazards, which includes an evaluation of each structure located within the LRDP area and a determination as to the need for further structural improvements. All of these procedures would continue to be implemented as new facilities are developed on campus under the 2021 LRDP.

Compliance with CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook mandates would reduce the potential impact related to seismic ground shaking through the identification of site-specific seismic hazards and implementation of responsive structural design in accordance with peer-reviewed earthquake loads and seismic performance requirements. Therefore, the potential risk of loss, injury, or death related to seismic ground shaking would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.7-2: Increase the Risk of Exposure of People or Buildings to Seismic-Related Ground Failure, Including Liquefaction

Development and redevelopment per the 2021 LRDP could occur on a geologic unit or soil that could become unstable. In addition, ground failure could be triggered by seismic shaking and could result in on- or off-site landslides, lateral spreading, or liquefaction, creating potential risks to life or property. All structures proposed to be constructed or redeveloped would be required to comply with the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook, to ensure that all new and modified structures would be capable of withstanding anticipated levels of ground shaking. For this reason, the potential impact related to ground failure and liquefaction would be **less than significant**.

Construction on unstable soil or bedrock can pose risk to life and property. Unstable earth materials include landslides and areas with soils that are susceptible to liquefaction or lateral spreading. Landslide potential is limited to a few areas of the campus, which generally are located along the larger stream drainages and in old quarries. Development under the 2021 LRDP is not proposed in such areas.

Liquefaction and lateral spreading of soils can occur when loose saturated soils are subjected to long duration intense seismic shaking from large magnitude earthquake events. Although, there are very few locations on the campus that are underlain by loose, saturated soils, previous geotechnical investigation has identified potentially liquefiable deposits (Steven Raas and Associates 2000) within the LRDP area.

Because there are only a few areas on the campus that are underlain by unstable earth materials, new development on the campus under the 2021 LRDP would, for the most part, not be located on such units and the risk to life and property would not be significant. However, some of the proposed bridges could cross areas with landslide potential and there are some limited areas within the north campus development area where the surficial soils may be susceptible to liquefaction. New construction in these areas could expose people and property to the risk from unstable ground conditions, and thereby result in a potentially significant impact.

As discussed above, all structures proposed to be constructed or redeveloped would be required to comply with the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook, to ensure that all new and modified buildings and infrastructure would be capable of withstanding anticipated levels of ground shaking. Site-specific geotechnical studies and soil engineering reports would be required before consideration of approval for all development pursuant to the 2021 LRDP. These site-specific geotechnical studies and soil engineering reports would evaluate potential risk associated with seismic ground failure and liquefaction for individual projects pursuant to the 2021 LRDP and incorporate project-specific design requirements and conditions of approval for all development

pursuant to the 2021 LRDP. Therefore, the potential risk of ground failure and liquefaction would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.7-3: Result in Substantial Erosion or Loss of Topsoil during Construction, Operations, or Maintenance

Development and redevelopment project construction, operations, and maintenance under the 2021 LRDP may involve vegetation removal, clearing, and grading of soils, all of which could result in erosion and loss of topsoil, particularly if soils are exposed to wind or stormwater during construction. However, through compliance with all required regulations, such as SWRCB General Permit for Discharges of Stormwater Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ) and the Statewide Phase II MS4 Permit, the impact related to substantial erosion or loss of topsoil during construction would be **less than significant**.

The LRDP area is underlain by soils that range from slightly to very highly erodible, based on U.S. Soil Conservation Service classification (see Table 3.7-2). Highly to very highly erodible soils are present in some areas of central and north campus and in small portions of the lower campus. These problems and the effects of alterations to predevelopment storm water runoff patterns are discussed in more detail in Section 3.10, "Hydrology and Water Quality."

Construction of facilities, operations of campus facilities, and maintenance activities would result in soil-disturbing activities that could lead to increased erosion including grading, trenching, boring, and removal of trees and other vegetation. For construction projects under 1 acre, UC Santa Cruz has developed a set of erosion control standards for construction projects that would apply. For construction projects over 1 acre, compliance with the SWRCB General Permit for Discharges of Stormwater Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ) would apply. For operations and maintenance activities, the Statewide Phase II MS4 Permit would apply. These standards are included in the Campus Standards Handbook and incorporated by reference into the specifications for campus development projects.

In addition, UC Santa Cruz continues to assess the health and functionality of the existing campus storm drain system, natural drainages and karst systems, as well as proposed improvements to those systems and development of non-potable water systems. Refer to Section 3.10, "Hydrology and Water Quality," for further information. This plan addresses existing drainage and erosion issues, current water infrastructure planning, campus projects currently under development, and presents goals for water sustainability and resilience.

2021 LRDP development areas do not encroach on steep slopes and drainages, and campus standards require that substantial development on slopes greater than 20 percent be avoided. Therefore, tree removal and other construction activities would not occur on steep slopes, with the exception of footings for the proposed bridges that cross the deep drainages on campus.

The regulatory and permitting requirements for building construction and stormwater control provide adequate protection against soil erosion during and as a result of construction, operations, and maintenance activities. Therefore, the impact associated with erosion and sedimentation from implementing the 2021 LRDP would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.7-4: Increase the Risk of Exposure of People or Buildings to Expansive or Otherwise Unstable Soils

The LRDP area includes soils with high shrink-swell potential. Development and redevelopment projects within the LRDP area on these soils could result in shrinking and swelling of soils, which can cause damage to foundations. However, all structures constructed or redeveloped would be required to comply with the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook, which require site-specific geotechnical studies and soil engineering reports to address potential risk associated with expansive or unstable soils. Because project-specific design requirements and conditions of approval would be incorporated for all development pursuant to the 2021 LRDP, the potential for structural damage due to shrinking and swelling of soils would be **less than significant**.

As discussed in Section 3.7.2 and shown in Table 3.7-1, soil types range in shrink-swell potential from low to high. Expansive soils (soils that shrink and swell depending on moisture level) are present in scattered sections of the main residential campus and their distribution can be highly variable even across building sites. This is due to the derivation of the soils from the weathering of the highly faulted and folded layers of metamorphic rock in those sections of the main residential campus. Expansive soils can damage building foundations if they are inadequately designed for their expansive properties. This can cause heaving and cracking of slabs-on-grade, pavements, and structures founded on shallow foundations if they are inadequately engineered for these conditions. Potential risk to life and property would result if buildings and other structures were constructed on expansive soils without appropriate design, and the impact would be potentially significant. Engineering solutions available include but are not limited to replacement of expansive soils with fill, treatment of soils, or deepening of foundations.

As discussed above, all structures proposed to be constructed or redeveloped would be required to comply with the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook. Site-specific geotechnical studies and soil engineering reports would be required before consideration of approval of development pursuant to the 2021 LRDP. These site-specific geotechnical studies and soil engineering reports would evaluate potential risk associated with expansive or unstable soils and incorporate project-specific design requirements and conditions of approval for all development pursuant to the 2021 LRDP. Therefore, the potential for structural damage due to shrinking and swelling of soils would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.7-5: Increase the Risk of Exposure of People or Buildings to Unstable Conditions Due to Karst Topography, Including Subsidence or Collapse

The LRDP area includes karst topography, which is characterized by irregular surfaces resulting from subsidence or collapse of the bedrock and sediment into subterranean cavities that have developed within the marble bedrock. Future development per the 2021 LRDP could result in construction of facilities on sites underlain by dolines or sinkholes, both of which are a characteristic of karst topography, that are filled with soft soil that lead to settling or collapse beneath facilities. However, all structures constructed or redeveloped would be required to comply with the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook, which require site-specific geotechnical studies and soil engineering reports to address potential karst hazard risks. Because project-specific design requirements and conditions of approval would be incorporated for all development pursuant to the 2021 LRDP, the potential for structural damage due to karst topography would be **less than significant**.

As shown in Figure 3.7-8, Karst Hazards Map, the LRDP area includes karst topography, which is characterized by irregular surfaces resulting from subsidence or collapse of the bedrock and sediment into subterranean cavities that have developed within the marble bedrock. Construction in karst terrain is potentially hazardous because many karst features are not visible at the surface. Based on boring data from prior investigations on the main residential campus, the surface of the marble bedrock is highly irregular, varying in elevation by more than 100 feet over a horizontal distance of 10 feet or less (Nolan, Zinn and Associates 2005; Zinn Geology, in press). Underground cavities may be concealed by loose and soft soil and these soils may have inadequate bearing capacity for construction. Such soils

may also contain marble rubble, overlain by more consolidated soils supported by soil arching. Settling and/or collapse can occur beneath a structure above an undetected cavity.

There is only one documented instance of doline collapse under a main residential campus building. In that instance, the collapse was triggered at the Earth and Marine Science Building during construction of the building because the contractor focused disposal of construction stormwater into an existing doline filled with soft soil (Zinn Geology, in press). There was also a reactivation of an infilled doline when a sinkhole collapse occurred under the campus emergency 911 line, possibly as a result of a recent installation of an underground stormwater treatment system leaking and triggering collapse of soft doline fill. There are no other documented instances of catastrophic collapse on the UC Santa Cruz campus, nor is there any geologic evidence of historical collapse (Nolan, Zinn and Associates 2005). However, the unpredictability of subsurface conditions taken in tandem with imposing heavy building loads or infrastructure systems poses risks to development.

As discussed above, all structures proposed to be constructed or redeveloped would be required to comply with the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook. Site-specific geotechnical studies and soil engineering reports would be required before consideration of approval of development pursuant to the 2021 LRDP. These site-specific geotechnical studies and soil engineering reports conducted jointly by geotechnical engineers and geologists would evaluate, consistent with the requirements of Chapter 18 of the CBC, potential risk associated with karst hazards, including reviewing the most current version of the Karst Hazards Map (Figure 3.7-8) as part of site-specific project design to determine the level of hazard that could be presented to the proposed development and implementing the investigative protocols outlined on the map for the specific zone (see the "Karst Hazard and Subsidence" subsection in Section 3.7.2, "Environmental Setting," above, for description of the zones). Consistent with the aforementioned CBC requirements and taking into account location-specific information provided by geology studies conducted by UC Santa Cruz (e.g., UC Santa Cruz Campus Geology Report [UC Santa Cruz 2005]), full consideration of potential hazards from dolines would include collapse of cavern roofs, settlement of doline fill or low density soil zones on top of the marble, and failure or sliding of materials adjacent to the cavities. Foundations adjacent to the solution chambers, and not just those overlying the voids or chambers, are therefore potentially at risk and will be evaluated in the site-specific geotechnical studies and soil engineering reports.

To address the karst hazard, most existing construction on the UC Santa Cruz campus includes conventional spread footing foundations, which are adequate where building pressures are light and low-density zones or solution cavities are relatively deep. Other foundation construction techniques that have been used in karst areas include spread footings with grade beams to span low-density zones, structural mats and post-tensioned slabs, pier and grade beam foundations with either end-bearing or side-wall friction for support, driven piles, geotextile-reinforced compacted fill, pressure or compaction grouting of underlying sediments combined with the aforementioned footings, and deep dynamic compaction (Nolan, Zinn and Associates 2005).

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. However, all structures proposed to be constructed or redeveloped would be required to comply with the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook. These regulations require site-specific geotechnical studies and soil engineering reports, which would be conducted by geotechnical engineers and geologist experienced in karst hazards before consideration of approval of development pursuant to the 2021 LRDP. Because project-specific design requirements and conditions of approval would be incorporated for development pursuant to the 2021 LRDP, the potential for structural damage due to karst topography would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.7-6: Directly or Indirectly Destroy Unique Paleontological Resources

Development under the 2021 LRDP could result in the disturbance of paleontologically sensitive formations, which could result in the potential disturbance of paleontological resources. Potential fossil-bearing formations in the LRDP area include marine formations (Santa Margarita sandstones, Santa Cruz mudstone, and Quaternary marine terrace deposits) and sedimentary formations (Quaternary non-marine terrace deposits and doline deposits). A **potentially significant** impact on paleontological resources could result if an inadvertent discovery is made during ground-disturbing activities associated with development and redevelopment projects under the 2021 LRDP.

Development under the 2021 LRDP could result in the disturbance of paleontologically sensitive formations, which could result in the potential disturbance of paleontological resources. Paleontological potential refers to the likelihood that a rock unit will yield a unique or significant paleontological resource. All sedimentary rocks, some volcanic rocks, and some low-grade metamorphic rocks have potential to yield significant paleontological resources. Depending on location, the paleontological potential of subsurface materials generally increases with depth beneath the surface, as well as with proximity to known fossiliferous deposits.

As discussed in Section 3.7.2, above, marine formations in Santa Cruz County have yielded significant invertebrate and vertebrate fossils, including several taxa of marine mammals. Potential fossil-bearing formations in the LRDP area include marine formations (Santa Margarita sandstones, Santa Cruz mudstone, and Quaternary marine terrace deposits) and sedimentary formations (Quaternary non-marine terrace deposits and doline deposits).

Santa Margarita sandstones in the Santa Cruz region have yielded significant marine vertebrate fossils. Although no finds have been made in the Santa Margarita sandstones on the UC Santa Cruz campus, this may be because there has been no development in the Santa Margarita formation. The Santa Margarita sandstone formations in the LRDP area are considered to have high potential to include significant fossils.

No fossil finds have been documented in doline fill deposits and Quaternary marine terrace sediments in the region, nor have any fossil finds been made on campus, despite extensive development in areas underlain by Quaternary marine and non-marine terrace deposits. Therefore, while these deposits may have some potential to yield fossils, the potential to encounter fossils in these formations in the LRDP area is low.

Dolines, or sinkholes, are a characteristic of karst topography, which developed in the main residential campus area during the Pleistocene and Holocene as the result of dissolution of marble. Dolines occur in numerous locations on the central and lower portions of the main residential campus and there has been extensive development in these areas. This suggests that this setting is not paleontologically sensitive on campus, or that fossils in this setting are rare. Therefore, the potential to encounter fossils in dolines in the LRDP area is low.

The Westside Research Park site is underlain by relatively recent emergent coastal terrace deposits, which generally are not paleontologically sensitive because of their recent age. However, these deposits are underlain by Santa Cruz mudstone, a Plio-Pleistocene marine deposit formation that has yielded marine vertebrate fossils, including sea mammals, fish, and birds, in the Santa Cruz region (UCMP 2010). This formation, which could be exposed by excavation at this site, is considered to have high paleontological potential.

Although discovery is relatively unlikely, paleontological resources have been documented within geologic formations in the Santa Cruz Region and the LRDP area includes potential fossil-bearing formations. For this reason, a significant impact on paleontological resources could result if an inadvertent discovery is made during ground-disturbing activities associated with development and redevelopment projects under the 2021 LRDP. Therefore, the impact on paleontological resources would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.7-6: Treatment of Paleontological Resources

For development within the potential fossil-bearing formations in the LRDP area, namely marine formations of Santa Margarita sandstones, Santa Cruz mudstone, and Quaternary marine terrace deposits, and sedimentary formations of Quaternary non-marine terrace deposits and doline deposits, UC Santa Cruz shall require, as part of contract

specifications, that the contractor provide a paleontological resources awareness training program to all construction personnel active on the project site during earth moving activities. The first training will be provided prior to the initiation of ground disturbing activities. The training will be developed and conducted in coordination with a qualified paleontologist. The program will include relevant information regarding fossils and fossil-bearing formations that may be encountered. The training will also describe appropriate avoidance and minimization measures for resources that have the potential to be located on the project site.

If any paleontological resources are encountered during ground-disturbing activities, the contractor shall ensure that activities in the immediate area of the find are halted and that UC Santa Cruz is informed. UC Santa Cruz shall retain a qualified paleontologist to evaluate the discovery and recommend appropriate treatment options pursuant to guidelines developed by the Society of Vertebrate Paleontology, including development and implementation of a paleontological resource impact mitigation program by a qualified paleontologist for treatment of the particular resource, if applicable. These measures may include, but not be limited to the following:

- salvage of unearthed fossil remains and/or traces (e.g., tracks, trails, burrows);
- screen washing to recover small specimens;
- preparation of salvaged fossils to a point of being ready for curation (e.g., removal of enclosing matrix, stabilization and repair of specimens, and construction of reinforced support cradles); and
- identification, cataloging, curation, and provision for repository storage of prepared fossil specimens.

Significance after Mitigation

Mitigation Measure 3.7-6 requires a paleontological awareness training for construction personnel on projects within potential fossil-bearing formations. If paleontological resources are discovered during ground-disturbing activities, Mitigation Measure 3.7-6 requires that a qualified paleontologist evaluate the discovery and notify UC Santa Cruz, and that appropriate treatments are implemented to document and protect the resources. Implementation of these measures would reduce the potential impacts to unique paleontological resources to a **less-than-significant** level.

3.8 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

This section discusses greenhouse gas (GHG) emissions expected to result from campus development and growth under the proposed 2021 LRDP. GHGs are a type of gas, most commonly carbon dioxide but also including other gases, that trap heat in the Earth's atmosphere, leading to global climate change. Emissions of GHGs from projects have the potential to adversely affect the environment because they contribute to global climate change. Although no single project produces enough GHG emissions to alter global climate, each project has the potential to contribute GHGs that ultimately concentrate in the Earth's atmosphere and contribute to this growing global crisis. Unlike criteria air pollutants and toxic air contaminants (TACs) that are short-lived pollutants of localized or regional concern, the location where GHG emissions are generated is less of a concern due to their long-term atmospheric residence time.

The fact that GHGs are emitted from a project does not always mean they are "new" emissions. Because these emissions are tied to people and their activities, such as heating their homes, driving, and in this case, education, they are often emitted in a different location and at a different rate than they were prior to a project's construction, and the project serves to "transfer" the location from where GHGs are emitted. A project located in an area that reduces driving or places people in homes powered by renewable energy may, in the aggregate, reduce global GHGs. By contrast, a project located in a remote area that increases commutes may cause a net increase in GHGs. In terms of this project, the 2021 LRDP does not necessarily create new students and faculty/staff because it is likely some or all of these students and faculty/staff would have attended other colleges and been employed elsewhere. Therefore, the rate per person at which GHGs are emitted is as important, or more important, in determining a project's effect on climate change than the gross quantity of emissions.

Public comments on the NOP (Appendix B) included concerns regarding the GHG impacts associated with growth planned under the 2021 LRDP, GHG impacts from construction activities, and consistency of campus growth and development under the 2021 LRDP with regional growth plans and UC Santa Cruz's GHG reduction efforts. Concerns were also raised related to the potential for the 2021 LRDP to result in increased students and staff vehicles and related emissions due to limited housing availability on-campus and within the city of Santa Cruz.

3.8.1 Regulatory Setting

FEDERAL

Supreme Court Ruling

The U.S. Environmental Protection Agency (EPA) is the federal agency responsible for implementing the federal Clean Air Act (CAA) and its amendments. Per *Massachusetts v. Environmental Protection Agency,* the Supreme Court of the United States ruled on April 2, 2007, that carbon dioxide (CO_2) (which is a GHG) is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs. The ruling in this case resulted in EPA taking steps to regulate GHG emissions and lend support to state and local agencies' in their efforts to reduce GHG emissions.

Greenhouse Gas Permitting Requirements

EPA's New Source Review permitting program, including its Prevention of Significant Deterioration (PSD) requirements, applies to new major sources of criteria air pollutants and precursors. Title V of the federal CAA requires "major sources" of air pollutants to obtain and operate in compliance with an operating permit (EPA 2019a). Operating permits are legally-enforceable documents designed to improve compliance by clarifying what sources must do to control air pollution.

In 2010, EPA issued the Prevention of Significant Deterioration and Title V Greenhouse Gas Tailor Rule (EPA 2011). This rule set mass emission-based permitting criteria specifically for carbon dioxide-equivalent (CO_2e) emissions that define when permits under the New Source Review PSD and Title V Operating Permit programs are required for new

and existing industrial facilities. This is known as Steps 1 and 2 of the Tailoring Rule for PSD and Title V permitting based on CO_2e emissions.

A new part of the GHG Tailoring Rule, known as Step 3, was issued by EPA in 2012. This step, known as Step 3, revised the regulations to require a source that emits or has the potential to emit levels of CO_2e that exceed established mass emission criteria (i.e., 100,000 tons per year [90,718 metric tons (MT) per year]) of CO_2e, but that has minor source emissions of all other regulated pollutants, to apply for an operating permit. However, in 2014, the US Supreme Court issued its decision in *Utility Air Regulatory Group v. EPA*, 134 S. Ct. 2427. The Court held that EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other, non-GHG pollutants) may continue to require limitations on GHG emissions. In response to the Supreme Court decision and the D.C. Circuit's amended judgment, EPA is undertaking various actions to explain the next steps in GHG permitting (EPA 2019a). This program is currently under review by EPA, but has not been changed at the time of publication of this Draft EIR.

Regulations for Greenhouse Gas Emissions from Passenger Cars and Trucks and Corporate Average Fuel Economy Standards

In October 2012, EPA and the National Highway Traffic Safety Administration (NHSTA), on behalf of the Department of Transportation, issued final rules to further reduce GHG emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 FR 62624). NHSTA's CAFE standards have been enacted under the Energy Policy and Conservation Act since 1978. This national program requires automobile manufacturers to build a single light-duty national fleet that meets all requirements under both federal programs and the standards of California and other states. This program would increase fuel economy to the equivalent of 54.5 miles per gallon (mpg) limiting vehicle emissions to 163 grams of CO_2 per mile for the fleet of cars and light-duty trucks by model year 2025 (77 FR 62630).

On August 2, 2018, NHTSA and EPA proposed the Safer Affordable Fuel-Efficient Vehicle Rule (SAFE Rule). This rule addresses emissions and fuel economy standards for motor vehicles and is separated in two parts as follows.

- Part One, "One National Program" (84 FR 51310), revokes a waiver granted by EPA to the State of California under Section 209 of the CAA to enforce more stringent emission standards for motor vehicles than those required by EPA for the explicit purpose of GHG emission reduction, and indirectly, criteria air pollutant and ozone precursor emission reduction. This revocation became effective on November 26, 2019, restricting the ability of the California Air Resources Board (CARB) to enforce more stringent GHG emission standards for new vehicles and set zero emission vehicle mandates in California. CARB has estimated the vehicle tailpipe and evaporative emissions impacts to criteria air pollutants and precursors from SAFE Rule Part One and has provided off-model adjustment factors to adjust emission outputs from CARB's Emission Factor (EMFAC2017) model. EMFAC2017 is CARB's most recent version of the EMFAC model series and considers effects of known policy implementation and economic forecasts, such as the implementation of the CAFE standards and Advanced Clean Cars program.
- Part Two, "Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks" (85 FR 24174) addresses CAFE standards for passenger cars and light trucks for model years 2021 to 2026. This rulemaking proposes new CAFE standards for model years 2022 through 2026 and would amend existing CAFE standards for model year 2021. The proposal would retain the model year 2020 standards through model year 2026, but comment is sought on a range of alternatives discussed throughout the proposed rule that would affect tailpipe emissions, including CO_2. The final SAFE Rule Part Two was published in the Federal Register on April 30, 2020. The outcome of any pending or potential lawsuits (and how such lawsuits could delay or affect its implementation) are unknown at this time.

Clean Power Plan

The Clean Power Plan was unveiled by President Obama on August 3, 2015. The plan aims to reduce CO_2 emissions from electrical power generation by 32 percent relative to 2005 levels within 25 years. President Trump signed an executive order on March 28, 2017 mandating the EPA to review the plan. On June 19, 2019, EPA repealed the Clean Power Plan citing exceedance of EPA's statutory authority under the CAA (EPA 2019b).

STATE

CARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act, which was adopted in 1988. Various initiatives to reduce the state's contribution to GHG emissions are underway.

California Building Efficiency Standards (Title 24, Part 6)

The California Building Standards Code or Title 24 of the California Code of Regulations contains the regulations that govern the construction of buildings in California. Within the Building Standards Code, two parts pertain to the incorporation of both energy efficient and green building elements into land use development. Part 6 is California's Energy Efficiency Standards for Residential and Non-Residential Buildings and Part 11 is the California Green Building Standards, also known as CALGreen. These standards were first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption and are updated on an approximately 3-year cycle to allow consideration and possible incorporation of new energy efficient technologies and methods. All buildings for which an application for a building permit is submitted on or after January 1, 2020 must follow the 2019 standards (CEC 2018). The next set of standards is anticipated in 2022. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions.

California Integrated Waste Management Act

To minimize the amount of solid waste that must be disposed of in landfills, the State Legislature passed the California Integrated Waste Management Act of 1989 (AB 939), effective January 1990. According to AB 939, all cities and counties were required to divert 25 percent of all solid waste from landfill facilities by January 1, 1995, and 50 percent by January 1, 2000. Through other statutes and regulations, this 50 percent diversion rate also applies to State agencies. In order of priority, waste reduction efforts must promote source reduction, recycling and composting, and environmentally-safe transformation and land disposal.

In 2011, AB 341 modified the California Integrated Waste Management Act and directed the California Department of Resources Recycling and Recovery (CalRecycle) to develop and adopt regulations for mandatory commercial recycling. The resulting Mandatory Commercial Recycling Regulation (2012) requires that on and after July 1, 2012, certain businesses that generate four cubic yards or more of commercial solid waste per week shall arrange recycling services. To comply with this requirement, businesses may either separate recyclables and self-haul them or subscribe to a recycling service that includes mixed waste processing. AB 341 also established a statewide recycling goal of 75 percent; the 50 percent disposal reduction mandate still applies for cities and counties under AB 939, the Integrated Waste Management Act.

In April 2016, AB 1826 further modified the California Integrated Waste Management Act, requiring businesses that generate a specified amount of organic waste per week to arrange for recycling services for that organic waste in a specified manner. If CalRecycle determines that statewide disposal of organic waste has not been reduced by 50 percent below 2014 levels by 2020, businesses generating more than two cubic yards of organic waste per week would be subject to these waste collection requirements. CalRecycle plans to make this assessment in the fall of 2020 (CalRecycle 2020).

Diverting organic waste from landfills reduces emissions of methane (CH_4), considered a GHG. This is equivalent to reducing anaerobic decomposition of organic waste that would have otherwise occurred in landfills where organic waste is often buried with other inorganic waste.

Executive Order S-3-05

Executive Order (EO) S-3-05, signed by Governor Arnold Schwarzenegger in 2005, proclaimed that California is vulnerable to the impacts of climate change. It declared that increased temperatures could reduce the Sierra Nevada snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the EO established total GHG emission targets for the state. Specifically, statewide emissions are to be reduced to 2000 levels by 2010, 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

This executive order was the subject of a California Appellate Court decision, *Cleveland National Forest Foundation v. San Diego Association of Governments* (SANDAG) (November 24, 2014) 231 Cal.App.4th 1056, which was reviewed by the California Supreme Court in January 2017. The case addressed the adequacy of the GHG analysis in the EIR SANDAG prepared for its 2011 Regional Transportation Plan. The Supreme Court ruled on July 13, 2017 that SANDAG did not abuse its discretion by declining "to adopt the 2050 goal as a measure of significance in light of the fact that the Executive Order does not specify any plan or implementation measures to achieve its goal."

In addition to concluding that an EIR need not use this executive order's goal for determining significance, the Court described several principles relevant to CEQA review of GHG impacts, including: (1) EIRs should "reasonably evaluate" the "long-range GHG emission impacts for the year 2050;" (2) the 2050 target is "grounded in sound science" in that it is "based on the scientifically supported level of emissions reduction needed to avoid significant disruption of the climate;" (3) in the case of the SANDAG plan, the increase in long-range GHG emissions by 2050, which would be substantially greater than 2010 levels, was appropriately determined to be significant and unavoidable; (4) the reasoning that a project's role in achieving a long-range emission reduction target is "likely small" is not valid for rejecting a target; and (5) "as more and better data become available," analysis of proposed plan impacts will likely improve, such that "CEQA analysis stays in step with evolving scientific knowledge and state regulatory schemes." The Court also ruled that "an EIR's designation of a particular adverse environmental effect as 'significant' does not excuse the EIR's failure to reasonably describe the nature and magnitude of the adverse effect." The Court also recognized that the 40 percent reduction in 1990 GHG levels by 2030 is "widely acknowledged" as a "necessary interim target to ensure that California meets its longer-range goal of reducing greenhouse gas emission 80 percent below 1990 levels by the year 2050." Senate Bill (SB) 32 has since defined the 2030 goal in statute (discussed below).

Assembly Bill 32, the California Global Warming Solutions Act of 2006

In September 2006, Governor Schwarzenegger signed the California Global Warming Solutions Act of 2006, Assembly Bill (AB) 32. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020.

Low Carbon Fuel Standard

In January 2007, EO S-01-07 established a Low Carbon Fuel Standard (LCFS). The EO calls for a statewide goal to be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020, and that a LCFS for transportation fuels be established for California. The LCFS applies to all refiners, blenders, producers, or importers ("Providers") of transportation fuels in California, including fuels used by off-road construction equipment (Wade, pers. comm. 2017).

In June 2007, CARB adopted the LCFS under AB 32 pursuant to Health and Safety Code Section 38560.5, and, in April 2009, CARB approved the new rules and carbon intensity reference values with new regulatory requirements taking effect in January 2011. The standards require providers of transportation fuels to report on the mix of fuels they provide and demonstrate they meet the LCFS intensity standards annually. This is accomplished by ensuring that the number of "credits" earned by providing fuels with a lower carbon intensity than the established baseline (or obtained from another party) is equal to or greater than the "deficits" earned from selling higher intensity fuels.

In response to certain court rulings, CARB re-adopted the LCFS regulation in September 2015, and the LCFS went into effect on January 1, 2016. In 2018, CARB approved amendments to the regulation to readjust carbon intensity benchmarks to meet California's 2030 GHG reductions targets under SB32. These amendments include opportunities to promote zero emission vehicle (ZEV) adoption, carbon capture and sequestration, and advanced technologies for decarbonization of the transportation sector (CARB 2020a).

Senate Bill 375 of 2008

Senate Bill (SB) 375, signed by Governor Schwarzenegger in September 2008, aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires metropolitan planning organizations (MPOs) to adopt a regional plan showing prescribed land use allocation in each MPO's

Regional Transportation Plan. CARB, in consultation with the MPOs, is to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in their respective regions for 2020 and 2035.

Climate Change Scoping Plan

In December 2008, CARB adopted its first version of its *Climate Change Scoping Plan*, which contained the main strategies California will implement to achieve the mandate of AB 32 to reduce statewide GHG emissions to 1990 levels by 2020. Subsequent versions of the plan were released and in 2017 CARB adopted the most recent version titled *California's 2017 Climate Change Scoping Plan* (2017 Scoping Plan) (CARB 2017a). The 2017 Scoping Plan indicates that California is on track to achieve the 2020 statewide GHG target mandated by AB 32 (CARB 2017a:9). It also lays out the framework for achieving the mandate of SB 32 (discussed below) to reduce statewide GHG emissions to at least 40 percent below 1990 levels by the end of 2030 (CARB 2017a).

The 2017 Scoping Plan recommends that local plan-level GHG emission reduction goals should be consistent with state goals of reducing emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. For local plans, CARB recommends statewide targets of no more than 6 metric tons of CO_2e per capita by 2030 and 2 $MTCO_2e$ per capita by 2050, which were developed by applying the percent reduction goals to the State's 1990 emissions. Because these per-capita targets include emissions from all sectors in the State, CARB states that it is appropriate for local jurisdictions to develop evidence-based per-capita targets that are consistent with the framework used to develop statewide per-capita targets. The resulting emissions should be consistent with the downward trends of the statewide objectives (CARB 2017a: 99-100).

Additionally, the 2017 Scoping Plan includes some guidance for project-level thresholds for consideration. Where adequate geographically-specific GHG reduction plans, as defined in the 2017 Scoping Plan, are not available, CARB recommends that projects incorporate design features and GHG reduction measures, as feasible, to minimize GHG emissions. CARB considers a project-level threshold of no net additional increase in GHG emissions to be appropriate as an overall objective for new development, although the Scoping Plan specifically states that a net zero approach is not required (CARB 2017a: 101.).

Cap-and-Trade Program

In 2011, CARB adopted the cap-and-trade regulation and created the cap-and-trade program, which covers sources of GHG emissions that emit more than 25,000 MT CO_2e per year in the State such as refineries, power plants, industrial facilities, and transportation fuels. The cap-and-trade program includes an enforceable state-wide GHG emissions cap that declines approximately three percent annually. CARB distributes allowances, which are tradable permits, equal to the emissions allowed under the cap. Sources that reduce emissions more than their limits can auction carbon allowances to other covered entities through the cap-and-trade market. Sources subject to the cap are required to surrender allowances and offsets equal to their emissions at the end of each compliance period. The cap-and-trade program took effect in early 2012 with the enforceable compliance obligation beginning January 1, 2013. The cap-and-trade program was initially slated to sunset in 2020 but the passage of SB 398 in 2017 extended the program through 2030.

The Santa Cruz campus is subject to cap-and-trade and participates in the program. Through an agreement with CARB, all subject UC campuses, including the Santa Cruz campus, receive allowances in exchange for a financial commitment to university actions to combat climate change.

Legislation Associated with Electricity Generation

Senate Bill X1-2 (SB X1-2) of 2011 requires all California utilities to generate 33 percent of their electricity from renewables by 2020. SB X1-2 sets a three-stage compliance period requiring all California utilities, including independently-owned utilities, energy service providers, and community choice aggregators, to generate 20 percent of their electricity from renewables by December 31, 2013; 25 percent by December 31, 2016; and 33 percent by December 31, 2020. SB X1-2 also requires the renewable electricity standard to be met increasingly with renewable energy that is supplied to the California grid from sources within, or directly proximate to, California. SB X1-2 mandates that renewables from these sources make up at least 50 percent of the total renewable energy for the 2011-2013 compliance period, at least 65 percent for the 2014-2016 compliance period, and at least 75 percent for 2016 and beyond. In October 2015, SB 350 was

signed by Governor Brown, which requires retail sellers and publicly-owned utilities to procure 50 percent of their electricity from renewable resources by 2030. In September 2018, SB 100 was signed by Governor Brown, committing California to 100% clean energy by 2045. SB 100 requires all California utilities to generate 52 percent of their electricity from renewables by 2027, 60 percent by 2030, and 100 percent by 2045.

Advanced Clean Cars Program

In January 2012, CARB approved the Advanced Clean Cars program which combines the control of GHG emissions and criteria air pollutants, as well as requirements for greater numbers of zero-emission vehicles, into a single package of regulatory standards for vehicle model years 2017 through 2025. The new regulations strengthen the GHG standard for 2017 models and beyond. This will be achieved through existing technologies, the use of stronger and lighter materials, and more efficient drivetrains and engines. The program's zero-emission vehicle regulation requires battery, fuel cell, and/or plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025. The program also includes a clean fuels outlet regulation designed to support the commercialization of zero-emission hydrogen fuel cell vehicles planned by vehicle manufacturers by 2015 by requiring increased numbers of hydrogen fueling stations throughout the state. The number of stations will grow as vehicle manufacturers sell more fuel cell vehicles. By 2025, when the rules will be fully implemented, the statewide fleet of new cars and light trucks will emit 40 percent fewer GHGs and 75 percent fewer smog-forming emissions than 2012 model year vehicles (CARB 2020b). However, the recent federal SAFE Rule Part One revokes CARB's authority to enforce these new rules under the Advanced Clean Cars Program. In June 2020, CARB released estimates of how the federal SAFE Rule would affect vehicle emissions forecasts in CARB's EMFAC2017 model in the form of adjustment factors developed to modify existing CO_2 emission factors for light and medium duty gasoline fueled vehicles (LDA, LDT1, LDT2, MDV). The adjustment factors increase the CO_2 emissions of these vehicles by up to 12 percent (2050 emission factors).

Executive Order B-18-12

In April 2012, Governor Brown signed EO B-18-12 requiring State agencies, departments, and other entities under the Governor's direct executive authority to implement green building practices to improve energy, water and materials efficiency, improve air quality and working conditions for State employees, reduce costs to the State and reduce environmental impacts from State operations. Among other actions, the EO requires State agencies to reduce agency-wide water use by 10 percent by 2015 and 20 percent by 2020, as measured against a 2010 baseline. The EO directs that new State buildings larger than 10,000 square feet use clean, on-site power generation and obtain the US Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver certification. Further, EO B-18-12 states that all new State buildings beginning design after 2025 be constructed as Zero Net Energy (ZNE) facilities, with an interim target of 50 percent of new facilities beginning design after 2020 to be ZNE. The EO also calls for State agencies to identify and pursue opportunities to provide electric vehicle charging stations at employee parking facilities in new buildings. As a state entity not under the direct executive authority of the Governor, the UC is not subject to EO B-18-12; however, the green building practices required by the EO are largely implemented through the UC Sustainable Practices Policy, discussed further below.

Executive Order B-30-15

On April 20, 2015 Governor Brown signed EO B-30-15 to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. The Governor's EO aligns California's GHG reduction targets with those of leading international governments such as the 28-nation European Union, which adopted the same target in October 2014. California is on track to meet or exceed the target of reducing GHG emissions to 1990 levels by 2020, as established in AB 32, discussed above. California's emission reduction target of 40 percent below 1990 levels by 2030 sets the next interim step in the State's continuing efforts to pursue the long-term target expressed under EO S-3-05 to reach the goal of reducing emissions 80 percent below 1990 levels by 2050. This is in line with the scientifically established levels needed in the US to limit global warming below 2 degrees Celsius, the warming threshold at which major climate disruptions are projected, such as super droughts and rising sea levels.

Senate Bill 32 and Assembly Bill 197 of 2016

In August 2016, Governor Brown signed SB 32 and AB 197, which extend California's GHG reduction programs beyond 2020. SB 32 amended the Health and Safety Code to include Section 38566, which contains language to authorize CARB to achieve a statewide GHG emissions reduction of at least 40 percent below 1990 levels by no later than December 31, 2030. SB 32 codified the targets established by EO B-30-15 for 2030, which set the next interim step in the State's continuing efforts to pursue the long-term target expressed in EO S-3-05 and B-30-15 of 80 percent below 1990 emissions levels by 2050. AB 197 requires CARB to prioritize direct emission reductions and consider social costs when adopting regulations to reduce GHG emissions as a means to protect what are perceived as impacted and disadvantaged communities. The legislation requires CARB to prioritize those rules and regulations that would result in direct emissions reductions at large stationary and mobile sources.

Senate Bill 1383 of 2016

In supporting the goals of AB 32, Governor Brown approved SB 1383 in September 2016, which requires CARB to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants (SLCPs), such as CH_4, hydrofluorocarbons, and anthropogenic black carbon (soot) emissions. SLCPs are GHGs that degrade in the atmosphere at a faster rate than CO_2 and are considered to be responsible for 40 percent of current net climate changing emissions. The strategy includes a target to reduce CH_4 emissions by 40 percent below 2013 levels by 2030, including those from livestock management operations. This bill also requires CalRecycle and CARB to adopt regulations that achieve specific targets to reduce organic waste in landfills. The Final SLCP Reduction Strategy was approved by CARB in March 2017 and includes recommendations to reduce CH_4 emissions from a variety of sources as well as refrigerants and fumigants (CARB 2017b).

Executive Order B-48-18

In January 2018, Governor Brown signed EO B-48-18 requiring all State entities to work with the private sector to have at least 5 million zero-emission vehicles (ZEVs) on the road by 2030, as well as install 200 hydrogen fueling stations and 250,000 electric vehicle charging stations by 2025. It specifies that 10,000 of the electric vehicle charging stations should be direct current fast chargers. This order also requires all State entities to continue to partner with local and regional governments to streamline the installation of ZEV infrastructure. The Governor's Office of Business and Economic Development is required to publish a *Plug-in Charging Station Design Guidebook* and update the *2015 Hydrogen Station Permitting Guidebook* (Eckerle and Jones 2015) to aid in these efforts. All State entities are required to participate in updating the *2016 Zero-Emissions Vehicle Action Plan* (Governor's Interagency Working Group on Zero-Emission Vehicles 2016) to help expand private investment in ZEV infrastructure with a focus on serving low-income and disadvantaged communities. Additionally, all State entities are to support and recommend policies and actions to expand ZEV infrastructure at residential land uses, through the Low Carbon Fuel Standard Program, and recommend how to ensure affordability and accessibility for all drivers.

Executive Order B-55-18

On September 10, 2018, Governor Brown signed EO B-55-18, committing California to total, economy-wide carbon neutrality by 2045. The executive order directs CARB to work with relevant State agencies to develop a framework to implement and accounting that tracks progress toward this goal.

Executive Order N-79-20

In September 2020, Governor Gavin Newsom signed Executive Order N-79-20, which sets a statewide goal that 100 percent of all new passenger car and truck sales in the state will be zero-emissions by 2035. It also establishes a goal that 100 percent of statewide new sales of medium- and heavy-duty vehicles will be zero emissions by 2045, where feasible, and that all new drayage trucks sold in California will be zero emissions by 2035. Additionally, the Executive Order targets 100 percent of new off-road vehicle sales in the state to be zero emission by 2035. CARB is responsible for implementing the new vehicle sales regulation.

UNIVERSITY OF CALIFORNIA

University of California Carbon Neutrality Initiative

In November 2013, UC President Janet Napolitano introduced the Carbon Neutrality Initiative, which commits UC campuses (buildings and vehicle fleets) to emitting net zero GHG emissions by 2025. In line with this initiative, UC Santa Cruz and other UC campuses also planned to achieve net zero GHG emissions from commuting and business air travel by 2050. These goals require the UC system, including UC Santa Cruz, to aggressively improve energy efficiency in buildings, reduce emissions from campus fleet and other sources, and increase utilization of renewable energy sources. (University of California Office of the President [UCOP] 2018). The UC defines carbon neutrality as where:

> *… the University will have net zero climate impacts from [GHG] emissions attributed to Scope 1 direct emission sources and Scope 2 indirect emission sources as defined by The Climate Registry, and specific Scope 3 emissions as defined by the American College and University Presidents' Climate Commitment (ACUPCC). This neutrality will be achieved by minimizing GHG emissions from these sources as much as possible and using carbon offsets or other measures to mitigate the remaining GHG emissions.*

Scope 1, 2, or 3 emissions are defined in greater detail below in Section 3.8.2 in the discussion of GHG Emissions Classification. The UC has incorporated the Carbon Neutrality Initiative into the UC Sustainable Practices Policy, which specifies the emissions reduction targets in the Climate Action section.

University of California Sustainable Practices Policy

At the direction of The Regents of the University of California, UCOP developed a Sustainable Practices Policy which establishes sustainability goals to be achieved by all campuses, medical centers, and the Lawrence Berkeley National Laboratory within the UC system. The policy is regularly updated, with the most recent update occurring in July 2020. The policy goals encompass nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, sustainable water systems (UCOP 2020). The policy includes the following provisions relevant to the reduction of GHG emissions:

- Green Building Design
  - All new buildings projects, other than acute care facilities, shall be designed, constructed, and commissioned to outperform the California Building Code (Title 24 portion of the California Code of Regulations) energy efficiency standards by at least 20 percent or achieve energy performance targets, related to 1999 benchmarks, shown in Table 1 of Section V.A.3 of the policy (summarized in Table 3.6-1, in Section 3.6, "Energy").
  - All new buildings will strive to achieve certification of US Green Building Council's LEED "Gold" and achieve a minimum of LEED "Silver" certification, whenever possible within the constraints of program needs and standard budget parameters.
  - No new building or major renovation that is approved after June 30, 2019, shall use onsite fossil fuel combustion (e.g., natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure). Projects unable to meet this requirement shall document the rationale for this decision, as described in Section V.A.4.
- Clean Energy
  - Campuses and health locations will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of the location's Climate Action Plan or other goals.
  - By 2025, each campus and health location will obtain 100 percent clean [i.e., zero carbon] electricity. By 2018, the University's Wholesale Power Program will provide 100 percent clean electricity to participating locations.

- Climate Protection
  - Each campus and the UC Office of the President will develop strategies for meeting the following UC goals:
    - Carbon neutrality from Scope 1 and 2 sources, such as on-site natural gas combustion and off-site electricity generation, by 2025.
    - Carbon neutrality from specific Scope 3 sources (as defined by the Second Nature's Carbon Commitment) by 2050 or sooner.
- Sustainable Transportation
  - Each location shall implement strategies to reduce GHG emissions from fleet activities, such that by 2025 zero emission vehicles or hybrid vehicles shall account for at least 50% of all new light-duty vehicle acquisitions.
  - Each location shall strive to reduce its percentage of employees and students commuting by single occupancy vehicle (SOV) by 10 percent relative to its 2015 SOV commute rate and have at least 4.5 percent of commuter vehicles be ZEVs by 2025.
  - Each location shall strive to have no more than 40 percent of its employees and no more than 30 percent of all employees and students commuting to the location by SOV and have at least 30 percent of commuter vehicles be ZEVs by 2050.
  - Each location shall develop a business-case analysis for any proposed parking structures serving University affiliates or visitors to campus to document how a capital investment in parking aligns with each campus' Climate Action Plans and/or sustainable transportation policies.
- Sustainable Building Operations for Campuses
  - Each campus shall seek to certify as many buildings as possible through the "LEED for Operations and Maintenance" rating system, within budgetary constraints and eligibility limitations.
- Zero Waste
  - The University will reduce per capita total municipal solid waste generation at all locations other than medical centers as follows:
    - reduce waste generation by 25 percent per capita from FY2015/16 levels by 2025,
    - reduce waste generation by 50 percent per capita from FY2015/16 levels by 2030,
    - divert 90% of municipal solid waste from landfills.
  - By 2020, the University will prohibit the sale, procurement or distribution of Expanded Polystyrene (EPS) other than that utilized for laboratory supply or medical packaging and products.

As a member of the UC, the goal of carbon neutrality under the Climate Protection section shown above applies to UC Santa Cruz. By 2025, UC Santa Cruz and its projects must demonstrate zero net emissions from on-campus natural gas combustion sources such as the central plant, campus fleet, and purchased electricity (Scope 1 and 2 emissions) to comply with the UC's climate change commitments.

American College and University Presidents Climate Commitment

The UC has also signed the American College and University Presidents Climate Commitment (ACUPCC). Each signatory commits to completing an inventory of GHG emissions within one year, and to developing, within two years, an institutional plan to achieve carbon 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.

UC Santa Cruz Climate and Energy Strategy

UC Santa Cruz's 2017 Climate and Energy Strategy (CES) serves as the campus's climate action plan and addresses how the campus would achieve its two climate and energy goals: achieving carbon neutrality by 2025 from Scope 1 and Scope 2 sources and mitigating the impacts of the Cap-and-Trade Regulation (UC Santa Cruz 2017). The strategies to meet these goals include the following:

- Purchasing voluntary carbon offsets for the remainder of emissions that cannot be mitigated through onsite reductions starting in 2025,
- Double the pace of implementation of energy efficiency projects that qualify for funding through the Higher Education Energy Efficiency Partnership (Strategic Energy Partnership) program.
- Install up to 4.4 megawatts (MW) solar photovoltaic panels (3.3 MW of which would be installed on main residential campus, with an additional 1.1 MW at Westside Research Park and the Long Marine Lab at the Coastal Science Campus) through execution of a Power Purchase Agreement.
- Establish energy use intensity (EUI) targets for new capital projects that achieve the UC Sustainable Practices Policy "stretch targets" at a minimum, and strive to achieve a 60 percent reduction in EUI below 1999 benchmarks (by building type) in conjunction with achieving Net Zero Site Source targets for major capital projects.

The CES did not explore GHG reductions from Scope 1 mobile emissions (e.g., fleet), Scope 3 emissions (e.g., commuter vehicles), renewable energy technologies other than solar, waste and water-mitigation strategies, or specific strategies included in UC Sustainability Practices Policy. The CES refers to the UC Sustainability Practices Policy Transportation section for GHG reductions related to Scope 1 mobile emissions from fleet activity (UC Santa Cruz 2017).

UC Santa Cruz Energy Efficiency Programs

The Energy Management department leads several efforts related to energy efficiency for UC Santa Cruz. These efforts focus on energy efficiency projects, building commissioning, behavioral change towards higher conservation, installation of onsite renewable energy generation, and procurement of renewable energy. UC Santa Cruz is currently in year 3 of a multiyear project to retrofit all campus buildings to high efficiency LED lighting with integrated daylighting/occupancy controls. This retrofit effort is anticipated to substantially reduce campus energy usage, especially during times of peak demand for the campus and the state.

UC Santa Cruz is also focusing on the commissioning and renovation of its district utility systems, specifically to improve the operation of the main residential campus' campus-wide heating and cooling loops, through a combination of hardware and software renovations. These systems are two of the highest energy using systems on the main residential campus, and these projects will result in significant energy/carbon savings.

Additionally, while campus vehicles used about 72,000 gallons of diesel in 2019, student shuttles and other fleet vehicles began using renewable biodiesel that year. Biodiesel emits 50-90% less carbon than traditional diesel, so this transfer reduces UC Santa Cruz's annual fleet emissions by at least 25% annually. "Biodiesel" is a blend of diesel fuel derived from biological sources, including plant and animal matter (e.g. raw vegetable oils, used cooking oils, and animal fats), and conventional diesel derived from petroleum. A typical blend might be B20 (20% biological, 80% petroleum). UC Santa Cruz has identified a high-quality product "RD99" which is derived from 99% biological sources.

To encourage the use of electric (zero-emission) vehicles, UC Santa Cruz's Transportation and Parking Services (TAPS) has installed a number of EV charging stations on campus. 14 EV charging stations are located at the Core West Parking Structure, eight EV charging stations at the Coastal Science Campus, and 40 new EV charging stations were installed in the East Remote parking lot. TAPS will be required to electrify the campus shuttle fleet by 2040.

UC Santa Cruz Campus Sustainability Plan

UC Santa Cruz's Campus Sustainability Plan is divided into four focus areas: learning and culture; materials management and food systems; natural environmental and infrastructure; and climate and energy. The following lists the plan's goals and strategies by focus area that are relevant to the 2021 LRDP. Many of these goals are related to the policies included in UC Sustainability Practices Policy (UC Santa Cruz 2019).

Natural Environment & Infrastructure

GOAL 2: Meet the UC Office of the President Sustainable Practices Policy goal to reduce potable water usage by 36 percent by weighted campus user by 2025 from a 2005-08 baseline.

- **STRATEGY 2.1:** Increase the use of non-potable water on campus.
- **STRATEGY 2.2:** Reduce potable water use through technological innovations and physical improvements.
- **STRATEGY 2.4:** Identify new sources of funding for both potable water reduction and non-potable sourced development projects.

GOAL 3: Reduce commute travel mode impacts relative to a 2017 baseline by: reducing Scope 3 commuter greenhouse gas emissions 10 percent by 2022; reducing commute vehicle miles travelled (VMT) five percent by 2022; and reducing per capita parking demand 10 percent by 2022.

- **STRATEGY 3.1:** Increase transit ridership to/from campus by 10 percent.
- **STRATEGY 3.2:** Develop an outreach strategy to promote sustainable transportation culture and prioritize human-powered on-campus travel at UC Santa Cruz.
- **STRATEGY 3.4:** Increase electric vehicle (EV) charging infrastructure and programs to achieve a 4.5 percent mix of zero-emission vehicles for personal commute by 2025.

Climate & Energy

GOAL 1: Support the UC Office of the President Sustainable Practices Policy goal of achieving carbon neutrality for Scope 1 and Scope 2 emissions by 2025.

GOAL 2: Achieve net zero emissions for all new capital projects.

- **STRATEGY 2.1:** For all major capital projects, achieve at least the UC Office of the President Sustainable Practices Policy "stretch" EUI targets and strive for 50 percent better than baseline design.
- **STRATEGY 2.2:** Develop and implement a net zero energy policy for capital projects that provides different avenues to mitigate emissions and incorporates net zero ready building requirements.
- **STRATEGY 2.3:** Continue to achieve LEED Silver and strive for LEED Gold (V4) for new buildings and, for labs, meet at least the prerequisites of the Laboratories for the 21st Century.

GOAL 3: Improve the energy efficiency of campus buildings by 10 percent below a 2010-2012 baseline (in kBtu/sf).

- **STRATEGY 3.1:** Implement the 90+ energy efficiency and renewable energy projects identified in the UC Santa Cruz Climate & Energy Strategy report recommendations.
- **STRATEGY 3.2:** Reduce energy use from plug loads through procurement policies and behavior change.
- **STRATEGY 3.3:** Reduce excessive energy use through improvements to space management practices, response time to equipment and operational issues, and building operations scheduling.

GOAL 4: Reduce energy use by 10 percent, over a 2010 baseline, through energy conservation programs and practices (in kBtu/sf).

- **STRATEGY 4.1:** Develop Carbon Neutrality and energy use reduction education and training materials.

LOCAL

As noted in Section 1.1 of the Introduction, UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the university's educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

Monterey Bay Air Resources District

The Monterey Bay Air Resources District's (MBARD) CEQA guidelines consider the cumulative impact of GHG emissions to climate change and set project-level thresholds for stationary source projects (MBARD 2008, 2016).

A proposed stationary source project will not have a significant GHG impact, if operation of the project will:

- Emit less than the significance level of 10,000 metric tons per year (MT/year) CO_2e, or
- In accordance with the State CEQA Guidelines Section 15064.4(b)(3), the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions [such as, sources subject to the Cap-and-Trade requirements pursuant to Title 17, Article 5 (California Cap on Greenhouse Gas Emissions and Market-based Compliance Mechanisms)].

MBARD has not adopted project- or plan-level GHG thresholds to be used for CEQA evaluations of land use plans and land development projects.

Association of Monterey Bay Area Governments

The Association of Monterey Bay Area Governments (AMBAG) serves as the MPO for Monterey, San Benito and Santa Cruz Counties. In accordance with SB 375, AMBAG has prepared a Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) that integrates land use and transportation planning at a regional level to achieve GHG emission reduction targets from passenger vehicles. The most recent MTP/SCS is Moving Forward Monterey Bay 2040, which was adopted in June 2018. CARB set a target for the Monterey Bay Area of 5 percent reduction from 2005 per capita GHG emissions for the year 2035. The MTP/SCS demonstrates the region's ability to exceed the GHG emission reduction target set forth by CARB through transportation investments, strategic land use development, and performance measures (AMBAG 2018).

City of Santa Cruz Climate Action Plan

Completed in 2012, the City of Santa Cruz's (City) Climate Action Plan (CAP) sets target of reducing the City's GHG emissions by 37 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050 (City of Santa Cruz 2012). The City's CAP was completed in 2012 and anticipated growth from the 2005 LRDP through 2020. With respect to campus growth, the CAP directs the City to partner with residential landowners to improve energy efficiency for off-campus student housing. The CAP also encourages continued collaboration between the Santa Cruz METRO Transit District and UC Santa Cruz to support transit programs paid by student fees. The CAP only includes emissions generated by activities within the city limits, which excludes the UC Santa Cruz campus.

County of Santa Cruz Climate Action Strategy

The County of Santa Cruz Climate Action Strategy (CAS) presents a countywide GHG emissions inventory for 2009 (and a simplified inventory of GHG emissions from agricultural sources for 2011) and sets an interim target for GHG reductions by 2035, derived by linear interpolation, that is consistent with the statewide goals of reducing GHG emissions to 1990 levels by 2020 and achieving an 80 percent reduction in GHGs below 1990 levels by 2050 (County of Santa Cruz 2013). The second part of the document contains a vulnerability assessment and discussion of the conditions that may occur in Santa Cruz county as a result of climate change impacts, identifying the most susceptible areas. The CAS does not specifically discuss the UC Santa Cruz campus, and emissions from the university would not be included in the county inventory.

Climate Action Compact

In 2007, the County of Santa Cruz (County), the City, UC Santa Cruz, and various local businesses and organizations partnered to create the Climate Action Compact (City of Santa Cruz 2007). This compact established a public-private partnership to establish measurable community-wide GHG reduction goals. The Climate Action Compact primarily focuses on developing partnerships between jurisdictions and local entities to lower GHG emissions.

3.8.2 Environmental Setting

THE PHYSICAL SCIENTIFIC BASIS OF GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface and a smaller portion of this radiation is reflected back toward space. The absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most of the incoming solar radiation passes through and is not absorbed by the gases present in the earth's atmosphere; however, infrared radiation emitted by the earth is absorbed by GHGs. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs more than natural ambient concentrations have been found to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is "extremely likely" that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic forcing (International Panel on Climate Change [IPCC] 2014).

GHGs have varying potential to trap heat in the atmosphere, known as global warming potential (GWP), and atmospheric lifetimes. GWP reflects how long GHGs remain in the atmosphere, on average, and how intensely they absorb energy. Gases with a higher GWP absorb more energy per pound than gases with a lower GWP, and thus contribute more to warming the earth's atmosphere. The parameter "atmospheric lifetime" describes how long the molecules will remain in the atmosphere. Atmospheric lifetimes of GHGs range from tens to thousands of years. These gases remain in the atmosphere long enough to become well mixed. The amount that is measured in the atmosphere is roughly the same all over the world, regardless of the source of the emissions. The GWP of a gas is determined using CO_2 as the reference gas, which has a GWP of 1 over 100 years (IPCC 2007).[1] For example, a gas with a GWP of 10 is 10 times more potent than CO_2 over 100 years. The use of GWP allows GHG emissions to be reported using CO_2 as a baseline. The sum of each GHG multiplied by its associated GWP is referred to as "carbon dioxide equivalents" (CO_2e). This essentially means that 1 metric ton of a GHG with a GWP of 10 has the same climate change impacts as 10 metric tons of CO_2.

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas most pollutants with localized air quality effects have relatively short atmospheric lifetimes (about one day), GHGs have long atmospheric lifetimes (one to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the lifetime of any GHG molecule is dependent on multiple variables and cannot be determined with any certainty, it is understood that more CO_2 is emitted into the atmosphere than is sequestered or trapped by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions,

[1] All Global Warming Potentials are given as 100-year values.

approximately 55 percent are estimated to be sequestered through ocean and land uptake every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO_2 emissions remains stored in the atmosphere (IPCC 2013:467).

The quantity of GHGs in the atmosphere that ultimately result in climate change is not precisely known, but is enormous; no single project alone would measurably contribute to an incremental change in the global average temperature, or to global, local, or microclimates. From the standpoint of CEQA, GHG impacts relative to global climate change are inherently cumulative.

GREENHOUSE GAS EMISSION SOURCES

GHG emissions contributing to global climate change are attributable in large part to human activities associated with the electricity, transportation, industrial, commercial, residential, and agricultural/forestry sectors. Emissions of CO_2 are mainly byproducts of fossil fuel combustion. CH_4, a highly potent GHG, primarily results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices and landfills. N_2O is also largely attributable to agricultural practices and soil management. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution (CO_2 dissolving into the water), respectively, two of the most common processes for removing CO_2 from the atmosphere.

STATEWIDE SOURCES

As discussed previously, GHG emissions are attributable in large part to human activities. California government is putting in place programs and legislation to reduce GHG emissions with the hope of delaying, mitigating, or preventing at least some of the anticipated impacts of global climate change on California communities. The total GHG inventory for California in 2017 was 424 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) (CARB 2019). This is less than the 2020 target of 431 $MMTCO_2e$ set forth by the state pursuant to AB 32 (CARB 2019). Combustion of fossil fuel in the statewide transportation sector was the single largest source of California's GHG emissions in 2017, accounting for 41 percent of total GHG emissions in the state (CARB 2019). This sector was followed by the industrial sector (24 percent) and the electric power sector (including both in-state and out-of-state sources) (15 percent) (CARB 2019). See Table 3.8-1 and Figure 3.8-1 below.

Table 3.8-1 California Greenhouse Gas Emissions Inventory

Emissions Sector	MMT CO_2e/year 1990	MMT CO_2e/year 2000	MMT CO_2e/year 2005	MMT CO_2e/year 2010	MMT CO_2e/year 2017
Transportation	150.6	179.5	188.9	168.1	173.9
Electricity Generation[1]	110.5	105.3	108.2	90.6	63.6
Industrial[2]	105.3	104.6	104.6	101.1	101.8
Agriculture & Forestry	18.9	32.0	34.5	34.6	33.9
Residential	29.7	31.2	29.5	31.3	29.7
Commercial	14.4	14.3	15.8	20.1	21.2
Not Specified[3]	1.3	0.4	0.3	0.3	—
Total Emissions[4]	**430.7**	**467.2**	**481.7**	**446.1**	**424.1**

Notes: GWP = global warming potential; MMT CO_2e/year = million metric tons of carbon dioxide equivalent per year

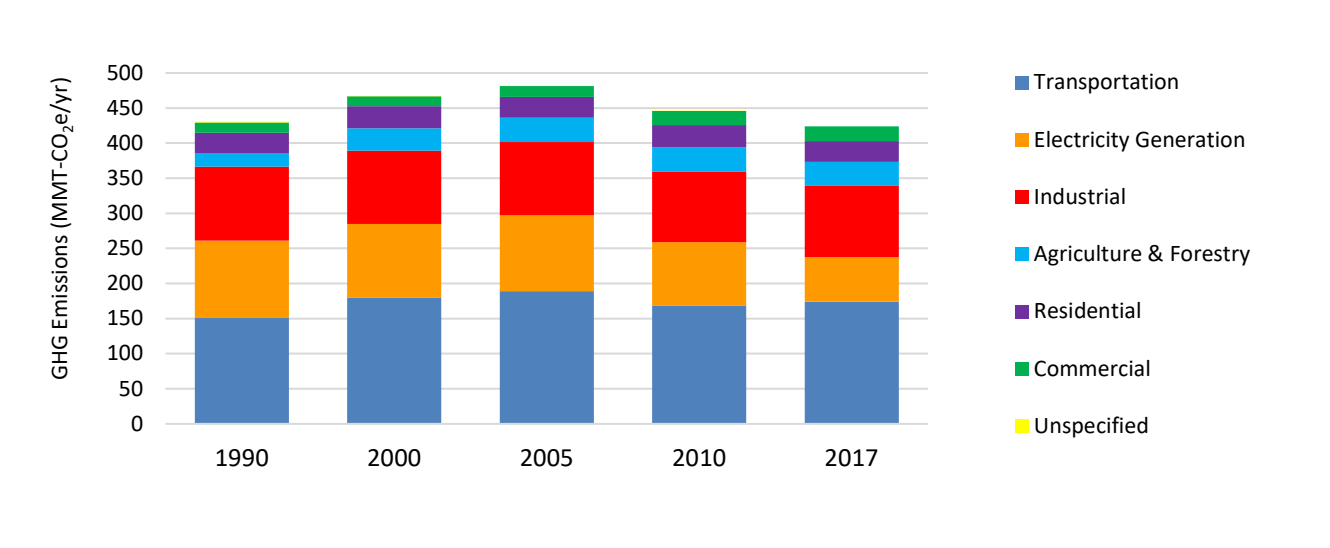
[1] Includes in-state-generated and imported electricity production.

[2] Waste emissions are contained within Industrial Sector emissions.

[3] Includes solvent and chemical emissions

[4] Totals may not sum exactly due to rounding

Source: CARB 2019



Source: CARB 2019

Figure 3.8-1 California's Greenhouse Gas Emissions by Economic Sector (1990–2017)

GHG EMISSIONS CLASSIFICATION

To achieve consistency in reporting across different geographies, UC Santa Cruz uses a GHG emissions classification system that classifies GHG emissions into three "scopes" based on the nature and source of the emissions. The UCOP Sustainability Practices Policy defines Scope 1 and 2 emissions per the Climate Registry (The Climate Registry 2018). Given that the Climate Registry defines Scope 3 emissions as "all other indirect emissions," the UCOP defines Scope 3 emissions per Second Nature's Carbon Commitment (The Climate Registry 2018, Second Nature 2020). These definitions are as follows.

- Scope 1 GHG emissions include direct emissions that are emitted on the project site/facility and are associated with on-site combustion of natural gas, fuel use in University-owned vehicle fleets, and fugitive emissions of gases used for refrigeration and scientific research. Fugitive gases include hydrofluorocarbon gases, perfluorocarbon gases, and sulfur hexafluoride (SF_6).
- Scope 2 GHG emissions include indirect emissions associated with the consumption of purchased energy from off-site sources. Scope 2 electricity emissions reflect emissions from all energy used at the electricity-generating power plant, but exclude transmission and distribution losses, which are reported under Scope 3.
- Scope 3 GHG emissions include indirect emissions not covered in Scope 2, such as GHG emissions from employee and student commuting, business air and ground travel.

These definitions of Scope 1, 2 and 3 emissions are used at UC Santa Cruz to gather and report GHG emissions data annually.

Note that CEQA requires an evaluation of direct and indirect emissions. With the exception of business air and ground travel, all of the Scope 1, 2, and 3 emission sources listed above and those from off-site wastewater treatment; water supply, treatment, and conveyance; and solid waste disposal must be also addressed in a CEQA document.

UC SANTA CRUZ EMISSIONS

The UC Sustainability Practices Policy requires each campus to report a GHG emissions inventory to an independent reporting organization. UC Santa Cruz currently reports its annual Scope 1 and Scope 2 GHG emissions inventory to the Climate Registry. The most recent inventory reported to the Climate Registry was for calendar year 2018. UC Santa Cruz emissions inventories reported to outside agencies are verified by accredited independent auditors.

A summary of UC Santa Cruz's GHG inventories for the Santa Cruz campus during 1990 and 2018, as reported in the CES (UC Santa Cruz 2017), is presented below in Table 3.8-2. The values for 2018 are based on actual data collected and reported to the Climate Registry, while 1990 values are based on collected data and regression analysis.

Table 3.8-2 UC Santa Cruz GHG Emissions between 1990 and 2018 ($MTCO_2e$)

Annual GHG Emissions ($MTCO_2e$)	1990	2007	2009	2018
Emissions Source Stationary Sources	16,989	22,872	24,046	28,917
Purchased Electricity	4,136	16,912	11,183	1,595
Mobile Fleet	1,701	2,266	2,151	2,032
Scopes 1 and 2 Total	22,826	42,050	37,380	32,544
Mobile Non-Fleet (Commuters)	26,830	24,160	23,468	22,780
Business Air Travel	6,856	11,420	10,681	10,940
Scope 3 Total[1]	33,686	35,580	34,149	33,720
TOTAL	**55,512**	**77,630**	**71,529**	**66,264**

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalents

[1] Reports did not include solid waste, water, and wastewater-related emissions.

Sources: UC Santa Cruz 2017; Second Nature 2018; data compiled by Ascent Environmental in 2020.

EFFECTS OF CLIMATE CHANGE ON CALIFORNIA

According to IPCC, which was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme, global average temperature will increase by 1.7 to 4.8 degrees Celsius (°C) (3.1 to 8.6 degrees Fahrenheit [°F]) by the end of the century unless additional efforts to reduce GHG emissions are made (IPCC 2014:10). According to *California's Fourth Climate Change Assessment (dated August 2018)*, with global GHGs reduced at a moderate rate, California will experience average daily high temperatures that are warmer than the historic average by 2.5 °F from 2006 to 2039, by 4.4 °F from 2040 to 2069, and by 5.6 °F from 2070 to 2100; and if GHG emissions continue at current rates then California will experience average daily high temperatures that are warmer than the historic average by 2.7 °F from 2006 to 2039, by 5.8 °F from 2040 to 2069, and by 8.8 °F from 2070 to 2100 (OPR, CEC, and CNRA 2018:5).

Since its previous climate change assessment in 2012, California has experienced several of the most extreme natural events in its recorded history: a severe drought from 2012-2016, an almost non-existent Sierra Nevada winter snowpack in 2014-2015, increasingly large and severe wildfires, and back-to-back years of the warmest average temperatures (OPR, CEC, and CNRA 2018:3). According to CNRA's report, *Safeguarding California Plan: 2018 Update* (CNRA 2018), California experienced the driest four-year statewide precipitation on record from 2012 through 2015; the warmest years on average in 2014, 2015, and 2016; and the smallest and second smallest Sierra snowpack on record in 2015 and 2014 (CNRA 2018). In contrast, the northern Sierra Nevada range experienced its wettest year on record in the 2016-2017 water year (CNRA 2018). The changes in precipitation exacerbate wildfires throughout California with increasing frequency, size, and devastation. As temperatures increase, the increase in precipitation falling as rain rather than snow also could lead to increased potential for floods because water that would normally be held in the snowpack of the Sierra Nevada and Cascade mountains until spring would flow into the Central Valley concurrently with winter rainstorm events. This scenario would place more pressure on California's levee/flood control system (CNRA 2018).

Changes in temperature, precipitation patterns, extreme weather events, and sea-level rise have the potential to affect and decrease the efficiency of thermal power plants and substations, decrease the capacity of transmission lines, disrupt electrical demand, and threaten energy infrastructure with the increased risk of flooding (CNRA 2018). Increased temperatures would also lead to increased electricity demand for cooling needs in buildings and facilities.

Water availability and changing temperatures, which affect prevalence of pests, disease, and species, directly impact crop development and livestock production. Other environmental concerns include decline in water quality, groundwater security, and soil health (CNRA 2018). Vulnerabilities of water resources also include risks to degradation of watersheds, alteration of ecosystems and loss of habitat, impacts to coastal areas, and ocean acidification (CNRA 2018). The ocean absorbs approximately a third of the CO_2 released into the atmosphere every year from industrial and agricultural activities, changing the chemistry of the ocean by decreasing the pH of seawater (CNRA 2018).

In comparison with historical annual means (between 1961 and 1990), Santa Cruz County annual mean rainfall is expected to decrease by 3 to 4 inches and annual maximum temperatures are projected to rise 3 to 5°F by the 2070-2099 period, according to the RCP 4.5 scenario under CEC's Cal-Adapt climate change scenario planning tool (CEC 2020). Cal-Adapt is a climate change scenario planning tool developed by CEC that downscales global climate model data to local and regional resolution under representative concentration pathways (RCPs): the RCP 8.5 represents a scenario where emissions continue to rise strongly through 2050 and plateau around 2100, and the RCP 4.5 represents a scenario where emissions peak around 2040, then decline. RCP 4.5 represents a low-emissions scenario in which global emissions are lower in the long term compared to RCP 8.5. (CEC 2020).

With respect to sea-level rise, although UC Santa Cruz is located in a coastal area, the project boundaries are not likely to be affected by sea-level rise even under the maximum inundation scenario (CEC 2020).

3.8.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Impacts from campus development under the 2021 LRDP would be significant if the project would exceed either of the following significance criteria, in accordance with Appendix G of the *State CEQA Guidelines*:

- generate GHGs, either directly or indirectly, that may have a significant impact on the environment; or
- conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

The 2021 LRDP is considered to have a significant impact to global climate change if the 2021 LRDP would:

- generate GHG emissions that would exceed the GHG emission reduction efforts of the State of California. With respect to statewide planning efforts to reduce GHG emissions, the 2021 LRDP would have a less-than-significant impact if, despite LRDP growth and development, UC Santa Cruz's total (including both existing and 2021 LRDP sources) 2030 emissions are at least 40 percent below 1990 emissions and UC Santa Cruz's total 2040 emissions are at least 60 percent below 1990 emissions;
- generate GHG emissions within the LRDP area in excess of campus-wide GHG emissions under existing conditions; or
- conflict with the following plans for the reduction of GHG emissions: (1) the UC Sustainable Practices Policy (UCOP 2020), (2) the GHG reduction goals of the AMBAG RTP/SCS; or (3) the potential attainment of the State GHG reduction goals for 2050 (i.e., 2017 Scoping Plan).

As stated in the 2017 Scoping Plan, "… the State's (2020 and) 2030 targets have not been set in isolation. They represent benchmarks, consistent with prevailing climate science, charting an appropriate trajectory forward that is in line with California's role in stabilizing global warming below dangerous thresholds." (CARB 2017a:ES3). Per the Scoping Plan, achieving the 2020 and 2030 GHG reduction targets will place California on a path toward and provide the momentum to attain a 2050 goal of 80 percent reduction in GHG emissions below 1990 levels.

These thresholds were developed using science-based goals of the world-wide reductions in GHG emissions that would be needed in order to avoid dangerous climate change effects, as discussed in both the regulatory and environmental setting discussions above; these goals represent what can be described as California's—and by parallel consideration, UC Santa Cruz's—proportional reduction in GHG emissions to avoid dangerous climate change. Per the 2017 Scoping Plan, local governments can demonstrate consistency with statewide targets by "applying the

percent reductions necessary to reach 2030 and 2050 climate goals (i.e., 40 percent and 80 percent, respectively) to their community-wide GHG emissions target" (CARB 2017:100). For the purposes of demonstrating consistency with the State's targets, UC Santa Cruz can be considered a "local government," as it has functions as largely as a self-contained small city, with students living, eating, recreating, and studying within campus limits, and UC Santa Cruz has jurisdiction over the land uses within the campus. Although the Scoping Plan also gave local jurisdictions the option of using per-capita or per-service-population targets, UC Santa Cruz has decided to use the relative percent reduction in line with the state's targets as its threshold due to the availability of the campus's 1990 GHG emissions inventory baseline because the campus's range of emission sectors span all sectors accounted for in the state's inventory. As such, these thresholds are consistent with CARB's recommendations for assessing plan-level direct and indirect impacts to global climate change in the 2017 Scoping Plan (CARB 2017a:99).

In addition, the California Supreme Court's decision in Center for Biological Diversity v. Department of Fish and Wildlife (62 Cal.4th 204) confirmed that there are multiple potential pathways for evaluating GHG emissions consistent with CEQA. The decision clarified that use of statewide emission reduction targets is a "permissible criterion of significance" so long as substantial evidence and reasoned explanation is provided to relate those goals to project-specific emissions.

As an alternative threshold, this document also analyzes 2021 LRDP emissions against a "net zero" threshold, under which any increase in GHG emissions above existing conditions (net zero) would be considered a significant impact on the environment. The project will therefore result in a significant GHG impact if implementation of 2021 LRDP increases GHG emissions associated with uses in the LRDP area above existing conditions. In its 2017 Scoping Plan Update, CARB specifically stated that this threshold--"Achieving no net additional increase in GHG emissions"--is an appropriate significance threshold for development projects (CARB 2017a).

ANALYSIS METHODOLOGY

The California Office of Planning and Research recommends that lead agencies under CEQA make a good-faith effort, based on available information, to estimate the quantity of GHG emissions that would be generated by a proposed project, including the emissions associated with construction activities and operational sources (stationary sources, vehicular traffic, and energy consumption), and to determine whether the project's incremental contribution of GHG emissions would be cumulatively considerable and to mitigate the project's incremental contribution where feasible mitigation is available (CEQA Guidelines Section 15064.4).

Of note, biogenic GHG emissions are included in UC Santa Cruz's GHG verified inventory, but are excluded from the analysis of GHG impacts herein. EPA has defined biogenic emissions as CO_2 emissions related to the natural carbon cycle, such as the decomposition, combustion, and digestion of organic matter (EPA 2017). Conversion of un-fossilized organic matter into CO_2 emissions releases CO_2 to the atmosphere that is later converted into organic matter through photosynthesis in plants, whether directly or indirectly through consumption. Biogenic emissions exclude anthropomorphic CO_2 emissions, such as premature removal of vegetation leading to increased CO_2 emissions from the accelerated release of the carbon stored in vegetation. According to the Local Government Operations Protocol, biogenic emissions may be reported, but should be quantified separately from anthropomorphic emissions because biogenic emissions do not contribute to a net increase of GHGs in the atmosphere (CARB 2010:24). Excluding biogenic emissions also allows for the recognition of the lower carbon intensities of biofuels relative to their fossil fuel equivalents.

The following section describes the analysis methodology for estimating construction emissions and operational emissions associated with the proposed 2021 LRDP.

Construction-Related Greenhouse Gas Emissions

Construction-related GHG emissions were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2 modeling tool (CAPCOA 2016), as recommended by MBARD (MBARD 2008, 2016). Modeling was based on project-specific information (e.g., land use types, traffic modeling, amount of new building space) and default values in CalEEMod that are based on location, land use type, and typical construction activities. CalEEMod

accounts for a variety of state, federal, and local programs and policies that affect construction-related emissions, such as local air district rules on architectural coatings and federal emission standards for off-road equipment, but these regulations primarily affect emissions of criteria pollutants. For a detailed description of model input and output parameters, and assumptions, refer to Appendix D1.

Due to the programmatic nature of this analysis, the timing of construction activities for all projects anticipated during implementation of the 2021 LRDP cannot be predicted. Construction of additional academic space under the 2021 LRDP would begin as early as 2022. It is conservatively assumed that an average of 112,000 square-feet (sf) of academic space would be constructed per year, including facilities for Instruction and Research, Academic and Administrative Support, and Student Support and Public Services, through to full implementation of the 2021 LRDP (i.e., 2040). Other components of the 2021 LRDP, such as parking lots, infrastructure, and housing for students and faculty, could also be constructed starting in 2022.

Construction-related GHG emissions are based on the results of CalEEMod runs for the construction of 112,000 sf of academic space per year and 200,700 sf of other land uses per year. For construction years 2022 through 2040, the exact construction schedule of all land uses of the 2021 LRDP during any given year is unknown. To simplify the analysis of construction emissions in these years, the construction activity of all land uses is averaged over an 18-year lifespan to estimate annual construction activity and associated annual emissions that may occur within a given year of construction. Annual levels of emissions are needed to compare against GHG thresholds that are based on annual emissions targets.

Operational Greenhouse Gas Emissions

Operational emissions of GHGs were estimated from energy use (i.e., electricity and natural gas consumption), area sources (i.e., landscaping equipment), water use, wastewater generation, solid waste generation, and mobile sources using CalEEMod Version 2016.3.2. CalEEMod also accounts for policies that may affect emissions factors, such as state and federal vehicle emission standards and building energy efficiency standards, discussed further below. These policies are accounted for in modeling results, unless otherwise noted.

With respect to building energy use, electricity and natural gas consumption would result in indirect and direct GHG emissions, respectively. While the Green Building Design policy of the Sustainable Practices Policy specifies that new buildings anticipated to be developed under the 2021 LRDP will only use electricity for space and water heating purposes rather than onsite fossil fuel combustion, an exception may be made for buildings connected to existing campus thermal infrastructure that relies on natural gas usage. These buildings would consume both electricity and natural gas for lighting, space and water heating, and appliances, and gasoline for landscaping maintenance equipment. Building energy use was estimated using CalEEMod Version 2016.3.2 (CAPCOA 2016). CalEEMod default values were adjusted based on the assumption that the land uses within the campus would meet 2019 Title 24 building energy efficiency standards. These standard were chosen because the UCOP Sustainable Practices Policy allows campuses to choose between achieving energy usage rate 20 percent better than the current Title 24 building energy efficiency standards or meeting the UC Whole Building Performance Targets, and, as shown in Table 3.6-2 of Section 3.6, "Energy," 2019 Title 24 standards are more stringent than the UC Whole Building Performance Targets (UCOP 2020).

Further, the list below describes how specific policies of the Sustainable Practices Policy are reflected in the modeling of operational emissions. In general, the modeling of operational GHG emissions reflects policy language that specifically requires UC Santa Cruz to achieve a certain target, versus targeting a certain level of sustainability with no set requirement.

- Green Building Design
  - GHG reductions resulting from achieving the energy performance targets related to 1999 benchmarks, as shown in Table 1 of the *UC Building 1999 Energy Benchmarks by Campus* (Sahai, et al. 2014), are accounted for through reduced energy consumption in GHG modeling.

- Climate Protection
  - Achieving carbon neutrality for Scope 1 and 2 sources by 2025, and for Scope 3 sources by 2050, is accounted for in the GHG modeling assumptions.
- Sustainable Transportation
  - Strategies to reduce GHG emissions from fleet activities and other sustainable transportation strategies are included as part of the suite of emissions reduction projects that UC Santa Cruz would enact as part of its commitment to achieve carbon neutrality from Scope 1 and 2 sources by 2025. As part of Transportation Mitigation Measure 3.16-1, traffic demand model (TDM) performance standards will be implemented that result in the reduction of total VMT per capita to 15 percent below current campus average and the total employment VMT per employee to 15 percent below the countywide average. This additional reduction is accounted for in calculation of mitigated GHG emissions.
- Sustainable Building Operations for Campuses
  - Certification of as many buildings as possible through the "LEED for Operations and Maintenance" rating system is not accounted for in GHG modeling.
- Zero Waste
  - Reduction of per capita total municipal solid waste generation at campus facilities is not accounted for in GHG modeling.

With respect to emissions from electricity use, UC Santa Cruz procures its electricity from PG&E. Electricity-related operational emissions of GHGs for the existing main residential campus and Westside Research Park and new development under the 2021 LRDP were calculated in CalEEMod, and for this analysis it was conservatively assumed that no new solar panels would be installed. As recommended by EPA, annual non-baseload output emissions rates were used to calculate the GHG emissions associated with electricity use for the existing and future conditions of the main residential campus and research park (EPA 2014). In addition, increases in the renewable mix of electricity generation sources due to the California Renewable Portfolio Standard (RPS) and SB 350 are assumed to affect the emission factors in future years. For 2040 conditions, electricity emission factors used in calculating GHG emissions were chosen to reflect year 2040 statewide averages (i.e., 77.8 lb-CO_2/MWh, 0.005 lb-CH_4/MWh, and 0.001 lb-N_2O/MWh). These are based on factors from EPA's Emissions & Generation Resource Integrated Database (eGRID) for the CAMX region and interpolated for 2040 based on the State's 2045 100 percent clean energy target under SB 100 (EPA 2020).

Operational area-source GHG emissions from landscaping equipment were estimated using CalEEMod based on model defaults for the applied land uses. The analysis assumed that new uses under the 2021 LRDP would not include fireplaces or wood-burning stoves. Plan implementation is expected to result in some loss of vegetation (i.e., trees) during construction, with an overall net decrease in the number of trees (approximately 3,386 trees over the 2021 LRDP implementation period). The change in carbon sequestration potential was accounted for using CalEEMod's vegetation module. This rate is based on a review of the current tree density on campus of approximately 22 trees per acre. Any new land uses built on currently forested land were assumed to result in the loss of 22 trees per acre developed. This rate was applied to a total acreage, including parking lot acreage and redevelopment areas, of approximately 153.9 acres.

With respect to mobile sources, EMFAC2017 was used to estimate GHG emissions from vehicle miles traveled (VMT) generated by implementation of the 2021 LRDP (refer to Section 3.16, "Transportation"). The modeled emission factors reflect the average vehicle mix and usage rates forecast for Santa Cruz County in 2040, the 2021 LRDP's approximate year for achieving full implementation. Daily VMT were adjusted to annual VMT using a conversion factor of 287 which accounts for UC Santa Cruz's academic schedule, holidays, and enrollment levels during summer and regular academic quarters. See Appendix D1 for calculation details.

Modeling was based on 2021-LRDP-specific information (e.g., land use types, traffic modeling, building space) and default values in CalEEMod that are based on location and land use types. For a detailed description of model input and output parameters, refer to Appendix D1. Full implementation of the 2021 LRDP is assumed to occur in 2040.

ISSUES NOT EVALUATED FURTHER

No issues related to GHG emissions have been eliminated from further discussion.

IMPACTS AND MITIGATION MEASURES

Impact 3.8-1: Generate Greenhouse Gas Emissions that May Have a Significant Impact on the Environment

The 2021 LRDP would increase development and population within the main residential campus and Westside Research Park. This increase in development along with the implementation of design features, programs, and other measures would result in annual emissions of 26,769 $MTCO_2e$ per year in 2040. This amount is below existing conditions, and would therefore result in a less-than-significant impact under the net zero threshold. However, when applying the more conservative "state target" threshold, this reduction is equivalent to 46 percent below the campus's 1990 levels by 2040, which is not consistent with the interpolated target to reduce statewide GHG emissions by 60 percent below 1990 levels by 2040. Therefore, the 2021 LRDP contribution to climate change from GHG emissions would be **significant**.

Table 3.8-3 shows the historical and anticipated annual GHG emissions generated by UC Santa Cruz from 1990 through 2040. Emissions from water, wastewater, and solid waste were not included in the 1990 and 2018 inventories, and as a result, data from those years are not presented in the table below. With the implementation of the UC Sustainable Practices Policy, sustainability actions outlined in the UC Santa Cruz CES, and potential planned emissions reductions projects, the Scope 1 and 2 emissions under the build-out scenario would be reduced to zero by 2025 with the help of on-site GHG reduction projects and the purchase of offset credits. Without these emission reduction projects or the purchase of carbon offsets, the 2021 LRDP would result in a net increase in campus-wide GHG emissions caused by additional construction activity; on-road VMT; building energy consumption; water, waste, and wastewater emissions; and additional stationary source emissions—up to 30 percent over 1990 levels—by 2040. This accounts for any emissions reductions from existing buildings and operations that may occur as a result of legislative requirements as the state's electricity grid becomes more carbon neutral under SB 100 and as average vehicle emission rates decrease over time.

Tables 3.8-3 through 3.8-5 show the GHG emissions generated by both existing UC Santa Cruz operations and operations that would occur under the 2021 LRDP in order to compare the effect of the 2021 LRDP on the campus's progress toward meeting both the UC Carbon Neutrality Initiative Target and the State's GHG reduction targets under SB 32.

Table 3.8-3 UC Santa Cruz GHG Emissions under the 2021 LRDP (Without On-Site Emission Reduction Projects, Carbon Offsets, or Renewable Energy Credits) ($MTCO_2e$/year)

Emissions Source	1990 Reference Emissions	Existing Emissions (2018)	Existing + 2021 LRDP Emissions (2025) [1]	Existing + 2021 LRDP Emissions (2030) [1]	Existing + 2021 LRDP Emissions (2040)
Scopes 1 & 2 [2]					
Stationary Sources (Existing)	16,989	28,917	28,917	28,917	28,917
Purchased Electricity[3] (Existing)	4,136	1,595	2,068	1,654	517
Campus Fleet (Existing)	1,701	2,032	1,785	1,609	1,257
Stationary Sources (2021 LRDP growth)	0	0	1,494	2,561	4,695
Purchased Electricity[3] (2021 LRDP growth)	0	0	364	625	1,145
Campus Fleet (2021 LRDP growth)[4]	0	0	205	351	644
Total Scope 1 and 2 Emissions	22,826	32,544	34,833	35,717	37,175

Emissions Source	1990 Reference Emissions	Existing Emissions (2018)	Existing + 2021 LRDP Emissions (2025) [1]	Existing + 2021 LRDP Emissions (2030) [1]	Existing + 2021 LRDP Emissions (2040)
Scope 3[5]					
Non-Fleet Mobile Sources (Existing)[6]	26,830	22,780	19,616	17,355	12,835
Non-Fleet Mobile Sources (2021 LRDP growth)[6]	0	0	3,446	5,908	10,832
2021 LRDP Construction (2021 LRDP growth)[7]	0	0	942	942	942
Changes to on-campus vegetation (2021 LRDP growth)[8]	0	0	687	1,178	2,160
Total Scope 3 Emissions	26,830	22,780	24,692	25,384	26,769
Totals					
Total Emissions from Existing UC Santa Cruz Operations	49,656	55,324	52,386	49,536	43,526
Total Emissions from New Development under 2021 LRDP	0	0	7,139	11,565	20,418
Total Emissions without Additional Reductions	49,656	55,324	59,525	61,101	63,944
Other Scope 3 Emissions (excluded from total) [1,9]					
Process/Fugitive Emissions (2021 LRDP growth)[10]	N/A	0	39	67	124
Water/Wastewater (2021 LRDP growth)	N/A	0	257	440	807
Solid Waste (2021 LRDP growth)	N/A	0	751	1,287	2,360
Electricity Transmission and Distribution Losses (2021 LRDP growth)	N/A	0	<0.1	<0.1	<0.1

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalents; LRDP = Long Range Development Plan.

Post-1990 emissions are adjusted to use global warming potential factors from IPCC's Third Assessment Report, which is consistent with the factors used in UC Santa Cruz's 1990 emissions inventory (UC Santa Cruz 2017). See Appendix D1 for additional details.

[1] 2025 and 2030 emissions are based on interpolation between 2018 and 2040. This approach assumes a linear rate of growth through 2040.

[2] Includes emissions from electricity and natural gas combustion in buildings, campus fleet, electricity, and stationary sources. Excludes process and fugitive sources (e.g., refrigerants, scientific research). The UC Santa Cruz CES did not quantify these emissions for 1990 levels, however the "Annual Progress Evaluation for University of California, Santa Cruz, 2018" reported that process and fugitive emissions were less than one percent of total emissions. Thus, process and fugitive emissions are expected to remain small and are excluded from this analysis.

[3] Reductions based on SB 100 state goal of 50 percent of electricity to be powered by renewable resources by 2025, 60 percent by 2030, and 100 percent zero-carbon electricity by 2045 (interpolated to 88 percent by 2040), relative to 1990 levels.

[4] Scaled from 2018 campus emissions, thus has the same scope as the campus's 2018 inventory (i.e., includes emissions from the Westside Research Park)

[5] The UC Santa Cruz CES excludes air travel, electricity transmissions and distribution losses, off-site wastewater treatment, and off-site municipal solid waste disposal. Air travel is excluded from CEQA analysis. These other emissions are included at the end of the table for informational purposes.

[6] Includes all on-road mobile emissions, including commuting, vendor trips, and trucks trips, excluding campus fleet.

[7] Represents average annual construction emissions under the 2021 LRDP over 30 years, the assumed lifespan of new construction. 2021 LRDP construction emissions would not continue after 2040.

[8] Accounts for the net change in carbon losses due to removal of trees during construction. 2025 and 2030 values interpolated from total loss anticipated in 2040.

[9] Included for informational purposes.

[10] Scaled from campus's existing process and fugitive emission reported by Second Nature by growth in research building area.

Source: UC Santa Cruz 2017; Second Nature 2018; data compiled by Ascent Environmental in 2020

Table 3.8-4 Comparison of Emissions to UC Carbon Neutrality Initiative Target ($MTCO_2e$/year)

Emissions Source	Existing + 2021 LRDP Emissions (2025) [1]	Existing + 2021 LRDP Emissions (2030) [1]	Existing + 2021 LRDP Emissions (2040)
Scope 1 and 2 Emissions without Reductions	34,833	35,717	37,175
Scope 1 Emissions Reductions (e.g., carbon offsets and on-site emission reduction projects)	12,773	20,353	35,513
Scope 2 Emissions Reductions (e.g., renewable energy credits)	529	907	1,662
Total Scope 1 and 2 Reductions	13,302	21,260	37,175
Scope 1 and 2 Emissions with Reductions	21,532	14,458	0
UC Carbon Neutrality Initiative Target (Scopes 1 and 2) [1]	0	0	0
Meets 2025 UC Carbon Neutrality Initiative Target?	No	No	Yes

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalents; LRDP = Long Range Development Plan.

Emissions shown use global warming potential factors from IPCC's Third Assessment Report, which is consistent with the factors used in UC Santa Cruz's 1990 emissions inventory (UC Santa Cruz 2017). See Appendix D1 for additional details.

[1] Scope 3 emissions are not required to be carbon neutral until 2050 (UCOP 2020; UC Santa Cruz 2017).

Source: Data compiled by Ascent Environmental in 2020

Table 3.8-5 Comparison of Emissions to State GHG Reduction Targets ($MTCO_2e$/year)

Emissions Source	1990 Reference Emissions	Existing Emissions (2018)	Existing + 2021 LRDP Emissions (2025) [1]	Existing + 2021 LRDP Emissions (2030) [1]	Existing + 2021 LRDP Emissions (2040)
Scope 1, 2, and 3 Emissions without reductions	49,656	55,324	59,525	61,101	63,944
Percent Change from 1990 without reductions	—	11%	20%	23%	29%
Scope 1, 2, and 3 Emissions with reductions	49,656	55,719	46,223	39,842	26,769
Percent Change from 1990 with reductions		12%	-7%	-20%	-46%
State GHG Reduction Targets (Percent Change from 1990)				-40%	-60%
Targeted Scope 1,2, and 3 Emissions under State Targets ($MTCO_2e$)				29,794	19,862
Do Scope 1, 2, and 3 Emissions with reductions meet State GHG Reduction Targets?				No	No
Additional Reductions Needed to Meet State Targets ($MTCO_2e$)				10,048	6,907

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalents; LRDP = Long Range Development Plan.

Post-1990 emissions use global warming potential factors from IPCC's Third Assessment Report, which is consistent with the factors used in UC Santa Cruz's 1990 emissions inventory (UC Santa Cruz 2017). See Appendix D1 for additional details.

[1] 2025 and 2030 emissions are based on interpolation between 2018 and 2040. This approach assumes a linear rate of growth through 2040.

[2] Includes Scopes 1, 2, and 3 emissions.

Source: Data compiled by Ascent Environmental in 2020

With anticipated emission increases in the years leading to 2040 with 2021 LRDP implementation, UC Santa Cruz will be concurrently implementing the UC Sustainable Practices Policy and the UC Santa Cruz 2017 CES to meet the requirement of climate neutrality for Scope 1 and 2 emissions by 2025 and climate neutrality for selected Scope 3 emissions (e.g., commuting) by 2050. Implementation of these policies and initiatives would reduce emissions through improved energy efficiency in new and existing buildings, an increased proportion of renewable energy use, and reduced emissions of research gases.

UC Santa Cruz has approved and implemented on-site projects to reduce overall campus emissions, such as the 250-kW photovoltaic solar array that was installed at the McHenry library roof in December 2013, which generates 20,000 kWh/month. In addition, a photovoltaic solar array was installed within the East Remote Parking Lot and will generate

2.1 MWh/month. Combined, these two solar arrays currently displace over 20 percent of purchased electricity or 6.4 percent of the total campus electrical load, and reduce campus-wide GHG emissions by 767 $MTCO_2e$ or 2 percent of UC Santa Cruz's Scope 1 and 2 emissions.

As part of its effort to increase campus sustainability, UC Santa Cruz is continually evaluating additional projects, subject to financial feasibility and/or technical viability, for direct action and in a manner consistent with the UC Sustainable Practices Policy. Additional and concurrent solutions being considered by UC Santa Cruz include high performance building renovations, behavior-based conservation programs, fleet renewal, and space planning solutions. Due to uncertainties associated with forecasting, including not knowing the exact number of affected structures, these potential reductions were not quantified. It is expected that these upcoming emission reductions would further reduce the projected 2030 and 2040 Scope 1 and 2 emissions but are not expected to fully achieve the 2025 climate neutrality targets for Scopes 1 and 2. In the case where the actions to reduce emissions on campus, as described above, would not completely reduce UC Santa Cruz campus emissions to the 2025 target set by the UC Sustainable Practices Policy, UC Santa Cruz would purchase renewable energy credits and carbon offsets to meet the GHG reduction goals. These credits would need to meet relevant criteria to be considered valid, such as additionality and permanence; see Mitigation Measure 3.8-1.

UC Santa Cruz produces an annual GHG inventory to track GHG emission volumes and sources. Through this tracking system, GHG reductions are expected to continue the overall downward trend that has occurred since 2007 (Table 3.8-2). The annual UC Santa Cruz GHG inventory will be used to determine the need for purchasing renewable energy credits and/or carbon offsets in the year 2025 to ensure emission reductions match the 2025 climate neutrality requirement for Scopes 1 and 2 emissions. UC Santa Cruz will prioritize developing on-campus projects to reduce GHG emissions and only purchase renewable energy credits and/or offsets as necessary, seeking out offsets generated within or as close to Santa Cruz as available that would achieve additionality, social justice, and the advancement of UC research. It should be further noted that the UC is currently developing an official carbon offset policy that will provide specific guidelines for individual campuses to follow.

The annual inventory will also be used to track progress towards meeting the limited Scope 3 climate neutrality requirement under the UC Sustainable Practices Policy. To meet the 2040 target of 60 percent below 1990 levels, a remaining reduction of 6,907 $MTCO_2e$ would still need to be achieved by 2040 from Scope 3 sources.

As shown in Table 3.8-5, with implementation of the UC Sustainable Practices Policy, campus emissions reduction projects, and purchases of renewable energy credits and carbon offsets, the 2021 LRDP would result in GHG emissions that are seven percent less than 1990 levels by 2025, 20 percent less than 1990 levels by 2030, and 46 percent less than 1990 levels by 2040. Campus energy efficiency projects and other green energy projects would help decrease the need to purchase carbon offsets. As noted above, UC Santa Cruz plans to follow CARB guidance with respect to prioritization as outlined in the 2017 Scoping Plan (e.g., on-site reductions first followed by local/regional investments in GHG reductions then potential broader applications, including carbon credits).

With respect to the potential for 2021 LRDP implementation to result in increased GHG emissions by UC Santa Cruz, Table 3.8-5 identifies a net reduction in overall campus emissions under 2025, 2030, and 2040 conditions compared to existing conditions. Thus, the 2021 LRDP Update would result in a net reduction of GHG emissions compared to existing conditions, which constitutes a less-than-significant impact when applying the net zero threshold specifically condoned by CARB in its 2017 scoping plan.

However, although UC Santa Cruz's emissions would meet the UC Carbon Neutrality Initiative targets, they would not meet the interpolated GHG reductions goals of reducing GHG emissions to 60 percent below 1990 levels by 2040 in order to meet the State's 2050 goals. Therefore, when evaluated under this threshold, the 2021 LRDP would not be consistent with the statewide GHG reduction goals and would considerably contribute to climate change. This impact would be **significant**.

Mitigation Measures

Mitigation Measure 3.8-1: Reduce Annual Greenhouse Gas Emissions

UC Santa Cruz shall commit to reducing annual GHG emissions by at least 6,907 $MTCO_2e$ by 2040. This reduction shall be achieved through the combination of on-campus GHG reduction projects and, if necessary, purchase of carbon offsets.

On-Campus or Other Regional Lands Reductions

UC Santa Cruz shall prioritize GHG reductions through on-campus GHG-reduction projects and actions or at other university-owned properties in the region. UC Santa Cruz could also pursue joint GHG-reduction efforts with other local/regional agencies (e.g., City and County of Santa Cruz.) Reductions in GHG emissions shall be achieved through the combination of any of the following:

1. Replanting removed trees or planting equivalent new trees displaced by construction at a 1:1 ratio and ensuring the continued health of the replanted trees. A 100 percent replanting rate would offset 2,160 $MTCO_2e$ per year by 2040. Tree planting at a higher rate would provide further GHG reductions.
2. Reducing new non-fleet mobile source emissions from commuting, vendor trips, and delivery trips by 2040. A 10 percent reduction in anticipated emissions from these sources would reduce emissions by 1,083 $MTCO_2e$ per year in 2040. These reductions can be achieved through an enhanced Transportation Demand Management Program (see Mitigation Measure 3.16-2). This program would include parking management, expanded vanpool program, improved transit service, and increased telecommuting.
3. Requiring renewable diesel or other zero carbon emissions alternatives to be used in place of conventional diesel use in equipment for all construction activity, even those occurring after this 2021 LRDP plan period. A 100-percent renewable diesel construction fleet would reduce emissions in 2040 by 942 $MTCO_2e$ per year.
4. Reducing waste and increasing recycling and composting within the LRDP area as part of UC Santa Cruz's Zero Waste goal under UCOP's Sustainable Practices Policy, including additional on-campus education and opportunities for waste recycling.
5. Pursuing innovative on-site wastewater treatment alternatives, such as waste-to-energy projects, that reduce N_2O and CH_4 process emissions compared to those generated at off-site wastewater treatment.
6. Pursuing electrification of existing buildings and requiring that all new buildings be electric only.
7. Any other on-campus or regional projects or measures identified during the course of the 2021 LRDP that would effectively and quantifiably reduce emissions.

Acquire Carbon Offset Credits in Conformance with CARB Guidance that are Demonstrably Real, Permanent, Additional, Quantifiable, Verifiable, and Enforceable

As part of this mitigation measure, UC Santa Cruz would make the following separate, though overlapping, GHG emission reduction commitments: (1) UC Santa Cruz will maintain compliance with carbon offset accreditation requirements under CARB's Cap-and-Trade program, and (2) per existing UC Policy, UC Santa Cruz's GHG emissions shall, commencing in 2025, be entirely carbon neutral.

Compliance with CARB's Cap-and-Trade Program: Any carbon offset credits obtained for the purpose of compliance with CARB's Cap-and-Trade program shall be purchased from an accredited carbon credit market. Based on the current program as of January 2021, such offset credits (or California Carbon Offsets) shall be registered with, and retired by an Offset Project Registry, as defined in 17 California Code of Regulations § 95802(a), that is approved by CARB, such as, but not limited to, Climate Action Reserve (CAR), American Carbon Registry, and Verra (formerly Verified Carbon Standard), that is recognized by The Climate Registry, a non-profit organization governed by U.S. states and Canadian provinces and territories.

Compliance with UC Policy: Compliance with UC's policies for carbon neutrality by 2025 and UC's own policy to reduce Scope 1, 2, and transportation-related Scope 3 emissions below 1990 levels pursuant to AB 32 will be accomplished through reductions in direct emissions, the purchase of renewable electricity, and the purchase of carbon offset credits.

UC Santa Cruz will purchase voluntary carbon offset credits as the final action to reach the GHG emission reduction targets. Internal guidelines will be developed per the UC Carbon Neutrality Initiative to ensure that any use of offsets for this purpose will derive from verified GHG emissions reductions resulting from actions that align, as much as possible, with UC's research, teaching, and public service mission.

To demonstrate that the carbon offset credits provided are real, permanent, additional, quantifiable, verifiable, and enforceable, as those terms are defined in 17 California Code of Regulations § 95802(a), UC Santa Cruz shall prepare an annual report documenting the protocol used to verify those credits and submit that report for approval to a CARB-accredited third-party verification entity. If the verification entity finds that any credits purchased did not meet these criteria, UC shall purchase alternative credits and submit a follow-up report to the verification entity for concurrence. All carbon offsets purchased will be reported publicly and tracked through the Climate Registry as required by UC policy.

For any remaining emissions not achieved through on-campus reduction efforts, as outlined above, UC Santa Cruz shall ensure that the remaining emissions reductions are taking place and on the trajectory toward meeting the target of reducing annual GHG emissions by at least 6,907 $MTCO_2e$ by 2040 and shall conduct an annual review of emissions reductions. To achieve any remaining GHG emissions reductions, voluntary carbon offsets shall be purchased.

Significance after Mitigation

Implementation of Mitigation Measures 3.8-1 would reduce annual GHG emissions generated by the UC Santa Cruz campus under the 2021 LRDP, which were already below the net zero threshold before mitigation, by 6,907 $MTCO_2e$, which is needed to reduce the campus's emissions to 60 percent below 1990 levels. Therefore, with mitigation, this impact would be **less than significant**.

Impact 3.8-2: Conflict with an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases

Implementation of the 2021 LRDP would achieve targets established in the UC Sustainable Practices Policy through anticipated planning and policy actions. As achievement of the Sustainable Practices Policy would meet or exceed statewide targets for 2030 and not impede the ability of UC Santa Cruz to achieve statewide 2050 targets, the 2021 LRDP would not conflict with an applicable plan, policy, or regulations intended to reduce GHG emissions. A **less-than-significant** impact would occur.

As described above in Impact 3.8-1, the UC Santa Cruz GHG emission reduction strategies will result in large scale emission reductions compared to both existing (absolute) emissions and per-capita reductions. While implementation of the 2021 LRDP would result in actions and activities that increase Scope 1, 2, and 3 emissions, UC Santa Cruz GHG emission reduction strategies and requirements will account for and plan reduction efforts to reduce these emissions associated with the 2021 LRDP. Further GHG emissions reductions may be achieved by the purchase of voluntary carbon offsets.

Specific 2021 LRDP items, such as large increases in on-campus student housing, have been incorporated into the 2021 LRDP because they are supportive and complementary to the GHG emission reduction strategies for the Scopes 1, 2, and 3 reduction requirements.

Proposed land uses, population increases, building development and redevelopment, and planned infrastructure for the 2021 LRDP are required through UC policies to achieve the university's goal of reducing GHG emissions generated by the campus. Individually, these elements would not reduce GHG emissions and, in contrast, would increase emissions due to the campus expansion under the 2021 LRDP. Campus expansion will result in additional GHG emissions due to construction, an increase in mobile sources, more building space requiring more heating and cooling, and an increased campus population. However, with implementation of the 2021 LRDP:

- Existing campus facilities would be redeveloped to be more energy efficient, resulting in less energy use and generating less emissions than existing conditions;

- New on-campus facilities would be developed to meet or exceed energy efficiency standards with a commitment to achieve at least LEED Silver, thereby resulting in fewer emissions from electricity and natural gas use compared to similar new facilities built elsewhere in the state;
- Land use and planned infrastructure would be developed to discourage personal vehicle use, such as through providing limited parking for personal vehicles and preferential parking for shared vehicles, as well as the construction of bicycle and transit infrastructure, thereby reducing transportation-related emissions; and
- Any remaining GHG emissions that need to be reduced after the physical implementation of the 2021 LRDP to meet UC Santa Cruz's GHG reduction targets would be abated by purchases of renewable energy credits and verified carbon offset credits by UC Santa Cruz.

The combination of these actions would lead to the emissions reductions shown in Table 3.8-3 despite increases in campus population under the 2021 LRDP.

The UC Sustainable Practices Policy sets specific dates of 2025 for Scope 1 and 2 carbon neutrality and 2050 for limited Scope 3 carbon neutrality, consistent with the goals set in the UC Carbon Neutrality Initiative. The UC Sustainable Practices Policy sets ambitious goals for Scopes 1 and 2 and has no requirement for carbon neutrality or offset purchases for interim year emissions between 2020 and 2025 or between 2025 and 2050. The activities planned under the 2021 LRDP would likely contribute interim year emissions described in this document while the campus would be concurrently implementing emission reduction efforts leading up to the 2025 Scope 1 and 2 requirements.

As described in the impact discussion for Impact 3.8-1, UC Santa Cruz produces an annual GHG inventory to track GHG emission volumes and sources. The annual GHG inventory will be used to determine the need for purchasing renewable energy credits and/or carbon offsets in the year 2025 to ensure emission reductions match the 2025 carbon neutrality requirement for Scopes 1 and 2 emissions. In consideration of future reduction targets beyond the forecast period for this EIR, the 2050 annual inventory will be used to track compliance with the Scope 3 carbon neutral requirement, but 2050 is outside of the 2021 LRDP planning period. Nevertheless, by achieving (or exceeding) 2030 GHG reduction goals, UC Santa Cruz would demonstrate it is on a path toward achieving 2050 statewide GHG reduction goals. The 2021 LRDP would not preclude or create obstacles to future attainment of the 2050 reduction goal. Compliance with the 2050 goal is anticipated by the year 2050 but analysis of detailed compliance with the 2050 reduction goal is not feasible at this time.

Based on this discussion, the 2021 LRDP would implement the UC Sustainable Practices Policy, which is consistent with the UC Carbon Neutrality Initiative, which in turn supports the state's GHG reduction plans. Additionally, the 2021 LRDP would not conflict with the implementation of the AMBAG 2040 MTP/SCS. More specifically, the 2021 LRDP would be consistent with the six primary goals of the MTP/SCS (Access and Mobility, Economic Vitality, Environment, Healthy Communities, Social Equity, and System Preservation and Safety). With respect to access and mobility, the 2021 LRDP would expand on-campus transit and active transportation facilities consistent with the MTP/SCS goal to provide convenient, accessible, and reliable travel options. In terms of economic vitality through a high-performing transportation system, development under the 2021 LRDP would provide both infill and clustered development oriented towards enhanced alternative transportation modes. With respect to promoting environmental sustainability and protection of the environment, the various sections of this EIR identify mitigation measures designed to conserve and protect the physical environment through the prevention of significant impacts, where feasible. With respect to healthy communities and as noted in Section 3.3, "Air Quality," the 2021 LRDP would not result in potential health risks to the on-campus population or nearby receptors. In terms of social equity and system preservation, implementation of the 2021 LRDP would provide for the enhancement of existing transportation services in the area, consistent with this goal. Thus, the adoption of the 2021 LRDP would not conflict with the applicable plan, policy, or regulations for GHG emission reductions. Impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

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3.9 HAZARDS AND HAZARDOUS MATERIALS

This section evaluates potential health, safety, and environmental impacts related to hazards and hazardous materials that could result from implementation of the 2021 LRDP. It describes existing potential hazards and safety concerns within UC Santa Cruz, and the nature of potential impacts that would occur as a result of 2021 LRDP implementation.

Comments were received in response to the NOP (see Appendix B) that identified specific hazards and hazardous materials concerns regarding handling of hazardous materials on-campus, wildfire risk, emergency access, exposure to hazardous materials during construction, impacts to trees and vegetation during construction, and wastewater impacts. An evaluation of potential health risks related to airborne contaminants during construction is included in the analysis in Section 3.3, "Air Quality." For further information on trees and vegetation, please refer to Section 3.5, "Biological Resources." A discussion of wastewater treatment and disposal is included in Section 3.17, "Utilities and Service Systems." Wildfire risk is further discussed in Section 3.18, "Wildfire."

During the course of daily operations, UC Santa Cruz uses materials, some of which are considered hazardous. Such hazardous materials include chemical reagents, solvents, fuels, paints, cleansers, and pesticides that are used in activities such as laboratory research, building and grounds maintenance, vehicle maintenance, and fine arts. For the purpose of this document, the term "hazardous material" is used in reference to any material or waste with physical, chemical, or other characteristics that could pose a risk to human health or safety, or could result in degradation of the environment if released. Although chemicals are the most recognized type of hazardous materials, radioactive and biohazardous materials used in laboratory research are also considered in the following discussion.

3.9.1 Regulatory Setting

FEDERAL

Toxic Substances Control Act

The Toxic Substances Control Act regulates the manufacturing, inventory, and disposition of industrial chemicals, including hazardous materials. Pursuant to Title II of the Toxic Substances Control Act, the U.S. Environmental Protection Agency (EPA) adopted the Asbestos Model Accreditation Plan in 1994. The Model Accreditation Plan requires that all persons who inspect for asbestos-containing materials or design or conduct response actions with respect to friable asbestos obtain accreditation by completing a prescribed training course and passing an exam. Section 403 of the Toxic Substances Act establishes standards for lead-based paint hazards in paint, dust, and soil.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) was designed to protect human health and the environment, reduce or eliminate the generation of hazardous waste, and conserve energy and natural resources. EPA has authorized the California Department of Toxic Substances Control (DTSC) to enforce hazardous waste laws and regulations in California. Under RCRA, DTSC has the authority to implement permitting, inspection, compliance, and corrective action programs to ensure that people who manage hazardous waste follow state and federal requirements. Under the Certified Unified Program Agency (CUPA) program, which is described below, DTSC has in turn delegated enforcement authority to Santa Cruz County, which has direct oversight of hazardous waste management at UC Santa Cruz. Requirements place "cradle-to-grave" responsibility for hazardous waste disposal on the shoulders of hazardous waste generators. Generators must ensure that their wastes are disposed of properly, and legal requirements dictate the disposal requirements for many waste streams (e.g., banning many types of hazardous wastes from landfills).

Emergency Planning Community Right-to-Know Act

The Emergency Planning Community Right-to-Know Act (EPCRA) was passed in response to concerns regarding the environmental and safety hazards posed by the storage and handling of toxic chemicals. EPCRA establishes requirements regarding emergency planning and "community right-to-know" reporting on hazardous and toxic chemicals.

EPCRA requires states and local emergency planning groups to develop community emergency response plans for protection from a list of extremely hazardous substances (40 Code of Federal Regulations [CFR] 355 Appendix A). The community right-to-know provisions help increase the public's knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. In California, EPCRA is implemented through the California Accidental Release Prevention Program. UC Santa Cruz submits the required information on use, storage, or release of hazardous substances on campus to the Santa Cruz County Environmental Health Services (EHS), the local certified CUPA.

Federal Insecticide, Fungicide, and Rodenticide Act

Pesticides are regulated under the Federal Insecticide, Fungicide and Rodenticide Act by EPA. This includes labeling and registration of pesticides as to how they may be used. EPA delegates pesticide enforcement activities in California to the California Department of Pesticide Regulation (DPR), under Title 3 of the California Code of Regulations (CCR) and the California Food and Agriculture Code. The DPR registers pesticides for use in California, and licenses pesticide applicators and pilots, advisors, dealers, brokers, and businesses. In turn, the Santa Cruz County Agricultural Commissioner acts as the local enforcement authority for DPR. The County Agricultural Commissioner registers licensed pest control businesses; requires permits and advanced notification for buying or using California restricted-use pesticides; and requires the completion of pesticide use reports for pesticides applied in the county. In addition, the County Agricultural Commissioner investigates pesticide-related injury and illnesses, and oversees enforcement of worker training in pesticide management.

Hazardous Materials Transportation Act

The United States Department of Transportation (USDOT) has developed regulations in Titles 10 and 49 of the CFR pertaining to the transport of hazardous substances and hazardous wastes. The Hazardous Materials Transportation Act is administered by the Research and Special Programs Administration of the USDOT. The act provides the USDOT with a broad mandate to regulate the transport of hazardous materials, with the purpose of adequately protecting the nation against risk to life and property that is inherent in the commercial transportation of hazardous materials. The USDOT regulations that govern the transport of hazardous materials are applicable to any person who transports, ships, causes to be transported or shipped, or who is involved in any way with the manufacture or testing of hazardous materials packaging or containers.

Federal Occupational Safety and Health Act

The Occupational Safety and Health Act is intended to ensure that employers provide their workers with a work environment free from recognized hazards to safety and health, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, or unsanitary conditions. The U.S. Department of Labor regulates worker health and safety at the federal level. The federal Occupational Safety and Health Act (OSHA) authorizes states (including California) to establish their own safety and health programs with the federal OSHA approval.

To establish standards for workplace health and safety, this act also created the National Institute for Occupational Safety and Health as the research institution for OSHA. Workplace health and safety regulations apply to all UC Santa Cruz employees, including student employees and research assistants. These standards are adopted at the state level and enforced on the campus by California OSHA (Cal/OSHA) as described below under State laws and regulations.

Title 40 CFR Part 112, Oil Pollution Prevention

The Spill Prevention Control and Countermeasure (SPCC) plan is required by Title 40, CFR Part 112. In California, owners and operators of aboveground storage tanks (ASTs) must comply with federal regulations pertaining to oil spill prevention and aboveground petroleum storage. The SPCC plan provides an analysis of the potential for release from ASTs and the measures that could be put into place to reduce the potential of release. Facilities subject to these regulations must complete an SPCC plan if they contain tanks with a capacity of 660 gallons or more, or if the total facility capacity exceeds 1,320 gallons. UC Santa Cruz maintains a current SPCC plan for on-campus facilities.

Title 42 CFR Select Agent Regulation

Federal laws relative to biological safety are contained in Title 42 of the CFR. Title 42 CFR Part 73 implements provisions of the Public Health Security and Bioterrorism Preparedness Response Act, which requires the Secretary of Health and Human Services to regulate the possession of certain biological agents ("select agents") harmful to humans. The regulation controls the access, use, and transfer of select agents to ensure that these are shipped only to institutions or individuals equipped to handle them appropriately and only to those who have legitimate reasons to use them. The Centers for Disease Control and Prevention (CDC) is responsible for implementing this regulation; a facility must register with the CDC if it possesses a select agent or agents.

Atomic Energy Act

In the United States, the use of radioactive materials is, in general, regulated by the Nuclear Regulatory Commission under the Atomic Energy Act. The two major Nuclear Regulatory Commission rules that apply to the UC Santa Cruz campus from Title 10 of the CFR (Chapter I, Nuclear Regulatory Commission) are Part 19, Notices, Instructions and Reports to Workers, Inspections, and Part 20, Standards for Protection Against Radiation.

The following sections of the CFR also apply to the UC Santa Cruz Campus Radiation Safety Programs:

Title 10: Chapter I, Nuclear Regulatory Commission
- Part 30, Rules of General Applicability to Domestic Licensing of Byproduct Material
- Part 40, Domestic Licensing of Source Material
- Part 55, Operator's Licenses
- Part 70, Domestic Licensing of Special Nuclear Materials

Title 49: Chapter I, Research and Special Programs Administration, Department of Transportation

Federal Plant Pest Act

The federal agencies primarily responsible for regulating transgenic materials in the United States are the U.S. Department of Agriculture (USDA), EPA, and the Food and Drug Administration. Under the authority of the Federal Plant Pest Act, USDA Animal and Plant Health Inspection Service regulates importation, interstate movement, and environmental release of transgenic plants and organisms. The service licenses, through permits, the field testing of food crops before commercial release. UC Santa Cruz researchers who grow transgenic plants in field trials must obtain permits from the USDA.

Centers for Disease Control and Prevention and National Institutes of Health Guidelines

The CDC and National Institutes of Health (NIH) have issued federal guidelines that address biological safety; because research at university campuses often involves federal funding, compliance with these guidelines becomes mandatory for most research. The CDC and the NIH have developed containment and handling guidelines for use in microbiological and biomedical laboratories. UC Santa Cruz has adopted these guidelines as standard practice. Work involving recombinant deoxyribonucleic acid (rDNA), infectious agents, Select Agents, biological toxins or other listed material must be authorized by the UC Santa Cruz Institutional Biosafety Committee.

The NIH Guidelines for Research Involving Recombinant DNA Molecules specifies practices for constructing and handling rDNA molecules and organisms and viruses containing rDNA molecules. These guidelines are applicable to all rDNA research conducted in the United States.

In addition to Biosafety Levels (BL) for biohazardous materials, the guidelines identify containment at four BLs for rDNA research involving plants (BL1-P through BL4-P) and small laboratory animals (BL1-N through BL4-N), and containment practices for plants, microorganisms, and animals. Recombinant DNA experiments at BL1 pose no significant hazard, BL2 experiments pose minimal hazard, and BLs 3 and 4 involve more hazardous agents. UC Santa Cruz laboratories conducting experiments involving BL2 and above must be authorized by the UC Santa Cruz Institutional Biosafety Committee.

STATE

California Building Code

The California Building Standards Code (CBC) (California Code of Regulations, Title 24) provides minimum standards for the design and construction of buildings and structures in California. Minimum standards are organized under Part 1 to 12 and include code standards for buildings, mechanical, plumbing, energy, historical buildings, fire safety, and green building standards. State law mandates that local government enforce these regulations, or local ordinances, with qualified reasonably necessary and generally more restrictive building standards than provided in the CBC. Title 24 is applicable to all occupancies, or structures, throughout California, whether or not the local government takes an affirmative action to adopt Title 24.

California Code of Regulations

The California Department of Industrial Relations regulates implementation of worker health and safety in California. The Department of Industrial Relations includes the Division of Occupational Safety and Health, which acts to protect workers from safety hazards through its Cal/OSHA program and provides consultative assistance to employers. California standards for workers dealing with hazardous materials are contained in Title 8 of the CCR and include practices for all industries (General Industrial Safety Orders), and specific practices for construction and other industries. Workers at hazardous waste sites (or working with hazardous wastes, as might be encountered during excavation of contaminated soil) must receive specialized training and medical supervision according to the Hazardous Waste Operations and Emergency Response regulations. Additional regulations have been developed for construction workers potentially exposed to lead and asbestos. Cal/OSHA enforcement units conduct on-site evaluations and issue notices of violation to enforce necessary improvements to health and safety practices.

Title 17 of the CCR provides information on the appropriate accreditation, certification, and work practices for lead-based paint and lead hazards. Division 4.5, Environmental Health Standards for the Management of Hazardous Waste, of Title 22 Social Security contains the DTSC's hazardous waste regulations. The regional water quality control board (RWQCB) regulations are contained in Title 27 of the CCR. Title 26 is a compilation of toxics regulations issued by State regulatory agencies that are also found in the original titles assigned to each agency.

California Accidental Release Prevention Program

The California Accidental Release Prevention Program (CalARP) (CCR Title 19, Division 2, Chapter 4.5) covers certain businesses that store or handle more than a specified volume of regulated substances at their facilities. The CalARP program regulations became effective on January 1, 1997, and include the provisions of the federal Accidental Release Prevention program (Title 40, CFR Part 68), with certain additions specific to the state pursuant to Article 2, Chapter 6.95, of the Health and Safety Code. UC Santa Cruz does not store any regulated substance in a quantity that would be covered by CalARP (UC Santa Cruz 2005).

California Department of Health Services Licensing

The Radiological Health Branch of the California Department of Health Services administers federal and state radiation safety laws that govern the storage, use, and transportation of radioactive materials and the disposal of radioactive waste, including the Radiation Control Law, Radiologic Technology Act, and Nuclear Medicine Technology Certification, through the implementing regulations contained in Title 17 of the CCR. To obtain a California radioactive material license, an applicant must complete a detailed application that requires a description of plans for decontamination and decommissioning, including identification of transfer or disposal procedures taken before decommissioning and any necessary surveys. To maintain a radioactive materials license, an institution must meet training and radiation safety requirements and be subject to routine inspections. UC Santa Cruz holds a license from the state of California that governs the use of radioactive materials in campus laboratories (UC Santa Cruz 2005).

Storage Tank Regulations

The underground storage tank (UST) monitoring and response program is required under Chapter 6.7 of the California Health and Safety Code and Title 23 of the CCR. The program was developed to ensure that the facilities

meet regulatory requirements for monitoring, maintenance, and emergency response in operating USTs. The Santa Cruz County EHS is the local administering agency for this program. UC Santa Cruz operates two of USTs for storage of petroleum products. Both tanks are located on the main residential campus (UC Santa Cruz 2016a).

The Aboveground Petroleum Storage Act requires registration and spill prevention programs for ASTs that store petroleum. In some cases, ASTs for petroleum may be subject to groundwater monitoring programs that are implemented by the RWQCB and the State Water Resources Control Board (SWRCB).

California Health and Safety Code

Chapter 6.95 of the California Health and Safety Code requires facilities that use, produce, store, or generate hazardous substances or have a change in business inventory to have a Hazardous Materials Management Plan (HMMP) or Business Plan. The plan must disclose the type, quantity, and storage location of materials. The law also requires a site-specific emergency response plan, employee training, and designation of emergency contact personnel.

As a state agency and large-quantity user of hazardous materials, UC Santa Cruz is required to submit an HMMP to the local administering agency, the Santa Cruz County EHS. The HMMP describes hazardous materials storage and handling practices and contains procedures for monitoring storage, performing regular inspections, detecting releases, and testing the detection systems on a regular basis. Compliance with the hazardous materials programs at UC Santa Cruz is verified through annual self-audits, with periodic random follow-up audits by the Santa Cruz County EHS.

Hazardous Waste Control Law

DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste under the RCRA and the California Hazardous Waste Control Law. Both laws impose "cradle to grave" regulatory systems for handling hazardous waste in a manner that protects human health and the environment. The DTSC has delegated some of its authority under the Hazardous Waste Control Law to county health departments and other CUPAs, including the Santa Cruz County EHS.

Hazardous Waste and Substances Sites List

The Hazardous Waste and Substances Sites List, also known as the Cortese List, is a planning document used by the State of California and its various local agencies to comply with the CEQA requirements to provide information about the location of hazardous materials release sites. The list includes hazardous waste and substance sites from DTSC's database, leaking underground storage tank (LUST) sites from SWRCB's database, solid waste disposal sites with waste constituents above hazardous waste levels outside of the waste management unit, Cease and Desist Orders and Cleanup and Abatement Orders concerning hazardous wastes, and hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code. California Government Code Section 65962.5 requires that the California Environmental Protection Agency (CalEPA) update the list annually. The list is maintained via DTSC's Brownfields and Environmental Restoration Program (Cleanup Program) and is accessible through the EnviroStor online database.

California Occupational Safety and Health Act

In California, under the California Occupational Safety and Health Act, Cal/OSHA assumes primary responsibility for developing and enforcing standards for safe workplaces and work practices. For the federal OSHA program to be delegated to the state, Cal/OSHA standards must be at least as stringent as federal OSHA standards, and they are generally more stringent. Cal/OSHA hazardous materials regulations include requirements for safety training, availability of safety equipment, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal/OSHA enforces hazard communication program regulations, which include identifying and labeling hazardous substances, providing employees with Material Safety Data Sheets, and describing employee-training programs. These regulations also require the campus to prepare emergency action plans, including escape and evacuation procedures. Title 8 also establishes general industry safety orders for bloodborne pathogens, sharps injury prevention, and disposal of infectious wastes. All laboratories that involve the handling of biohazardous materials must comply with Cal/OSHA standards. Cal/OSHA regulations apply to all UC Santa Cruz employees, including student employees and research assistants.

Asbestos and Lead Programs

The removal and handling of asbestos-containing materials is governed primarily by EPA regulations under Title 40 of the CFR but is implemented by the Monterey Bay Air Resources District (MBARD). This program is described further in Section 3.3, "Air Quality." The federal OSHA also has a survey requirement under Title 29 CFR, which is implemented by Cal/OSHA under Title 8 CCR. These regulations require facilities to take all necessary precautions to protect employees and the public from exposure to asbestos.

The Cal/OSHA lead standard for construction activities is implemented under Title 8 of the CCR. The standard applies to any construction activity that may release lead dust or fumes, including, but not limited to, manual scraping, manual sanding, heat gun applications, power tool cleaning, rivet busting, abrasive blasting, welding, cutting, or torch burning of lead-based coatings. Unless otherwise determined by approved testing methods, all paints and other surface coatings are assumed to contain lead at prescribed concentrations, depending on the application date of the paint or coating.

Title 3 CCR, Food and Agriculture Code

Under Divisions 6 and 7 of the Food and Agriculture Code, Title 3 CCR, the California Department of Pesticide Regulation is vested with primary responsibility to enforce pesticide laws in California. The County Agricultural Commissioners grant site-specific permits for use of restricted pesticides and conduct periodic on-site observations of application sites and field worker safety. University personnel engaged in official duties relating to agricultural use of pesticides are exempt from the need to obtain an agricultural pest control advisor license, but campus personnel handling or applying restricted pesticides or the supervising applicator must obtain a State Qualified Applicator Certificate.

Porter-Cologne Water Quality Act

The Porter-Cologne Water Quality Control Act, codified in the California Water Code, authorizes SWRCB to implement programs to control pollution to the state waters. Pursuant to this law, the RWQCB establishes the waste discharge requirements that limit concentrations of certain chemicals and compounds in treated wastewater discharged from the campus. Wastewater produced on campus is conveyed via the campus sewer system, without treatment to the City of Santa Cruz wastewater system. The City provides municipal wastewater treatment services to UC Santa Cruz through the Santa Cruz Water Treatment Plant (UC Santa Cruz 2019).

UNIVERSITY OF CALIFORNIA

UC Santa Cruz Environmental Health and Safety

UC Santa Cruz implements several programs that pertain to reducing/controlling risks of exposure to hazards and hazardous materials. The Environmental Health and Safety department (EH&S) is charged with monitoring compliance with environmental, health and safety programs intended to minimize or prevent occupational injuries and illnesses in the workplace and to protect the quality of the surrounding environment. EH&S advises the campus community of responsibilities with respect to health, safety and environmental issues; recommends appropriate corrective actions; and helps implement new health and safety programs. EH&S also acts as liaison between UC Santa Cruz and various external agencies and regulatory bodies.

Use of Hazardous Materials at UC Santa Cruz

The use of hazardous materials on campus generates hazardous byproducts that must eventually be handled and disposed of as hazardous wastes. UC Santa Cruz maintains an online chemical inventory system in compliance with state regulations. Principal Investigators and/or Departments are required to disclose hazardous material inventory records to EH&S if a hazardous chemical is used, handled, or stored in UC Santa Cruz facilities. Chemical inventory reports are submitted to the County of Santa Cruz.

EH&S develops specific policies and programs pertaining to laboratory and research safety, industrial hygiene, environmental management, radiation safety, hazardous materials management, information technology, ergonomics, biosafety and emergency management. To better manage hazards and reduce the potential risk, UC Santa Cruz has developed an on-line Laboratory Safety Manual (LSM) provides information regarding protection

from health hazards associated with the laboratory environment in accordance with applicable Cal/OSHA regulations, including the "Chemical Hygiene Plan" requirements specified in Title 8 of CCR Section 5191. The LSM serves as a resource for identifying and evaluating the nature of potential laboratory hazards, as well as determining appropriate hazard controls. The information in the LSM applies to all laboratories that use, store or handle potentially hazardous materials and all personnel who work in these facilities. EH&S also maintains the following manual and forms:

Injury and Illness Prevention Program

UC Santa Cruz implements a template-driven Illness Prevention Program (IIPP) that is customized by each department to ensure a safe and healthful work environment for its employees. Each department is required to maintain and implement an IIPP in compliance with Labor Code Section 6402.7(a) and CCR Title 8 Section 3203. A master IIPP, outlining goals and specific modes of implementation, is maintained by the EH&S. However, primary responsibility for the program resides with Unit Heads and Department Supervisors; therefore, each department at UC Santa Cruz is required to maintain an IIPP. The IIPP for each department is the umbrella under which all employee health and safety programs are implemented, and all employees must be covered by an IIPP plan, but the level of organization at which the plan is administered can be variable. EH&S has responsibility for monitoring compliance with the UC Santa Cruz IIPP programs to minimize or prevent occupational injuries and illnesses, and to protect the quality of the workplace and surrounding environment (UC Santa Cruz 2020a).

Each IIPP should contain the following elements:

- Statement of Purpose,
- Authority and Responsibility,
- Compliance with Safe Work Practices,
- Communicating Safety Issues,
- Identifying Workplace Hazards,
- Procedures for Correcting Unsafe or Unhealthy Conditions,
- Procedures for Investigating Injuries and Illness,
- Safety and Health Training, and
- Recordkeeping and Documentation.

Biological Safety Program

The UC Santa Cruz Biological Safety Program is administered through the Institutional Biosafety Committee and the campus Bloodborne Pathogens Program. The Biological Safety Program oversees all research involving rDNA, human, animal, or plant pathogens, human blood, human cell lines, and other potentially infectious materials. No work with infectious biological agents or rDNA is permitted on the UC Santa Cruz campus prior to approval of a Biological Use Authorization. UC Santa Cruz has adopted the Centers for Disease Control and Prevention publication entitled, "Biosafety in Microbiological and Biomedical Laboratories," as the campus biosafety manual (CDC 2009). The Biological Use Authorization approval process by the Institutional Biosafety Committee is based on guidelines from the CDC and the NIH (UC Santa Cruz 2020b).

Laser Safety Committee

The Laser Safety Committee is responsible for formulating policy related to the safe use of lasers. The Committee is also charged with monitoring UC Santa Cruz's compliance with regard to federal and state regulations for the safe use of laser radiation. The Laser Safety Officer (LSO) conducts periodic inspections of all laser laboratories to ensure compliance to ensure that the policies and guidelines established by the Laser Safety Committee are implemented. The LSO is also responsible for providing basic laser safety awareness training and maintaining resources to assist laser owners and operators (UC Santa Cruz 2016b).

Radiation Safety Program

The Radiation Safety Program maintains the California Radioactive Materials License for UC Santa Cruz and oversees the safe use of ionizing radiation including radioactive materials and radiation producing machines. The program is designed to protect registered radiation users, staff, students, and the general public from radiation exposure, and ensure the safe receipt, handling, use and storage of radiation and radioactive material. The program assists users to maintain all radiation exposures As Low As Reasonably Achievable (ALARA), and to ensure operations are in compliance with applicable state and federal regulations (UC Santa Cruz 2017a).

Lab Safety Training

Laboratory safety training is required at the time of initial work in a lab and when new hazards or processes are introduced. Training is required for Principal Investigators, UC Santa Cruz researchers, visiting researchers, and any other personnel working in the laboratory. Training must include physical and health hazards in the work area, along with applicable exposure control measures. In accordance with the UC Office of the President Lab Safety Training Policy, all researchers must complete approved comprehensive lab safety training every three years (UC Santa Cruz 2016c).

Laboratory Inspections

EH&S and individual laboratories conduct periodic inspections. Principal Investigators and Laboratory Safety Representatives are responsible for initiating correction of potential hazards noted during both self-inspections and EH&S inspections. EH&S can provide corrective actions when needed. Laboratory inspections are conducted at the following intervals (UC Santa Cruz 2020c):

- Self-inspections are carried out on a quarterly basis.
- EH&S conducts annual inspections of all laboratory spaces.
- A "move out" inspection is conducted when a research group vacates a laboratory space.
- "Move-in" inspections are conducted when a Principal Investigator or research group moves into a new laboratory space.
- Laboratory inspection may also be conducted when a new substance, process, procedure, or piece of equipment with potential to be hazardous is introduced to the workplace.

Laboratory Hazard Assessment

Workplace hazard and personal protective equipment (PPE) assessments are required for all locations where there is use or storage of hazardous materials, or where equipment may present a physical hazard. The Laboratory Hazard Assessment Tool (LHAT) provides a platform for Principal Investigators, or Responsible Person, to identify laboratory hazards and specify required PPE. In addition, LHAT facilitates PPE training and distribution. All faculty, students, staff, and visitors must wear appropriate PPE when in the laboratories.

Fume Hood Certification

In accordance with Title 8 of CCR Section 5154.1, fume hoods are inspected annually. During this annual inspection EH&S measures fume hood face velocity (air intake), insures a visual indicator is in place, that all chemicals are at least six inches inside the face of the hood, that the hood is not overly cluttered with chemicals or equipment, and that all large items are elevated to allow air to flow beneath and around them. This minimizes air flow blockage.

Emergency Operations Plan

The Emergency Operations Plan (UC Santa Cruz EOP) establishes policies, procedures and an organizational structure for the preparedness, response, recovery and mitigation of disasters and events impacting the main campus and its satellite facilities. The plan also provides guidance to departments, units and activities within UC Santa Cruz with a general concept of potential emergency assignments before, during, and following emergency situations. The UC Santa Cruz EOP adopts the Standardized Emergency Management System (SEMS), an emergency management organizational structure used by emergency response agencies statewide to coordinate response to multi-jurisdictional or multi-agency incidents. By incorporating SEMS, UC Santa Cruz implements the same emergency response organization structure and terminology as other city, county, and state agencies. SEMS incorporates:

- The Incident Command System (ICS), a field-level emergency response system based on management by objectives;
- Multi-Agency Coordination, affected agencies working together to coordinate allocations of resources and emergency response activities;
- Mutual Aid, a system for obtaining additional emergency resources from non-affected jurisdictions;
- Operational Area Concept, a system for coordinating damage information, resource requests and emergency response; and
- National Incident Management System (NIMS), a system for coordinating federal resources and response.

The ICS is a foundation part of the SEMS; it provides an organizational structure that can grow rapidly in response to the requirements of an emergency. The structure identifies employee roles, activates certain positions needed to manage a particular incident or level of emergency, promotes unity of command, and establishes a unified command when multiple jurisdictions or agencies have incident response responsibilities. The UC Santa Cruz EOP also outlines evacuation procedures for building emergencies (Stage 1) and campus-wide emergencies (Stage 2). The procedures and actions that students, faculty, and staff should take during an evacuation are communicated by residential staff assigned to a college, building emergency coordinator in academic/administrative buildings, public address announcement from public safety vehicles, and the CruzAlert system. CruzAlert is the UC Santa Cruz emergency notification system used to quickly communicate information to the campus community during emergency situations (UC Santa Cruz 2016d).

UC Santa Cruz Campus Standards Handbook

The UC Santa Cruz Campus Standards Handbook outlines required products and mandatory design constraints for all construction on the campus (UC Santa Cruz 2017). Part 5 Division 2 of the UC Santa Cruz Campus Standards Handbook outlines standard specifications for working with asbestos and lead containing materials including protocols, monitoring, record keeping, and manifesting of the waste. Any variation from the standard specifications must be reviewed and approved by UC Santa Cruz EH&S. The standards specify that employees and contractors working for the campus must be notified of the presence of asbestos in buildings constructed before 1979. In the event a contractor encounters material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), lead, or other hazardous substances that have not been rendered harmless, the UC Santa Cruz Campus Standards Handbook requires the contractor to immediately stop work in the area affected and report the condition to a UC Santa Cruz representative in writing. The work in the affected area can resume only in the absence of asbestos, PCB, lead, or other hazardous substances, or when such materials have been rendered harmless. In addition, all work which causes disturbance or dislocation of asbestos containing materials shall be done in strict accordance with all applicable Federal, State, and Local rules, regulations, standards, and codes. This includes the latest regulations of the U. S. Environmental Protection Agency, Monterey Bay Air Resources District, U. S. Occupational Safety and Health Administration (OSHA), State of California Department of Public Health (CDPH), and the California Department of Industrial Relations-Division of Industrial Safety and Health (CAL-OSHA).

University of California Facilities Manual

The UC updated its Facilities Manual that applies to all campuses and contains the UC policies, procedures, and guidelines for its facilities. The Facilities Manual states that UC is the Authority Having Jurisdiction (AHJ) for matters of code regulations on projects on UC campuses (UCOP 2019). The Facilities Manual contains the following with regards to transportation:

- Volume 2: Planning, Chapter 3 Long Range Development Plans, 3.1.2. LRDP Elements
- *Circulation and Transportation*. The LRDP shows how people move to and through the site in the future. All forms of travel are considered: pedestrian, bicycle, mopeds, motorcycles, cars, service and delivery vehicles, emergency vehicles, and hazardous material transportation. The LRDP indicates which paths and roads are shared by one or more forms of travel and which are segregated. Parking for all vehicle types is addressed.

- Volume 6: Plant Operations & Maintenance, Chapter 5 Energy and Water Conservation and Management, 5.1.2. Operational Guidelines
- Suggest that personnel minimize individual automobile use through carpooling and use of public transportation.

LOCAL

As noted in Section 3.0.1, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of its educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

Santa Cruz County General Plan

The County of Santa Cruz General Plan contains the following policy that is related to hazards and hazardous materials in the county and that may be relevant to the 2021 LRDP:

- **Policy 6.7.4: Conformance to Federal, State, and Local Siting Standards.** Require all hazardous land disposal facilities to conform to the siting standards contained in state statutes as well as conform to General Plan and LCP Land Use Plan and Zoning ordinances of the County of Santa Cruz.

Santa Cruz County Environmental Health Services

The CalEPA designates specific local agencies as a CUPA. The Santa Cruz County EHS is the designated CUPA for the County, and is responsible for implementing a unified hazardous materials regulatory program throughout Santa Cruz County. Compliance is verified through annual routine inspections of all regulated facilities and investigation of citizen-based complaints or inquiries regarding improper handling and/or disposal of hazardous materials or hazardous wastes. The Santa Cruz County EHS is responsible for implementing the following programs:

- hazardous materials management plans,
- hazardous waste generator and tiered permitting,
- underground storage tanks (UST),
- California accidental release prevention (Cal ARP), and
- aboveground petroleum storage tanks.

Implementation of these programs involves:

- permitting and inspection of regulated facilities,
- providing educational guidance and notice of changing requirements stipulated in state or federal laws and regulations,
- investigations of complaints regarding spills or unauthorized releases, and
- administrative enforcement actions levied against facilities that have violated applicable laws and regulations.

County Office of Emergency Services

The Operational Area Emergency Management Plan (EMP) outlines the County's planned response to emergency situations associated with large-scale emergency incidents within or affecting Santa Cruz County. In addition, EMP outlines the emergency management organizational structure for the Santa Cruz County Operational Area. The EMP is reviewed, updated, republished, and redistributed every four years. The County Office of Emergency Services (County OES) is responsible for maintaining records of EMP revisions (County of Santa Cruz 2015a).

Santa Cruz County Local Hazard Mitigation Plan

The Santa Cruz County Local Hazard Mitigation Plan (County LHMP) represents the County's commitment to reduce risks from natural and other hazards, and serves as a guide for decision-makers to commit resources to reducing the effects of potential hazards in the County. The County LHMP serves as a basis for the State Office of Emergency Services (OES) to provide technical assistance and to prioritize project funding. The following primary goals are identified in the County LHMP to reduce disaster risk in Santa Cruz (County of Santa Cruz 2015b):

- Avoid or reduce the potential for loss of life, injury and economic damage to Santa Cruz residents from earthquakes, wildfires, floods, drought, tsunami, coastal erosion, landslide and dam failure.
- Increase the ability of the County government to serve the community during and after hazard events.
- Protect Santa Cruz's unique character, scenic beauty and values from being compromised by hazard events.
- Encourage mitigation activities to increase the disaster resilience of institutions, private companies and systems essential to a functioning Santa Cruz.

City of Santa Cruz General Plan

The City of Santa Cruz General Plan contains the following policies that are related to hazards and hazardous materials in the city and that may be relevant to the 2021 LRDP:

- **Policy HZ 1.1:** Ensure emergency preparedness.
  - Action HZ 1.1.1 Annually update the Emergency Operations Plan.
  - Action HZ 1.1.3 Ensure that new development design, circulation, and access allows for maintaining minimum emergency response times.
- **Policy HZ 4.1:** Regulate hazardous wastes with respect to potential leakage, explosions, fires, escape of harmful gases, or formation of new hazardous substances.
  - Action HZ 4.1.4 Reduce the use of toxic materials in the community and prevent their disposal into the air, water, or soil.
- **Policy HZ 4.2:** Ensure proper handling and disposal of hazardous waste.
  - Action HZ 4.2.1 Maintain the Hazardous Household Wastes facility for Santa Cruz residents to dispose hazardous materials safely and legally.
- **Policy HZ 4.4:** Reduce the risk of exposure to hazardous materials from sites being developed or redeveloped.

City of Santa Cruz Emergency Operations Plan

Updated annually in accordance with Policy HZ 1.1 of the City's General Plan, the City's Emergency Operations Plan (City of Santa Cruz EOP) describes the roles and operations of the departments and personnel of the City of Santa Cruz during a major emergency. The City of Santa Cruz EOP sets forth standard operating procedures for managing public emergencies resulting from floods, storms, earthquakes, tsunami, fires, hazardous material incidents and other natural or manmade disasters. Similar to the UC Santa Cruz EOP, the City of Santa Cruz EOP incorporates the ICS response system to assign employees with reasonable expertise and training to a function critical to emergency management during the course of emergencies without loss of precious time (City of Santa Cruz 2018).

City of Santa Cruz Local Hazard Mitigation Plan

Chapter 5 of the City's Local Hazard Mitigation Plan (2012 Update) identifies fire hazard areas within the City of Santa Cruz and identifies several wildfire mitigation actions, including cooperative fire protection agreements, reduction of fire risk through vegetation management and appropriate code enforcement, promotion of built-in fire extinguishing and warning systems, and fire prevention programs in schools and other institutions. The City and UC Santa Cruz currently maintain a cooperative agreement to collaboratively avoid/minimize the threat from wildland/urban interface fires.

3.9.2 Environmental Setting

DEFINITIONS

The term *hazardous material* is defined in different ways for different regulatory programs. This EIR uses the definition given in California Health and Safety Code Section 25501(n) and (o), which defines hazardous material as:

> any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous wastes, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

By convention, most hazardous materials are thought to be hazardous chemicals, but certain radioactive materials and biohazardous materials, as defined here, are also hazardous. This EIR considers hazardous materials to include hazardous chemicals, radioactive materials, and biohazardous materials that are used on campus.

A **biohazardous material** is a material that harbors a biological agent capable of causing diseases in humans, animals, or plants. Biohazardous materials include infectious agents, microbiological specimens, and cultures of microorganisms capable of causing disease; microbiological specimens or cultures included in NIH/ CDC Risk Group 2, 3, or 4; recombinant organisms containing DNA from infectious agents; human blood, body fluids, or unfixed tissue; laboratory waste contaminated with biohazards; animal parts, tissues or fluids suspected of containing an agent infectious to humans, whether deliberately introduced or naturally occurring; and discarded materials suspected of contamination with infectious agents.

An **infectious agent** is any microorganism, bacteria, mold, parasite, or virus that normally causes or significantly contributes to increased human mortality (California Health and Safety Code Section 117675). Infectious agents have also been defined as any material that contains an organism capable of being communicated by invading and multiplying in body tissues (40 CFR 259.10).

Select agents and toxins are agents and toxins listed by the Secretary of the U.S. Department of Health and Human Services as having the potential to pose a severe threat to public health and safety, in accordance with Section 351A(a)(1) of the Public Health Service Act.

A **hazardous waste**, for the purposes of this EIR, is any hazardous material that is to be abandoned, discarded, or recycled.

Radioactive waste is any waste that emits radiation in excess of normal background levels. Radioactive waste mixed with hazardous chemical waste is known as *mixed waste*. *Biological waste* refers to biohazardous waste mixed with radioactive waste.

Biohazardous waste is any liquid or solid waste generated through the handing of specimens from humans or animals that may contain infectious agents. Cultures of infectious agents, human anatomical remains, and animal carcasses that may be infectious are also considered biohazardous waste.

Sharps waste includes devices capable of cutting or piercing, such as hypodermic needles, razor blades, and broken glass (California Health and Safety Code Section 117755).

Medical waste is a general term that includes both biohazardous and sharps waste (California Health and Safety Code Section 117690). Medical waste mixed with hazardous chemical waste is also referred to as *mixed waste*. 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.

Some scientific materials do not meet the standard criteria for hazardous materials, but their presence and use on campus is a matter of concern to the surrounding community. These include laboratory research animals, transgenic materials, and non-ionizing radiation.

Transgenic materials include microorganisms, plants, and animals that have been genetically engineered or modified. Recombinant DNA techniques create new genetic combinations by changing, adding, or subtracting DNA genes, but this methodology does not necessarily mean that new organisms are created. Much research is performed using tissue cultures or benign bacteria grown under laboratory-controlled conditions. With the exception of transgenic bacteria that could be infectious (considered biohazardous waste), transgenic materials generally do not pose a threat to public health or the environment.

Non-ionizing radiation (NIR) is radiative energy that is not created by radioactive materials and does not impart ionizing energy in a biological medium such as the body. Many devices throughout the modern world act either directly or indirectly as sources of NIR. Many sources of NIR are present on the UC Santa Cruz campus in research applications or in ancillary equipment. These sources include lasers, large magnets, microwave generators, and radio-frequency radiation. In general, NIR tends to be less hazardous to humans than ionizing radiation. However, depending on the wavelength/frequency and the irradiance (or power density) value, NIR sources may present a human health hazard.

POTENTIAL CONTAMINATION

Documented Sites of Contaminations in the LRDP Area

There are no documented sites of contamination on the main residential campus.

Westside Research Park, constructed in 1981, operated as a silicon wafer manufacturing plant until 2001. The property had several previous owners, including Synertek, Inc., AT&T, Silicon Systems Inc., and Texas Instruments (TI). Prior to development, the property was occupied by the Antonelli Brother's horticulture nursery. In 1985, arsenic, cadmium, copper and lead were detected in soil samples, and cadmium and copper were detected in groundwater samples. A Phase I and Phase II Environmental Site Assessment (ESA) prepared by Geosystem, Inc. (EGI) in 2001 concluded that chemicals used by TI had not impacted soil and groundwater. However, arsenic was detected in one sample. Upon further investigation it was concluded that the presence of arsenic was a localized anomaly. The presence of nitrate in groundwater samples was attributed to past agricultural activities. TI vacated the property in 2001. A 2002 Phase I and Phase II ESA noted that hazardous materials utilized in manufacturing activities were removed from the site and no spills had occurred during removal of hazardous materials. Manufacturing equipment remained on-site. Anderson Environmental Management (AEM) conducted a Site Hazard Assessment and Investigation for review of the hazardous materials and hazardous waste materials on-site and associated storage locations, secondary containment, delivery, exhaust and abatement systems. AEM corrected and decontaminated an acid wastewater leak, surface mercury contamination on a supply fan, and solvent accumulation in a solvent duct, leaks in corroded ducts, exhaust fans, and drain system. In 2003, AEM prepared a Facility Closure Plan to inform the Santa Cruz EHS regarding the on-site closure activities and to document implementation of proper safety, health procedures, and protocols (Ninyo and Moore 2004). AEM initiated on-site remediation activities in 2004, which included removal of contaminated soil; chemical sweep to capture, consolidate, and dispose of or recycle general chemicals and supplies; the decontamination, decommissioning, and removal of manufacture equipment; and the decontamination of individual rooms. Santa Cruz County EHS approved the site closure report in 2004, and the site is considered closed (UC Santa Cruz 2005). According to the DTSC EnviroStor database, the site is considered inactive (EnviroStor ID No. 71003553), but submittal of a Preliminary Endangerment Assessment (PEA) to DTSC is considered necessary in order for DTSC to mark the site as closed (DTSC 2020a; 2020c). The PEA process is used to determine whether there has been a release of a hazardous substance that presents a risk to human health or the environment, and the PEA may serve as a Phase I ESA (DTSC 2020). The inactive determination listed in the DTSC EnviroStor database is based on documents prepared in 1994 and 1997. However, as noted previously, AEM initiated on-site remediation activities and the site closure report for the Westside Research Park was approved by the Santa Cruz County EHS in 2004. As of the writing of this EIR, UC Santa Cruz EH&S is in the process of updating the DTSC's records to reflect existing conditions at Westside Research Park.

Sites of Contamination within 1 Mile of the LRDP Area

Table 3.9-1 presents a list of documented sites located within 1 mile of the LRDP area.

Table 3.9-1 Documented Sites of Contamination within 1 Mile of UC Santa Cruz LRDP Area

Site	Address	Nearest UC Santa Cruz Property	Type	Status
Pogonip Farm	333 Golf Club Drive	Main residential Campus	DTSC Evaluation	Active
California Radiographics Inc.	375 Coral Street	Main residential Campus	DTSC Non-operating	Completed; Case Closed (2018)
Bayside Oil Inc.	210 Encinal Street	Main residential Campus	DTSC Operating Permit	Operating
El Rio Mobile Home Park	2120 North Pacific Avenue	Main residential Campus	DTSC Voluntary Cleanup	No Further Action
PG&E	North Pacific Avenue & River Street	Main residential Campus	DTSC Voluntary Cleanup	Active
Salz Leathers Inc.	1040 River Street	Main residential Campus	DTSC Voluntary Cleanup	Certified
Plantronics Inc.	345 Encinal Street	Main residential Campus	SWRCB Cleanup Program Site	Open Verification Monitoring
Almar cleaners	857 Almar Avenue	Westside Research Park	SWRCB Cleanup Program Site	Open Verification Monitoring
Granite Construction Company	1280 Shaffer Road	Westside Research Park	SWRCB Cleanup Program Site	Completed; Case Closed (2006)
Santa Cruz Industries	411 Swift Street	Westside Research Park	SWRCB Cleanup Program Site	Open Remediation
Tobey's Rasp Service	2203 Mission Street	Westside Research Park	SWRCB Cleanup Program Site	Completed; Case Closed (2013)
Residential Property	502 Spring Street	Main residential Campus	SWRCB LUST Cleanup Site	Open Site Assessment
Gas & Shop	2003 Mission Street	Westside Research Park	SWRCB LUST Cleanup Site	Completed; Case Closed (1997)
E.V. Moceo Company	1206 Fair Avenue	Westside Research Park	SWRCB LUST Cleanup Site	Completed; Case Closed (2015)
Elyxir Distributing	2521 Mission Street	Westside Research Park	SWRCB LUST Cleanup Site	Completed; Case Closed (1998)
Lipton Inc.	2200 Delaware Avenue	Westside Research Park	SWRCB LUST Cleanup Site	Completed Case Closed (1997)
Mission Linen Service	601 Swift Street	Westside Research Park	SWRCB LUST Cleanup Site	Completed; Case Closed (2001)
Rotten Robbie	1906 Mission Street	Westside Research Park	SWRCB LUST Cleanup Site	Completed; Case Closed (1991)
Rudolph Property	2429 Mission Street	Westside Research Park	SWRCB LUST Cleanup Site	Open Remediation
S.C. Artichoke & Sprout Grower	402 Ingalls Street	Westside Research Park	SWRCB LUST Cleanup Site	Completed; Case Closed (1993)
Ultramar Beacon No. 3734	2202 Mission Street	Westside Research Park	SWRCB LUST Cleanup Site	Completed; Case Closed (2013)

Sources: DTSC 2020d; SWRCB 2020b.

USE OF HAZARDOUS MATERIALS AT UC SANTA CRUZ

A variety of hazardous materials are used on campus during the course of daily operations. Hazardous chemicals used on campus include: chemical solvents, and reagents that are used in campus laboratories; pesticides, fungicides, and herbicides used by agricultural programs and in landscape maintenance; relatively small amounts of solvents, paints, and acids used by fine arts programs; gasoline and diesel fuels, oils and lubricants, antifreeze, cleaning solvents and corrosives, paints and paint thinners, and refrigerants used in vehicle and building maintenance. In addition, lab chemicals, radioactive materials, biohazardous materials, and laboratory animals are used in teaching and research activities.

On-campus research facilities use small activities of radioactive materials, including Carbon-14, Carbon monoxide-57, Hydrogen-3, Iodine-125, Phosphorus-32 and -33, and Sulfur-35. Small quantities of Uranium-238 are also used during on-campus research. The Radiation Safety Program oversees the safe use of ionizing radiation, including radioactive materials and radiation producing machines, assists users within maintaining all radiation exposures at ALARA, and ensures operations are in compliance with applicable state and federal regulations (UC Santa Cruz 2017a).

UC Santa Cruz holds several biological use authorizations (BUA) due to the use of hazardous materials during on-campus research. Biohazardous materials can include rDNA, human, animal (including research animals), or plant pathogens, human blood, human cell lines, and other potentially infectious materials. The Biological Safety Program oversees all research involving biohazardous materials. In addition, EH&S inspects campus medical waste generators on an annual basis.

UC Santa Cruz completed a new EH&S facility on Heller Drive in the north-central area of campus and anticipates that the facility will be fully operational in December 2020. The EH&S facility will process and temporarily hold waste generated by teaching, research, and campus maintenance activities. Two interim regulated waste facilities will be consolidated on one site and will increase UC Santa Cruz's ability to manage surplus chemicals and waste, reduce waste-handling costs, and improve safety.

EXISTING BUILDINGS AND SITE CONDITIONS

Hazardous materials are commonly found in building materials that may be affected during demolition and renovation activities associated with redevelopment. Prior to 1978, lead compounds were commonly used in interior and exterior paints. Prior to the 1980s, building materials often contained asbestos fibers, which were used to provide strength and fire resistance. In addition, other common items present in buildings, such as electrical transformers, fluorescent lighting, electrical switches, heating/cooling equipment, and thermostats, can contain hazardous materials that may pose a health risk if not handled and disposed of properly. Among these hazardous materials are PCBs, which were used in hundreds of industrial and commercial applications because of their non-flammability, chemical stability, high boiling point, and electrical insulating properties. Equipment within UC Santa Cruz that might contain PCBs includes electrical equipment and thermal insulation material (e.g., fiberglass, felt, foam, or cork). Older, pole-mounted electrical transformers can also contain PCBs.

Underground Storage Tanks

The County of Santa Cruz EHS, as the certified CUPA, confirmed closure of two USTs on the main residential campus. The first was closed-in-place in 1989, the second in 2002. The County of Santa Cruz EHS issued a letter to UC Santa Cruz in 1989 and 2002, indicating that no further assessment was needed (SWRCB 2020a).

Asbestos

Asbestos, a naturally-occurring fibrous material, was used as a fireproofing and insulating agent in building construction before such uses were largely banned by EPA in the 1970s. Because it was widely used prior to the discovery of its health effects, asbestos is found in a variety of building materials, including sprayed-on acoustic ceiling texture, floor tiles, and pipe insulation.

Asbestos exposure is a human respiratory hazard when it becomes friable (i.e., easily crumbled) because inhalation of airborne fibers is the primary mode of asbestos entry into the body. Asbestos-related health problems include lung

cancer and asbestosis. Asbestos-containing building materials are considered hazardous by Cal/OSHA when bulk samples contain more than 0.1 percent asbestos by weight. These materials must be handled by a qualified contractor.

Many facilities at UC Santa Cruz contain asbestos due to its presence in the building materials used during construction. EH&S maintains a database with detailed information related to historical asbestos building material surveys. The health risk posed by asbestos to UC Santa Cruz students and employees is very low due to the implementation of the campus' Asbestos Management Program. This program involves removal of damaged, friable asbestos, in-place management of undamaged asbestos-containing materials, and removal of existing asbestos containing materials during construction and renovation projects (UC Santa Cruz 2020d).

Lead

Lead can be found in old water pipes, solder, paint, and in soils around structures painted with lead-based paints. Lead accumulates in blood, soft tissues, and bones. Lead-based paints are likely present on the buildings constructed prior to the late 1970s, when the quantity of lead in paints became regulated. Potentially hazardous exposures to lead can occur when lead-based paint is improperly removed from surfaces by dry scraping, sanding, or open-flame burning. Lead-based paints and coatings used on the exterior of buildings may have also flaked or oxidized and deposited into the surrounding soils.

UC Santa Cruz has not conducted a campus-wide survey of lead paint on campus. However, the Lead Compliance Plan establishes a program for the proper management of construction and maintenance activities involving lead. The overall purpose is to minimize potential negative impacts to the environment, and ensure adherence to the various regulatory issues concerning lead in UC Santa Cruz facilities. The policies apply to all employees and contractors during construction work activities in which lead-containing materials are present in the work environment (UC Santa Cruz 2009).

Mercury and Polychlorinated Biphenyls

Mercury and PCBs were historically used in electrical equipment. Spent fluorescent light tubes, thermostats, and other electrical equipment may contain heavy metals, including mercury. Mercury evaporates slowly when exposed to air, and vapors can cause kidney and liver damage. PCBs were historically used in insulators, capacitors, and transformers. Fluorescent light ballasts manufactured before 1978 may contain PCBs. PCBs are highly persistent in the environment, and exposure can cause serious liver, dermal, and reproductive system damage. Disposal of materials containing these contaminants is now heavily regulated, but there is potential that contamination within the plan area occurred as a result of accidental spills and historical practices before more stringent regulations were adopted. PCB-containing fluorescent light ballasts are removed and replaced as they burn out. Equipment containing PCBs is disposed of as hazardous waste.

AIRPORT HAZARDS

There are no public airports or private airstrips within 2 miles of UC Santa Cruz. The nearest airport is the Watsonville Municipal Airport approximately 15 miles southwest of the main residential campus (AirNav 2020).

NEARBY SCHOOLS

Existing sensitive receptors within 0.25 mile of the main residential campus include Santa Cruz Waldorf School and Westlake Elementary School. The Pacific Collegiate School is located approximately 0.25 mile from the Westside Research Park. Childcare centers located within 0.25 mile of the main residential campus include the Neighborhood childcare center and Campus Kids Connection Inc. There is one childcare center on the main residential campus located at the Family Student Housing complex on the west side of campus.

EMERGENCY RESPONSE

The City of Santa Cruz Fire Department (SCFD), which is responsible for campus fire safety, responds to all campus emergencies. SCFD provides hazardous materials incident response and works in conjunction with UC Santa Cruz EH&S in responding to reports of hazardous materials spills and accidents, and enforcing hazardous materials regulations. The SCFD Chief is appointed by the California State Fire Marshal's (CSFM) to serve as the Designated Campus Fire Marshal (DCFM) and delegated the authority to act as the State Fire Marshal. The DCFM is designated as the authority having jurisdiction in the interpretation and application of fire protection codes and regulations and authorized to enforce applicable fire and life-safety codes, laws and regulations on campus, and UC Santa Cruz–administered facilities. The DCFM is authorized to suspend unsafe operations or activities and has the responsibility for ensuring compliance with all fire protection requirements including but not limited to:

- the storage, handling, and use of explosive, flammable, combustible, toxic, corrosive, and other hazardous materials;
- the maintenance of exits, fire resistive construction and assemblies, fire alarm systems, and fire extinguishing systems and equipment;
- the prevention and elimination of fire and life-safety and panic hazards;
- the review and approval of all campus construction and alteration plans and specifications including fire protection and alarm systems, buildings, structures and utilities;
- the inspection of all campus construction projects prior to use or occupancy; and
- the issuance of "stop orders" when construction work is done contrary to the provisions of the building or fire protection codes, standards, or regulations.

The SCFD Chief is also responsible for managing the on-campus SCFD to ensure the expeditious control of fires and rescue emergencies at the campus and cooperate with other jurisdictions, as appropriate.

Santa Cruz County Hazardous Materials Interagency Team (SCHMIT responds to major hazardous materials incidents county-wide, including UC Santa Cruz. and is staffed by hazardous materials technicians from several area fire departments. SCHMIT includes 30 hazardous materials technicians and specialists that rotate coverage 24 hours per day.

3.9.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, the 2021 LRDP would result in a significant impact related to hazards and hazardous materials if it would:

- create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- 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;
- emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- 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, create a significant hazard to the public or the environment;
- 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, result in a safety hazard or excessive noise for people residing or working in the project area;

- impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

ANALYSIS METHODOLOGY

The impacts of campus development under the 2021 LRDP are evaluated based on a review of documents and publicly available information about hazardous and potentially hazardous conditions on or near the plan area. This includes SWRCB and DTSC hazardous materials database information. Existing conditions, as described above, are the conditions within the plan area and on properties within approximately 1 mile of the UC Santa Cruz at the time the NOP for this EIR was issued (2020), based on information readily available through public-access databases.

ISSUES NOT EVALUATED FURTHER

Airport Hazards

There are no airports located within 2 miles of the LRDP area. As a result, implementation of the 2021 LRDP would not result in new or relocated residential land uses, other types of noise-sensitive receptors, or new places of permanent employment where residents or workers could be exposed to a safety hazard or excessive aircraft noise. This issue is not discussed further.

Wildfire

Impacts associated with exposing people or structures, either directly or indirectly, to wildland fires are evaluated in Section 3.18, "Wildfire."

IMPACTS AND MITIGATION MEASURES

Impact 3.9-1: Create a Significant Hazard Through the Routine Transport, Use, or Disposal of Hazardous Materials

Construction and operation of development under the 2021 LRDP would involve the transport, use, and disposal of hazardous materials to and from the UC Santa Cruz campus. With adherence to existing regulations and compliance with safety standards, the impact from hazardous materials transport, use and disposal would be **less than significant**.

Hazardous Materials Use during Construction

Construction activities would temporarily increase the regional transport, use, storage, and disposal of hazardous materials and petroleum products (such as diesel fuel, lubricants, paints and solvents, and cement products containing strong basic or acidic chemicals) that are commonly used at construction sites. Hazardous waste generated during construction may consist of welding materials, fuel and lubricant containers, paint and solvent containers, and cement products containing strong basic or acidic chemicals. SWRCB Construction General Permit (2009-0009 DWQ) requires spill prevention and containment plans to avoid spills and releases of hazardous materials and wastes into the environment. Inspections would be conducted to verify consistent implementation of general construction permit conditions and best management practices (BMPs) to avoid and minimize the potential for spills and releases, and of the immediate cleanup and response thereto. BMPs include, for example, the designation of special storage areas and labeling, containment berms, coverage from rain, and concrete washout areas. The transportation of hazardous materials could result in accidental spills, leaks, toxic releases, fire, or explosion. The USDOT Office of Hazardous Materials Safety prescribes strict regulations for the safe transportation of hazardous materials, as described in Title 49 of the CFR. These standard accident and hazardous materials recovery training and procedures are enforced by the state and followed by private state-licensed, certified, and bonded transportation companies and contractors. Compliance with SWRCB Construction General Permit regulations and USDOT

regulations minimize the potential risk of a spill or accidental release of hazardous materials through routine transport, use, or disposal during construction.

Hazardous Materials Use during Operation

Implementation of the 2021 LRDP would result in construction of Academic and Support facilities. These facilities could result in the transport, use, and disposal of potentially hazardous materials.

People could be exposed to hazardous chemicals through inhalation, skin absorption (contact), ingestion, and injection (cuts). UC Santa Cruz policies and procedures address the procurement, handling, and disposal of carcinogenic, controlled, volatile, flammable, and explosive substances. UC Santa Cruz EH&S is charged with implementing measures, directly and through campus departments, designed to ensure compliance with applicable laws and regulations.

Facilities constructed under the 2021 LRDP would continue to comply with all hazardous materials standards for UC Santa Cruz. To minimize exposure to chemicals in the air, researchers and other workers would continue to take standard procedural precautions, such as working under fume hoods, when using chemicals likely to present exposure hazards. Fume hoods and other engineering controls would be required to meet Cal/OSHA requirements and fume hoods are inspected annually in compliance with Title 8 CCR Section 5154.1. Proper use of the fume hoods and other engineering controls would keep indoor laboratory air toxics concentrations below the suggested guidelines of the American Conference of Governmental Industrial Hygienist Threshold Limit Values and the legal limits of the OSHA Permissible Exposure Levels.

To prevent exposure through skin contact, campus policies and procedures require that protective clothing, such as laboratory coats, gloves, and safety glasses, be worn while handling hazardous materials and wastes. Proper washing after handling chemicals is also required. Also, in accordance with state laws and campus policy, eating, drinking, applying cosmetics, and chewing gum or tobacco are not allowed in laboratories using radioactive, carcinogenic, or biohazardous materials; these restrictions are imposed to prevent the potential ingestion of chemicals.

Further, all individuals who handle hazardous materials are appropriately trained and are provided with Safety Data Sheets, which provide chemical safety information about precautions for protecting against known hazards associated with the material and often include useful information on chemical, physical, and toxicological properties, along with suggestions for storing, transporting, and disposing of chemicals (UC Santa Cruz 2017b). Staff and students who work around hazardous materials are required to wear appropriate protective equipment and to use fume hoods for procedures where exposure to fumes or vapors is a concern. Safety equipment is routinely available in all areas where hazardous materials are used. EH&S inspections and required training enforce compliance with these procedures.

The Campus has implemented programs and controls to detect inadvertent release of hazardous material to the sanitary sewer or landfill (UC Santa Cruz 2020f). Pouring hazardous wastes down drains and disposing of hazardous materials with ordinary solid waste are prohibited by law.

As required by CalEPA and Santa Cruz County EHS as CUPA, UC Santa Cruz EOP describes training and procedures to follow in the event of an accidental release of hazardous materials. The SCFD responds to all reported hazardous materials releases in conjunction with EH&S. The DCFM is responsible for ensuring compliance with the proper storage, handling, and use of explosive, flammable, combustible, toxic, corrosive, and other hazardous materials.

Safety Services maintains an online chemical inventory system accessible to authorized users, which is used to submit annual chemical inventory reports to the County of Santa Cruz, fulfilling the Community Right-to-Know and Business Plan requirements. In addition, department IIPP, laboratory-specific Chemical Hygiene Plans, and department laboratory safety training have been developed and are implemented. EH&S and individual laboratories conduct periodic inspections, and Principal Investigators and Laboratory Safety Representatives are responsible for initiating correction of potential hazards noted during both self-inspections and EH&S inspections. Compliance with these regulations minimizes the potential for accidental release of hazardous materials during operation.

Hazardous Materials Transport

The USDOT Office of Hazardous Materials Safety prescribes strict regulations for the transportation of hazardous materials, as described in Title 49 CFR. Transportation along public roadways within or near the campus is also subject to all hazardous materials transportation regulations established by the USDOT and California Highway Patrol pursuant to the California Vehicle Code. UC Santa Cruz requires that all hazardous materials to be shipped on public roads be packaged in compliance with all applicable regulations. Compliance with these regulations minimizes the potential for accidental release of hazardous materials being transported to or from campus.

UC Santa Cruz Hazardous Waste Storage and Disposal guidelines require that hazardous waste be packaged and labeled properly, which includes placing them in appropriate sealed containers, segregating incompatible materials, and identifying all components with approximate concentrations. Flammable wastes (mostly solvents), corrosives (acids and bases), and oxidizers are shipped off site for recycling, treatment, or disposal (UC Santa Cruz 2020e). Hazardous wastes are picked up from users by EH&S staff, who check the wastes for appropriate packaging, or by licensed hazardous waste haulers. Compliance with all applicable federal and state laws, as well as campus programs, practices, and procedures related to the transportation of hazardous materials would continue under the 2021 LRDP, minimizing the potential for a release and providing for prompt and effective cleanup if an accidental release occurs.

Radioactive Materials Use during Operation

The Radiation Safety Program oversees the safe use of ionizing radiation, including radioactive materials and radiation producing machines. The program assists users to maintain all radiation exposures ALARA, and to ensure operations are in compliance with applicable state and federal regulations. Given that adequate procedures are in place to limit exposure to radiation from radioactive materials and radiation-producing machines, the potential of the 2021 LRDP to expose campus occupants to substantial health or safety risks is low. UC Santa Cruz projects implemented under the 2021 LRDP would comply with these controls, which would minimize the risk of exposure to radioactive materials.

Biohazardous Materials Use during Operation

The CDC "Biosafety in Microbiological and Biomedical Laboratories," adopted by UC Santa Cruz as the campus biosafety manual, provides guidance on minimizing skin penetration incidents and other exposure to biohazardous materials. The Campus has taken the following measures specifically addressing hazards associated with biohazardous materials: providing biohazard and medical waste guidelines, routine inspections by EH&S, providing biosafety information on the EH&S website, and the Bloodborne Pathogens Program (UC Santa Cruz 2016e and UC Santa Cruz 2020g).

The majority of biohazardous waste generated at UC Santa Cruz is transported for disposal or treatment by a California registered hazardous waste hauler; the remainder is treated on campus. The waste is treated by autoclaving, which renders the waste nonhazardous by applying steam pressure. Once treated, the waste is disposed of as nonhazardous waste through the general campus waste stream. Biohazardous wastes that also contain hazardous chemical or radioactive waste are categorized and handled as hazardous or radioactive wastes. Generated wastes are segregated, handled, labeled, stored, and transported to minimize direct or indirect exposure of personnel. Some campus activities also produce biohazardous waste that cannot be autoclaved, such as animal carcasses. Wastes of this kind are double-bagged, refrigerated, and picked up by an outside contractor for incineration. EH&S guides and assists with the disposal of medical waste and performs regular inspections of campus medical waste generator and treatment sites (UC Santa Cruz 2020g). Compliance with UC Santa Cruz guidelines for waste treatment and disposal would minimize the risk of exposure to biohazardous materials.

Adherence to existing regulations and compliance with the safety procedures mandated by applicable federal and state laws and regulations and UC Santa Cruz programs and policies would minimize the risks resulting from the routine transportation, use, storage, or disposal of hazardous materials or hazardous wastes associated with construction and operation of campus development under the 2021 LRDP to a **less-than-significant** level.

Mitigation Measures

No mitigation is required.

Impact 3.9-2: Result in the Release of Hazardous Materials from a Site of Known or Potential Contamination

Due to the proximity of documented contamination sites and proximity of public roadways, there is potential for contamination to be encountered during construction. Because the LRDP plan area could contain undocumented contamination that has not been characterized or remediated, this would be a **potentially significant** impact.

Known Sites of Contamination

As noted above in Section 3.9.2, hazardous materials databases maintained by state and federal agencies were reviewed. According to the DTSC EnviroStor database, Westside Research Park is considered an inactive site but a PEA is required. In 2004, on-site remediation activities included the removal of contaminated soil; a chemical sweep to capture, consolidate, and dispose of or recycle general chemicals and supplies; the decontamination, decommissioning, and removal of manufacture equipment; and the decontamination of individual rooms. Santa Cruz County EHS approved the site closure report for Westside Research Park in 2004, and the site is considered closed. As of the writing of this EIR, UC Santa Cruz EH&S is in the process of updating the DTSC's records to reflect existing conditions at Westside Research Park, and based on available data, UC Santa Cruz anticipates that the PEA will conclude that there are no contaminated soils on site in areas that could be disturbed during construction. In addition, there are sites known to contain hazardous materials within 1 mile of UC Santa Cruz (see Table 3.9-1). Proposed land use changes and potential development under the 2021 LRDP would occur only in the plan area, UC Santa Cruz does not propose to develop outside of the main residential campus boundary. Therefore, implementation of the 2021 LRDP would not disrupt known hazardous materials sites located within 1 mile of UC Santa Cruz. Activities involving the assessment, cleanup, and monitoring of these sites would continue regardless of approval of the 2021 LRDP.

Common Road Contaminants

In general, properties located adjacent to roadways may contain elevated concentrations of lead in exposed surface soils, which could pose a health hazard to construction workers and users of the properties. Lead is a state-recognized carcinogen and reproductive toxicant. Exposure of construction workers or future site occupants to lead in soil could result in adverse health effects, depending on the duration and extent of exposure. Substantial quantities of aerially-deposited lead are understood to be generally confined to within 30 feet of a roadway. Other potential contaminants, including herbicides associated with weed abatement and contaminated ballast rock, are generally confined to the immediate transportation right-of-way. Any disturbance of ballast rock and soils in established transportation corridors could result in the release of potentially hazardous materials.

Undocumented Contamination Sites

Grading and excavation activities may also expose construction workers and the public to hazardous substances present in the soil or groundwater that are not anticipated based on information about existing site conditions. If any previously unknown contamination is encountered during grading or excavation, the removal activities required could pose health and safety risks. Adverse impacts could result if construction activities inadvertently disperse contaminated material into the environment. For example, if contaminated soil was present and uncovered, runoff could transport the soil downstream and contaminate other locations. Potential hazards to human health include ignition of flammable liquids or vapors, inhalation of toxic vapors in confined spaces such as trenches, and skin contact with contaminated soil or water.

Demolition Hazards

In addition, demolition of existing structures could result in exposure of construction personnel and the public to hazardous substances. Construction workers and nearby employees and/or residents could potentially be exposed to airborne lead-based paint dust, asbestos fibers, and/or other contaminants because of demolition activities associated with redevelopment.

Existing structures are believed to contain hazardous materials, including asbestos, lead, and heavy metals – primarily because the use of these materials was not heavily restricted when the buildings were constructed. Demolition of

structures could result in inadvertent release or improper disposal of debris containing potentially hazardous materials; however, federal, state, and local regulations have been developed to address potential impacts related to the handling and disposal of hazardous materials during demolition. Potential impacts would be minimized through adherence to regulatory standards that prescribe specific methods of material characterization and handling.

To ensure the safety of outside contractors working on UC Santa Cruz property, it is the responsibility of the UC Santa Cruz project manager to provide contractors with a record of hazardous substances used by UC Santa Cruz, precautions and protective measures that can be taken to lessen the possibility of exposure, and a list of UC Santa Cruz contacts should an exposure occur. Where contamination is identified or suspected, UC Santa Cruz Design Guide Sections 02 41 13, "Selective Site Demolition," and 02 41 19, "Selective Structure Demolition," requires the Contractor to immediately stop work in the affected are and report the condition to UC Santa Cruz in writing. Work in the affected area can resume upon written agreement between UC Santa Cruz and the Contractor, if in fact the material is asbestos, PCB, lead, or other hazardous substances in compliance with federal and state regulations, or when such materials have been rendered harmless.

Asbestos and lead abatement must be performed and monitored by contractors with appropriate certifications from the State Department of Health Services. In addition, Cal/OSHA has regulations concerning the use of hazardous materials, including requirements for safety training, availability of safety equipment, hazardous materials exposure warnings, and emergency action and fire prevention plan preparation. Cal/OSHA enforces the hazard communication program regulations, which include provisions for identifying and labeling hazardous materials, describing the hazards of chemicals, and documenting employee-training programs. All demolition that could result in the release of lead and/or asbestos must be conducted according to Cal/OSHA standards. Contractors are also required to stop work and inform UC Santa Cruz if they encounter material believed to be asbestos, PCBs, lead, or other hazardous materials. Specific actions required by law include the following.

- Asbestos. Prior to demolition, all structures would be tested for the presence of asbestos-containing materials. Any asbestos would be removed and disposed of by an accredited contractor in compliance with federal, state, and local regulations (including the Toxic Substances Control Act and the National Emission Standard for Hazardous Air Pollutants). Compliance with these regulations would result in the safe handling and disposal of asbestos-containing materials.
- Lead-based paint or other coatings. A survey for indicators of lead-based coatings would be conducted before demolition to further characterize the presence of lead at the project site. For the purposes of compliance with Cal/OSHA regulations, all coated surfaces would be assumed to potentially contain lead. There is also a potential for soil contamination because of deposition of deteriorated (i.e., flaked, peeled, chipped) lead-based paint adjacent to structures where lead-based exterior paints were used. Loose or peeling paint may be classified as a hazardous waste if concentrations exceed total threshold limits. Cal/OSHA regulations require air monitoring, special work practices, and respiratory protection during demolition where even small amounts of lead have been detected.
- Heavy metals and PCBs. Spent fluorescent light bulbs and ballasts, thermostats, and other electrical equipment may contain heavy metals, such as mercury, or PCBs. If concentrations of these materials exceed regulatory standards, they would be handled as hazardous waste in accordance with hazardous waste regulations. Fluorescent light ballasts containing PCBs are disposed of by UC Santa Cruz.
- Laboratory Contamination. Prior to any demolition or renovation work in a laboratory, all hazardous materials must be removed and the user is instructed to survey the laboratory for contamination. EH&S conducts laboratory inspections when a research group vacates a space. For areas exposed to radiation, it is the responsibility of the Radiation Principal Investigator to ensure that decontamination is carried out properly and instruct personnel in decontamination procedures. EH&S Radiation Safety provides assistance in cases of gross or personal contamination.

UC Santa Cruz Campus Standards Handbook specify that employees and contractors working for the campus must be notified of the presence of asbestos in buildings constructed before 1979. Contractors who disturb or potentially disturb asbestos or lead are required to comply with all federal, state, and local regulations regarding hazardous materials.

Due to the proximity of documented contamination sites, proximity of public roadways, and the potential for undocumented contaminated sites to occur on-campus, there is potential for contamination to be encountered during construction of projects under the 2021 LRDP. Disturbance of contaminated materials could inadvertently expose construction workers and other receptors nearby to contamination. This would be a potentially significant impact.

Mitigation Measures

Mitigation Measure 3.9-2a: Conduct Preliminary Site Investigation

During project planning, EH&S shall be consulted in order to identify if any past contamination, USTs, ASTs, or other contamination could potentially occur in areas to be disturbed for project construction. EH&S will consider the cases on file at the County of Santa Cruz EHS and information on historical uses in the area to be impacted such as old maps and photos. If EH&S determines that there is no or minimal potential for contamination to occur on site, no additional mitigation is necessary. If it is determined that contamination has the potential to exist on a project site, Mitigation Measure 3.9-2b shall be implemented.

Mitigation Measure 3.9-2b: Conduct Site-Specific Investigation and Prepare Work Plan

Where initial investigations indicate the potential for contamination, UC Santa Cruz shall conduct soil sampling within the boundaries of the project site prior to initiation of grading or other groundwork. This investigation will follow the American Society for Testing and Materials standards for preparation of a Phase II ESA and/or other appropriate testing guidelines. If the results indicate that contamination exists at levels above regulatory action standards, then the site will be remediated in accordance with recommendations made by applicable regulatory agencies, including County of Santa Cruz EHS, RWQCB, and DTSC. The agencies involved shall depend on the type and extent of contamination.

Based on the results and recommendations of the investigation described above, UC Santa Cruz shall prepare a work plan that identifies any necessary remediation activities, including excavation and removal of on-site contaminated soils, and redistribution of clean fill material within the project site. The work plan shall include measures that ensure the safe transport, use, and disposal of contaminated soil removed from the project site.

Mitigation Measure 3.9-2c: Prepare and Implement Hazardous Materials Contingency Plan

Prior to initiation of grading or other ground disturbance, UC Santa Cruz shall provide a hazardous materials contingency plan to EH&S and County of Santa Cruz EHS, as appropriate. The plan will describe the necessary actions that would be taken if evidence of contaminated soil or groundwater is encountered during construction. The contingency plan shall identify conditions that could indicate potential hazardous materials contamination, including soil discoloration, petroleum or chemical odors, and presence of underground storage tanks or buried building material.

If at any time during the course of construction, evidence of soil and/or groundwater contamination with hazardous material is encountered, UC Santa Cruz shall immediately halt construction and contact EH&S and County of Santa Cruz EHS. Work shall not be resumed until the discovery has been assessed/treated appropriately (through such mechanisms as soil or groundwater sampling and remediation if potentially hazardous materials are detected above threshold levels) to the satisfaction of County of Santa Cruz EHS, RWQCB, and DTSC (as applicable).

The hazardous materials contingency plan, and obligations to abide by and implement the plan, shall be incorporated into the construction and contract specifications of the project.

Mitigation Measure 3.9-d: Require Minimization of Hazards during Demolition

Prior to demolition of existing structures, in order to minimize potential for accidental release of hazardous materials during demolition, UC Santa Cruz shall complete the following:

- Locate and dispose of potentially hazardous materials in compliance with all applicable federal, state, and local laws. This shall include: 1) identify locations that could contain hazardous residues; 2) remove plumbing fixtures known to contain, or potentially containing, hazardous materials; 3) determine the waste classification of the debris; 4) package contaminated items and wastes; and 5) identify disposal site(s) permitted to accept such wastes.

- Provide written documentation to the appropriate County department and MBARD that asbestos testing and abatement consistent with MBARD Rule 424, as appropriate, has occurred in compliance with applicable federal, state, and local laws.
- Provide written documentation to the appropriate County department and MABRD that lead-based paint testing and abatement, as appropriate, has been completed in accordance with applicable state and local laws and regulations. Abatement shall include the removal of lead contaminated soil (considered soil with lead concentrations greater than 400 parts per million in areas where children are likely to be present). If lead-contaminated soil is to be removed, UC Santa Cruz shall submit a soil management plan to County of Santa Cruz EHS.

Significance after Mitigation

With implementation of Mitigation Measure 3.9-2a the potential for on-site contamination would be confirmed before site-specific investigation is initiated. Mitigation Measures 3.9-2b would confirm on-site soil conditions before development and any identified contamination would be appropriately remediated. Mitigation Measure 3.9-2c would establish a contingency plan that would describe the necessary actions that would be taken if evidence of contaminated soil or groundwater is encountered during construction, including cessation of work until the potential contamination is characterized and properly contained or remediated. Mitigation Measure 3.9-2d would minimize the potential for release of potentially hazardous construction materials during demolition by requiring that asbestos-containing building materials, lead-based paint, and other hazardous substances in building components are identified, removed, packaged, and disposed of in accordance with applicable state laws and regulations. This would minimize the risk of an accidental release of hazardous substances during project construction that could adversely affect human health or the environment. Following implementation of these mitigation measures, implementation of projects under the 2021 LRDP would result in a **less-than-significant** impact related to potential release of hazardous materials from a site of known or potential contamination.

Impact 3.9-3: Result in Handling of Hazardous or Acutely Hazardous Materials within 0.25 Mile of an Existing School

Although hazardous materials and waste could be handled within 0.25 mile of an existing or proposed school as a result of implementation of the 2021 LRDP, the handling, storage, and disposal of hazardous materials would be subject to campus safety programs and procedures. This impact would be **less than significant.**

Existing sensitive receptors within 0.25 mile of the main residential campus include Santa Cruz Waldorf School and Westlake Elementary School. The Pacific Collegiate School is located approximately 0.25 mile from the Westside Research Park. Childcare centers located within 0.25 mile of the main residential campus include the Neighborhood childcare center and Campus Kids Connection Inc. There is one childcare center on the main residential campus located at the Family Student Housing complex on the west side of campus. No new schools are proposed 0.25 mile of UC Santa Cruz.

Hazardous materials would continue to be handled within 0.25 mile of an existing school as a result of 2021 LRDP implementation, and overall quantities of hazardous materials used within the LRDP area may increase in the future. However, these materials would not exist in quantities sufficient to pose a risk to occupants of the nearby schools or campus community and would be restricted to use for academic research purposes and building and grounds maintenance. As explained above, under Impact 3.9-1, hazardous materials in laboratories are typically handled in small quantities. The potential consequences of accidental releases would be limited to a single building and in most cases are limited to the individual laboratory where the spill occurred, and people outside the buildings would not be exposed. Furthermore, handling, storage, and disposal of hazardous materials associated with the 2021 LRDP would be subject to campus safety programs, discussed above in Section 3.9.1. Therefore, the potential risk of upset or release of hazardous materials that could affect an existing or proposed school is considered minimal. The impact to those attending nearby existing schools would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.9-4: Impair Implementation of, or Physically Interfere with, an Adopted Emergency Response Plan or Emergency Evacuation Plan

Implementation of the 2021 LRDP would not interfere with an adopted emergency response or evacuation plan, but construction activities for projects under the 2021 LRDP could result in short-term, temporary impacts to street traffic because of roadway improvements and potential extension of construction activities into the right-of-way. This could result in a reduction in the number of lanes or temporary closure of certain street segments. Any such impacts would be limited to the construction period and would affect only adjacent streets or intersection. This would be a **potentially significant** impact.

Implementation of the 2021 LRDP would result in circulation and transportation infrastructure improvements intended to enhance alternative transportation opportunities and increase connectivity within the UC Santa Cruz and to the city. Several new roads would be added to the transportation network in order to provide better cross-campus transit service, create safer bicycle and pedestrian environments, and fill gaps in the existing roadway system. Existing and proposed roadways would remain accessible to emergency vehicles under the 2021 LRDP, no permanent road closures are proposed. Any roadway extensions and new streets would be designed and constructed to include bicycle, pedestrian and transit facilities, where feasible, and in a manner consistent with the UC Facilities Manual, which notes that the UC system, as a whole and inclusive of UC Santa Cruz, complies with the Title 24 California Building Standards Code, Parts 1-12 and all amendments. UC Santa Cruz would also comply with applicable federal and state regulations related to roadway and transportation facility design, and with local regulations where campus roadways connect to city and county facilities. As discussed in Section 3.16, "Transportation," while adequate emergency access within the LRDP area is already provided, the proposed roadway extensions and new streets would provide improved network connections that could improve emergency vehicle access throughout the LRDP area.

The UC Santa Cruz EOP outlines evacuation procedures for building emergencies (Stage 1) and campus-wide emergencies (Stage 2). The SCFD responds to all campus emergencies and provides hazardous materials incident response and works in conjunction with UC Santa Cruz EH&S. In addition, SCHMIT responds to major hazardous materials incidents county-wide, including UC Santa Cruz.

Implementation of the 2021 LRDP could interfere with the campus' EOP through construction-related road closures. UC Santa Cruz requires contractors to notify the designated UC representatives at least two weeks prior to any proposed roadway closure. In addition, when paths, lanes, or roadways are blocked, UC Santa Cruz requires detour signs to be installed that clearly designate an alternate route. UC Santa Cruz office of Physical Planning, Development, and Operations requires that maintenance and project managers notify the UC Police Department (UCPD) and SCFD of road closures and alternative routes. However, notification requirements do not ensure that adequate emergency services are available.

Implementation of the 2021 LRDP could result in short-term, temporary impacts to emergency vehicle access and evacuation because of roadway improvements and potential extension of construction activities into the right-of-way. This could result in a reduction in the number of lanes or temporary closure of certain street segments. While such impact would be limited to the construction period and would affect only adjacent streets or intersection, the impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.9-4: Prepare and Implement Site-Specific Construction Traffic Management Plans

UC Santa Cruz shall prepare and implement site-specific construction traffic management plans for any construction effort that would require work within existing roadways. To the extent feasible, the campus shall maintain at least one unobstructed lane in both directions on campus roadways during construction activities. At any time only a single lane is available due to construction-related road closures, the campus shall provide a temporary traffic signal, signal carriers (i.e., flag persons), or other appropriate traffic controls to allow travel in both directions. If construction activities require the complete closure of a roadway, the campus shall provide appropriate signage indicating alternative routes. If simultaneous construction activities occur close to one another, UC Santa Cruz shall require that simultaneous road closures not

occur within 1,000 feet of each other. To ensure adequate access for emergency vehicles when construction projects would result in temporary lane or roadway closures, the campus shall inform emergency services, including the UCPD and SCFD of the closures and alternative travel routes. During National Weather Service Red Flag Warnings and Fire Weather Watches, the UCPD and SCFD shall be consulted to determine if any changes to road closures are necessary while these fire hazard conditions are in effect.

Significance after Mitigation

Preparation and implementation of a construction traffic management plan, as required by Mitigation Measure 3.9-4, would adequately address any potential conflicts with emergency access or evacuation routes during construction by communicating proposed lane and road closures to first responders and allowing first responders to plan accordingly to ensure that emergency response times and maintain adequate emergency access. As a result, with mitigation this would be a **less-than-significant** impact.

3.10 HYDROLOGY AND WATER QUALITY

This section describes the existing hydrology and water quality conditions for the LRDP area and analyzes the potential for the 2021 LRDP to affect water quality, including resulting in substantial siltation or erosion, cause flooding due to the alteration of drainage patterns, or to deplete groundwater supplies or interfere with groundwater recharge.

Public comments were received in response to the NOP (See Appendix B) related to hydrology and water quality identified concerns regarding runoff from an increase in impervious surface, development on groundwater recharge areas, drainage impacts associated with new development, and the potential for stormwater capture via sinkholes to impact groundwater quality.

3.10.1 Regulatory Setting

FEDERAL

Clean Water Act

The U.S. Environmental Protection Agency (EPA) is the federal agency primarily responsible for water quality management. The Clean Water Act (CWA) is the primary federal law that governs and authorizes federally mandated water quality control activities by EPA and the states. The CWA provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. Various elements of the CWA address water quality, as described below.

CWA Water Quality Criteria/Standards

Pursuant to federal law, EPA has published water quality regulations under Title 40 of the Code of Federal Regulations (CFR). Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. As defined by the act, water quality standards consist of designated beneficial uses of the water body in question and criteria that protect the designated uses. Section 304(a) requires EPA to publish advisory water quality criteria that accurately reflect the latest scientific knowledge on the kind and extent of all effects on health and welfare that may be expected from the presence of pollutants in water. Where multiple uses exist, water quality standards must protect the most sensitive use. As described in the discussion of state regulations below, the State Water Resources Control Board (SWRCB) and its nine regional water quality control boards (RWQCBs) have designated authority in California to identify beneficial uses and adopt applicable water quality objectives.

CWA Section 303(d) Impaired Waters List

Under Section 303(d) of the CWA, states are required to develop lists of water bodies that do not attain water quality objectives after implementation of required levels of treatment by point source dischargers (municipalities and industries). Section 303(d) requires that the state develop a total maximum daily load (TMDL) for each of the listed pollutants. The TMDL is the amount of the pollutant that the water body can receive and still comply with water quality objectives. The TMDL is also a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. In California, implementation of TMDLs is achieved through water quality control plans, known as Basin Plans, of the State RWQCBs. See the state regulatory setting, below, for information on the Central Coast Basin Plan.

National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) permit program was established in the CWA to regulate municipal and industrial discharges to surface waters of the United States. NPDES permit regulations have been established for broad categories of discharges including point source waste discharges and nonpoint source stormwater runoff. Each NPDES permit identifies limits on allowable concentrations and mass emissions of pollutants contained in the discharge. Sections 401 and 402 of the CWA contain general requirements regarding NPDES permits.

"Nonpoint source" pollution originates over a wide area rather than from a definable point. Nonpoint source pollution often enters receiving water in the form of surface runoff and is not conveyed by way of pipelines or discrete conveyances. Two types of nonpoint source discharges are controlled by the NPDES program: discharges caused by general construction activities and the general quality of stormwater in municipal stormwater systems. The goal of the NPDES nonpoint source regulations is to improve the quality of stormwater discharged to receiving waters to the maximum extent practicable. The state RWQCBs are responsible for implementing the NPDES permit system.

Federal Antidegradation Policy

The Federal Antidegradation Policy was enacted to provide protection to high-quality water resources of national importance. It directs states to develop and adopt statewide antidegradation policies that include protecting existing instream water uses and maintaining a level of water quality necessary to protect those existing uses and the water quality of high-quality waters. In EPA's CWA regulations regarding water quality standards (40 CFR Chapter 1, Section 131.12[a][3]), the criteria for requiring an antidegradation standard includes the following conditions:

- Existing instream water uses and a level of water quality necessary to maintain those uses shall be maintained and protected.
- Water quality will be maintained and protected in waters that exceed water quality levels necessary for supporting fish, wildlife, and recreational activities, and water quality, unless the state deems that water quality levels can be lowered to accommodate important economic or social development. In these cases, water quality levels can only be lowered to levels that support all existing uses.
- Where high quality waters constitute an outstanding National resource, such as waters of national and state parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

STATE

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act), which is the state's clean water act, provides the statutory authority for State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCB) to regulate water quality and was amended in 1972 to extend the federal CWA authority to these agencies (see Clean Water Act, above). The Porter-Cologne Act established the SWRCB and divided the state into nine regions, each overseen by a RWQCB. The SWRCB is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, but much of the daily implementation of water quality regulations is carried out by the nine RWQCBs.

Under the Porter-Cologne Act, the RWQCB's are given the responsibility and authority to prepare water quality plans for areas within the region (Basin Plans), identify water quality objectives, and issue NPDES permits and Waste Discharge Requirements (WDRs). Water quality objectives are defined as limits or levels of water quality constituents and characteristics established for reasonable protection of beneficial uses or prevention of nuisance. NPDES permits, issued by RWQCBs pursuant to the CWA, also serve as WDRs issued pursuant to the Porter-Cologne Act. WDRs are also issued for discharges that are exempt from the CWA NPDES permitting program, discharges that may affect waters of the state that are not waters of the United States (i.e., groundwater), and/or wastes that may be discharged in a diffused manner. WDRs are established and implemented to achieve the water quality objectives (WQOs) for receiving waters as established in the Basin Plans, as described below. Sometimes they are combined WDRs/NPDES permits.

State Water Resources Control Board

In California, SWRCB has broad authority over water quality control issues for the state. The SWRCB is responsible for developing statewide water quality policy and exercises the powers delegated to the state by the federal government under the CWA. Other state agencies with jurisdiction over water quality regulation in California include the California Department of Health Services (for drinking water regulations), the California Department of Pesticide Regulation, the California Department of Fish and Wildlife (formerly Department of Fish and Game), and the Office of Environmental

Health and Hazard Assessment. Regional authority for planning, permitting, and enforcement is delegated to the nine regional water boards. The regional boards are required to formulate and adopt water quality control plans for all areas in the region and establish water quality objectives in the plans. The Central Coast RWQCB is responsible for the water bodies in the LRDP area.

Central Coast Low Impact Development Initiative

The Central Coast RWQCB established the Low Impact Development Initiative (LIDI) to support healthy watersheds throughout the Central Coast region through the implementation of LID design principles, hydromodification controls, and sustainable development.

Central Coast Basin Plan

The LRDP area is within the jurisdiction of the Central Coast RWQCB (Region 3). The Central Coast RWQCB has the authority to implement water quality protection standards through the issuance of permits for discharges to waters located within its jurisdiction. Beneficial uses of inland surface waters and water quality objectives for the region are specified in the Water Quality Control Plan for the Central Coast Basin (Basin Plan) prepared by the Central Coast RWQCB in compliance with the federal CWA and the state Porter-Cologne Water Quality Control Act. Table 3.10-1 lists the beneficial uses of creeks and other water bodies on or near the LRDP area. The objective of the Basin Plan is to show how the quality of the surface and ground waters in the Central Coast Region should be managed to provide the highest water quality reasonably possible. The RWQCB Board implements the Basin Plan by issuing and enforcing waste discharge requirements (WDRs) to individuals, communities, or businesses whose waste discharges can affect water quality. These requirements can be either State WDRs for discharges to land, or federally delegated permits for discharges to surface water.

Table 3.10-1 Beneficial Uses of Surface Water Bodies on or Near UC Santa Cruz

Water Body	Beneficial Uses in the Basin Plan
Wilder Creek	MUN, AGR, GWR, REC1, REC2, WILD, COLD, WARM, MIGR, SPWN, BIOL, FRESH, COMM
Cave Gulch	MUN, GWR, REC1, REC2, WILD, COLD, WARM, COMM
Moore Creek	MUN, AGR, GWR, REC1, REC2, WILD, COLD, WARM, SPWN, BIOL, FRESH, COMM
San Lorenzo River	MUN, AGR, IND, GWR, REC1, REC2, WILD, COLD, MIGR, SPWN, BIOL, RARE, FRESH, COMM
Antonelli Pond	GWR, REC1, REC2, WILD, WARM, MIGR, SPWN, RARE, COMM

Beneficial Use Definitions: Municipal and Domestic Supply (MUN); Agricultural Supply (AGR); Industrial Service Supply (IND); Ground Water Recharge (GWR); Freshwater Replenishment (FRSH); Water Contact Recreation (REC-1); Non-Contact Water Recreation (REC-2); Commercial and Sport Fishing (COMM); Warm Fresh Water Habitat (WARM); Cold Fresh Water Habitat (COLD); Wildlife Habitat (WILD), Preservation of Biological Habitats of Special Significance (BIOL); Rare, Threatened, or Endangered Species (RARE); Migration of Aquatic Organisms (MIGR); Spawning, Reproduction, and/or Early Development (SPWN).

Source: Central Coast RWQCB 2017

Sustainable Groundwater Management Act of 2014

The Sustainable Groundwater Management Act of 2014 (SGMA)[1] became law on January 1, 2015, and applies to all groundwater basins in the state (Water Code Section 10720.3). By enacting the SGMA, the legislature intended to provide local agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater within their jurisdiction (CWC Section 10720.1). The SGMA is a follow up to SB X7-6, adopted in November 2009, which mandated a statewide groundwater elevation monitoring program to track seasonal and long-term trends in groundwater elevations in California's groundwater basins. In accordance with this amendment to the CWC, DWR developed the California Statewide Groundwater Elevation Monitoring (CASGEM) program.

[1] The SGMA is comprised of three separate bills: Senate Bill 1168, Senate Bill 1319, and Assembly Bill 1739. All three were signed into law by the Governor on September 16, 2014.

Pursuant to the SGMA, any local agency that has water supply, water management or land use responsibilities within a groundwater basin may elect to be a "groundwater sustainability agency" for that basin (CWC Section 10723). Local agencies had until January 1, 2017 to elect to become or form a groundwater sustainability agency. In the event a basin is not within the management area of a groundwater sustainability agency, the county within which the basin is located will be presumed to be the groundwater sustainability agency for the basin. However, the county may decline to serve in this capacity (CWC Section 19724). The City is currently in the planning stages to partner with other local agencies in compliance with the SGMA.

The SGMA also requires DWR to categorize each groundwater basin in the state as high-, medium-, low-, or very low priority (CWC Sections 10720.7, 10722.4). All basins designated as high- or medium-priority basins must be managed by a groundwater sustainability agency under a groundwater sustainability plan that complies with Water Code Section 10727 et seq. If required to be prepared, groundwater sustainability plans must be prepared by January 31, 2020 for all high- and medium-priority basins that are subject to critical conditions of overdraft, as determined by DWR, or by January 31, 2022 for all other high- and medium-priority basins. In lieu of preparation of a groundwater sustainability plan, a local agency may submit an alternative that complies with the SGMA no later than January 1, 2017 (CWC Section 10733.6). Per the Strategic Groundwater Management Act Data Viewer, DWR has ranked the West Santa Cruz Terrace basin as "very low priority" (DWR 2020). As UC Santa Cruz is not a local agency, it is not eligible to form a groundwater sustainability agency.

NPDES Permits

The SWRCB and RWQCBs, through powers granted by the federal CWA, require specific permits for a variety of activities that have potential to discharge pollutants to waters of the state and adversely affect water quality. To receive an NPDES permit a Notice of Intent (NOI) to discharge must be submitted to the RWQCB and design and operational BMPs must be implemented to reduce the level of contaminated runoff. BMPs can include the development and implementation of regulatory measures (local authority of drainage facility design) various practices, including educational measures (workshops informing public of what impacts result when household chemicals are dumped into storm drains), regulatory measures (local authority of drainage facility design), public policy measures (label storm drain inlets as to impacts of dumping on receiving waters), and structural measures (filter strips, grass swales, and retention basins). All NPDES permits also have inspection, monitoring, and reporting requirements.

General Permit for Storm Water Discharges Associated with Construction Activity

The SWRCB administers the NPDES General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (Construction General Permit). The state requires that projects disturbing more than one acre or more of land during construction file a NOI with the RWQCB to be covered under the General Construction Permit. Construction activities subject to the General Construction Permit include clearing, grading, stockpiling, and excavation.

The Construction General Permit requires that projects develop and implement a Storm Water Pollution Prevention Plan (SWPPP), identifying potential sources of pollution and specifying runoff controls during construction for the purpose of minimizing the discharge of pollutants in storm water from the construction area. The SWPPP must list BMPs the discharger will implement to protect storm water runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. For projects within the Central Coast Regional Water Quality Control Board jurisdiction, a Storm Water Control Plan documenting the project compliance with the Post-Construction Requirements is also required for entities regulated under the Municipal Separate Storm Sewer System Permit for registration under the Construction General Permit.

General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems

The Municipal Stormwater Permitting Program regulates stormwater discharges from municipal separate storm sewer systems (MS4s). Stormwater is runoff from rain or snow melt that runs off surfaces such as rooftops, paved streets, highways or parking lots and can carry with it pollutants such as oil, pesticides, herbicides, sediment, trash, bacteria and metals. The runoff can then drain directly into local natural and man-made waterbodies. Often, the runoff drains into storm drains which eventually drain, untreated, into a waterbody.

MS4 permits are issued in two phases: Phase I, for medium and large municipalities, and Phase II for small ones. The Phase II Small MS4 General Permit provides coverage for small municipalities, and covers permittees statewide. The Phase II Small MS4 General Permit requires the discharger to develop and implement best management practices through a coordinated storm water program with the goal of reducing the discharge of pollutants to the maximum extent practicable, which is the performance standard specified in Section 402(p) of the CWA.

The SWRCB designated UC Santa Cruz as a Non-Traditional permittee, which refers to a separate storm sewer system within municipalities such as those related to state prisons, universities, etc. The UC Santa Cruz Storm Water Management Program (UC Santa Cruz SWMP) aims to reduce the discharge of pollutants to the Maximum Extent Practicable, as defined by the US EPA. "Minimum Control Measures" (MCMs) is the term used by the US EPA for the six MS4 program elements aimed at achieving improved water quality through NPDES Phase II requirements. The SWMP ensures that UC Santa Cruz is fulfilling the requirements of its Phase II General Permit for MS4's. In doing so, the program ensures both legal compliance as well as environmental sustainability systems to protect the water quality.

UNIVERSITY OF CALIFORNIA

UC Santa Cruz Campus Standards Handbook

The UC Santa Cruz Campus Standards Handbook outlines required products and mandatory design constraints for all construction on the campus (UC Santa Cruz 2017). The standards are meant to ensure that UC Santa Cruz constructs functional and durable buildings, based on experience with existing campus buildings. The standards are complementary to project-specific requirements and can be modified, as necessary, at the discretion of the UC Santa Cruz project manager based on site-specific conditions. UC Santa Cruz requires:

- review of schematic, design development, 50 percent, 100 percent construction documents, and 100 percent backcheck submittals;
- compliance with federal, State, and regional codes or acts; in the case of conflict between codes, the more stringent code conditions apply;
- soil investigation reports, as necessary, for projects;
- site survey information;
- consultation with the Design Advisory Board, normally at the beginning of schematic design, midway through schematic design, and midway through design development;
- review by the Campus Physical Planning Advisory Committee after the end of schematic design;
- design review approval for applicable projects by the UC Regents;
- review and approval by the State Fire Marshal and Division of the State Architect at construction document completion;
- approval of completed design development documents by the State Public Works Board for major State-funded projects;
- independent reviews are required by the UC Regents for cost, design, and seismic safety; and
- design compliance with current LRDP EIR mitigation measures and any project-specific mitigation measures.

UC Santa Cruz Storm Water Management Program

The UC Santa Cruz SWMP, last updated in 2014, was developed and is implemented by UC Santa Cruz in compliance with the SWRCB Phase II NPDES requirements. The intent of the UC Santa Cruz SWMP is to facilitate comprehensive management of storm water quality and to subsequently enhance UC Santa Cruz's environmental stewardship. The UC Santa Cruz SWMP covers the LRDP area (main residential campus and Westside Research Park at2300 Delaware, as well as UC Monterey Bay Education Science and Technology (MBEST) Center and the Coastal Science Campus; identifies constituents of concern (COC), sources, or activities that would have the potential to discharge a COC into runoff; and identifies best management practices to be implemented to address the COC.

UC Santa Cruz Post-Construction Stormwater Management Requirements

The UC Santa Cruz Post-Construction Stormwater Management Requirements (UC Santa Cruz Post-Construction Requirements), last updated in March 2017, are in compliance with Central Coast Regional Water Quality Control Board Resolution No. R3-2013-0032. The UC Santa Cruz Post-Construction Requirements are incorporated into the Stormwater Management Program. The document divides the main residential campus into four watershed management zones based on geologic conditions, slope, and other factors; defines regulated projects as including new development and redevelopment projects that would create or replace more than 2,500 square feet of impervious surface over a project site, and sets forth a series of performance requirements related to site design and runoff reduction; water quality treatment; stormwater control plan requirements; runoff retention; LID development standards; and peak flow management. The UC Santa Cruz Post-Construction Requirements emphasize protecting and, where degraded, restoring key watershed processes to create and sustain linkages between hydrology, channel geomorphology, and biological health necessary for healthy watersheds. Maintenance and restoration of watershed processes impacted by storm water management is necessary to protect water quality and beneficial uses. All regulated projects on the main residential campus are required to comply with the requirements set forth in this document. The specific performance requirements for runoff reduction, water quality treatment, and peak flow management, depend on the size of the project and within which watershed management zone the project is located (UC Santa Cruz 2016).

Generally, projects in all watershed management zones that add or replace more than 5,000 square feet of impervious surface, must provide storm water treatment systems that treat the volume of runoff generated by the 85th percentile 24-hour storm, with specific performance requirements for low impact development systems, biofiltration treatment systems, and non-retention-based systems such as engineered treatment systems. Retention requirements are based on the watershed management zones. All runoff from the 85th or 95th percentile 24-hour rainfall event must be retained on site via storage, rainwater harvesting, infiltration, and/or evapotranspiration. In addition, post-development peak flows may not exceed pre-project flows for the 2- through 10-year storm event.

LOCAL

As noted in Section 3.0.1, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the university's educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding UC Santa Cruz when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

County of Santa Cruz General Plan

The County of Santa Cruz General Plan (1994) contains the following policies related to hydrology and water quality in the county and that may be relevant to the 2021 LRDP:

- Policy 7.18.5 Groundwater Management. Promote water management in the Pajaro Valley and Santa Margarita groundwater basins and the Soquel-Aptos area to protect the long-term security of water supplies and to safeguard groundwater quality and maintain stream baseflows.

City of Santa Cruz General Plan

The City of Santa Cruz General Plan (2012) contains the following policies related to hydrology and water quality in the city and that may be relevant to the 2021 LRDP:

- **Policy CC3.3** Safeguard existing surface and groundwater sources.
- **Policy CC3.4** Maintain and improve the integrity of the water system.
- **Policy CC4.1** Provide an adequate and environmentally sound wastewater collection, treatment, and disposal system.

3.10.2 Environmental Setting

STUDY AREA

The study area for the evaluation of impacts on hydrology and water quality consists of all watersheds that originate on the main residential campus and the Westside Research Park (see Table 3.10-2 below for a list of campus watersheds). For groundwater impacts, the study area includes the LRDP area and portions of the city of Santa Cruz between the LRDP area and the coastline (see Figure 3.10-1).

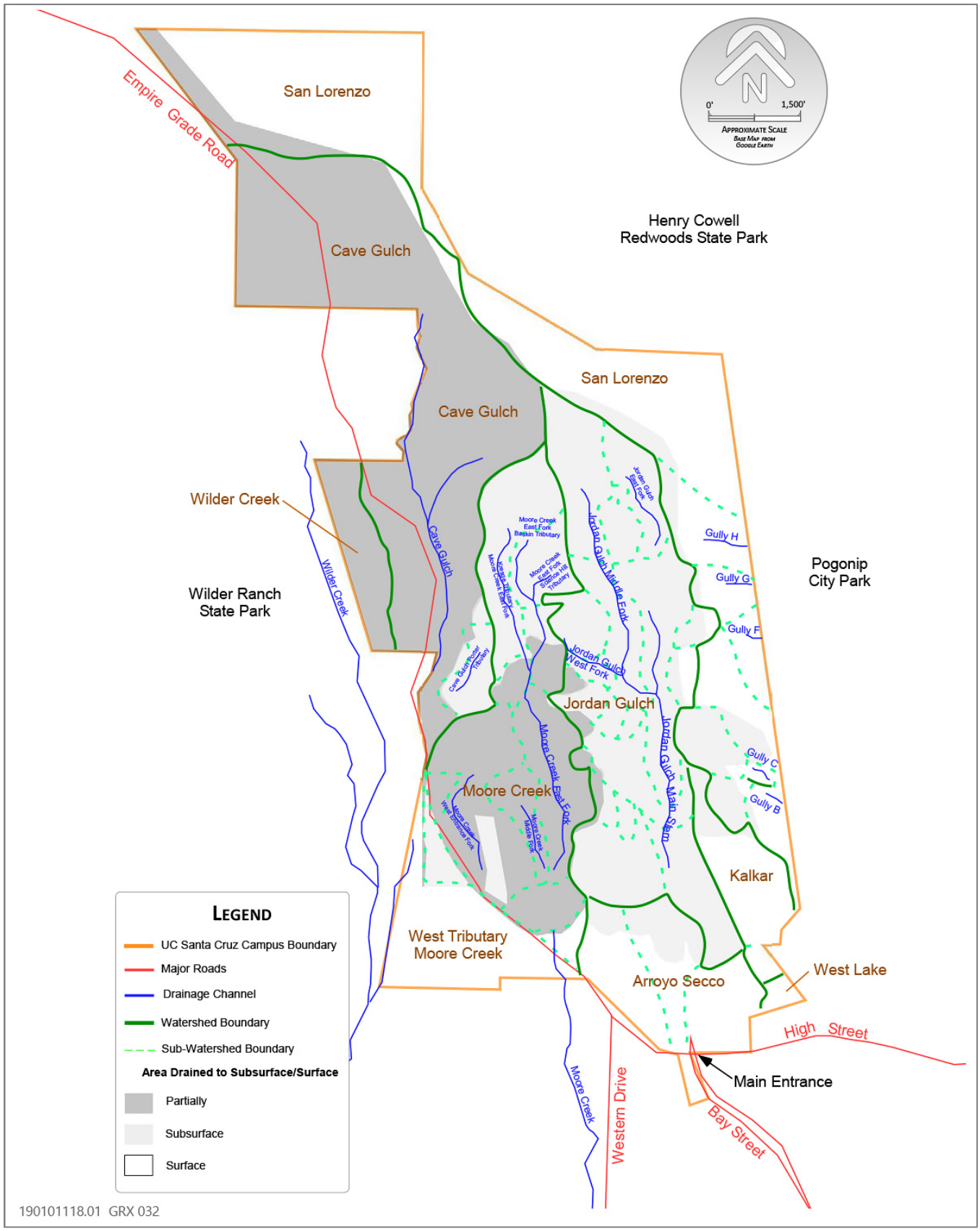
Table 3.10-2 Watersheds on the LRDP Project Area

Watershed	Total Area (acres)	On-Campus (approximate acreage)	Area on-Campus as Percent of Total	Subsurface (acres)	Partial Subsurface (acres)	Surface Drainage (acres)	Number of Subsurface-Drained Sub-watersheds
Wilder Creek	2,830	45	16%	0	49	0	1
Cave Gulch	630	466	74%	25	440	0	4
Moore Creek	905	272	30%	104	141	9	15
Moore Creek Western Tributary	335	112	33%	12	0	100	1
Jordan Gulch	442	442	100%	364	66	13	20+
Arroyo Seco	665	121	18%	23	0	98	2
High Street	60	6	10%	0	0	6	0
Kalkar Quarry	65	62	97%	9	0	53	1
San Lorenzo River	74,000	522	0.7%	51	0	471	6
Total				**588**	**696**	**750**	**50**

Overview Main Residential Campus

The main residential campus is situated on hilly terrain as a series of upward sloping marine terraces from an elevation of approximately 300 feet at its southern boundary to approximately 1,200 feet along its northwest boundary. The terrain is incised by steep natural drainage channels which include gulches and coastal canyons.

The northern one-third of the main residential campus is comprised primarily of weathered schist and granitic rocks overlain in some areas by nearly flat-lying, weathered Santa Margarita sandstone. Surface flows in these areas are dispersed and the geology of the area supports percolation of precipitation before eventually gathering in well-defined drainages.



Source: Figure produced and provided by Weber, Hayes & Associates in 2020

Figure 3.10-1 Watersheds and Sub-Basins on UC Santa Cruz Campus

The southern two-thirds of the main residential campus consist of marble, granite and schist bedrock overlain by deposits of residual soils and colluvium, where karst topography has developed as a result of the dissolution of marble. While this portion of the main residential campus is cut by several steep-walled north-south flowing stream channels, an integrated drainage system is not present due to sporadic stream capture by sinkholes and swallow holes (i.e., the location in karst limestone at which surface water is channeled to the subsurface). Most storm water on campus eventually reaches the karst aquifer, where it flows through a complex system of solution channels (i.e., fractures through which water may flow) and caves. Some of the runoff reappears at the surface as springs at lower elevations to the east, south, and west of the main residential campus (Johnson and Weber & Associates 1989).

On account of steep gradients and the presence of fractured rocks and soils highly susceptible to erosion, the potential for erosion by storm water runoff is generally high on the central and north campus. Furthermore, the potential for erosion on the central and lower campus has been exacerbated by the addition of impervious surfaces as the central campus has developed over the years.

There is no campus-wide storm drain system. Within the developed portions of the main residential campus, storm drains have been installed to capture local runoff and convey it to natural areas. Flow rates are reduced through detention basins and underground detention vaults. After detention, the runoff is discharged into the nearest drainage channel or dissipated for infiltration in open grasslands or other undeveloped land. However, runoff from some older development is discharged to drainage channels without detention.

Westside Research Park

The Westside Research Park is situated on a portion of the gently southward sloping, lowest (i.e., youngest) emergent marine terrace, a common landform along the California coastline that reflects changes in sea levels. The site ranges in elevation from approximately 70 feet at its northern boundary to approximately 55 feet at its southern boundary along Delaware Avenue, and is bounded to the west by Antonelli Pond. The Land Trust of Santa Cruz County owns and is responsible for the management and restoration of Antonelli Pond and the lower Moore Creek Corridor (Land Trust of Santa Cruz 2020). The surficial materials beneath the site consist of Quaternary coastal terrace deposits comprised of predominantly fine to coarse-grained sand and fine gravel, with varying fractions of silt and clay. Extensive subsurface investigative work completed at a nearby chemical release site (411 Swift Street, located approximately 2,200 feet east of the site) documents the thickness of the terrace deposits to range from 7 to 12.5 feet below the ground surface (bgs) where shallow bedrock is encountered (Trinity Source Group 2018). Shallow groundwater that is encountered above the bedrock contact has been documented to range from depths of 4 to 10 feet bgs. The bedrock underlying the coastal terrace deposits is the Santa Cruz Mudstone. The bedrock unit consists of siliceous mudstone and sandy siltstone.

Stormwater runoff is captured through a network of drain inlets and conveyed to the City of Santa Cruz storm sewer system. A portion of the runoff is also conveyed to Antonelli Pond. Shallow groundwater conditions at the site present constraints for surface water percolation.

SURFACE WATER RESOURCES

Surface Water Hydrology Precipitation and Evapotranspiration

Rainfall levels vary considerably with elevation; the lower campus receives an average of approximately 30 inches of rainfall annually, while the north campus receives approximately 40 to 45 inches or more (Johnson and Weber & Associates 1989). Average evapotranspiration is estimated to be 19.7 inches per year (Johnson and Weber & Associates 1989). Average annual rainfall on the main residential campus is approximately 41.4 inches based on the stormwater tool to estimate load reductions (TELR) (Beck et al. 2017) modeling calculations for various 24-hr precipitation depths and the average annual number of days with measurable precipitation to represent the overall distribution and total average annual depths. The rainfall estimates were obtained from the PRISM Climate Group (2004) at Oregon State University (2NDNATURE 2020).

WATERSHEDS

The main residential campus and Westside Research Park are located within the Big Basin Hydrologic Unit, as defined by the Central Coast RWQCB. The main residential campus is drained through both surface and subsurface drainages by watersheds that originate within the main residential campus boundaries. The assignment of surface water runoff to a particular watershed is based on topographic features of the main residential campus; however, flows captured by the natural subsurface karst aquifer drainage system or by the UC Santa Cruz storm water drainage system may be transferred from one watershed to another in some cases.

Three watersheds, Cave Gulch, Moore Creek and Jordan Gulch, drain approximately 1,275 acres in the northern and central portions of the main residential campus. All three stream channels are generally aligned north-south and controlled by the major geologic fracture systems on the main residential campus. Cave Gulch, which drains mainly the undeveloped northwestern portions of the main residential campus, joins Wilder Creek immediately west of the main residential campus. Moore Creek, which drains the central and western portions of the main residential campus, flows in a southwesterly direction and ultimately discharges into Antonelli Pond near the coast. Jordan Gulch drains the central and eastern portions of the main residential campus and much of the developed campus core and continues as a spring-fed channel down Bay Street (Figure 3.10-1).

As noted above, as a result of the karst geomorphology of the central and lower campus, several of the tributaries of the main residential campus drainages do not discharge into the main channels but instead discharge into in-stream swallow holes. Flow in the two main drainages on the main residential campus, Moore Creek and Jordan Gulch, is captured by swallow holes in the lower campus. The karst features intercept most of the surface flow, even during extreme rainfall events. As a result, surface runoff from the main residential campus is usually low overall compared to other areas with similar rainfall (Johnson and Weber Associates 1989).

Areas of the main residential campus not drained by the three major watersheds are drained by a number of creeks and gullies that originate along the campus boundary. Much of the western boundary of the main residential campus, including portions of the north campus, is drained by Cave Gulch and Wilder Creek. Four small drainages occur along the southern campus boundary. From west to east these include: a western tributary of Moore Creek that discharges to Moore Creek downstream from the main residential campus boundary; the headwaters of Arroyo Seco, a canyon east of Western Drive; hillslope drainage onto High Street; and drainage into Kalkar Quarry Pond (a spring-fed pond occupying a former marble quarry). The northeastern and eastern boundary of the main residential campus is drained mainly by a series of hillslope drainages within the San Lorenzo River watershed (Johnson 2003).

The drainage areas of the LRDP area watersheds are shown in Table 3.10-2. The Westside Research Park is located within the Moore Creek Watershed. Each of the major watersheds are described below. There are nine principal watersheds and more than 50 sub watersheds drained by individual sinkholes and swallow holes.

Based on the locations of known sinkholes and swallow holes, campus watersheds have been divided into portions having partial or complete subsurface drainage as shown in Figure 3.10-1.

Wilder Creek Watershed

Wilder Creek has a watershed of approximately 2,830 acres. About 45 acres of Wilder Creek watershed is located in western portion of the main residential campus. A large spring, Wilder Creek Spring, outcrops in the creek west of the main residential campus approximately 100 yards upstream of the Cave Gulch confluence. This spring likely discharges some of the water originating from the subsurface drainage underlying the main residential campus. Upstream from the Wilder Creek Spring, much of the stream flow drains underground through swallow holes in the streambed (Johnson and Weber & Associates 1989). During the drier months, streamflow in Wilder Creek percolates into permeable alluvium and sandstone before reaching Highway 1 (Johnson 1988).

Cave Gulch Watershed

The western and northwestern portions of the main residential campus drain to the Cave Gulch watershed, a tributary basin to the Wilder Creek watershed and is the largest watershed draining campus. The on-campus drainage area of Cave Gulch is about 466 acres, which is about 74 percent of the total watershed of this drainage. The on-campus

portions of the Cave Gulch system are steep to moderately steep with channel gradients ranging from roughly 1 to 10 percent (Kennedy/Jenks Consultants 2004).

There are two main tributaries to Cave Gulch on the main residential campus. The Porter Tributary is located immediately downslope of the Porter Infill Apartments and to the west of the Family Student Housing complex and drains approximately 30 acres. Two sinkholes located near Family Student Housing capture runoff from the Porter Tributary. The Pump Station Tributary is located approximately one mile north of the west entrance to the main residential campus on Empire Grade and receives runoff from an inboard ditch along Empire Grade that is several thousand feet in length (Kennedy/Jenks Consultants 2004).

In general, campus lands that presently discharge into the Cave Gulch drainage system are largely undeveloped and contain only a few service roads used for recreation and emergency vehicles access and a 1-million gallon water tank. The few developed areas within the watershed are a portion of the Trailer Park, the western half of Kresge and Porter Colleges, and a portion of Family Student Housing complex. Erosion conditions have been documented within the watershed, associated mainly with the Pump Station Tributary and the Porter Tributary (Kennedy/Jenks Consultants 2004).

Moore Creek Watershed

The Moore Creek watershed is the third largest watershed within the core campus area and has a drainage area of about 905 acres above Antonelli Pond, which is located in the city of Santa Cruz. Approximately 384 acres of the drainage area are located on the LRDP area, including the Moore Creek Western Tributary. On the main residential campus, the watershed extends from the northern portions of the main residential campus, north of Baskin Engineering, to the southern boundary just beyond the Arboretum Dam. The Moore Creek drainage system consists of the main stem and several tributaries. The East Fork Baskin and Science Hill tributaries drain the northwestern portions of the Science Hill area of the main residential campus, including portions of the Baskin Engineering buildings, the Natural Sciences Unit II building, the Physical Sciences building, and the core west parking structure. The East Fork Kresge Tributary drains the area between Kresge College and Heller Drive. Both the East Fork Kresge Tributary and the East Fork Baskin Tributary terminate at sinkholes (the Kresge Tributary Sinkhole and the Baskin Tributary Sinkhole, respectively) and discharge into the Moore Creek main stem only when the sinkholes overflow (Kennedy/Jenks Consultants 2004).

The head of the Moore Creek East Fork is located just west of University House and drains the central and south portion of campus from Meyer Drive south to the Arboretum Dam. The primary campus developments contributing runoff include Rachel Carson College Apartments, Performing Arts, southeast portion of Porter College, University House and the eastern portion of Oakes College. The East Dam forms the lower end of the East Fork of Moore Creek where a sinkhole is present. The East Dam has never been documented to spill during flood events but reportedly came very close to doing so during the 1982 storms (UCSC 2006). Spilling during the 1982 storms was averted due to the opening of two sinkholes located behind the dam within the reservoir (Kennedy/Jenks Consultants 2004).

Moore Creek Middle Fork originates south of Oakes College and to the west of West Remote parking lot and also flows into the Arboretum Pond. The lowest on-campus tributary is the West Entrance Fork that originates just south of the intersection of Koshland Way and Heller Drive and flows in a southerly direction to the West Dam (see Figure 3.10-1). The West Dam is likely a relic feature from the late 1800s and early to mid-1900s when the City of Santa Cruz constructed the Arboretum Dam to store water from their North Coast water supply. A sinkhole is present in this channel just upstream of the West Dam. The East and West dams were constructed upstream of the Arboretum Dam and were intended to serve as sediment catch basins above the reservoir and/or to provide additional storage capacity. The use of the Arboretum Pond for water supply was abandoned in 1948 after the City determined that up to 750,000 gallons of water per day were being lost to the subsurface due to the presence of sinkholes in the channel of Moore Creek and the West Entrance Fork (UCSC 2006). All three dams on Moore Creek are earthen embankment dams. The East and West dams do not have spillways, although a 30-inch pipe was installed in the West Dam to serve as a spillway for excess flows. Originally the Arboretum Dam did not have a spillway and the dam only released discharge through a 14-inch pipe installed through the base of the dam. In 2001, a 4-foot diameter pipe was installed

below the dam crest to act as a spillway (UCSC 2006). Both the 4-foot spillway pipe and the 14-inch outlet pipe discharge to a culvert under Empire Grade that carries runoff to Moore Creek.

The total area of Moore Creek watershed above the Arboretum Dam is about 305 acres, but about 100 acres of this drainage area drains directly to the subsurface at locations upstream of the dam (UCSC 2006). The impounded water drains through the pipe at the base of the dam, via the subsurface, and via leakages through burrows in the dam faces. Typically, water remains in the Arboretum Pond well into the dry season (UCSC 2006). The Arboretum Pond and the two basins created by the East and West Dams have a reported combined capacity of about 35 acre-feet below the elevation of the Arboretum Dam spillway pipe, the West Dam outlet, and the crest of the East Dam. This capacity is large enough to contain runoff from a 50-year storm if all existing sinkholes are plugged, or a 100-year storm if the existing sinkholes remain open (Rutherford & Chekene 1992, cited in UC Santa Cruz 2005).

Approximately 15 acres of the main residential campus lands south of the Arboretum Dam drain directly into Moore Creek south of the main residential campus.

Channel conditions in the Moore Creek watershed as documented in the Stormwater and Drainage Master Plan (Kennedy/Jenks Consultants 2004) vary from fair to bad. Moore Creek contained the most severe in-channel conditions on the main residential campus with the Main Stem and West Entrance Fork were documented to be in particularly poor condition. Erosion features within the Moore Creek watershed consisted of actively migrating knickpoints, eroding channel banks, minor slope failures, loss of near-channel vegetation, and channel incision (Kennedy/Jenks Consultants 2004). These erosion conditions result from a number of factors including the natural erosion process, increased runoff due to impervious surfaces and partly as a result of pedestrian and bicycle use of trails along creek banks. The Baskin and Kresge sinkholes were documented to be at or close to capacity (Kennedy/Jenks Consultants 2004), at the time of the study. It is important to note, however, that in-channel sinkholes episodically change their capacity to infiltrate stormwater runoff due to erratic cycles of collapse and infill.

Jordan Gulch Watershed

The Jordan Gulch watershed is the second largest watershed on the main residential campus with a drainage area of approximately 1,350 acres, of which 442 acres are within the LRDP area. The watershed extends from the northern portions of campus, north of Colleges Nine and Ten, south to the lower portions of campus near the main entrance.

Several critical sinkholes break-up the Jordan Gulch watershed into sub-watersheds and include the McLaughlin Drive Sinkhole (also known as the Chinquapin Sinkhole), Middle Fork Sinkhole, Upper Quarry Sinkhole, McHenry Library Sinkhole, and the Lower Quarry Sinkhole. These sinkholes capture runoff from upper campus and as a result, almost all the water in the Jordan Gulch watershed enters the subsurface drainage system. Failure of these sinkholes to effectively capture runoff during storm events would result in increasing impacts in downstream reaches.

Jordan Gulch East Fork drains an approximate 30-acre area and extends from the Spring Trail Road, north of Colleges 9 and 10, south to McLaughlin drive where it terminates in McLaughlin Sinkhole. This sub-watershed receives concentrated stormwater runoff from Fuel Break Road, Chinquapin Road, Spring Road and lesser volumes from Colleges 9 and 10.

Jordan Gulch Middle Fork drains an approximate 85-acre area which extends from the area west of College Nine near Spring Road and flows south in a relatively deep canyon to its confluence with the Jordan Gulch main stem just west of the East Field area. This sub-watershed receives concentrated stormwater runoff from Colleges 9 and 10 and are also are fed by springs in the north campus.

Jordan Gulch West Fork drains an approximate 24-acre area within the central portion of campus located around McHenry Library, the Center for Adaptive Optics, Thimann Lab, Clark Kerr Hall, the Academic Resources Center, and the Baskin Arts Center. This sub-watershed receives concentrated runoff from these locations.

Jordan Gulch Main Stem drains an approximate 215-acre area and extends from the Bay Tree Bookstore and continues south in a deeply incised canyon where it terminates in two sinkholes just north of the Lower Quarry. South of the Lower Quarry, it continues down to the area just west of the Hagar Drive/Glenn Coolidge Drive intersection. This sub-watershed receives a mix of detained and undetailed stormwater from the Bay Tree Bookstore, Cowell

College, East Field House Complex and the Humanities building. The Humanities building also has a historic sinkhole on site that takes predevelopment runoff volumes from the site. Runoff in excess of predevelopment volumes is detained and released into the mainstem of Jordan Gulch. The lower mainstem also receives stormwater runoff from the lower west fork and middle forks of Jordan Gulch (Kennedy/Jenks Consultants 2004).

Jordan Gulch Great Meadow Tributary drains an approximate 39-acre area extending from the Music Facilities, south-southeast to the Lower Quarry and Village Housing complex. This sub-watershed primarily receives runoff from portions of Baskin Art, the Music Performance Hall, and associated buildings and parking lots. The development and enlargement of several sinkholes along the Great Meadow Tributary occurring in the 1990s have been documented (Kennedy/Jenks Consultants 2004).

Channel conditions in the Jordan Gulch watershed as documented in in the *Stormwater and Drainage Master Plan* (Kennedy/Jenks Consultants 2004) in general are "better" than the conditions in the Moore Creek watershed. The McLaughlin Drive and Middle Fork sinkholes were documented to be at or close to capacity (Kennedy/Jenks Consultants 2004). Stretches of those drainages that are underlain by active and "dormant" sinkholes may, however, change their capacity to infiltrate stormwater runoff in the future as the sinkholes collapse or become infilled with sediment. Storm water drainage improvements were proposed for this watershed under the Infrastructure Improvements Project. Since 2005, the main residential campus has been implementing this phased infrastructure improvement program. Projects completed for this watershed are discussed in Section 3.10.5.

San Lorenzo – Pogonip Watershed

The San Lorenzo – Pogonip watershed has a combined total drainage area of approximately 520 acres on the main residential campus. In general, the San Lorenzo – Pogonip watershed drains much of the eastern portion of the main residential campus east of Hagar Drive from north of the Crown-Merrill Apartments south to the southern boundary of the campus and boarders the City of Santa Cruz' Pogonip Park to the east of campus. Eight sub watersheds comprise the larger area that are associated with a number of west-east trending gullies (Gullies A through H) that drain to the east (see Figure 3.10-1). Several sinkholes are documented within this area, including a primary sinkhole with Gully B that receives runoff from the East Remote parking lot (Kennedy/Jenks Consultants 2004). At least one sinkhole beneath the Lower East Field was previously covered to facilitate development (Johnson 2003).

Channel conditions in the San Lorenzo–Pogonip watershed vary from location to location but are in general fair to poor. Steep channel gradients, erosive soils and burrowing animals contribute to erosion conditions in Gullies F and B, and concentrated runoff contributes to erosion conditions in Gullies H and G. Gully B is located approximately 800 feet southeast of the East Remote parking lot and receives storm water via a culvert that captures roadway runoff along the west side of Glenn Coolidge Drive and channels it to the head of this gully. Approximately 10 acres of campus land drains into Gully B; however approximately 3 acres may drain to a covered sinkhole beneath the Lower East Field. Most of Gully B is undeveloped with the exception of an approximate ½ acre area that is covered by Glenn Coolidge Drive, a County-owned and maintained roadway. Previously documented erosion sites in the gully are situated downstream of four wooden check dams built by the City in the Pogonip. Gully F is located directly east of the East Field, and drains to the southeast before crossing under Glenn Coolidge Drive. The drainage area of Gully F on the main residential campus is approximately 37 acres. This gully receives un-detained water from the southern portion of Stevenson College, the East Field, and some length of Glenn Coolidge Drive. Concentrated stormwater runoff is the likely cause of erosion problems documented within this gully on campus lands. Gully G is located at the north end of Glenn Coolidge Drive where is turns west becomes McLaughlin Drive. Its on-campus drainage area is approximately 19 acres. Portions of Stevenson, Crown and Merrill Colleges, Stevenson College parking lots and portions of McLaughlin Drive contribute runoff to this gully. This gully is deeply incised to the east of Glenn Coolidge Drive and has experienced several channel bank failures. Concentrated runoff from impervious surfaces is likely the source of erosion conditions in this gully. A large detention vault was recently installed beneath the Stevenson College East Parking lot to address this issue. Recent inspections confirm the drainage area on campus has since stabilized. Gully H is located in the northeastern corner of the campus with an on-campus drainage area of approximately 40 acres. Existing UC Santa Cruz development that contributes runoff to this gully includes Crown-Merrill Apartments, Crown College and three large parking lots. The erosion conditions previously documented in this

gully include actively migrating knickpoints, incised channel, and eroding slope gullies. Concentrated runoff is the primary cause of these conditions (Kennedy/Jenks Consultants 2004).

Other Local Drainages

The far southwestern extent of the main residential campus west of Empire Grade has low relief and lacks a well-defined drainage pattern. The central and eastern portions of this area drain into a western tributary of Moore Creek.

Arroyo Seco is a canyon located south of Meder Street and east of Western Drive. The upper 120 acres of the Arroyo Seco watershed are located on campus south of Jordan Gulch and east of Moore Creek. Surface runoff from approximately 98 acres near the main entrance of the main residential campus leaves the area as overland flow and joins Bay Creek south of the main residential campus. From this point, the creek, Bay Creek, continues down in the median of Bay Street as a spring-fed perennial (year-round), partially culverted stream to Neary Lagoon.

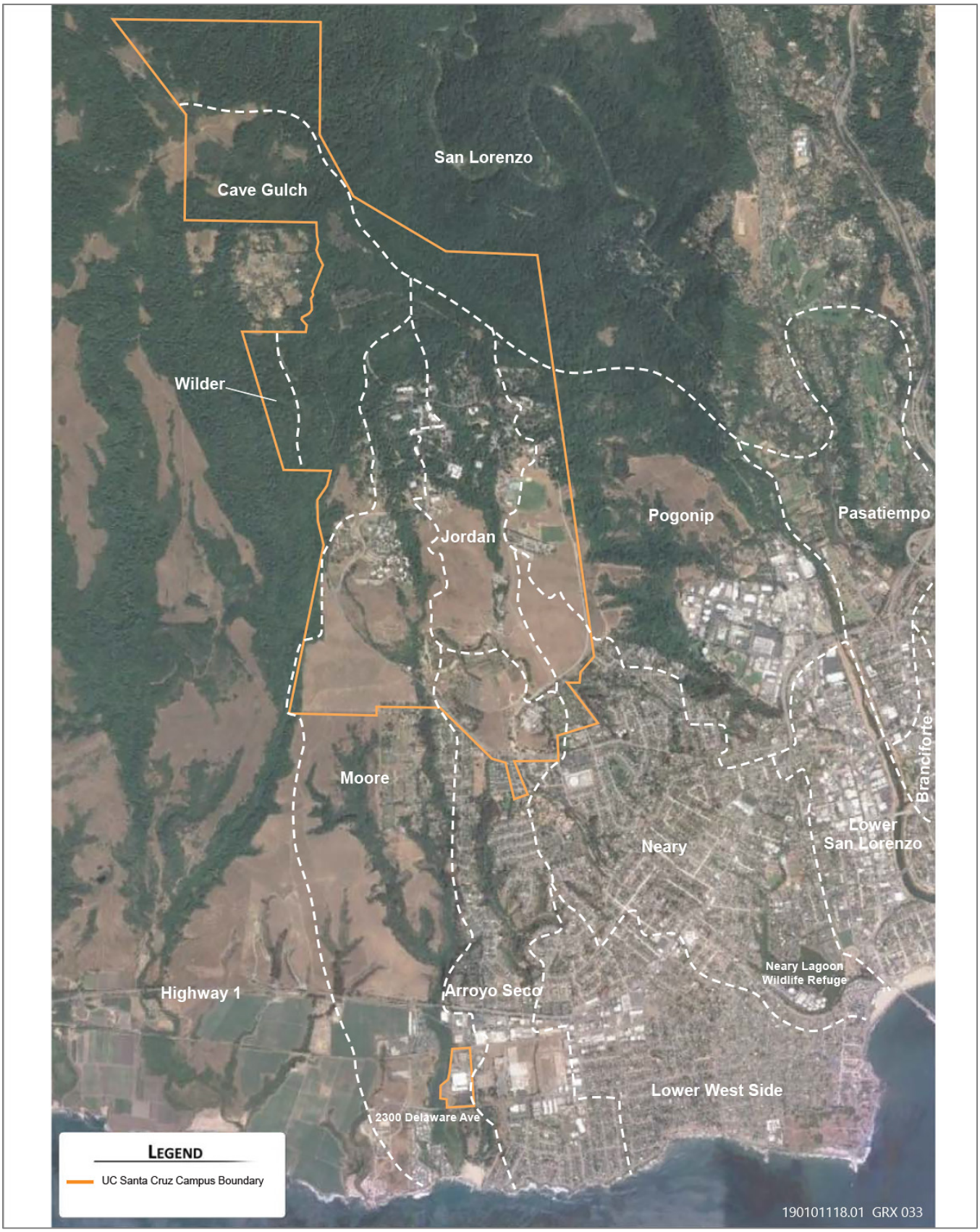
Kalkar Quarry is a historic marble quarry just east of the main residential campus near the intersection of Hagar Drive/Glenn Coolidge Drive, which has developed a pond that is fed by an underlying spring and by a series of culverts that drain the south-eastern portion of the main residential campus, including a portion of the Faculty Housing area (UCSC 2006).

WATERSHEDS SURROUNDING THE LRDP AREA

Watersheds surrounding the main residential campus and Westside Research Park are shown on Figure 3.10-2. The northwest portion of the main residential campus along the Ben Lomond Mountain ridge is bordered to the north and northeast by the San Lorenzo River watershed and the Gold Gulch drainage subarea. Bordering the main residential campus to the east are the Pogonip and Arroyo de San Pedro Regaldo drainage subareas of the San Lorenzo River watershed. The San Lorenzo River drains to the Pacific Ocean approximately 2.2 miles southeast of the main residential campus. Of the total San Lorenzo River watershed area of about 74,000 acres, only an area of approximately 520 acres drains from the campus itself.

To the southeast of the main residential campus are the watersheds of Kalkar Quarry, which is also known as Ojos de Agua (65 acres total, with over 97 percent on campus) and High Street (60 acres total, with only about 10 percent on campus). These two watersheds are subareas of the Jordan Gulch/Neary Lagoon watershed with outflow to Neary Lagoon on the coastal plain. Of the total 1,350 acres of the Jordan Gulch/Neary Lagoon watershed, approximately 400 acres that are located on the main residential campus drain to the subsurface through karst sinkholes. About 13 acres of the on-campus portion of the Jordan Gulch watershed drain to the surface south of the main residential campus, where the Jordan Gulch drainage continues south along Bay Street as a spring-fed channel (Bay Creek) toward Neary Lagoon. To the south of the main residential campus and further west are the Arroyo Seco watershed (665 acres total with approximately 120 acres on campus) and the Moore Creek watershed, including the West Tributary Moore Creek subarea (1,240 acres total with approximately 400 acres on campus). Moore Creek discharges to Antonelli Pond before reaching the Pacific Ocean at Natural Bridges State Beach. Arroyo Seco discharges to the Pacific Ocean just east of Natural Bridges State Beach (UCSC 2006).

Most of the northwest portion of the main residential campus along the Ben Lomond Mountain ridge, is bordered to the northwest and west by the headwaters of Wilder Creek, Peasley Gulch, Baldwin Creek, and Majors Creek. Bordering the west side of the main residential campus are the lower Wilder Creek watershed and Cave Gulch watershed (Johnson 1988 & 1989). Wilder Creek drains into the Pacific Ocean approximately 2 miles southwest of the main residential campus (UCSC 2006).



Source: Figure produced and provided by Weber, Hayes & Associates in 2020

Figure 3.10-2 Watersheds in the Greater Vicinity of UC Santa Cruz Campus

EROSION

As discussed in Section 3.7, Geology and Soils, specifically Table 3.7-2 and Figure 3.7-5, large portions of the north campus contain soils with a slight to moderate erosion potential, and significant pockets of soils with a high to very high erosion potential are present in the upper, central, and lower areas of the main residential campus. The Westside Research Park contains soils with a slight to moderate erosion potential. The portion of the main residential campus underlain by karst is pockmarked with dolines (or sinkholes), with some of the sinkholes present in the drainages (i.e., swallow holes). Erosion, sedimentation, and infiltration, both natural and man-made, can have complex interactions. Some sinkholes have been filled by infiltration of fine-grained sediments or by wall collapse, which can exacerbate erosion problems. In other locations, the sinkholes have actually enlarged and capture almost all of the sediment and a portion or all of the drainage water, resulting in very little erosion downstream.

In 2004, UC Santa Cruz prepared a Stormwater and Drainage Master Plan (Stormwater Plan) as a comprehensive and definitive document for planning improvements to the UC Santa Cruz storm water drainage system (Kennedy/Jenks Consultants 2004). Development of the Stormwater Plan also addressed Best Management Practices (BMPs) to improve the water quality of the stormwater and focused on human-caused erosion, because this type of erosion is generally the easiest to control or prevent. The Stormwater Plan notes that natural factors or events can also cause erosion, and not all the erosion occurring on campus is caused by human activity. The Stormwater Plan developed a list of prioritized, in-channel and out of channel improvement projects for implementation to address deficiencies in the existing systems. The proposed projects were designed to improve the natural drainage channels through upstream reductions in flows (through infiltration, dispersion, detention, and/or retention) and in-channel stabilization, armoring, and repair. These recommended improvement projects were incorporated into UC Santa Cruz Infrastructure Improvements Project (2005 LRDP DEIR, Volume 3, Chapter 2) for implementation. Specifically, the focus of Phase 1 improvements was to reduce flows in those sections of the drainages that were experiencing severe erosion by diverting, dispersing and detaining runoff in the upper portions of the watersheds. The focus of Phase 2 improvements was in-channel stabilization, armoring, and repair. The improvements were identified for four drainages on the main residential campus – Cave Gulch, Moore Creek, Jordan Gulch, and some of the gullies that flow into the Pogonip-San Lorenzo watershed. The implementation of the Infrastructure Improvements Project would alter drainage patterns but would not result in increased flooding on or off site (Kennedy/Jenks Consultants 2004).

Since 2005, UC Santa Cruz has been implementing this phased infrastructure improvement program. To date, completed Phase 1 improvement projects are included in Table 3.10-3.

Phase 2 improvement projects began in July 2013 and the initial groundwork (e.g., grading, planting, placing of rock, etc.) was completed in October 2014. These improvement projects focused on the Baskin, Science Hill and East Fork Reach tributaries of Moore Creek and the East Fork, Mainstem Upstream Reach and Downstream Reach of Jordan Gulch. In general, infrastructure improvements included the installation of log drop structures, rock step pools, sediment excavation, installation of a biotechnical debris dam and check dams, installation of rock step pools, rock sills, log drops, board check dams, excavation of sediment in limited areas, re-contouring of banks, minor grading associated with these features, and re-vegetation.

At the request of the US Army Corps of Engineers (USACE) and the Central Coast RWQCB, Huffman-Broadway Group, Inc. (HBG) along with UC Santa Cruz staff conducted annual assessments of post-restoration habitat and structural conditions using the California Rapid Assessment Method (CRAM). The purpose of the Post-Restoration CRAM study was to assess the performance of the stream restoration efforts to obtain data that will aid the USACE and Central Coast RWQCB in determining if the restoration work, over a 5-year period, results in aquatic functions and services equal to or greater than Pre-Restoration conditions. Results of five annual CRAM studies conclude that the channels appear to be stable and functioning as designed. However, the overall CRAM scores indicate that the stream restoration efforts have provided little overall improvement (Huffman-Broadway Group 2019).

Table 3.10-3 UC Santa Cruz Stormwater Plan Improvement Projects

Improvement Project	Watershed / Tributary	Problem	Project Description
Steinhart Way Diversion (Project: MC-EF-BT-C)	Moore Creek / Baskin Tributary	Runoff from Thimann Lab and Lecture Hall contributes to erosion and overflow of Moore Creek East Fork Baskin Tributary sinkhole.	Divert storm piping from Thimann Lecture and East side of Thimann Labs to new Kerr Hall Detention Basin. Project included installation of new storm drain along Steinhardt Way from Thimann to CFAO detention basin.
Center for Adaptive Optics (CFAO) Outlet Channel to Kerr Hall Detention Basin (Project: MC-EF-BT-SHT-A)	Moore Creek / Science Hill Tributary	Runoff from loading dock creating erosion and poor water quality.	Diversion of Thimann Lab runoff from loading dock to the new Kerr Hall Detention Basin. A new rock-lined channel was created to direct low flows to Kerr Hall Detention Basin; two new culverts; and a series of step pools. The site was revegetated with trees, shrubs, and ground cover.
Kerr Hall Detention Basin (Project: JG-WF-CO-R1-2)	Jordan Gulch / West Fork	Redirect Runoff from Kerr Hall and Thimann to New Detention Basin	Install new detention basin upstream of sinkhole. Redirect runoff from Kerr Hall and Thimann to new detention basin. The project included creating a forebay; creating an impermeable berm at downslope end; and installation of outlet structures. The site was revegetated with trees, shrubs, and ground cover.
Chinquapin Road Channel Improvements (Project JG-EF-J)	Jordan Gulch / East Fork	Runoff from Chinquapin sinkhole overflow and Chinquapin Road contributes to erosion in Jordan Gulch Mainstem	Divert runoff from Chinquapin sinkhole overflow and Chinquapin Road to Upper Quarry sinkholes. This included: providing a culvert dissipation basin at the storm drain outfall from Crown College; installation of infiltration pools adjacent to Chinquapin Road; installation of step pools and channel stabilization at Chinquapin Road and McLaughlin Drive and along McLaughlin Drive leading to the storm drain culvert; re-direction of low flows at 48-inch storm drain into a vegetated channel along the quarry access road; installation of a drainage channel along amphitheater road to sinkhole.
Middle Fork Diversion (Project JG-MF-R1-9)	Jordan Gulch / Middle Fork	Need to route runoff into Upper Quarry sinkhole.	Excavation of swale and raised and widened existing berm to route flows into Upper Quarry sinkhole.
Music Hall Diversion (Projects JG-MS-GMT-A1, JG-MS-GMT-R1-3, MS-GMT-R1-4)	Jordan Gulch / Great Meadow Tributary	Runoff from Arts areas is piped to Jordan Gulch Great Meadow Tributary and contributes to erosion.	Diverted Music detention water to the doline depression including installation of a bioswale to doline depression (400 to 500 LF); installation of a series of step pools; and installation of rock-lined channel from the doline depression to the sinkhole and revegetate. Improvements to stabilize sinkhole include lining of inlet channel with rock and stabilization of sinkhole banks with filter fabric, rock, and=biotechnical measures.

FLOODING

As previously stated, the UC Santa Cruz campus relies on a series of natural drainage courses and sinkholes for storm drainage. Storm water drains via pipes into the natural drainages. Most of the storm water enters the subsurface through a series of sinkholes. Existing campus erosion problems have contributed to build-up of sediment in the sinkholes, which limits their capacity to infiltrate runoff and results in flooding, which is a problem associated with a few sinkholes on the campus. The previous Stormwater Plan identified several critical sinkholes that showed signs of reaching capacity, which could increase the likelihood of spilling to downstream reaches and flooding. The sinkholes that were identified include the Baskin Tributary Sinkhole, the Middle Fork Jordan Gulch Sinkhole, the McLaughlin Drive Sinkhole, and the Kresge Tributary Sinkhole. Three of these sinkholes overflowed during storms in 2004

(Kennedy/Jenks 2004). Several of the completed storm water drainage improvements included in the Infrastructure Improvements Project have diverted runoff from these critical sinkholes to mitigate sedimentation and overflow. Detention basins and settling tanks serve some local building clusters. While this system meets current overall capacity requirements, there are localized areas of concern. Areas that have experienced flooding from surface ponding include the area near the McLaughlin Drive sinkholes and on Moore Creek at Highview Drive south of the main residential campus (UCSC 2006). The UC Santa Cruz campus is not located within a 100-year flood zone; however, as shown in Figure 3.10-3, a small and relatively insignificant area of the Westside Research Park along the southwestern property that slopes towards Antonelli Pond is within a 100-year flood zone (FEMA 2017).

GROUNDWATER RESOURCES/HYDROLOGY

Groundwater

UC Santa Cruz is not within a designated groundwater basin (DWR 2019). It is bordered to the east and immediately to the south by the West Santa Cruz Terrace basin. Areas to the west and immediately north are also not within a designated groundwater basin. The Santa Margarita Basin is situated approximately 2.5 miles north of the main residential campus. The main residential campus can be roughly divided into two hydrogeologic systems, upper/north campus and central/lower campus. These two hydrogeologic systems are directly related to campus geology (i.e., rock types, faults, and fracture zones) (Johnson and Weber & Associates 1989).

Main Residential Campus

North Campus

The north campus hydrogeologic system lies roughly north of McLaughlin Drive and includes shallow water bearing zones of moderate permeability within the Santa Margarita sandstone. Groundwater occurs in portions of thin (5- to 30-foot) eroded remnants of Santa Margarita sandstone. Weathered schist and granitic rocks overlie relatively impermeable unweathered schist and granitic rocks. This area lacks any exposed marble (Johnson and Weber & Associates, 1989). Deeper, fractured bedrock may produce sustainable groundwater, but at low yielding volumes (e.g., 10-30 gpm).

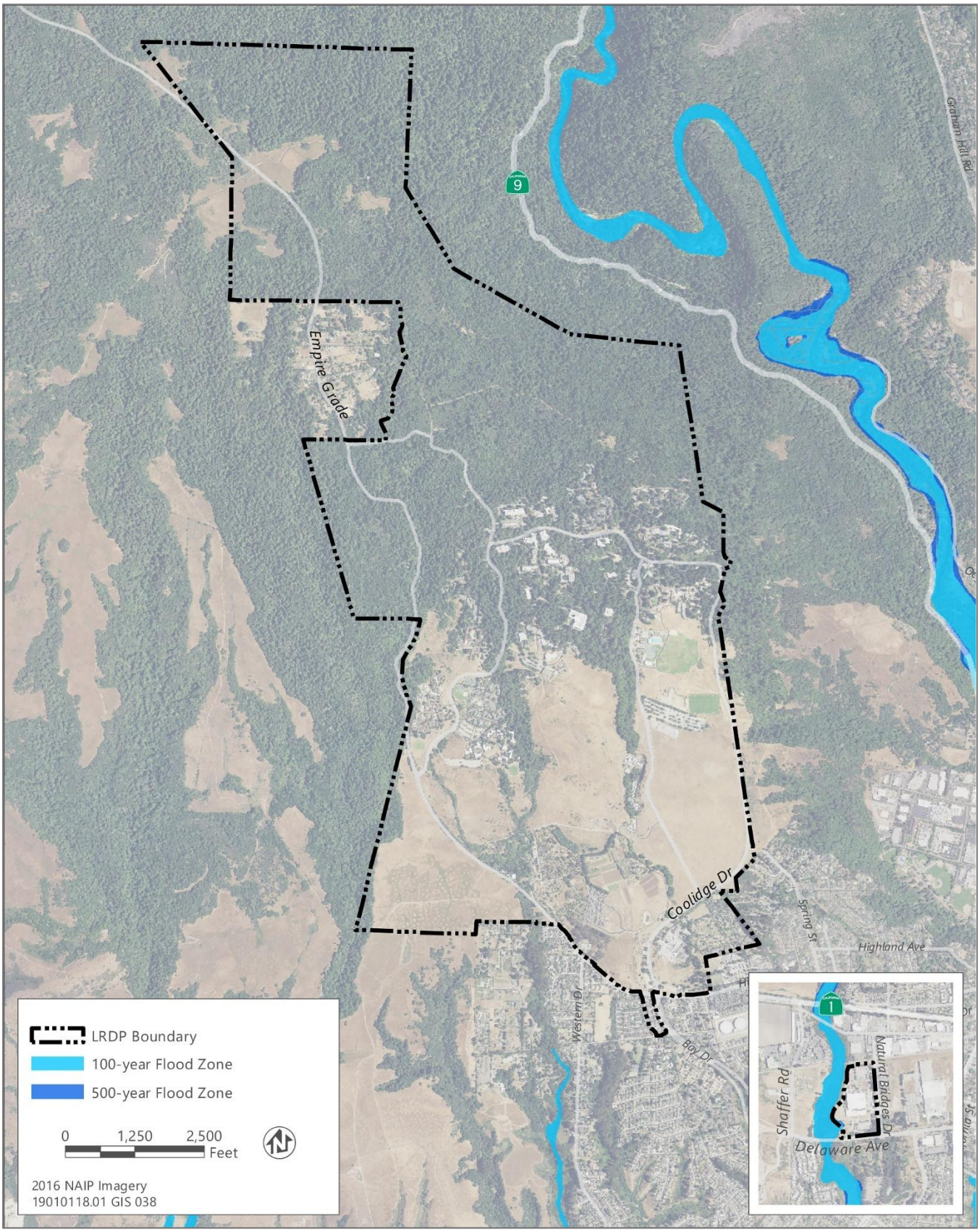
This portion of the main residential campus has a relatively uniform shallow groundwater system; depths to groundwater throughout the main portion of the north campus range from about 2 to 16 feet below ground surface (Nolan, Zinn, and Associates 2004). Due to the shallow groundwater table and the moderate permeability of the near-surface materials, the north campus area has a broad seep zone and several small springs on the slopes leading towards Cave Gulch and lower campus (Johnson and Weber & Associates 1989).

Topographically, the hydrologic system of the upper/north campus is dominated by broad and gently sloping surfaces, giving way to overland flows that seep into the soil and provide groundwater recharge. Surface runoff to the south and west eventually enters the karst (marble) aquifer system of the central and lower campus via Cave Gulch, Moore Creek, and Jordan Gulch. Due to the shallow nature and moderate permeability of the upper/north groundwater system, the aquifer system is not adequate to meet campus water supply needs.

Central/Lower Campus

The lower two-thirds of the main residential campus are largely underlain by marble and schist. The marble allows for the occurrence of karst topography, which is characterized by: (1) a relative absence of surface streams and drainage channels with most precipitation discharging to the subsurface through fractures, and (2) the presence of sinkholes, closed depressions, and swallow holes. More than 50 sinkholes are located throughout the marble-underlain area on the main residential campus and these features are estimated to capture up to 40 percent of campus runoff (Johnson 1988).

Within the marble is an extensive underground drainage network of subterranean caverns and channels formed by the dissolution of marble by groundwater. The locations of these channels are predominantly controlled by north-south and east-west trending bedrock fractures that provide a zone where water can penetrate, weather and dissolve the rock, eventually widening the fracture. Crystalline non-fractured marble will not be readily weathered or dissolved as it exhibits no primary porosity that would allow water penetration in any appreciable amounts. The two main



Source: data downloaded from FEMA in 2020

Figure 3.10-3 Flood Zones

underground karst dissolution channels on the main residential campus lie in Jordan Gulch and Moore Creek, where they coincide with two north-south trending fault/fracture systems, and large volumes of water flows within these channels. Non-fractured areas of the marble bedrock are expected to be non-water bearing. For example, in 1972, a 300-foot-deep boring was drilled within 30 to 50 feet of one of the large north-south fracture zones on campus (i.e., Lower Jordan Gulch) and did not encounter groundwater. By contrast, Test Well #1 was drilled at the intersection of two major fracture zones (400 to 500 feet north of the dry hole) and abundant groundwater was encountered at approximately 100 feet bgs (Johnson and Weber & Associates 1989).

As demonstrated by the aquifer pumping tests described below, a large volume of water is stored in these major underground dissolution channels. There are also several east-west trending fractures in the central and southern portions of the main residential campus (Johnson and Weber & Associates 1989). The distribution of these smaller fractures shows a strong correlation with the location of on-campus sinkholes and off-campus springs. Underground dissolution channels are inferred to be present along the alignments of these fractures. Figure 3.10-4 illustrates the relationship between fractures and sinkholes on the main residential campus and their relationship to off-campus springs. Figure 3.10-5 shows campus well locations and known springs and seeps on and adjacent to the main residential campus.

The karst aquifer system on this portion of the main residential campus has the greatest potential for groundwater extraction and supply on the main residential campus as a substantial portion of (about 40 percent) of precipitation runoff enters the system (Johnson 1988). The groundwater storage capacity within the saturated zone of the karst aquifer is estimated to be at least 3,000 acre-feet, with an equivalent potential storage capacity above the groundwater table (Johnson and Weber & Associates 1989; Gilchrist and Associates 1990). Evaluation of potential sustainable yields from the groundwater table are discussed below under "Aquifer Pumping Tests." However, as UC Santa Cruz receives water from the City for domestic and irrigation purposes, groundwater on the LRDP area is not extracted at this time.

Campus Wells

In the late 1980's a series of exploratory water wells were installed in the on-campus karst aquifer, which underlies the central and lower portion of the main residential campus, in Jordan Gulch. These wells were installed as part of an effort to evaluate groundwater resources on the main residential campus. Changes in well names since installation are summarized below:

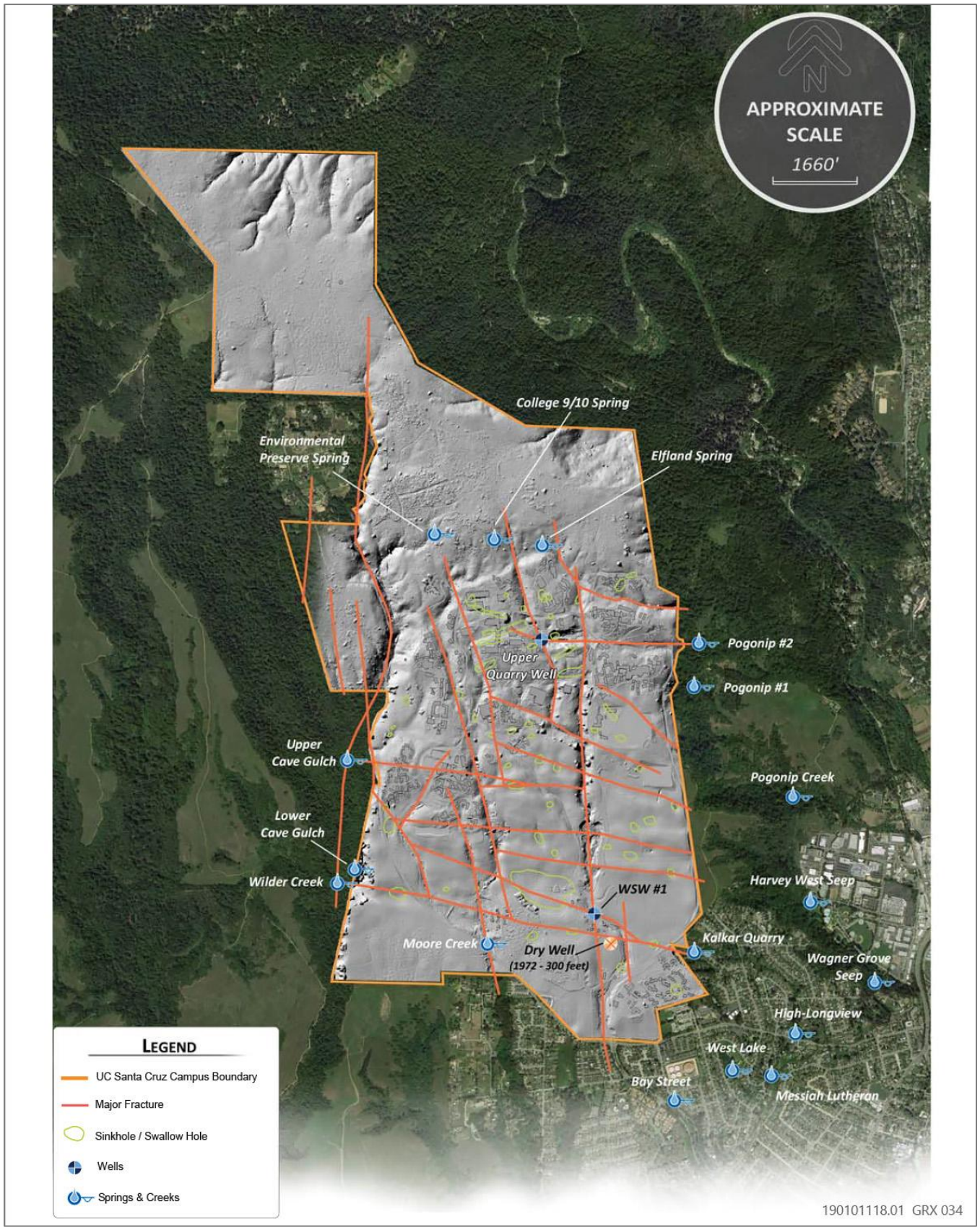
- **Test Well #1** was installed in the lower Jordan Gulch area in December-January, 1987-88, is now designated MW-1A,
- **Test Well #2** was installed in the Upper Quarry area in January 1988, is now designated the Upper Quarry Well,
- **Test Well #3** was installed in lower Jordan Gulch area of in December 1988 is now designated WSW#1, and
- **Test Well #4** was installed in the lower Jordan Gulch area in August 1989, is now designated well MW-1B.

Table 3.10-4 includes a summary of well construction details and Figure 3.10-5 includes the location of the wells.

Well WSW#1 was intended to develop water from the main residential campus karst aquifer at the intersection of a major north-south fracture lineation (Jordan Gulch) and a roughly east-west fracture lineation across the lower campus marked by a line of sinkholes. A detailed evaluation of the karst aquifer, associated spring discharge points, and a history of the well drilling, well completion and initial aquifer testing, including a 7-day aquifer pumping test and recovery test with extensive spring flow monitoring is presented in *Evaluation of the Groundwater Resources at the University of California, Santa Cruz* (Johnson and Weber & Associates 1989).

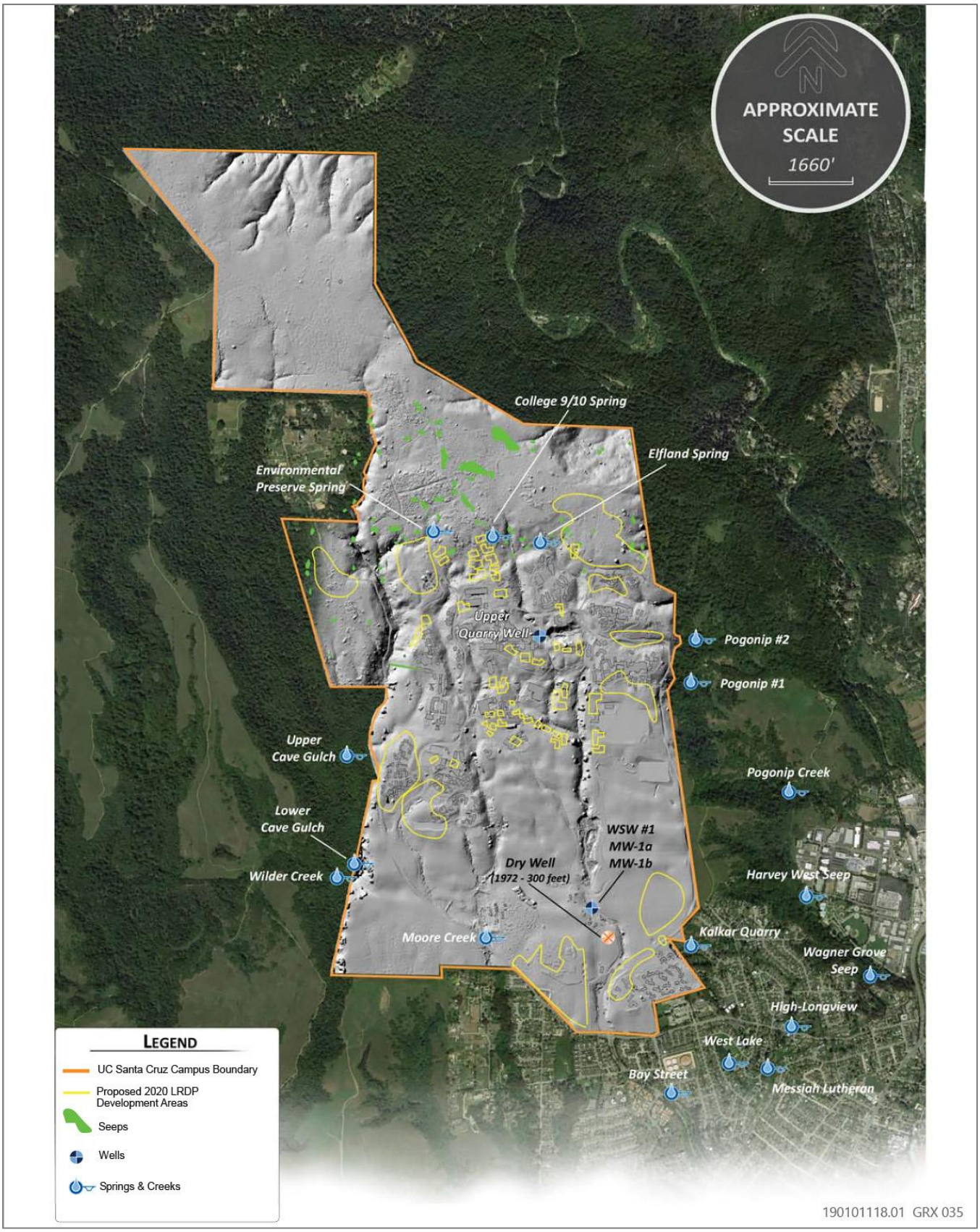
WSW#1 and Monitoring Wells MW-1A and MW-1B

WSW#1 was drilled and completed under City of Santa Cruz permit in December 1988. Drilling to a total depth of 226 feet encountered limestone/marble, with evidence of karst solution channels and zones of hard intact marble interspersed with abundant open to rubble-filled fractures and void spaces. Problems with borehole collapse and loss of circulation were frequent. A completed well was installed to 157 feet, with 5-inch diameter well casing, screened from 77–157 feet deep.



Source: Figure produced and provided by Weber, Hayes & Associates in 2020

Figure 3.10-4 Major Fractures on the UC Santa Cruz Campus



Source: Figure produced and provided by Weber, Hayes & Associates in 2020

Figure 3.10-5 Mapped Springs and Seeps on and Surrounding UC Santa Cruz and On-Campus Wells

Table 3.10-4 Summary of Well Construction Details

Well No.	Date Completed	Total Boring Depth (ft bgs)[1]	Borehole Diameter (in OD)[2]	Conductor Casing Interval (ft bgs)	Type of Conductor Casing	Conductor Casing Diameter (in ID)[3]	Total Well Casing Depth (ft bgs)	Well Casing Diameter (in ID)[3]	Type of Well Casing	Depth of Screened Interval (ft bgs)	Perforation Type	Filter Pack Interval (ft bgs)	Filter Pack Type	Ground Surface Elevation (ft above MSL) [4, 5]	TOC Elevation (ft above MSL) [6]	Static Water Level (ft bgs)[7]	Well Yield (gpm)[8]
MW-1A (Well #1)	1/3/88	297	10.5/7.5	0-27	Steel, 0.156 in	8.5	297	2	PVC, F480/ 200	97-297	Slotted 0.040 in	52-297	5/16-3/8 in gravel	420	424.84	95.60	42.0
MW-1B	8/10/89	186	7.875	None	None	None	160	2	PVC, Sch 40	100-160	Slotted 0.040 in	90-160	8x16 sand	415	418.69	46.79	Not Available
Upper Quarry Well (Well #2)	1/27/88	303	8.5	None	None	None	303	5	PVC, F480	115-303	Slotted 0.040 in	50-115; none at 115-303	3/8 in gravel above packer at 115 ft[9]	714	Not surveyed	94.52	12.5
WSW-1 (Well #3)	12/30/88	226	17.5 / 12.25 / 7.875	1st-0-19, 2nd- 0-108	1st-Steel, 0.188 in; 2nd-PVC F480	1st-12.75 in OD; 2nd-8.625 in OD	157	5	PVC, F480/ SD R21	77-157 (effectively 108-157)[10]	Slotted 0.040 in	0-157 [11]	8x16 gravel	412	416.41	88.31	92.5

[1] bgs = below ground surface.

[2] in OD = inches inside diameter; where multiple borehole diameters are listed, the larger are for conductor casing.

[3] in ID = inches inside diameter.

[4] MSL = Elevation Above Mean Sea Level; ground surface elevations are approximate, top-of-casing elevations are surveyed or calculated.

[5] Source: Weber & Associates March 1989, and Gilchrist & Associates, July 1990.

[6] TOC = Top of well casing (TOC) survey was conducted by Ifland Engineers at WSW-1, MW-1A and MW-1B on 12/5/07.

[7] Source: Weber, Hayes & Associates, November 15, 2019 (MW-1A, MW-1B and WSW#1) and Weber, Hayes & Associates, June 2019 (Upper Quarry Well)

[8] gpm = gallons per minute sustained yield during pump test.

[9] Borehole sealed by packer at 115 ft bgs, with no filter pack within screened interval below at 115-303 ft bgs.

[10] Well diagram and DWR report are unclear or inconsistent about filter pack interval; apparently screened interval is partially within 2nd conductor casing at 77-108 ft bgs, with filter pack extending to surface(?) inside conductor casing. Since the upper screen interval is sealed from the formation from 77-108 ft bgs by the conductor casing, the effective screen interval is therefore 108-157 ft bgs.

Source: Well construction data from Weber & Associates March 1989, and Gilchrist & Associates, July 1990.

Two, 2-inch diameter monitoring wells MW-1A and MW-1B were installed in December/January 1987-88 and August 1989, respectively, in the marble aquifer in Jordan Gulch. Well MW-1A (known in 1988 as Test Well #1) is located approximately 54 feet northeast of well WSW#1. Well MW-1A is completed in the same fracture system as the well WSW#1, as determined by previous dye tracing studies (Aley and Weber & Associates 1994). Well MW-1A also shows pumping influence from pumping in WSW#1 in both the 1989 and 2007 pumping tests (Weber, Hayes and Associates 2007). Monitoring well MW-1B is located approximately 37 feet west of WSW#1, at the western edge of Jordan Gulch. Although this well is completed in fractured marble at a similar ground surface elevation and depth as WSW#1 and MW-1A, it is evidently completed in a separate hydraulic fracture regime, and shows a distinctly higher water level (i.e., 40 to 50 feet higher), and no pumping influence from pumping in WSW#1 in 1989 or 2007.

Upper Quarry Well

The Upper Quarry well (initially designated Test Well #2) was drilled at the intersection of two prominent fracture zones just west of the Upper Quarry. The well was drilled in 1988 to a total depth of 303 feet and screened from 115 to 303 feet. Drilling encountered marble to approximately 200 feet with numerous voids and fractures mainly above the water table. Fractured schist with gneiss and/or granitic dikes was encountered below 200 feet. The cumulative depth of large, open voids including two large caverns was approximately 33 feet (about 11 percent secondary porosity in the marble, likely lower in the fractured schist). The upper 104 feet was cemented to stabilize the hole and provide a surface seal. No long-term pumping test has been conducted to evaluate the yield of this well.

Aquifer Pumping Tests

In 1989, a long-term pumping test on well WSW#1 was conducted at a pumping rate of 100 gallons per minute for 7 days, with extensive spring flow monitoring before, during and after the test. This 1989 test created less than 3 feet of total drawdown in the pumping well and had only 1.38 feet of drawdown in the nearby observation well MW-1A. There was no measurable impact on any spring flow during or after the pumping test. Aquifer analysis indicated the well is completed in a high yielding area of the karst aquifer, with the ability to provide a sustained pumping rate of 100 gpm without dewatering the well, or creating any pumping drawdown at identified spring locations over 2000 feet away (Johnson and Weber & Associates 1989).

In 2007 a 72-hour constant rate well pumping and aquifer recovery test was performed on well WSW#1 to evaluate the sustainable well yield, re-evaluate potential impacts from pumping, and compare the current pumping test results to the previous 7-day pumping and recovery test conducted on this well in 1989. The 72-hour well pumping test was conducted at an average flow rate of 92.5 gpm, followed by a recovery test. Total drawdown in the pumping well during the 3-day test was 0.96 feet. Total drawdown in observation well MW-1A was 0.88 feet. This is an unusually shallow cone of pumping depression, indicating that pumping at this rate did not heavily stress the aquifer. This sustainable flow rate is equivalent to approximately 48.6 MGY or 149 acre-ft/yr.

There was no observed drawdown in observation well MW-1B. Following the pumping test, the pumping well recovered immediately. There was no decrease in flow at several springs monitored during the test that indicated an impact from pumping. These spring locations included Bay Street Spring, Messiah Lutheran Spring, Westlake Pond, and Kalkar Quarry Pond. A previous dye trace study has shown the karst aquifer at WSW#1 to be in direct connection with Bay Street Spring, Messiah Lutheran Spring, and Westlake Pond (Aley and Weber & Associates 1994).

An expanded Initial Study of the Farm [i.e., Center for Agroecology and Sustainable Food Systems (CASFS)] and Arboretum Irrigation well (Well #3, aka WSW#1) was prepared in 1990 that addressed the potential environmental impacts from use of this well to irrigate cultivated lands at the CASFS and Arboretum (Gilchrist and Associates 1990). This report included an evaluation of well WSW#1 7-day pumping test along with a 5-year record of spring flow data and concluded that it was unlikely that pumping from this well at 100 gpm would have any effect on the springs surrounding UC Santa Cruz. Even with greater pumping rates, this study concluded it is probable that any dewatering of the marble aquifer would be rapidly recharged by captured runoff and subsurface flow carried in the karst solution channels during winter storms. However, the report recommended that due to the complexity of the karst fracture system, use of WSW#1 should incorporate long-term monitoring of springs near the main residential campus, as flow patterns and groundwater movement in the karst aquifer are not completely understood.

Well WSW#1 has not been used for water supply since it was installed in 1989, although annual water quality samples and water level measurements have been collected.

Dye Trace Studies

Four dye tracing studies have been completed on the main residential campus that provide information on groundwater in the karst area of the main residential campus. The first study was conducted in 1994 to evaluate groundwater flow paths and to determine whether pumping from well WSW #1, located in the Jordan Gulch watershed in the lower campus, would affect flow rates in individual springs in the area on and off campus. Dye was injected into monitoring well MW-1A (situated approximately 50 feet northeast of WSW#1) and into a sinkhole located near the East Remote parking lot (Aley and Weber & Associates 1994). Results of this study confirmed that dye traveled fairly rapidly between the dye injection location and nearby monitoring wells and springs. The dye was detected at four of the monitoring locations within 2 days and at eight of the monitoring locations within 2 weeks. The monitoring data also demonstrated that WSW #1 is hydraulically connected (i.e., partial or complete groundwater flow path between locations) to MW-1a, MW-1b, Bay Street Spring, West Lake Spring, and Messiah Lutheran Spring (Aley and Weber & Associates 1994). The study concluded that WSW#1 is hydraulically connected to major portions of the karst aquifer and therefore, if pumped, is unlikely to substantially affect the discharge of any individual spring or springs.

Three subsequent dye tracing studies were conducted on the central campus to evaluate the potential for building foundation pressure grouting programs to impact groundwater quality or flow rates at springs around the main residential campus. For each of these studies dye injected at the proposed grouting locations on the central campus was not detected at any of the off-campus monitoring points within each of the 18-week study periods, indicating that there are no rapid flow paths capable of moving water, grout or other fluid from the dye injection sites to off-campus springs. Because no rapid flow paths were identified, the studies concluded that pressure grouting programs in the areas tested would not have any significant impact on water recharge in the karst aquifer, or on water discharge rates or quality at springs, through leaching or grout transport (Weber, Hayes & Associates 2000, 2001a, 2001b).

GROUNDWATER RESOURCES OF THE REGION SURROUNDING THE MAIN RESIDENTIAL CAMPUS

The Purisima formation, Santa Margarita sandstone, and weathered granitic rocks are the main water bearing formations in the area surrounding the main residential campus. The Purisima formation underlies the eastern portions of the City of Santa Cruz and the adjacent communities of Soquel and Live Oak and is the primary source of groundwater in the Santa Cruz area. The City extracts groundwater from a network of wells installed in the Purisima formation, which accounts for approximately 5 percent of the City's water supply. Other water districts such as the Soquel Creek Water District and private wells also draw water from this formation (UCSC 2006).

In the area northwest of the main residential campus along Ben Lomond Mountain, private wells are installed in fractured and weathered granitic rock. These wells typically have low yields of 5 to 20 gpm, which are adequate for single households but not for larger developments (Johnson 1985).

Karst groundwater from fractures and solution cavities within the marble formation fed by captured surface runoff and groundwater flow from the north campus discharges to surface water in the surrounding areas via numerous springs and seeps which feed the drainages in the San Lorenzo River watershed to the north and east of the main residential campus; the Cave Gulch and Wilder Creek watersheds to the west of the main residential campus; and the Moore Creek, Arroyo Seco, and Jordan Gulch/Neary Lagoon watersheds south to southwest of the main residential campus (UCSC 2006). It is also likely that some of the groundwater originating on campus reaches the San Lorenzo River and the Pacific Ocean as subsurface flow (Johnson and Weber & Associates 1989).

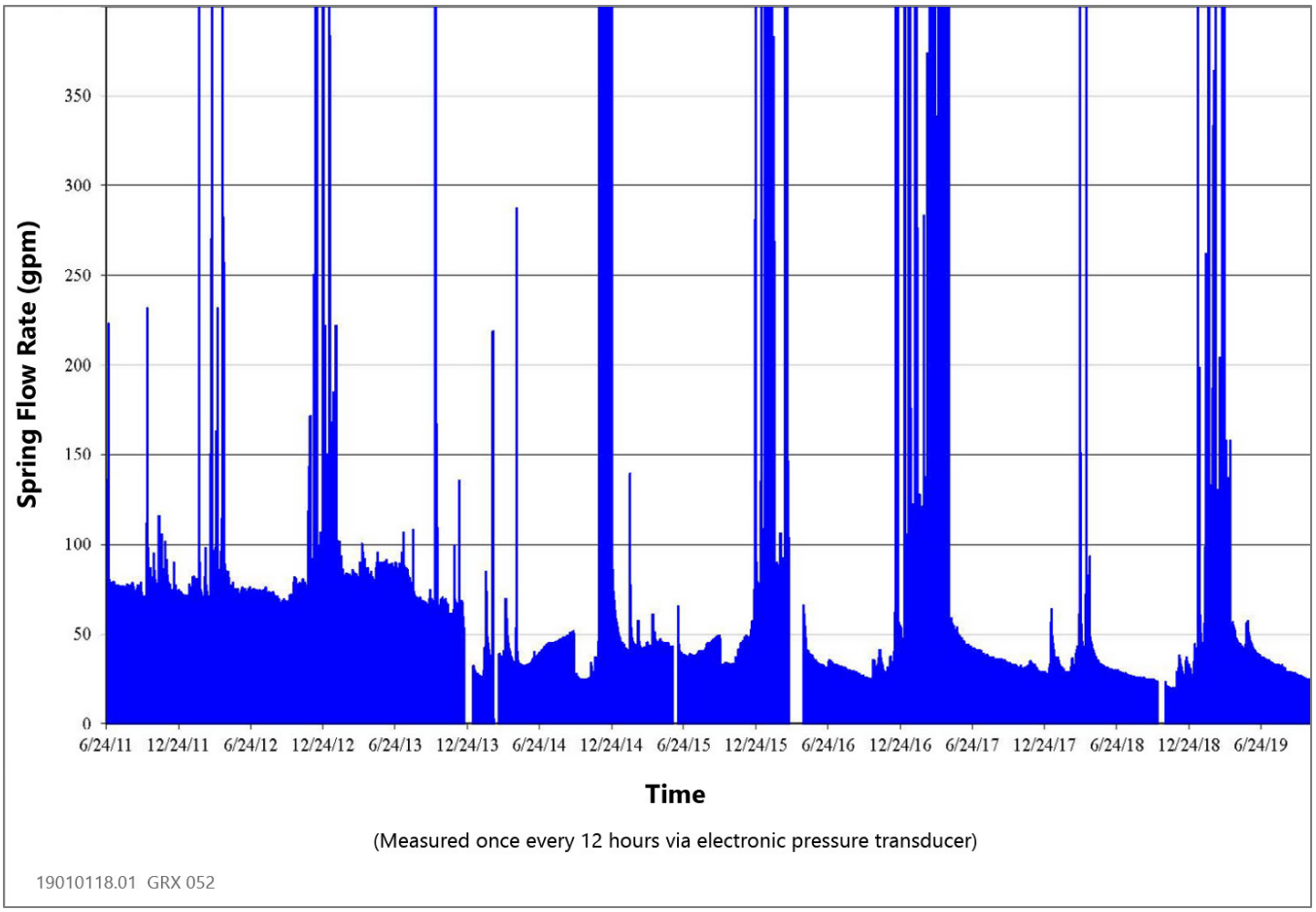
The springs and seeps that originate from the upper campus seep zone and feed the San Lorenzo River Watershed north and northeast of the upper campus include Tunnel Gulch Tributaries along the north campus boundary and Highway 9 Horse Trough Spring located along State Highway 9 above the San Lorenzo River immediately east of

upper campus. The karst springs and seeps that emerge east of the main residential campus boundary and flow toward the San Lorenzo River include Pogonip Springs #1 and #2, the Pogonip Creek Spring, Harvey West Seep, and Wagner Grove Seep. Southeast of the main residential campus boundary the karst springs that flow toward Neary Lagoon include Kalkar Quarry Spring, Messiah Lutheran Church Spring, High Street Spring, West Lake Spring, and Bay Street Spring. South of the main residential campus, the karst zone Arboretum and Moore Creek seeps feed Moore Creek, which flows to Antonelli Pond and the coastal plain. Along the western campus boundary, the Wilder Creek and Cave Gulch watersheds are fed by the Wilder Creek and Cave Gulch source seeps from the upper/north campus sandstone/schist seep zone, and the Upper and Lower Cave Gulch Springs, and Wilder Creek Spring from the karst aquifer (Johnson and Weber & Associates 1989).

UC SANTA CRUZ HYDROLOGIC MONITORING

Spring and Stream Flow Monitoring

Thirteen recognized springs, seeps or spring fed streams that are linked to the karst aquifer have been mapped to outcrop on- and off-campus. Monthly to semi-annual monitoring of flows from these surface water locations has been conducted by UC Santa Cruz since 1984; currently, nine are being monitored for flow monthly. In 2011, UC Santa Cruz obtained permission from the City of Santa Cruz Water Department (Water Department) to access and retrofit an existing weir that has been used by the Water Department to measure Bay Street Spring flow rates since 1980. The weir is housed inside a manhole on Water Department property just east of Bay Street, adjacent to, and upstream of the Bay Street Spring monitoring station that had been monitored since 1984. The weir was retrofitted with a stilling well and an electronic pressure transducer was installed and secured to the inside of the stilling well. The transducer is calibrated to record the height of water flowing over the 90 degree V-notch weir once every 12 hours in order to obtain high resolution spring flow monitoring data. A histogram of the continuous monitoring data that has been collected since June 2011 is shown on Figure 3.10-6. The high-resolution spring flow data confirms an almost immediate response to individual precipitation events and a strong seasonal trend of increased flow through the wet season, followed by a slow and steady period of reduced flow through the rest of the year during the drier months to base flow levels. Base flows are generally higher during wetter years and lower during the drier years. Construction related to the Bay Street Reservoir Replacement Project in 2013 (located ~500 feet north of the weir manhole) periodically and briefly affected observed spring flow at the weir manhole location due to brief diversions of the sub-drain system that delivers the spring water to this location. Following a mid-December 2013 diversion of the sub-drain system that was conducted in connection with the Bay Street Reservoir Replacement Project flows at the weir manhole dropped by more than half of the historic base flow rate (i.e., from about 65 gpm to less than 30 gpm). This is observed on Figure 3.10-6. It is suspected that when the sub-drain was plugged for downstream retrofitting the backpressure likely ruptured the historic piping resulting in upstream flow loss to the subsurface. All data collected following this incident appears to be erroneous with respect to the long-term record; however, strong seasonal trends are still observed.



Source: Data provided by 2NDNATURE in 2021.

Figure 3.10-6 Bay Street Spring Flow Data

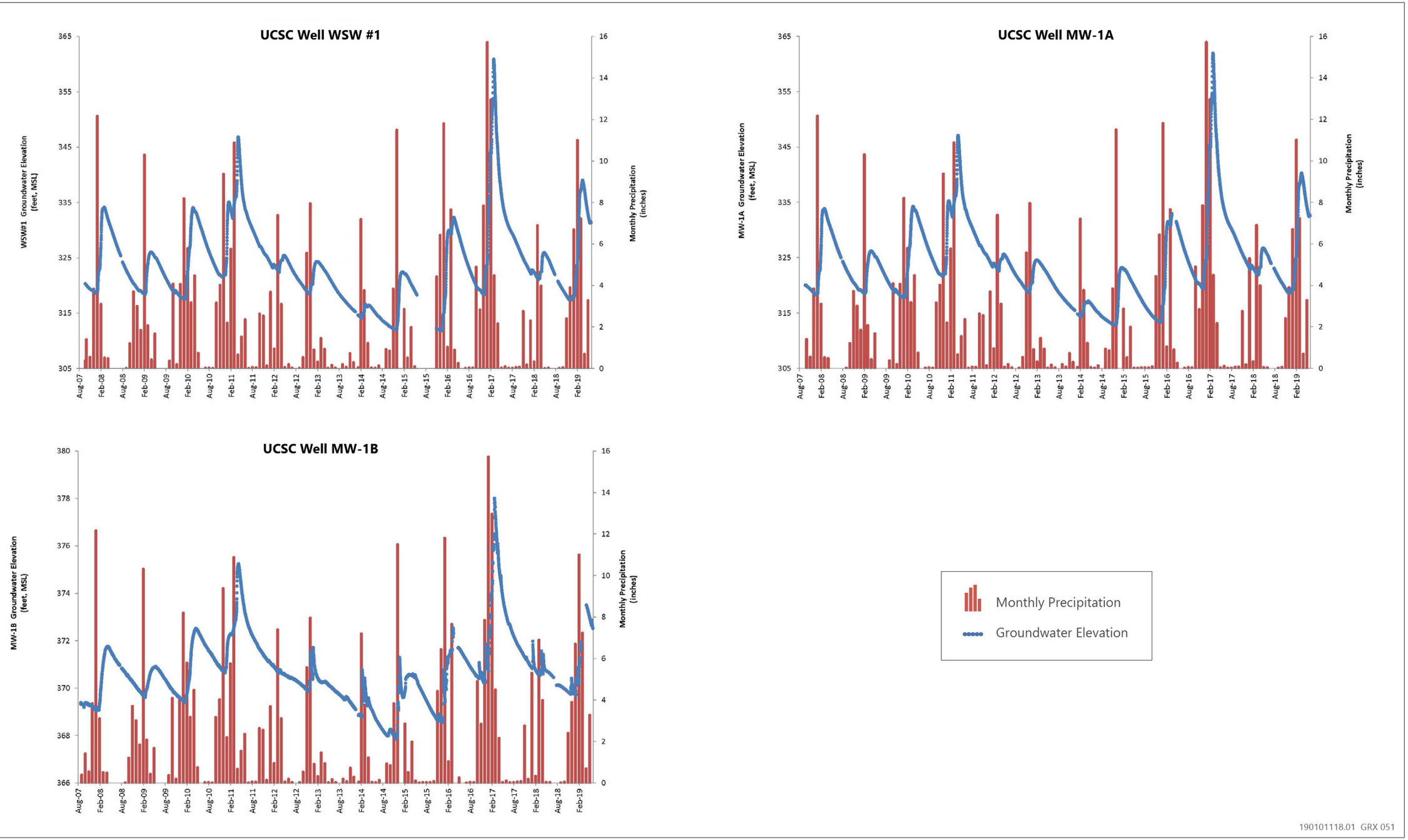
In addition, groundwater levels are measured in three wells that are completed in the karst aquifer in lower Jordan Gulch. The monitoring locations are shown on Figure 3.10-5. Because wet season measurements are influenced by the amount and timing of rainfall, there is more variation in wet season measurements. The dry season measurements represent base flow conditions and are therefore more suitable for year-to-year comparisons. The monitoring has indicated that development activities on campus have not created a measurable increase or decrease in flow rates at any of the springs and streams monitored, and have not affected groundwater elevations in on–campus monitoring wells (Weber, Hayes and Associates 2019a). A statistical summary of the monitoring data gathered by UC Santa Cruz since 1984 that is grouped by water year type, including average, maximum, minimum spring flows and standard deviation for spring or spring fed stream discharge data, and water surface elevations for the monitoring wells is presented in Table 3.10-5. Table G1-1 in Appendix G presents a summary of all monitoring data since 1984.

Continuous Water Level Monitoring

In August 2007, UC Santa Cruz installed dedicated electronic pressure transducers in wells WSW#1, MW-1A, and MW-1B, see Figure 3.10-5). The transducers are programmed to record water level data once every 12 hours to obtain high-resolution data of seasonal water level fluctuations in these wells. These transducers continue to record water levels to date. Hydrographs of water level fluctuations from wells WSW#1, MW-1A, and MW-1B along with superimposed monthly precipitation data are shown on Figure 3.10-7. The high-resolution data set confirms a strong seasonal trend of rapid groundwater recharge and water level rise after the start of winter rainfall followed by a slow and steady period of groundwater decline through the rest of the year during the drier months. Water levels in wells WSW#1 and MW-1A fluctuate in tandem, with nearly identical response to aquifer recharge and drainage. Seasonal water level rise observed in these wells since 2007 has ranged from approximately 43 feet during the wettest period monitored (i.e., ~36.5 inches of precipitation between December and March of the 2016-2017 water year) to approximately 2.5 feet during the 2013-2014 water year when only approximately 14 inches of precipitation was recorded for the entire water year. Data collected from well MW-1B indicates a similar recharge pattern as that observed in nearby wells WSW#1 and MW-1A, yet on a much smaller scale and with a time lag (i.e., observed to be on the order of a few days to several weeks). As noted in the Campus Wells Section, MW-1B is evidently completed in a separate hydraulic fracture regime, and shows a distinctly higher water level (i.e., 40 to 50 feet higher), and no pumping influence from pumping in WSW#1 in 1989 or 2007. Groundwater elevations are generally higher during wetter years and lower during the drier years. Most notably, during both wetter and drier years, dry season base water levels observed for wells WSW#1 and MW-1A have only varied by approximately 10 feet, with the base level following the driest years ever recorded in California state history being the lowest observed for the continuous water level monitoring data set. This relatively small fluctuation in base water levels from wetter years to several consecutive years of drought suggests a significant aquifer storage capacity in this area of the karst.

Surface Water and Groundwater Quality

Historically, UC Santa Cruz monitored water quality at nine spring, groundwater and/or surface locations on the main residential campus. Samples were collected to test the water quality of groundwater, spring water, and surface water. Samples collected at these locations were tested for general mineral, physical, and inorganic content and semi- to non-volatile range hydrocarbons (diesel-kerosene-motor oil range) and compared against performance criteria (e.g., water quality standards, guidelines, and benchmarks). This historic monitoring program was conducted between 1989 through 2008 pursuant to the 1988 LRDP Mitigation Measure 4.1-9. In 2009, UC Santa Cruz began monitoring storm water discharge from specific land use areas around campus as part of the University's Storm Water Management Program. Currently, samples are collected from seven surface locations and two wells (WSW#1 and Upper Quarry Well) during the first significant precipitation event of the wet season and are tested for general indicator storm water parameters, including pH, total suspended solids, specific conductance, and oil & grease. In addition, three of the surface water locations are tested for general mineral, physical, and inorganic content. An analysis of historic and recent sampling does not show an increase in urban runoff pollutants over time and there does not appear to be any significant identifiable water quality impacts from campus activities (Weber, Hayes and Associates 2019b).



Source: Data provided by 2NDNATURE in 2021.

Figure 3.10-7 Temporal Water Level Fluctuation and Monthly Precipitation Data for On-Campus Wells

Table 3.10-5 Statistical Summary of Spring and Stream Flow Rates and Groundwater Elevation

Location	Bay Street Spring	West Lake Outlet	Messiah Lutheran Spring	Kalkar Spring Quarry	High-Longview Spring	Wagner Grove Seep	Harvey West Seep	Pogonip Creek System	Pogonip Spring #1	Pogonip Spring #2	Upper Cave Gulch	Lower Cave Gulch	Wilder Creek Spring	Moore Creek Spring		MW-1A	MW-1B	WSW 1
Surface Elevation	235 ft MSL	255 ft MSL	255 ft MSL	310 ft MSL	250 ft MSL	200 ft MSL	110 ft MSL	150 ft MSL	435 ft MSL	500 ft MSL	540 ft MSL	330 ft MSL	330 ft MSL	410 ft MSL		424.84 (TOC, ft MSL)	418.69 (TOC, ft MSL)	416.41 (TOC, ft MSL)

Statistical Summary (Per Monitoring Event in Very Dry Years, < 23.5 in/yr precipitation)

Location	Bay Street Spring	West Lake Outlet	Messiah Lutheran Spring	Kalkar Spring Quarry	High-Longview Spring	Wagner Grove Seep	Harvey West Seep	Pogonip Creek System	Pogonip Spring #1	Pogonip Spring #2	Upper Cave Gulch	Lower Cave Gulch	Wilder Creek Spring	Moore Creek Spring		MW-1A	MW-1B	WSW 1
Flow Rate	gpm														**Total Q gpm**	**Ave. ft MSL**	**Ave. ft MSL**	**Ave. ft MSL**
Average	116.1	25.3	40.9	52.0	1.3	0	0.7	196.4	47.7	10.2	0	10.6	214.6	1.3	716.9	315.6	368.3	314.2
Std Dev (average only)	33.6	27.4	14.5	49.5	0.6	0	0.5	105.7	52.9	8.7	0	8.0	176.4	0.8	NA	5.6	1.1	2.0
Maximum	147.1	95.7	58.7	158.0	1.9	0	1.0	398.7	152.0	22.1	0	21.9	500.0	2.0	NA	327.0	370.4	316.2
Minimum	21.0	0.0	3.6	0.0	0.8	0	0.0	113.1	10.0	2.2	0	5.0	28.7	0	NA	310.5	367.3	312.1
Dry Season Average (June-Sept.)	104.3	8.8	31.0	26.8	0.8	0	0.5	162.1	17.8	3.1	0	5.0	102.0	1.0	463.1	313.5	367.8	312.1
Annual Flow	acre-feet/year														**Total Q acre-feet/ year**	**NA**	**NA**	**NA**
Average	187.2	40.7	65.9	83.9	2.1	0	1.1	316.8	76.9	16.4	0	17.2	346.1	2.0	1156.4	NA	NA	NA
Surface Elevation	235 ft MSL	255 ft MSL	255 ft MSL	310 ft MSL	250 ft MSL	200 ft MSL	110 ft MSL	150 ft MSL	435 ft MSL	500 ft MSL	540 ft MSL	330 ft MSL	330 ft MSL	410 ft MSL		424.84 (TOC, ft MSL)	418.69 (TOC, ft MSL)	416.41 (TOC, ft MSL)

Statistical Summary (Per Monitoring Event in Dry Years, 23.5 - 33.2 in/yr precipitation)

Location	Bay Street Spring	West Lake Outlet	Messiah Lutheran Spring	Kalkar Spring Quarry	High-Longview Spring	Wagner Grove Seep	Harvey West Seep	Pogonip Creek System	Pogonip Spring #1	Pogonip Spring #2	Upper Cave Gulch	Lower Cave Gulch	Wilder Creek Spring	Moore Creek Spring		MW-1A	MW-1B	WSW 1
Flow Rate	gpm														**Total Q gpm**	**Ave. ft MSL**	**Ave. ft MSL**	**Ave. ft MSL**
Average	117.4	39.6	48.1	80.2	27.0	0	3.4	191.0	24.7	7.8	9.1	6.9	274.5	3.6	833.3	315.6	366.3	324.3
Std Dev (average only)	32.3	39.3	17.2	58.5	18.0	0	5.3	46.3	40.0	8.6	8.5	3.1	417.3	7.7	NA	4.8	8.8	9.0
Maximum	180.0	175.9	108.2	245.8	70.4	0	18.8	390.7	201.0	40.0	23.5	12.6	2617.0	25.0	NA	323.2	370.4	369.1
Minimum	23.0	0.0	12.0	0.0	0.0	0	0.8	114.5	2.8	1.2	1.0	1.9	7.7	0.0	NA	308.1	321.1	313.0

Location	Bay Street Spring	West Lake Outlet	Messiah Lutheran Spring	Kalkar Spring Quarry	High-Longview Spring	Wagner Grove Seep	Harvey West Seep	Pogonip Creek System	Pogonip Spring #1	Pogonip Spring #2	Upper Cave Gulch	Lower Cave Gulch	Wilder Creek Spring	Moore Creek Spring		MW-1A	MW-1B	WSW 1
Dry Season Average (June-Sept.)	95.3	7.1	34.5	50.2	11.6	0	0.9	184.5	15.3	6.1	2.6	5.9	93.7	0.2	508.0	315.3	368.3	322.7
Annual Flow	acre-feet/year														**Total Q acre-feet/ year**	**NA**	**NA**	**NA**
Average	189.31	63.87	77.61	129.44	43.54	0	5.49	308.05	39.91	12.64	14.65	11.18	442.73	5.74	1344.15	NA	NA	NA
Surface Elevation	235 ft MSL	255 ft MSL	255 ft MSL	310 ft MSL	250 ft MSL	200 ft MSL	110 ft MSL	150 ft MSL	435 ft MSL	500 ft MSL	540 ft MSL	330 ft MSL	330 ft MSL	410 ft MSL		424.84 (TOC, ft MSL)	418.69 (TOC, ft MSL)	416.41 (TOC, ft MSL)

Statistical Summary (Per Monitoring Event in Normal Years, 33.2 - 51.1 in/yr precipitation)

Location	Bay Street Spring	West Lake Outlet	Messiah Lutheran Spring	Kalkar Spring Quarry	High-Longview Spring	Wagner Grove Seep	Harvey West Seep	Pogonip Creek System	Pogonip Spring #1	Pogonip Spring #2	Upper Cave Gulch	Lower Cave Gulch	Wilder Creek Spring	Moore Creek Spring		MW-1A	MW-1B	WSW 1
Flow Rate	gpm														**Total Q gpm**	**Ave. ft MSL**	**Ave. ft MSL**	**Ave. ft MSL**
Average	112.0	76.0	48.5	170.7	20.0	11.6	11.4	212.9	37.4	8.1	9.9	34.0	438.5	2.7	1,193.6	321.7	367.6	328.0
Std Dev (average only)	33.8	80.0	26.1	192.2	34.0	57.3	30.1	93.3	58.3	10.0	24.7	53.9	582.8	1.9	NA	7.4	5.7	7.0
Maximum	192.3	309.5	155.6	1110.6	116.0	298.3	157.9	559.5	329.0	48.7	117.9	175.0	3040.6	7.5	NA	340.5	372.7	339.0
Minimum	36.0	0.0	7.8	0.0	0.0	0.0	0.8	92.1	2.9	1.2	0.0	2.6	21.3	0.0	NA	310.7	336.8	311.8
Dry Season Average (June-Sept.)	88.0	21.9	38.1	120.9	0.0	0.0	3.1	189.4	20.4	4.3	0.9	13.5	186.0	1.5	687.9	320.8	368.9	328.3
Annual Flow	acre-feet/year														**Total Q acre-feet/ year**	**NA**	**NA**	**NA**
Average	180.7	122.6	78.2	275.4	32.2	18.7	18.4	343.4	60.4	13.1	16.0	54.8	707.3	4.3	1925.3	NA	NA	NA
Surface Elevation	235 ft MSL	255 ft MSL	255 ft MSL	310 ft MSL	250 ft MSL	200 ft MSL	110 ft MSL	150 ft MSL	435 ft MSL	500 ft MSL	540 ft MSL	330 ft MSL	330 ft MSL	410 ft MSL		424.84 (TOC, ft MSL)	418.69 (TOC, ft MSL)	416.41 (TOC, ft MSL)

Statistical Summary (Per Monitoring Event in Wet Years, 51.1 - 71.0 in/yr precipitation)

Location	Bay Street Spring	West Lake Outlet	Messiah Lutheran Spring	Kalkar Spring Quarry	High-Longview Spring	Wagner Grove Seep	Harvey West Seep	Pogonip Creek System	Pogonip Spring #1	Pogonip Spring #2	Upper Cave Gulch	Lower Cave Gulch	Wilder Creek Spring	Moore Creek Spring		MW-1A	MW-1B	WSW 1
Flow Rate	gpm														**Total Q gpm**	**Ave. ft MSL**	**Ave. ft MSL**	**Ave. ft MSL**

Location	Bay Street Spring	West Lake Outlet	Messiah Lutheran Spring	Kalkar Spring Quarry	High-Longview Spring	Wagner Grove Seep	Harvey West Seep	Pogonip Creek System	Pogonip Spring #1	Pogonip Spring #2	Upper Cave Gulch	Lower Cave Gulch	Wilder Creek Spring	Moore Creek Spring		MW-1A	MW-1B	WSW 1
Average	131.4	190.0	71.8	440.0	--	12.1	40.0	288.4	72.1	25.6	173.3	225.1	1054.8	8.5	2733.1	328.9	371.4	329.3
Std Dev (average only)	47.7	128.0	29.4	294.5	--	34.6	68.6	133.5	61.9	19.4	361.8	388.5	1266.6	6.8	NA	6.6	1.3	8.5
Maximum	230.9	406.8	135.4	971.5	--	115.7	181.6	574.7	233.5	64.6	1239.9	1357.5	4944.0	20.0	NA	340.0	373.1	344.6
Minimum	70.0	16.7	30.0	123.4	--	0.0	1.0	80.3	11.6	5.5	0.0	3.4	132.3	0.5	NA	319.9	369.5	316.4
Dry Season Average (June-Sept.)	94.3	59.8	52.5	159.0	--	0.0	1.5	303.3	38.8	9.9	0.0	27.0	212.8	1.2	960.1	327.2	371.1	327.3
Annual Flow	**acre-feet/year**														**Total Q acre-feet/ year**	**NA**	**NA**	**NA**
Average	212.0	306.5	115.7	709.7	--	19.6	64.5	465.2	116.2	41.3	279.5	363.0	1701.5	13.7	4408.5	NA	NA	NA
Surface Elevation	235 ft MSL	255 ft MSL	255 ft MSL	310 ft MSL	250 ft MSL	200 ft MSL	110 ft MSL	150 ft MSL	435 ft MSL	500 ft MSL	540 ft MSL	330 ft MSL	330 ft MSL	410 ft MSL		424.84 (TOC, ft MSL)	418.69 (TOC, ft MSL)	416.41 (TOC, ft MSL)

Statistical Summary (Per Monitoring Event in Very Wet Years, > 71.0 in/yr precipitation)

Location	Bay Street Spring	West Lake Outlet	Messiah Lutheran Spring	Kalkar Spring Quarry	High-Longview Spring	Wagner Grove Seep	Harvey West Seep	Pogonip Creek System	Pogonip Spring #1	Pogonip Spring #2	Upper Cave Gulch	Lower Cave Gulch	Wilder Creek Spring	Moore Creek Spring		MW-1A	MW-1B	WSW 1
Flow Rate	**gpm**														**Total Q gpm**	**Ave. ft MSL**	**Ave. ft MSL**	**Ave. ft MSL**
Average	84.2	197.3	105.2	875.8	--	3.9	9.4	365.3	271.3	30.1	189.6	126.8	992.4	10.6	3262.0		338.3	
Std Dev (average only)	29.5	181.4	78.3	762.7	--	3.9	4.4	187.3	290.1	24.7	189.6	121.0	785.6	11.1	NA		13.0	#DIV/0!
Maximum	116.0	451.1	236.6	1865.5	--	7.8	13.8	646.9	761.5	59.0	379.3	247.8	1991.6	29.2	NA		356.2	
Minimum	36.0	23.1	30.0	111.8	--	0.0	5.0	155.6	24.0	1.2	0.0	5.9	156.7	0.0	NA		324.1	
Dry Season Average (June-Sept.)	36.0	27.7	81.0	155.4	--	0.0	0.0	244.3	203.0	10.6	0.0	0.0	294.8	0.0	1052.8		327.8	326.6
Annual Flow	**acre-feet/year**														**Total Q acre-feet/ year**	**NA**	**NA**	**NA**
Average	135.9	318.2	169.8	1412.7	--	6.3	15.2	589.2	437.6	48.6	305.9	204.6	1600.8	17.0	5261.6	10523.3	NA	

Notes: gpm = gallons per minute, ft MSL = Feet above Mean Sea Level, TOC = Top of Casing elevation, NA = Not Applicable, Q = Discharge Flow

Source: UC Santa Cruz 2020.

3.10.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

- violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality;
- substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
  - result in substantial erosion or siltation on- site or off-site;
  - substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site;
  - create or contribute runoff water that would exceed the capacity of existing or planned stormwater- drainage systems or provide substantial additional sources of polluted runoff;
  - impede or redirect flood flows
- in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation; and/or
- conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

ANALYSIS METHODOLOGY

Evaluation of potential hydrologic and water quality impacts is based on a review of existing documents and studies that address water resources in the vicinity of the LRDP area. Information obtained from these sources was reviewed and summarized to describe existing conditions and to identify potential environmental effects, based on the standards of significance presented in this section. In determining the level of significance, the analysis assumes that implementation of the 2021 LRDP would comply with relevant federal, state, and local laws, ordinances, and regulations.

Surface Water

As noted above, the assessment of impacts to surface waters is based on a review of existing documents and studies related to surface water within the LRDP area and in the region. To ensure compliance with relevant federal, state, and local laws, ordinances, and regulations, UC Santa Cruz requires individual campus developments to comply with the Post Construction Stormwater Management Requirements (UC Santa Cruz Post-Construction Requirements) to provide water quality, runoff reduction, and peak management of stormwater equal to the volume of runoff generated by the 85th or 95th percentile 24-hour storm event, based on local rainfall data. In addition, UC Santa Cruz is evaluating options for providing a more comprehensive, integrated, and consistent approach to maintain the health and functionality of the existing campus storm drain system, natural drainages and karst system, as well as proposed improvements to those systems, and for the development of non-potable water supplies. These options would consider development envisioned under the 2021 LRDP, current water infrastructure planning, campus projects currently under development, and UC Santa Cruz's goals and aspirations for watershed health, water sustainability, and resilience to possibly provide solutions on a more district or area scale, instead of by individuals building.

Groundwater

Impacts from potential groundwater extraction were evaluated by examining previous hydrogeologic studies including aquifer pumping and recovery tests conducted on campus well WSW#1. To analyze potential effects of groundwater extraction from the karst aquifer, a water balance for the karst aquifer was estimated. The water balance

is a quantitative evaluation of groundwater recharge and is explained in terms of inputs (precipitation infiltration) and outputs (evapotranspiration, precipitation runoff, groundwater discharge via springs and groundwater underflow out of the area, and groundwater extraction via well pumping). For this analysis, hydrologic runoff modeling was completed for each of the main residential campus watersheds under existing land use conditions using the stormwater tool to estimate load reductions (TELR) (Beck et al. 2017) to generate annual percent runoff estimates that are used in the water balance calculations. A description of the modeling methodology, calculations and results are included in a technical memorandum prepared by 2NDNATURE, which is included as Appendix G.

ISSUES NOT EVALUATED FURTHER

Inundation by Tsunami, Seiche, or Mudflow

Tsunamis are large waves created by earthquakes, undersea landslides, or volcanic eruptions. Low-lying coastal areas such as tidal flats, marshes, and former bay margins that have been artificially filled are susceptible to inundation. The California Department of Conservation prepares tsunami inundation maps for coastal areas and all populated areas at risk to tsunami within the state based on the maximum tsunami threat for that area. Based on the tsunami inundation map prepared for Santa Cruz County (July 2009) there are few low-lying coastal areas of Santa Cruz County that are at risk from tsunami, which includes the low-lying area of Natural Bridges Sate Beach that continues inland to Antonelli Pond, which is immediately west of the Westside Research Park. However, the Westside Research Park itself and the camps is not mapped as being at risk; therefore, this issue is not evaluated further. Additionally, because the LRPD area is distant from any large, enclosed water bodies that could create seiche waves and located in relatively gently sloping topography or in areas dominantly comprised of hard, stable granitic and metamorphic rocks which underlie much of UC Santa Cruz where the risk of mudflow is minimal, these issues are also dismissed from further evaluation.

IMPACTS AND MITIGATION MEASURES

Impact 3.10-1: Violate Any Waste Discharge Requirements That Would Substantially Degrade Surface or Groundwater Quality

UC Santa Cruz does not discharge wastewater directly to any receiving water bodies; therefore, its wastewater is not subject to wastewater discharge requirements. Wastewater generated on the main residential campus and Westside Research Park is discharged to the City of Santa Cruz sewer system and is treated at the City's wastewater treatment plant. Therefore, implementation of the 2021 LRDP would result in a **less-than-significant** impact.

UC Santa Cruz, including the Westside Research Park, does not discharge wastewater directly to any receiving water bodies; therefore, its wastewater is not subject to wastewater discharge requirements. Wastewater generated on the main residential campus and Westside Research Park is discharged to the City of Santa Cruz sewer system and is treated at the City's wastewater treatment plant. Development under the 2021 LRDP would increase the volume of wastewater generated on campus by increasing both the UC Santa Cruz population and the number of campus buildings and facilities. As part of ongoing sustainability efforts, UC Santa Cruz evaluates the potential for on-site water recycling on a project-by-project basis, as demonstrated by the on-site water recycling system included as part of Student Housing West, which is a planned-but-not operational project (see Chapter 5, "Cumulative Impacts.") As part of Student Housing West, wastewater generated in new on-campus housing at both the Heller and Hagar sites will be collected and treated in wastewater treatment facilities that would be located within each respective site. The facilities would include a membrane bioreactor (MBR) plant to treat the wastewater and generate recycled water for irrigation and toilet flushing use. However, no campus-wide plan for water recycling is proposed. In general, the types of activities and uses in the LRDP area would remain largely unchanged, and therefore the quality of wastewater that is discharged to the sanitary sewer system would remain unchanged. The use of hazardous materials on campus is projected to increase under the 2021 LRDP because of increase laboratory space and campus populations. However, the types of chemicals and biological agents used in the future would likely be similar to those used in existing

laboratories on campus. As discussed in Section 3.9, "Hazards and Hazardous Materials," the UC Santa Cruz Environmental Health and Safety division implements comprehensive programs to handle hazardous waste. All new laboratories in the LRDP area would be required to comply with campus safety programs that regulate the handling, storage, and disposal of hazardous materials. Therefore, implementation of the 2021 LRDP would result in a **less-than-significant** impact.

Mitigation Measures

No mitigation is required.

Impact 3.10-2: Water Quality Impacts Related to Construction Activities

Construction activities associated with implementation of the 2021 LRDP would expose bare soil to rainfall and stormwater runoff, which could accelerate erosion and result in sedimentation of stormwater and, eventually discharge to receiving waterbodies. Construction-related projects in the LRDP area would be required to comply with the State Water Resources Control Board 2009-0009-DWQ Construction General Permit (CGP). Compliance with the CGP requires development of a Storm Water Pollution Prevention Plan (SWPPP) for projects disturbing 1 acre or more and the Campus Standards Handbook requires preparation of an Erosion Control and Sediment Control Plan for projects less than 1 acre. Compliance with the CGP and the Campus Standards Handbook would minimize erosion and sedimentation during construction. In addition, the design and operation of each new facility would adhere to UC Santa Cruz Post-Construction Stormwater Management Requirements (UC Santa Cruz Post-Construction Requirements). This program exists to ensure compliance with Central Coast Regional Water Quality Control Board Resolution R3-2013-0032. applicable laws and implementation of BMPs on the ground during construction. Therefore, implementation of the 2021 LRDP would not be expected to contribute substantial loads of sediment or other pollutants to stormwater or receiving waterbodies and would result in a **less-than-significant** impact.

Development under the 2021 LRDP would result in soil disturbance during construction of new facilities within the LRDP area. Removal of vegetation, excavation, grading, and stockpiling of soils for building foundations, roads, paths and driveways, and utility trenching would disturb soils that could accelerate erosion, especially during storm events if not properly managed. In addition to erosion and sedimentation, construction materials brought on site would also require containment from stormwater.

During construction, materials such as aggregate-base rock for roadway and parking area subgrade, sand bedding and backfill for utility lines, and base rock for building foundations would be brought to areas active construction sites. These materials could become exposed to stormwater and potentially result in runoff contamination. Areas of development on the main residential campus near karst features, such as sinkholes or swallow holes, could also potentially release contamination to groundwater. In addition, construction equipment that may contain toxic or hazardous substances, such as fuels, lubricants, oil, grease, and paint could also become exposed to stormwater runoff or to groundwater if they are not properly contained. Cumulative minor releases of contamination, or larger single releases (e.g., fuel spill) could result in adverse effects on surface and groundwater quality.

While potential stormwater related contamination during construction activities can pose a significant risk of impact to receiving waterbodies in the LRDP area, there are several layers of regulatory and programmatic elements that UC Santa Cruz is required to follow and implement when executing construction activities in the LRDP area. These include compliance with the SWRCB General Permit for Discharges of Stormwater Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ, the Stormwater Management Plan, Campus Standards Handbook, and the UC Santa Cruz Post-Construction Requirements, which are briefly described below.

For development under the 2021 LRDP that would disturb one or more acres of land, the contractor would be required to obtain coverage under the Construction General Permit before construction. To comply with the General Construction Permit, a SWPPP would be prepared and implemented with detailed measures to control soil erosion and waste discharges from project construction areas.

Imported fill and grading materials would be clean, chemically inert, and handled with appropriate BMPs to prevent contamination of stormwater. Erosion control barriers such as straw wattles, silt fences and mulching material would

be installed. Implementation of these standard erosion-control measures would reduce the potential for soil erosion and sedimentation of stormwater runoff during construction.

In the unlikely event that dewatering for an individual project is required, the SWPPP would include a dewatering plan, which would establish procedures to treat groundwater pumped from the site before discharge, and to prevent sediment and contaminant releases into groundwater during excavation. The SWPPP would also include protocols to clean up releases if they occur.

For projects less than one acre, the Campus Standards Handbook requires preparation of an Erosion Control and Sediment Control Plan, which ensures that, as part of project specific analysis, appropriate BMPs are incorporated into the project for compliance with Campus Standards Handbook. During construction, campus inspectors routinely inspect the project to confirm compliance with the project plans.

The primary objective of the UC Santa Cruz Post-Construction Requirements is to ensure that UC Santa Cruz is reducing pollutant discharges to the Maximum Extent Practicable and preventing stormwater discharges from causing or contributing to a violation of receiving water quality standards in all applicable development projects. Performance Requirements include site design and runoff reduction, water quality treatment, runoff retention and peak flow management. Water quality treatment for applicable projects include Low Impact Development, Biofiltration and Non-Retention Based treatment systems that are designed to meet water quality performance requirements for new or existing runoff generated from impervious surfaces. Hydraulic sizing criteria for these treatment systems and runoff retention must manage stormwater equal to the volume of runoff generated by the 85th or 95th percentile 24-hour storm event, based on local rainfall data. Post-development peak flows discharged from the project site must not exceed pre-project peak flows for the 2- through 10-year 24-hour storm events.

With continued regulatory compliance and implementation of program elements designed to reduce construction related impacts to water quality, the impacts from construction related activities in the LRDP area would be **less-than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.10-3: Alteration of Drainage Patterns and Increased Runoff

Development under the 2021 LRDP could alter drainage patterns, and increase the rate or amount of surface runoff, which could result in substantial siltation or erosion on or off site, and increase the amount of urban pollutants in storm water runoff, which could affect water quality. However, there are several layers of regulatory compliance and programmatic elements in place for new campus development that are designed to reduce runoff, peak flows and impacts to water quality and therefore, implementation of the 2021 LRDP would result in a **less-than-significant** impact.

Development under the 2021 LRDP would add new buildings, roads, paths, sidewalks, parking lots and other impervious surfaces to the LRDP area, which would generate more runoff compared to existing conditions, and could lead to more erosion in the drainages in the LRDP area and increased runoff of urban pollutants.

Pollutants, including sediment, entrained in urban runoff in high concentrations can adversely affect water quality and beneficial uses of the receiving waterbodies. As previously discussed, the campus SWMP ensures that UC Santa Cruz is legally fulfilling the requirements of its Phase II General Permit for Small Municipal Separate Storm Sewer System (i.e., Non-Traditional MS4 permit). Over the years UC Santa Cruz has constructed a variety of engineered facilities that convey runoff to the natural drainage channels that are designed to reduce erosion and impacts to water quality. These facilities include storm water detention basins and vaults, urban contaminant removal systems, biofiltration, engineered channels, catch basins, and bioswales. UC Santa Cruz also routinely performs street sweeping and parking lot cleaning, which also help reduce the amount of pollutants that enter storm water runoff. In addition to the SWMP, new campus developments must comply with the UC Santa Cruz Post-Construction Requirements, which are discussed in Impact 3.10-2, and are designed to reduce runoff, peak flow and water quality impacts. UC Santa Cruz is also considering options for providing a more comprehensive, integrated, and consistent approach to more

consistently determine site-specific runoff changes related to individual drainages, as well as cumulative watershed changes that will inform appropriate site design measures (if required) and in conformance with SWRCB Phase II NPDES requirements.

As described above, UC Santa Cruz conducts an annual water quality monitoring program. Historically, water quality sampling and laboratory analysis was conducted at several surface water, groundwater and spring locations between 1989 and 2008. In 2009, the campus began monitoring storm water discharge from specific land use areas around campus as part of the SWMP. Currently, samples are collected from seven surface locations and two wells (WSW#1 and Upper Quarry Well) during the first significant precipitation event of the wet season. An analysis of historic and recent sampling does not show an increase in urban runoff pollutants over time and there does not appear to be any significant identifiable water quality impacts from campus activities.

With continued regulatory compliance and implementation of program elements designed to reduce runoff, peak flows and impacts to water quality, the impacts from altering drainage and increasing runoff in the LRDP area would be **less-than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.10-4: Flood-Related Impacts

Development under the 2021 LRDP could alter drainage patterns in the LRDP area and would increase the rate or amount of surface runoff, which could exceed the capacity of storm water drainage systems, resulting in flooding on or off site. However, regulatory compliance and programmatic elements in place for new development in the LRDP area are designed to reduce runoff, peak flows and impacts to water quality and, therefore, implementation of the 2021 LRDP would result in a **less-than-significant** impact.

As previously discussed, UC Santa Cruz relies heavily on natural drainages to manage storm water in the LRDP area. As a result of the karst topography on the main residential campus, with sinkholes distributed in the channels and elsewhere throughout the central and lower campus, most storm water runoff from development reaches the karst aquifer by way of sinkholes and swallow holes and does not flow off the main residential campus. Flooding has historically occurred in the area of a few sinkholes on the main residential campus and southwest of the campus where Moore Creek flows through a culvert under an off-campus private road, Highview Drive.

Flooding on the main residential campus has historically been documented to occur at the locations of sinkholes that become inundated during significant precipitation events. Erosion has contributed to build-up of sediment in the sinkholes, which gradually limits their capacity to infiltrate runoff and can result in flooding. Three sinkholes identified in the *Stormwater and Drainage Masterplan* (Kennedy/Jenks Consultants 2004) were observed to be overflowing during the winter months of 2003 and 2004 following a wetter than average month of December. However, several of the completed storm water drainage improvements completed since 2005, which were included in the Infrastructure Improvements Project, have since diverted runoff from these critical sinkholes to mitigate sedimentation and overflow. There are no sink holes located on the Westside Research Park. Further, the portion of the Westside Research Park site that is located within the flood zone is limited to the far western edge of the property and is associated with Antonelli Pond. No development is currently anticipated within this portion of the Westside Research Park site.

New development under the 2021 LRDP could potentially cause new runoff to be diverted to sinkholes contributing to further build-up of sediment and loss of infiltration capacity. However, as noted previously, any development under the 2021 LRDP would comply with UC Santa Cruz Post-Construction Requirements for new development. Within the LRDP area, consistency with these requirements would involve retention of a substantial (i.e., 85th or 95th percentile storm event) amount of runoff and reduce peak flows. As noted previously, post-development peak flows may not exceed pre-project flows for the 2- through 10-year storm event. Compliance with existing regulations would effectively decrease the potential of sinkhole sedimentation and frequency of overflow by retaining and treating

stormwater flows on-site. Therefore, the potential for flooding impacts related to sinkhole overflow would be less than significant.

Historically flooding in the Moore Creek watershed, which includes Westside Research Park, near Highview Drive was partly attributed to an undersized stormwater conveyance pipe at Highview drive, which has in the past become clogged with in-channel debris at the entrance of this pipe causing significant ponding of stormwater runoff behind the road embankment (Kennedy/Jenks Consultants 2004). As noted above, this pipe was replaced and no longer results in localized flooding. In general, UC Santa Cruz Post-Construction Requirements which require compliance with SWRCB Phase II NPDES requirements would manage peak flow rates and reduce sediment flow in the LRDP area. Potential surface runoff on the Westside Research Park would also be conveyed to the existing storm drainage system that serves the existing facility or retained on-site. In addition to UC Santa Cruz Post-Construction Requirements managing peak flow rates, karst features intercept most of the surface flow, even during extreme rainfall events. As a result, surface runoff from the main residential campus is usually low overall compared to other areas with similar rainfall. In addition, runoff from the Moore Creek watershed that does not enter the on-campus karst would be detained by the Arboretum Pond system, which would further reduce peak flows. The Arboretum Pond and the two basins created by the East and West Dams have a reported combined capacity of about 35 acre-feet below the elevation of the Arboretum Dam spillway pipe, the West Dam outlet, and the crest of the East Dam. This capacity is large enough to contain runoff from a 50-year storm if all existing sinkholes are plugged, or a 100-year storm if the existing sinkholes remain open (UCSC 2006). Because adequate storage capacity is available in the Arboretum Pond system, impacts related to flooding off campus would be **less-than-significant**.

Mitigation Measures

No mitigation is required.

Impact 3.10-5: Impacts to Karst Aquifer Supply, Recharge and Groundwater Quality

Potential impacts on groundwater that could result under the 2021 LRDP include: 1) reduced spring flows and lowering of aquifer water levels as a result of a reduction in recharge due to increased impervious surfaces, and as a result of potential groundwater extraction in the event that groundwater pumping is implemented to reduce demand for water from the City's water supply, and 2) impacts to groundwater quality from contaminated surface runoff. Impacts associated with new development on the karst aquifer would be **potentially significant**.

As previously described, the main residential campus is divided into two distinct hydrogeologic systems. Impacts on groundwater volume, spring flow and quality are discussed below separately for each of the two hydrogeologic systems.

North Campus

No groundwater extraction is planned for the upper/north campus aquifer, and therefore no groundwater extraction-related effects on the upper/north campus seeps and springs or on seeps, springs, and domestic water supply wells in the Cave Gulch area.

Impacts Associated with New Impervious Surfaces

Several currently undeveloped areas along the upper/north campus are proposed for development under the 2021 LRDP. New impervious areas would overlie the north campus groundwater system. Infiltration of rainfall is a significant source of recharge of the shallow aquifer on the north campus. Although this shallow groundwater is not extracted as a water source on the campus, it supplies water to springs and seeps located throughout the north campus and in adjacent drainages such as Cave Gulch and Wilder Creek. However as noted previously, UC Santa Cruz Post-Construction Requirements require new developments to retain a substantial portion (i.e., 85th or 95th percentile storm event) of pre-development runoff onsite, which would prevent a reduction in flow to springs and seeps. As noted previously and consistent with existing requirements, post-development peak flows would also not exceed pre-project flows for the 2- through 10-year storm event. As noted previously, UC Santa Cruz is also considering options to more consistently evaluate and determine site-specific runoff changes, as well as cumulative watershed changes that will inform appropriate site design measures (if required) and in conformance with SWRCB

Phase II NPDES requirements. This evaluation will help to inform appropriate design measures, including those related to new impervious surfaces. Nonetheless, due to requirements in place as part of the UC Santa Cruz Post-Construction Requirements, the impact within the north campus would be **less than significant**.

Mitigation Measures

No mitigation is required.

Central/Lower Campus

Impacts Associated with New Impervious Surfaces

UC Santa Cruz activities under the 2021 LRDP that could affect the karst aquifer in the central/lower campus include: 1) the addition of new impervious surfaces that could potentially alter recharge to the karst aquifer, and 2) construction of new buildings in areas of karst that could require the use of pressure grouting to stabilize soft soils. The combined effect of these activities could result in the reduction of groundwater levels, which in turn could potentially affect off-site spring flow.

Watersheds that overlie the karst aquifer include Jordan Gulch, Moore Creek and portions of the San Lorenzo-Pogonip Watershed. As previously discussed, much of the runoff is captured within the Jordan Gulch and Moore Creek Watersheds and infiltrated on the main residential campus via karst features (e.g., sinkholes and swallow holes) and as a result, little to no runoff leaves campus as surface flow. An increase in impervious surfaces would be substantial under the 2021 LRDP; however, as described in Impact 3.10-2, any new development must comply with the UC Santa Cruz Post-Construction Requirements which require the on-site retention of stormwater equal to the volume of runoff generated by the 85th or 95th percentile 24-hour storm event, and therefore would continue to recharge the karst aquifer and would not result in a net deficit. UC Santa Cruz is also engaging in planning that would be implemented to provide a comprehensive, integrated, and consistent approach to maintain the health and functionality of the existing karst system. This planning would also take into consideration development envisioned under the 2021 LRDP, current water infrastructure planning, campus projects currently under development, and UC Santa Cruz's goals and aspirations for watershed health, water sustainability and resilience to further ensure that net deficits or increases to the karst aquifer would not occur. As a result, impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impacts Associated with Pressure Grouting

In the past, UC Santa Cruz has employed pressure grouting to densify and stabilize soft soils associated with dolines that may be present under a building site by injecting cement grout into the soil. For this application UC Santa Cruz has conducted dye tracing studies to determine if specific building sites are hydrologically linked to springs and/or wells in the karst system and whether the introduction of grout could affect groundwater quality or flow rates at springs around the campus. Results of these previous dye trace studies conducted for building sites on the central campus confirmed no detections of dye at any of the off-campus monitoring points within each of the 18-week study periods, indicating that there are no rapid flow paths capable of moving water, grout, or other fluid from the dye injection sites to off campus springs. The grout is introduced near the ground surface, and not at or below the water table. The grout that is pumped is extremely stiff and does not flow without high pumping pressures. Extreme care is taken not to pump excessive amounts of grout into bedrock voids and crevices. Injection pressures are monitored during the grout placement to ensure that grout is not entering the marble but into the soil as intended. In some cases, if the pocket of soft soil being grouted is large, the grouting is stopped for a day or two to allow the grout to cure, which ensures that the grout is not lost to voids. Because of all these precautions, the pressure grouting program that the campus has employed has not resulted in impacts to water flow or degradation of water quality. However, impacts to water quality and/or spring flow resulting from this practice could be **potentially significant** if not adequately addressed.

Mitigation Measures

Mitigation Measure 3.10-5a: Procedures for Building on Karst Where Groundwater is Encountered and Where Pressure Grouting is Considered

For projects involving construction on karst as determined by the geotechnical investigation, if 1) groundwater is encountered beneath the building site, and 2) the proposed building foundation design includes pressure grouting, UC Santa Cruz shall complete a dye tracing study to confirm potential hydrologic connectivity of the building site with springs around the campus or campus wells. If the study confirms the building site to be hydrologically linked to springs and/or wells in the karst system, then alternative building foundation designs will be implemented.

Significance after Mitigation

Mitigation Measure 3.10-5a would ensure that campus pressure grouting practices necessary for stabilizing soft soils at karst building sites would not impact karst groundwater quality nor would it affect offsite spring flows, and therefore the potential impact would be **less than significant**.

Impacts Associated with Groundwater Extraction

The City of Santa Cruz supplies water for potable and non-potable uses to the campus. The campus may operate an existing well (WSW #1) located adjacent to the CASFS in Jordan Gulch to extract groundwater for non-potable use to off-set irrigation demand for the CASFS and the Arboretum, to reduce the campus's demand for water from the City's during drought years, or in the event that the City does not provide water to some portions of the campus (See Section 3.17, "Utilities" for more information on water supply and demand.) Existing annual demand for the CASFS and Arboretum is approximately 4.6 and 5.0 million gallons per year (MGY), respectively or 14.13 and 15.35 acre-ft/yr, respectively, and is projected to increase to 5.7 and 6.3 MGY, respectively or 17.5 and 19.35 acre-ft/yr, respectively, by 2040 (Sherwood 2020). As discussed above, well WSW#1 is capable of sustainably pumping approximately 92.5 gpm with very limited drawdown and no observable effects to off-site spring flow. This sustainable flow rate is equivalent to approximately 48.6 MGY or 149 acre-ft/yr (refer to Section 3.17, "Utilities" for more information on water supply and demand).

To analyze the effects of potentially withdrawing a total approximate volume of 29.5 acre-ft/yr (existing) or 36.9 acre-ft/yr (projected to 2040) a hydrogeologic water balance for the karst groundwater basin was prepared and is included as Table G1-2 (see Appendix G). The watershed area directly or indirectly recharging the on-campus karst aquifer consists of approximately 2,355 acres, of which approximately 672 acres are off-campus. A campus average annual rainfall amount of 41.4 inches has been estimated based on the stormwater tool to estimate load reductions (TELR) (Beck et al. 2017) modeling calculations for various 24-hr precipitation depths and the average annual number of days with measurable precipitation to represent the overall distribution and total average annual depths. The rainfall estimates were obtained from the PRISM Climate Group (2004) at Oregon State University (2NDNATURE 2020). Runoff percentage is estimated for each watershed based on the stormwater TELR modeling results (Appendix G), with a combined annual average of 8.6 inches. It's important to note that runoff analysis embeds losses to evapotranspiration. The estimated mean annual recharge for the karst aquifer under existing conditions is approximately 36.9 inches, or 7,668 acre-ft/ year. Of this total, based on historic spring and stream discharge data (which is summarized in Table 3.10-5), approximately 2,083 acre-ft/ year is surface discharge, including spring flow and groundwater-fed surface stream base flow. By subtracting the groundwater discharge from recharge, the groundwater budget yields a surplus of approximately 5,585 acre-ft/ year, which is assumed to leave the campus area as subsurface outflow. Additionally, the groundwater storage capacity within void spaces in the karst aquifer is estimated to be at least 3,000 acre-feet (Johnson and Weber & Associates 1989). Similarly and with respect to the potential for groundwater use to offset potable water demand, additional pumping up to the capacity of the existing well could result in approximately 110 additional acre-ft/year, which would result in very limited drawdown and no observable effects to off-site spring flow. The water that would be extracted would represent a small fraction of the total volume of groundwater in the karst aquifer (i.e., less than 5 percent, depending on rainfall conditions [i.e., drought]) and have negligible effect on the karst aquifer and spring discharge. therefore the impact from potential groundwater extraction from the karst for the land use areas described above would be **less than significant**. However, because subsurface flow in the karst aquifer system is not well understood implementation of Mitigation

Measure 3.10-5b would ensure that any long-term pumping from the aquifer would not result in a net deficit in aquifer volume or a significant reduction in spring discharge.

Mitigation Measures

Mitigation Measure 3.10-5b: On-Going Groundwater Level and Spring Flow Monitoring

If the existing well WSW#1 or a new groundwater well is used for extraction, UC Santa Cruz shall perform monitoring of water levels within that well and any other campus wells completed in the karst aquifer on a continuous basis when groundwater pumping occurs. UC Santa Cruz shall also conduct, at a minimum, monthly flow monitoring of those springs in the vicinity of the LRDP area shown to be connected to the well via a dye tracing study or other applicable testing method for the duration of groundwater pumping to determine whether there is any long-term decline in water levels or spring discharge. Monitoring of the springs shall also include an assessment of surface water resources (i.e., habitats, plant species, and wildlife species) for a distance of 500 feet downgradient from the daylighting of connected springs at least 30 days prior to and after groundwater pumping to determine if there are any changes or adverse effects in the condition of these resources that may be attributed to changes in spring discharge as a result of groundwater pumping.

If monitoring of water levels and spring flows indicates that UC Santa Cruz extraction of groundwater is contributing to a net deficit in aquifer volume, as indicated by a substantial decrease in average base flow water levels in any monitored wells or a substantial reduction of base flows in monitored springs, the campus will terminate or reduce its use of groundwater from the aquifer. A substantial decrease shall constitute observations of a continual decreasing trend in base groundwater water levels over a 3-5 year period coupled with a decrease in spring base flow conditions, beyond the standard deviation for any given spring, for a corresponding water year type. The average base water levels and base flows in springs will be defined through a statistical analysis of historic data, grouped by water year types. As new monitoring data becomes available, UC Santa Cruz will continually update the statistical analysis.

Significance after Mitigation

Mitigation Measure 3.10-5b would ensure that UC Santa Cruz monitors water levels and define average base water levels to ensure that extraction does not contribute to a net deficit in aquifer volume. In the event that extraction contributes to a net deficit, UC Santa Cruz would terminate or reduce groundwater extraction. Therefore, the impact to groundwater levels would be **less than significant**.

3.11 LAND USE AND PLANNING

This section evaluates the potential environmental impacts that could result from conflicts with land use plans and policies from buildout of the 2021 LRDP. A description of the LRDP area's existing characteristics and setting is followed by an analysis focused on the relationship between the 2021 LRDP and existing plans and policies, and the relationship with proposed on-site and existing adjacent land uses.

Comments received on the NOP (see Appendix B) related to land use and planning included concerns regarding consistency with existing City and County plans and changes to land use designations within the LRDP area. All land use–related comments are addressed in the environmental analysis of this section. These issues are considered and addressed below, where applicable. Refer to Appendix B for comments received on the NOP.

3.11.1 Regulatory Setting

FEDERAL

There are no federal plans, policies, regulations, or laws related to land use and planning that would affect the 2021 LRDP.

STATE

California Coastal Act

The California Coastal Act was passed in 1976 to officially recognize the California Coastal Zone as a unique resource and delicately balanced ecosystem of value to all people. The California Coastal Act established detailed policies for permanent coastal management and states five main goals under PRC Section 30001.5. In summary, these goals aim to protect the coastal areas and restore them as needed, promote public access and recreation while upholding private property rights, and coordinate with local governments for planning and development that fosters mutual benefits. In most cases, the power vested in this act is transferred to individual jurisdictions along the coast, which are then required to adopt Local Coastal Programs (LCPs). In 1990 and 1994, the City of Santa Cruz and County, respectively, combined the LCP with updates to their General Plans. As UC Santa Cruz is a state agency, campus lands are not included in either of these general plans or LCPs. Nevertheless, UC Santa Cruz must comply independently with the requirements of the Coastal Act. Westside Research Park (2300 Delaware) and the portion of the main residential campus that is located to the west and south of Empire Grade are within the Coastal Zone.

UNIVERSITY OF CALIFORNIA

Ranch View Terrace Habitat Conservation Plan

Pursuant to an Implementing Agreement and Habitat Conservation Plan (HCP) that was approved by UC Santa Cruz in 2005, UC Santa Cruz agreed to protect two areas within the campus as habitat for California red-legged frog and Ohlone tiger beetle (UC Santa Cruz 2005). These protected areas are designated as Campus Habitat Reserve in the 2005 LRDP. The Campus Habitat Reserve is comprised of two mitigation parcels: Inclusionary Area A (IAA) preserve, which is 12.5 acres and located adjacent to Wilder Creek, and Inclusionary Area D (IAD) preserve, which is 13 acres and located west of the main entrance along the southern border of the campus. Both IAA and IAD were preserved as part of an Incidental Take Permit (ITP) for the Ranch View Terrace HCP. IAA is preserved in perpetuity and IAD is preserved through the ITP term of 60 years. As noted in Chapter 2, "Project Description," and discussed in further detail below, the 2021 LRDP includes an employee housing overlay of IAD, which would require a modification to the HCP if it were be developed in the future. Impacts related to conflicts with the Ranch View Terrace HCP are evaluated in Section 3.5, "Biological Resources."

LOCAL

As noted in Section 3.0.1, "University of California Autonomy," UC Santa Cruz, a constitutionally created state entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the university's education purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

Association of Monterey Bay Area Governments

The Association of Monterey Bay Area Governments (AMBAG) was organized in 1968 for the purpose of regional collaboration and problem solving. AMBAG was formed as a Joint Powers Authority governed by a 24-member Board of Directors composed of elected officials from each city and county within the region. The AMBAG region includes Monterey, San Benito, and Santa Cruz Counties. AMBAG serves as both a federally designated Metropolitan Planning Organization and Council of Governments. Among its many duties, AMBAG prepares regional housing, population, and employment forecasts that are used in a variety of regional plans, including the Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS).

The 2040 MTP/SCS was adopted in 2018 and is the current MTP/SCS for the Monterey Bay Area. As part of the 2040 MTP/SCS, AMBAG worked closely with stakeholders to develop a new growth forecast and an updated multimodal transportation network with land use patterns and strategies based on reasonably available revenues. The regional growth forecast expressed and included as part of the 2040 MTP/SCS identifies a growth in student enrollment by 2040 to 27,000-28,000 FTE students (AMBAG 2018).

County of Santa Cruz General Plan

The County of Santa Cruz General Plan was adopted in December 1994 and most recently amended in February 2020. The County of Santa Cruz General Plan contains the following policies related to land use and planning in the county and that may be relevant to the 2021 LRDP:

- **Policy 2.1.4:** Locate new residential, commercial, or industrial development, within, next to, or in close proximity to existing developed areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on environmental and natural resources, including coastal resources.
- **Policy 2.21.1:** Utilize a Public Facility/Institutional land use designation on the General Plan and LCP Land Use Maps to designate public and quasi-public facility uses and integrally related public facility support facilities. Recognize an intensity of use for existing public and private institutions at existing levels of development.
- **Policy 2.21.3:** Utilize Public Facility/Institutional land use designations exclusively for the public or quasi-public facility activity and appropriate ancillary uses at the site, and prohibit private uses more appropriately found under other General Plan and LCP Land Use Plan designations.
- **Policy 2.22.1:** Priority of Uses within the Coastal Zone. Maintain a hierarchy of land use priorities within the Coastal Zone:
  - First Priority: Agriculture and coastal-dependent industry
  - Second Priority: Recreation, including public parks; visitor serving commercial uses; and coastal recreation facilities.
  - Third Priority: Private residential, general industrial, and general commercial uses.
- **Policy 2.22.2:** Maintaining Priority Uses. Prohibit the conversion of any existing priority use to another use, except for another use of equal or higher priority.

City of Santa Cruz General Plan

The City of Santa Cruz adopted is general plan in June 2012. The City of Santa Cruz 2030 General Plan contains the following policies that are related to land use and planning in the city and that may be relevant to the 2021 LRDP:

- **Policy LU2.2.2:** Pursuant to the UC Santa Cruz/City Comprehensive Settlement Agreement amend the City's Sphere of Influence to add approximately 374 acres of the north campus area.
- **Policy LU2.3.1:** Protect, maintain, and enhance publicly accessible coastal and open space areas.
- **Policy LU2.3.4:** Encourage the continued preservation of portions of the UC Santa Cruz campus in open space uses pursuant to the UC Santa Cruz Long Range Development Plan.
- **Policy LU3.11.1:** Continue to recognize and protect the Pacific Ocean, Monterey Bay, and the Monterey Bay National Marine Sanctuary as natural resources and valuable open space.
- **Policy LU4.2.4:** Encourage the location of University-serving shopping and services on University lands.

3.11.2 Environmental Setting

Land use planning is used to direct the amount, type, and location of different land uses and to coordinate anticipated development efforts for long-term efficiency of land uses and developed systems (circulation, infrastructure, building space) within a planning area. This section describes the existing conditions related to land use and the existing land use designations within the LRDP area.

LAND USE DESIGNATIONS WITHIN THE LRDP AREA

The UC Santa Cruz main residential campus, located within Santa Cruz County and in the city of Santa Cruz, is approximately 2,000 acres in size. Approximately 53 percent of the main residential campus is located within the incorporated boundary of the city of Santa Cruz with the remaining acreage located within unincorporated Santa Cruz County. The Westside Research Park, which is also a part of the LRDP area, is located at 2300 Delaware Avenue on the west side of the city of Santa Cruz and within the Coastal Zone.

Current land uses within the LRDP area that were established under the 2005 LRDP are described below and shown in Figure 3.11-1 and Table 3.11-1.

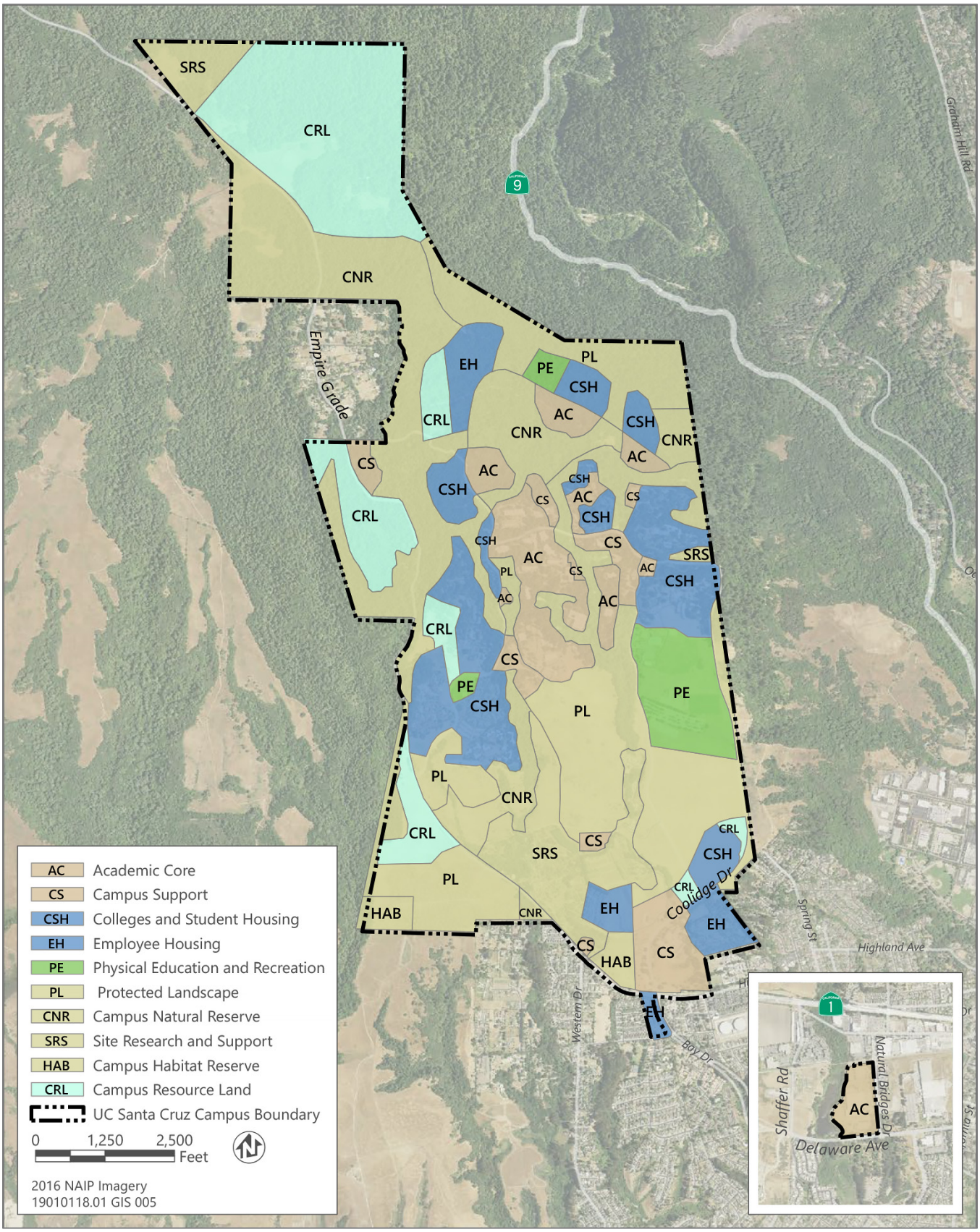
Table 3.11-1 Existing Land Use Designation Acreage

Land Use	Existing Acreage Under the 2005 LRDP[1]
Academic Core	150
Campus Support	89
Colleges and Student Housing	245
Employee Housing	75
Physical Education and Recreation	86
Campus Resource Lands	318
Campus Natural Reserve	410
Site Research and Support	152
Protected Landscape	503
Campus Habitat Reserve	26
Total Acreage[2]	**2,055**

[1] Two minor amendments were made to the 2005 Land Use Map. In 2016, Phase 1 of the Recycling Yard Project amended the LRDP by converting 1.6 acres of land from Protected Landscape to Campus Support and 2.1 acres of land from Site Research and Support to Campus Support for a total of 3.7 acres converted to Campus Support. In 2019, approximately 17 acres of land were re-designated from Campus Resource Land to Colleges and Student Housing in an LRDP amendment for the Student Housing West Project, which was approved by the Regents in 2019.

[2] Acreages are approximate, include rounding, and are based on 2005 LRDP, Draft 2021 LRDP, County parcel information, and GIS data.

Source: UC Santa Cruz 2005



Source: data downloaded from Santa Cruz County in 2019

Figure 3.11-1 Land Use-2005

Academic Land Use Designations

Academic Core

Under the 2005 LRDP, the Academic Core (AC) is intended to provide space and flexibility for future expansion in the north campus for needs anticipated under this plan, including potential professional schools and research functions. In the 2005 LRDP, the boundary of the AC was defined by Heller Drive to the west, the Great Meadow to the south, Hagar Drive to the east, and a potential loop road to the north of McLaughlin Drive. Facilities to accommodate the following building program elements are the principal uses sited in the Academic Core: Instruction and Research, Organized Research, Academic Support, Libraries, Student Services, Public Services, and Institutional Support.

Campus Support

The Campus Support (CS) land use designation accommodates support facilities, such as the central heating and cogeneration plants, maintenance shops, and equipment storage areas; buildings that house campus support departments, including the Physical Plant, Purchasing and Business Contracts, Physical Planning and Construction, University Police and Fire Departments, childcare centers and University Relations; and other support and service facilities. The largest area of CS within the main residential campus is located at the south entrance to the campus and accommodates both public functions and operations-oriented functions in the corporation yard. Additionally, some facility and operational corporation yard functions are located at an 8-acre site off Empire Grade.

Site Research and Support

Site Research and Support (SRS) occurs within three different portions of the LRDP area. The first of these occurs in the lower campus and includes land currently used by the Center for Agroecology and Sustainable Food Systems and the UC Santa Cruz Arboretum. The second and third areas for SRS are Chadwick Garden at the east end of McLaughlin Drive and 33 acres in the northwestern corner of the main residential campus, where there is no existing or proposed development. As necessary, the development of new buildings associated with these and future approved research programs is allowable within these designated areas. The principal program elements associated with this land use are Social Sciences, Physical and Biological Sciences, Student Services, and Public Services.

Residential Land Use Designations

Colleges and Student Housing

The college arc surrounding the academic core is designated Colleges and Student Housing (CSH). This area occupies land to the east, north, and west of the academic core, and accommodates construction of new colleges, expansion of existing colleges through infill, new undergraduate and graduate student housing, and family student housing projects. In addition, housing-related parking and recreational amenities are provided in the CSH area. Residential facilities include both residence hall, apartment style, and various suite-type accommodations.

The principal program elements permitted in Colleges and Student Housing include Housing and Food Services, related recreational amenities, related parking, Student Services, Academic Support, Family Student Housing, Childcare, and Physical Education and Recreation. Some facilities for the academic divisions are located in the colleges; it is also anticipated that new colleges will house some Instruction and Research space.

Employee Housing

Employee Housing (EH) designations occur in two primary areas of the main residential campus. Existing employee housing near the south entrance, including Ranch View Terrace, occupies approximately 42 acres. A second area to the north is designated for future development of employee housing. Housing for faculty and staff, childcare facilities, and related accessory buildings are consistent with this land use, together with associated parking and recreation space.

Open Space Land Use Designations

Physical Education and Recreation

Physical Education and Recreation (PE) designations occur within three areas of the main residential campus. Two of these areas, located east and west of the Academic Core, accommodate PE. The western area does not have sufficient remaining undeveloped space for expansion of PE and Recreation facilities. The east area includes adequate space for additional indoor recreation facilities, playing fields, and courts. A third area to the north is currently undeveloped and could accommodate a significant increase in indoor facilities, playing fields, courts, and other recreation facilities, thereby providing a more balanced distribution of recreation opportunities across the campus. This land use designation can also accommodate parking and transit facilities. As identified in the 2005 LRDP, a future recreation and events center could be located within this land use.

Campus Resource Land

The 2005 LRDP land use plan designates additional undeveloped land, mainly located in the far north campus and areas in the Coastal Zone west of Empire Grade and west of Porter College, to the Campus Resource Land (CRL) category. This land use designation is assigned to lands that have not been previously planned for development. 2005 LRDP envisioned that these lands would be maintained in their natural state to serve as long-term reserve lands for future use.

Campus Natural Reserve

Under the 2005 LRDP, Campus Natural Reserve (CNR) was established to protect certain of the campus's natural features and processes for teaching and research. Land under this designation remains in its natural state (except as required for maintenance), as teaching and research reserve. Construction in the CNR area is prohibited, except as required in conjunction with teaching and research in the area, or the limited construction of utilities, roads, and paths. One section of the CNR, the Lower Moore Creek area adjacent to the Arboretum, is jointly managed under the direction of the UC Santa Cruz Campus Natural Reserve and the Arboretum and includes a California regional native plant garden, California red-legged frog habitat improvements, and other support and interpretive structures.

Protected Landscape

The natural landscape of UC Santa Cruz has been recognized from the campus's inception as a unique asset that distinguishes UC Santa Cruz from other universities. In addition to the 420 acres in the CNR, approximately 503 acres of land have been designated as Protected Landscape (PL) in order to maintain special campus landscapes for their scenic value and to maintain special vegetation and wildlife continuity zones. To the extent feasible, PL will be retained in an undeveloped state as the campus grows. Any development within PL will not impinge on its overall character.

Under the 2005 LRDP, the meadows south of the developed center of the campus is proposed to be maintained as undisturbed grassland. In these meadows, no building will be allowed. Agricultural research that maintains the visual quality of the lower meadows may be allowed.

Campus Habitat Reserve

Two areas on campus are designated as Campus Habitat Reserve (HAB). The larger of these two areas, a 13-acre parcel on the southwestern corner of the campus adjacent to Wilder Creek, is designated as a reserve to retain high-quality grassland and forest habitat on the campus for the California red-legged frog and the Ohlone tiger beetle. This reserve was established pursuant to a 2005 Implementing Agreement between the U.S. Fish and Wildlife Service and the Regents, as further described above in Section 3.11.1. The second area, a 12.5-acre parcel, is located in the southern portion of the campus near the main entrance. A portion of the parcel is designated as a management site for Ohlone tiger beetle habitat with the remainder of the site managed for California red-legged frog. HAB lands are protected lands that will remain undeveloped, except as permitted by the terms of the implementing agreement and associated habitat conservation plan.

OVERLAY AREAS

Cowell Ranch Historic District

The Cowell Ranch Historic District (CRHD) is an overlay district that encompasses cultural resources of particular significance from the original Cowell Ranch. The Cowell Ranch constitutes a landmark that helps define a strong and unique "sense of place" for UC Santa Cruz. The overlay district is in a CS land use area. The CRHD is eligible for listing on the National and State Registers of Historic Places.

Parking Facilities

The Parking Facilities overlay areas provide consolidated peripheral parking and reduce the number of parking spaces in the central campus. The 2005 LRDP identified limited surface parking in Academic Core, Campus Support, Colleges and Student Housing, Site Research and Support, Physical Education and Recreation, and the CRHD overlay area. Existing surface parking lots may be used as future building sites. The Parking Facilities designation is an overlay area in the land use plan. It represents the general area within which possible future parking facilities could be located but does not designate specific site and garage configurations.

SURROUNDING LAND USES

The city of Santa Cruz, which borders the main residential campus to the east and south and surrounds the Westside Research Park, is a large community with approximately 64,424 residents and includes a variety of residential, community, visitor, and parks/natural area land uses (DOF 2020). Land uses to the north and east of the main residential campus predominantly consist of parkland, hiking trails, and biking trails. The areas south of the main residential campus include low-medium density residential, low density residential, and very low medium residential uses, in addition to some natural areas, commercial, community, and educational facilities, including Westlake Elementary School.

Land uses adjacent to the main residential campus to the north and west within the county consist primarily of low-density residential and open space land uses. Wilder Ranch State Park, located to the west of the campus, is a 7,000-acre park that extends from Ben Lomond Mountain to the north and descends south towards the coast. The park offers various recreational opportunities, including horseback riding, camping, bicycling, hiking, and group tours of the dairy ranch, located in the southern portion of the park (California State Parks 2020). Recreational areas are also located north of the main residential campus including portions of Pogonip City Park. Rural residential land (including the Cave Gulch neighborhood) are also located to the north.

Land uses adjacent to the Westside Research Park include Antonelli Pond to the west, which consists of public recreation, wildlife viewing, and self-guided tours. Community facilities and multi-family residential housing are located to the north. Various industrial and commercial uses are located east of Westside Research Park, while the Natural Bridges State Beach and Visitor Center is located directly south. The Natural Bridges area offers recreational day-uses including beach access and walking trails.

3.11.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, the project would result in a potentially significant impact on land use if it would:

- physically divide an established community; or
- cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

As noted above, impacts related to potential conflicts with applicable habitat conservation plans or natural community conservation plans are discussed in Section 3.5, "Biological Resources."

ANALYSIS METHODOLOGY

The evaluation of potential land use impacts is based on a review of documents pertaining to the LRDP area. As part of this review, local planning documents and land use plans were reviewed to determine whether implementation of the 2021 LRDP would impede or conflict with those plans such that an environmental impact would occur. To determine the significance conclusion this analysis assumes that the 2021 LRDP would comply with relevant state regulations. Impacts related to conflicts with the Ranch View Terrace HCP are evaluated in Section 3.5, "Biological Resources."

ISSUES NOT EVALUATED FURTHER

Physical Division of an Established Community

The physical division of an established community refers to the construction of a physical feature such as an interstate highway, major roadway, utility infrastructure expansion, or the removal of access features that would impair connections within a community. The proposed 2021 LRDP involves modifications to the existing UC Santa Cruz land use plan established as part of prior 2021 LRDPs, including the 2005 LRDP, to support potential growth predominantly near existing built facilities and construction within previously developed areas. No land acquisition or expansion of the campus would occur as part of the 2021 LRDP. Further, land use changes that may occur under the 2021 LRDP would not involve development within existing, established communities such that physical division of an existing community may occur. The 2021 LRDP will not result in any physical division to the surrounding community within the city or county. This impact is not further discussed in the EIR.

IMPACTS AND MITIGATION MEASURES

Impact 3.11-1: Conflict with Applicable Land Use Plans, Policies, or Existing Zoning Adopted for the Purposes of Avoiding or Mitigating an Environmental Effect

Implementation of the 2021 LRDP would not conflict with existing land use, policies, or zoning adopted for the purpose of avoiding or mitigating an environmental effect. Consistency with the Ranchview Terrace HCP is primarily addressed in Section 3.5, Biological Resources. Because the UC holds jurisdiction over campus-related projects, projects carried out by UC Santa Cruz would be consistent with the 2021 LRDP. Therefore, impacts associated with land use plans, policies, or zoning would be **less than significant.**

The UC Santa Cruz 2021 LRDP, if adopted, would become the applicable campus land use plan. Pursuant to the University of California's constitutional autonomy (refer to Section 3.0.1, "University of California Autonomy"), UC Santa Cruz is the only agency with land use jurisdiction over campus projects. The 2021 LRDP would not involve the extension of the existing campus boundary, and as such, the 2021 LRDP would not involve the potential acquisition of lands currently subject to municipal planning efforts. Under the 2021 LRDP, land use categories would be maintained, however, would be further refined to reflect current campus needs and functions.

As described in Chapter 2, "Project Description," and shown in Figure 3.11-2, the 2021 LRDP identifies the following land use categories to support anticipated campus growth (see Figure 3.11-2). Several land use categories from the 2005 LRDP were amended to better reflect their purpose and function within the LRDP area. Under the 2021 LRDP, the area designated Campus Habitat Reserve in the 2005 LRDP would be incorporated into the Campus Natural Reserve land use designation. The designation of Campus Resource Lands from the 2005 LRDP would be eliminated from the 2021 LRDP and would be largely incorporated into the Natural Space and Natural Reserve land use designations. Table 3.11-2 shows the differences in acreages per land use designation on the main residential campus between the 2005 LRDP, as amended and those proposed under the 2021 LRDP.

Table 3.11-2 Land Use Designations Acreage Summary for the Main Residential Campus

Land Use Designations	Acreage under the 2005 LRDP[1]	2021 LRDP Acreage	Net Change
Academic Land Use Designation			
Academic & Support (Academic Core in the 2005 LRDP)	132	163	31
Residential Land Use Designations			
Colleges and Student Housing	245	277	32
Employee Housing	75	82[3]	7
Open Space Land Use Designations			
Outdoor Research (Site Research and Support in the 2005 LRDP)	152	74	-78
Campus Natural Reserve	410	789	379
Natural Space (Protected Landscape in the 2005 LRDP)	503	513	10
Campus Resource Lands	318	--	-318
Campus Habitat Preserve[2]	26	26	0
Other			
Historic District[4] (Included as an overlay in the 2005 LRDP)	--	28	28
Athletics & Recreation (Physical Education and Recreation in the 2005 LRDP)	86	67	-19
Facilities & Operations	89	21	-68
Total acreage[5]	**2,036**	**2,040**	**4**

[1] Two minor amendments were made to the 2005 Land Use Map. In 2016, Phase 1 of the Recycling Yard Project amended the LRDP by converting 1.6 acres of land from Protected Landscape to Campus Support and 2.1 acres of land from Site Research and Support to Campus Support for a total of 3.7 acres converted to Campus Support. In 2019, approximately 17 acres of land were re-designated from Campus Resource Land to Colleges and Student Housing in an LRDP amendment for the Student Housing West Project, which was approved by the Regents in 2019; however, project implementation was delayed due to a legal challenge to the EIR. The Superior Court upheld the adequacy of the EIR but overturned the approval based on issues with the Regents' findings. It is anticipated that the Regents will consider re-approval of the Student Housing West project prior to certification of the 2021 LRDP EIR.

[2] Campus Habitat Preserve is comprised of two mitigation parcels, IAD Preserve, which is 12.5 acres and IAA Preserve, which is 13 acres. Both IAD Preserve and IAA Preserve were preserved as part of the Incidental Take Permit (ITP) for the Ranch View Terrace HCP. The IAA Preserve is preserved in perpetuity and IAD Preserve is preserved through the ITP term of 60 years. The IAD Preserve has an Employee Housing overlay, which would require a modification to the HCP if it were be developed in the future.

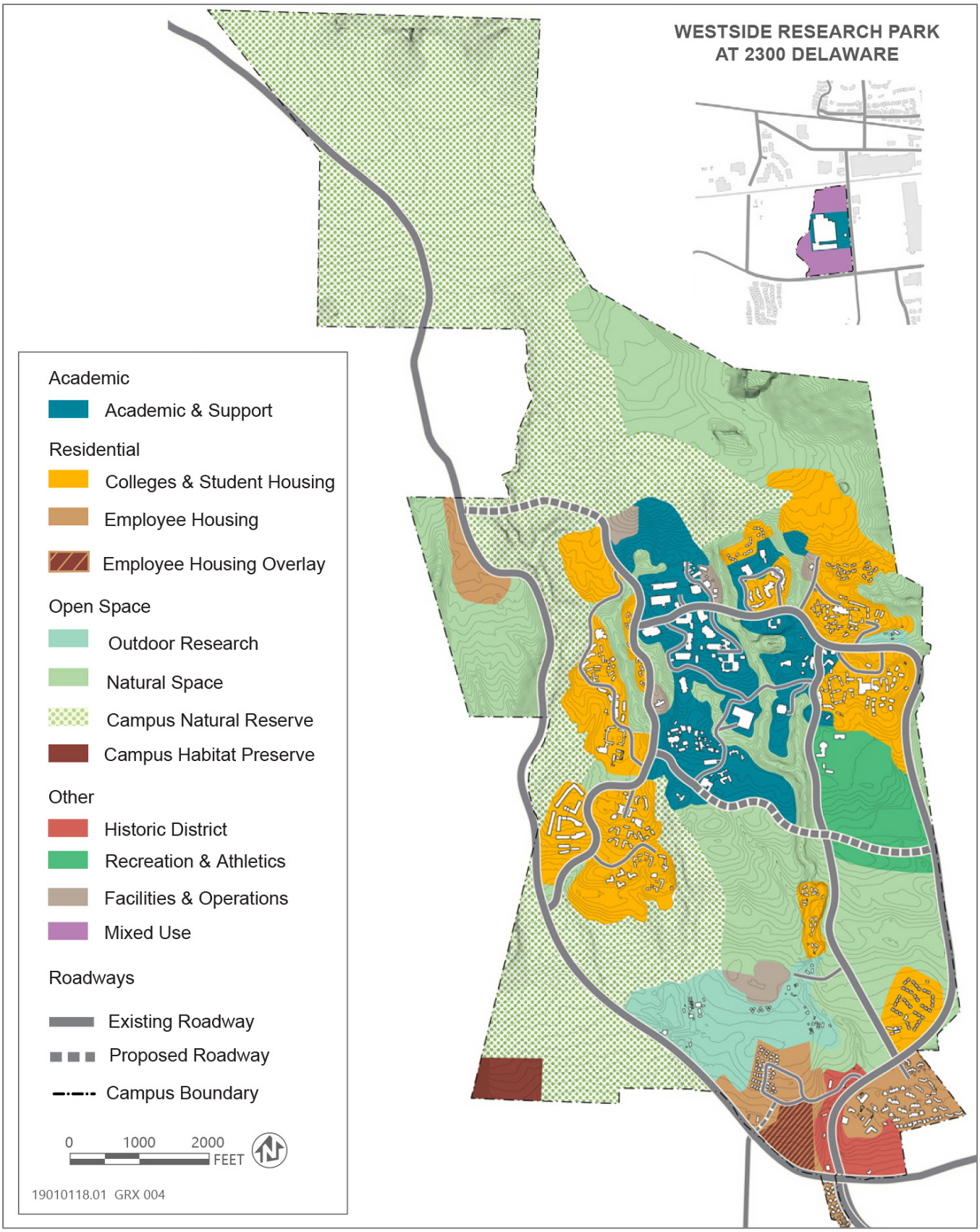
[3] The 12.5-acre Employee Housing Overlay on the Inclusionary Parcel D Preserve is not included in the overall acreage, but the Section 3.5, "Biological Resources" of this EIR evaluates the potential impacts of using this parcel for Employee Housing should UC Santa Cruz proceed with modifications to the Habitat Conservation Plan in the future.

[4] The Historic District was an overlay District in the 2005 LRDP in the Campus Support Land Use designation.

[5] Acreages are approximate, include rounding, and are based on 2005 LRDP, Draft 2021 LRDP, County parcel information, and GIS data.

Source: UC Santa Cruz 2020

As shown in Table 3.11-2, above, and as previously described, many of the land use designations identified in the 2005 LRDP would be refined through the 2021 LRDP in order to reflect present campus needs and functions. Section 2.5.2 of Chapter 2, "Project Description," provides additional information related to the proposed modified land use designations identified in Figure 3.11-2 and Table 3.11-2, above.



Source: UC Santa Cruz 2020

Figure 3.11-2 2021 LRDP Proposed Land Use Designations

New development accommodated under the 2021 LRDP would be clustered near existing and similar uses in order to maximize maintenance of open space areas within the campus. As shown in Figure 2-4 in Chapter 2, "Project Description," envisioned development areas are generally located adjacent to existing buildings and structures of similar use. For example, new Academic & Support development is planned to be located in areas that already include or are directly next to existing academic uses, and new residential facilities are planned to be developed near or adjacent to existing residential facilities. Therefore, the land use changes of the 2021 LRDP would be consistent with the current types of land uses present within the LRDP area.

As noted in Chapter 2, "Project Description," UC Santa Cruz is considering potential development of IAD, the 12.5-acre preserve established by the Ranch View Terrace HCP, as employee housing as part of the 2021 LRDP. If this were to occur, UC Santa Cruz would first need to consult with USFWS and amend the existing Ranch View Terrace HCP to provide for replacement habitat for Ohlone tiger beetle. That habitat would be required to meet the requirements of the incidental take permit issued for the HCP, such that impacts to Ohlone tiger beetle are fully mitigated and no jeopardy to the species would occur. As noted in Section 3.5, "Biological Resources," no Ohlone tiger beetle have been observed with IAD since it was established in 2005. In the event that amendment of the Ranch View Terrace HCP is not permissible through consultation with USFWS, employee housing would not be developed within the currently designated IAD. As a result and as explained in further detail in Impact 3.5-7 of Section 3.5, "Biological Resources," no conflicts with the HCP or its policies would occur.

The Westside Research Park, which is located south of the main residential campus along Delaware Avenue and Natural Bridges Drive, would be designated as Academic & Support and Mixed Use under the 2021 LRDP in order to accommodate potential additional employee housing and supporting commercial and retail uses. Table 3.11-3 shows the differences in acreages per land use designation on the Westside Research Park between the 2005 LRDP, as amended and those proposed under the 2021 LRDP.

Table 3.11-3 Land Use Designations Acreage Summary for the Westside Research Park

Land Use Designations	Acreage under the 2005 LRDP	2021 LRDP Acreage	Net Change
Academic & Support (Academic Core in the 2005 LRDP)	18	7	-11
Mixed Use	--	11	11
Total Acreage[1]	**18**	**18**	**0**

[1] Acreages are approximate, include rounding, and are based on 2005 LRDP, Draft 2021 LRDP, County parcel information, and GIS data.

Source: UC Santa Cruz 2020

The Westside Research Park was designated Academic Core under the 2005 LRDP. As shown in Table 3.11-3, under the 2021 LRDP the Academic & Support land use designation would continue to support existing research uses, and the Mixed Use designation would accommodate development of employee housing, academic, and support space. Consistent with 2021 LRDP objectives, the proposed land uses would accommodated compact and clustered development and increase housing opportunities.

As a constitutionally created state entity, UC Santa Cruz is not subject to municipal regulations of surrounding local governments, such as the City and County of Santa Cruz general plans or land use designations, for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the university's education purposes. The 2021 LRDP is generally consistent with the 2005 LRDP, although some land uses were refined to support compact development and reflect present campus needs and functions, including the provision of additional student resources on campus, which would also complement existing City General Plan policies and interests related to on-campus development. Further, County and City policies encourage the development of new uses proximate to existing uses, which is one of the primary foci of the 2021 LRDP. As noted in Chapter 2, "Project Description," the 2021 LRDP embraces a compact academic core with housing around the periphery. Employee housing would be strategically located in the lower campus to allow access to community resources. An enhanced historic district at the entrance to the main residential campus would provide an improved community interface. Designated reserve areas would be set aside for ecological, cultural, and educational uses, and natural space would protect wildlife corridors and scenic views. To improve

circulation, the 2021 LRDP includes an improved and more efficient roadway network and enhanced alternative transportation throughout the main residential campus. In addition, the Westside Research Park would be developed with mixed-use academic, research, and housing, consistent with the County's prioritization of uses within the Coastal Zone.

The 2021 LRDP, if adopted, would supersede the 2005 LRDP as the applicable land use plan. UC is the only agency with jurisdiction over UC Santa Cruz projects. Therefore, development accommodated by the 2021 LRDP would not conflict with adopted plans, policies, and/or regulations set forth by UC Santa Cruz. The impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

3.12 NOISE

This section includes a description of terminology and acoustic fundamentals, a summary of applicable regulations related to noise and vibration, a description of ambient-noise conditions, and an analysis of potential short-term construction and long-term operational-source noise impacts from campus development under the 2021 LRDP. Mitigation measures are recommended as necessary to reduce significant noise impacts. Additional data is provided in Appendix H, including noise modeling calculations referenced in the analysis of this section.

Comments received on the NOP (see Appendix B) related to noise asked for an analysis of noise generated by individuals using campus recreational facilities, traffic noise, and construction and operational noise impacts both on and off campus.

3.12.1 Terminology and Acoustic Fundamentals

Prior to discussing the noise setting for the 2021 LRDP, background information about sound, noise, vibration, and common noise descriptors is presented below to provide context and a better understanding of the technical terms referenced throughout this section.

NOISE

Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a human ear. Noise is defined as loud, unexpected, annoying, or unwanted sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this large range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB).

Because decibels are logarithmic units, SPLs expressed in dB cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness at the same time, the resulting sound level at a given distance would be 3 dB higher than if only one of the sound sources was producing sound under the same conditions. For example, if one idling truck generates an SPL of 70 dB, two trucks idling simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level approximately 5 dB louder than one source.

A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz and perceive sounds within this range better than sounds of the same amplitude with frequencies outside of this range. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an "A-weighted" sound level (expressed in units of A-weighted decibels) can be computed based on this information.

The A-weighting approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgment correlates well with the A-scale sound levels of those sounds. Thus, noise levels are typically reported in terms of A-weighted decibels. All sound levels discussed in this section are expressed in A-weighted decibels. Table 3.12-1 describes typical A-weighted noise levels for various noise sources.

Table 3.12-1 Typical A-Weighted Noise Levels

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

Source: Caltrans 2013a: Table 2-5.

Human Response to Changes in Noise Levels

As described above, the doubling of sound energy results in a 3 dB increase in the sound level. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different from what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear can discern 1 dB changes in sound levels when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency (1,000–8,000 Hz) range. In general, the healthy human ear is most sensitive to sounds between 1,000 and 5,000 Hz and perceives both higher and lower frequency sounds of the same magnitude with less intensity (Caltrans 2013a: 2-18). In typical noisy environments, changes in noise of 1–2 dB are generally not perceptible. However, it is widely accepted that people can begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5 dB increase is generally perceived as a distinctly noticeable increase, and a 10 dB increase is generally perceived as a doubling of loudness (Caltrans 2013a: 2-10). Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3 dB increase in sound would generally be perceived as barely detectable.

Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which a noise level decreases with distance depends on geometric spreading, ground absorption, atmospheric effects, and shielding by natural or human-made features, described in detail below.:

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Roads and highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources, thus propagating at a slower rate in comparison to a point source. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source.

Ground Absorption

The propagation path of noise from a source to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective wave–canceling provides additional attenuation associated with geometric spreading. Traditionally, this additional attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), additional ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the attenuation rate associated with cylindrical spreading, the additional ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance. This would also hold true for point sources, resulting in an overall drop-off rate of up to 7.5 dB per doubling of distance.

Atmospheric Effects

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels, as wind can carry sound. Other factors such as air temperature, humidity, and turbulence can also affect sound attenuation.

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction (Caltrans 2013a:2-41; FTA 2018:42). Barriers higher than the line of sight provide increased noise reduction (FTA 2018:16). Vegetation between the source and receiver is rarely effective in reducing noise because it does not create a solid barrier unless there are multiple rows of vegetation of sufficient height (FTA 2018:15, 104, 106).

Health Effects of Environmental Noise

The World Health Organization (WHO) is perhaps the best source of current knowledge regarding the health effects of noise impacts because European nations have continued to study noise and its health effects, while the US Environmental Protection Agency (EPA) all but eliminated its noise investigation and control program in the 1970s. According to WHO, sleep disturbance can occur when continuous indoor noise levels exceed 30 dBA or when intermittent interior noise levels reach 45 dBA, particularly if background noise is low. With a bedroom window slightly open (a reduction from outside to inside of 15 dB), the WHO criteria suggest that exterior continuous (ambient) nighttime noise levels should be 45 dBA or below, and short-term events should not generate noise in excess of 60 dBA. WHO also notes that maintaining noise levels within the recommended levels during the first part of the night is believed to be effective for the ability of people to initially fall asleep (WHO 1999).

Other potential health effects of high noise levels identified by WHO include decreased performance for complex cognitive tasks, such as reading, attention span, problem solving, and memorization; physiological effects such as hypertension and heart disease (after many years of constant exposure, often by workers, to high noise levels); and hearing impairment (again, generally after long-term occupational exposure, although shorter-term exposure to very high noise levels, for example, exposure several times a year to concert noise at 100 dBA, can also damage hearing). Finally, noise can cause annoyance and can trigger emotional reactions like anger, depression, and anxiety. WHO reports that, during daytime hours, few people are seriously annoyed by activities with noise levels below 55 dBA or moderately annoyed with noise levels below 50 dBA.

Vehicle traffic and continuous sources of machinery and mechanical noise contribute to ambient noise levels. Short-term noise sources, such as truck backup beepers, the crashing of material being loaded or unloaded, and car doors slamming contribute very little to= 24-hour noise levels but are capable of causing sleep disturbance and annoyance. The importance of noise to receptors depends on both time and context. For example, long-term high noise levels from large traffic volumes can make conversation at a normal voice level difficult or impossible, while short-term peak noise levels, if they occur at night, can disturb sleep.

Noise Descriptors

Noise in our daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, while some are random. Some noise levels fluctuate rapidly, but others fluctuate slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors used throughout this section.

- **Equivalent Continuous Sound Level (L_{eq}):** L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound level that occurs during the same period (Caltrans 2013a:2-48). For instance, the 1-hour equivalent sound level, also referred to as the hourly L_{eq}, is the energy average of sound levels occurring during a 1-hour period (Caltrans 2013a:2-47; FTA 2018:210).
- **Maximum Sound Level (L_{max}):** L_{max} is the highest instantaneous sound level measured during a specified period (Caltrans 2013a:2-48; FTA 2018:207–208).
- **Day-Night Level (L_{dn}):** L_{dn} is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB "penalty" applied to sound levels occurring during nighttime hours between 10 p.m. and 7 a.m. (Caltrans 2013a:2-48; FTA 2018:214).
- **Community Noise Equivalent Level (CNEL):** CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m. and a 5-dB penalty applied to the sound levels occurring during evening hours between 7 p.m. and 10 p.m. (Caltrans 2013a:2-48).

VIBRATION

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Ground-borne vibration is vibration of and through the ground. Ground-borne vibration can range from levels that are imperceptible to humans to levels that can create substantial damage to buildings and structures. Sources of ground-borne vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, (e.g., operating factory machinery) or transient in nature (e.g., explosions). Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or acceleration.

Ground-borne vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV and RMS vibration velocity are normally described in inches per second (in/sec) or in millimeters per second. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal.

PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings (FTA 2018:110; Caltrans 2013a:6).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to average vibration amplitude. The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over a 1-second period. As with airborne sound, the RMS velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to compress the range of numbers required to describe vibration (FTA 2018:110, 199; Caltrans 2013b:7). This is based on a reference value of 1 microinch per second.

The typical background ground-borne vibration-velocity level in residential areas is approximately 50 VdB. Ground vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels (FTA 2018:120; Caltrans 2013b:27).

Typical outdoor sources of perceptible ground vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur to fragile buildings. Construction activities can generate sufficient ground vibrations to pose a risk to nearby structures. Constant or transient vibrations can weaken structures, crack facades, and disturb occupants (FTA 2018:113).

Ground vibration levels generated by construction activity can be transient, random, or continuous. Transient construction vibrations are generated by blasting, impact pile driving, and wrecking balls. Continuous vibrations are generated by vibratory pile drivers, large pumps, and compressors. Random vibration can result from jackhammers, pavement breakers, and heavy construction equipment.

Table 3.12-2 summarizes the general human response to different ground vibration-velocity levels.

Table 3.12-2 Human Response to Different Levels of Ground Noise and Vibration

Vibration-Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Notes: VdB = vibration decibels referenced to 1 microinch/second and based on the root mean square (RMS) velocity amplitude.

Source: FTA 2018:120.

3.12.2 Regulatory Setting

FEDERAL

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate Federal noise control activities. In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at more local levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to state and local governments. However, documents and research completed by the EPA Office of Noise Abatement and Control continue to provide value in the analysis of noise effects.

Federal Transit Administration Vibration Impact Criteria

To address the human response to ground vibration, the Federal Transit Administration (FTA) has set forth guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines are presented in Table 3.12-3.

Table 3.12-3 FTA Ground-Borne Vibration Impact Criteria for Human Response

Land Use Category	GBV Impact Levels for Human Response (VdB re 1 microinch/sec) Frequent Event[1]	GBV Impact Levels for Human Response (VdB re 1 microinch/sec) Occasional Events[2]	GBV Impact Levels for Human Response (VdB re 1 microinch/sec) Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	80 VdB

Notes: GBV = ground-borne vibration

[1] "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

[2] "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.

[3] "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

[4] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels.

Source: FTA 2018:123-126

STATE

California Code of Regulations

The California Noise Insulation Standards found in California Code of Regulations (CCR), Title 24 Section 1207.4 establish requirements for new residential units that may be subject to relatively high levels of exterior noise. In this case, the noise insulation criterion is 45 dB L_{dn}/CNEL inside noise-sensitive spaces.

California General Plan Guidelines

Though not adopted by law, the *State of California General Plan Guidelines 2017*, published by the California Governor's Office of Planning and Research (OPR 2017), provide guidance for the compatibility of projects within areas of specific noise exposure. Acceptable and unacceptable community noise exposure limits for various land use categories have been determined to help guide new land use decisions in California communities. In many local jurisdictions, these guidelines are used to derive local noise standards and guidance.

Normally acceptable noise levels for single-family homes are levels below 55 dB L_{dn}/CNEL and conditionally acceptable levels range from 55 dB to 70 dB L_{dn}/CNEL. For multifamily homes levels below 60 dB L_{dn}/CNEL are normally acceptable and levels between 60 dB and 70 dB L_{dn}/CNEL are conditionally acceptable.

California Department of Transportation

In 2013, Caltrans published the Transportation and Construction Vibration Manual, which provides general guidance on vibration issues associated with construction and operation of projects in relation to structural damage. Table 3.12-4 below presents recommendations for levels of vibration that could result in damage to structures exposed to continuous vibration.

Table 3.12-4 Caltrans Recommendations Regarding Vibration Levels

PPV (in/sec)	Effect on Buildings
0.4-0.6	Architectural damage and possible minor structural damage
0.2	Risk of architectural damage to normal dwelling houses
0.1	Virtually no risk of architectural damage to normal buildings
0.08	Recommended upper limit of vibration to which ruins and ancient monuments should be subjected
0.006-0.019	Vibration unlikely to cause damage of any type

Notes: PPV= Peak Particle Velocity

Source: Caltrans 2013b

UNIVERSITY OF CALIFORNIA

UC Santa Cruz Major Events Policy

UC Santa Cruz Major Events Policy (UC Santa Cruz 2017) includes guidelines regarding on-campus amplified sound which applies to all major events hosted by the Division of Student Success, Colleges, Housing, and Educational Services, and Office of Physical Education, Recreation and Sports. Dances and concerts must meet additional policy provisions as outlined in this policy. This policy is a supplement to, and in case of inconsistency takes precedence over, the stipulations articulated in the UC Santa Cruz Student Policies and Regulations Handbook that require prior authorization for the use of sound amplification equipment, as well as any facility regulations and procedures governing use of particular facilities on the campus (UC Santa Cruz 2017). The guidelines that are relevant to the analysis of the noise effects of the project include the following:

- Outdoor Amplified Sound. The peace and quiet of the campus and adjacent neighborhoods should not be disturbed by the amplified sound from events; California Penal Code 415 concerning the disturbance of the peace is enforceable by the University Police Department. The completion and approval of Appendix A (Request for Outdoor Amplified Sound) is required during the planning stage for the event (minimum 3 weeks in advance of event). The following also apply:
    1) Outdoor events with amplified sound must be posted on the Campus Calendar.
    2) All possible effort must be taken to ensure that the level of amplified sound does not extend beyond the immediate audience.
    3) Sound equipment must be positioned carefully in order to prevent sound from disturbing persons not in the immediate area. The set should be carefully checked by the Sponsor before the event and monitored during the event by the Sponsor.
    4) Outdoor use of amplified sound for non-music events is permitted with prior approval in the [college areas, OPERS facilities, and Quarry Plaza] and in accordance with the conditions specified above. All other areas are by exception only.
    5) Outdoor amplification that will extend past 6:00 p.m. should be directed away from the city or nearby residential areas. Outdoor amplification should not extend past 10:00 p.m. unless an exemption is approved by the College Administrative Officer and/or Associate College Administrative Officer; or Residential Manger in the (non-college/residential living areas), as applicable, and posed to the Campus Calendar. Generally, exemptions will be granted for Fridays and Saturdays only. In all exemption cases, the amplified music may not continue past midnight.
    6) If the campus receives a complaint about the noise from either on or off-campus the amplification must be lowered. If a subsequent complaint is received, the music or other noise must cease.
    7) No outdoor amplified sound will be allowed during final examination periods without approval of the Vice Provost, Student Success.
- Contracts or agreements with performers or musicians should contain a statement that allows the Sponsor to regulate the level of amplified sound. When the sound level is excessive, the Sponsor will take the necessary corrective action, which may include, but is not restricted to, cancellation of the event.
- In the case of an outdoor dance or concert, all those who might be affected by the noise of such an event must be notified by (via phone call or email to units) three weeks prior to the event.

UC Santa Cruz Campus Standards Handbook

Part II of the UC Santa Cruz Campus Standards Handbook, "General Building Requirements" (UC Santa Cruz 2010) includes the following guidelines applicable to the analysis of the noise effects of the project:

2. Mechanical System Noise

- Design Classrooms, Libraries, Study Halls, and general Office spaces within NC 30 Standards. For large Lecture Halls, Auditoriums, Concert Halls, Recording Studios etc., (where more stringent controls are desirable), consult with the Project Manager to set standards suitable for the intended uses. Design all other areas within the NC standards recommended in the most recent ASHRAE handbooks. Inform the Project Manager during the Design Development stage if necessary that sound control measures will be adding a high cost value to the project.
- Mechanical equipment noise and vibration shall be aggressively controlled.

LOCAL

As noted in Section 3.0.2, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the university's educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

County of Santa Cruz General Plan

The County of Santa Cruz General Plan Noise Element (Santa Cruz County 2020) includes the following noise policies that may be relevant to the 2021 LRDP:

- **Policy 9.1.1.** Consider Table 9-2 [shown as Table 3.12-5 in this EIR, as the tables in the City and County General Plans list the same standards], *Acceptable through Unacceptable Ranges of Exterior Noise Exposure by Land Use* in the planning and permitting processes for new development to reduce noise exposure on future occupants of the new development to acceptable noise levels.
- **Policy 9.1.2.** Where noise sensitive developments would be exposed to noise levels that exceed those considered "normally acceptable," require the incorporation of noise reduction design elements as recommended by a site-specific acoustical study or using prescriptive or performance methods to reduce interior noise levels to the standards set forth in Title 24 of the California Code of Regulations for both residential and non-residential uses.
- **Policy 9.1.3.** Noise levels in common outdoor use areas in multi-unit residential development should not exceed [L_{dn}] 60 dB. Where this goal cannot be met by reasonable measures, such as strategic site layout and noise barriers, [L_{dn}] 65 dB might be considered acceptable. Outdoor noise limits do not apply to private exterior balconies.
- **Policy 9.2.2.** Require site-design and noise reduction measures for any project, including transportation projects, that would cause significant degradation of the noise environment due to project effects that could:

  (a) Increase the noise level at existing noise-sensitive receptors or areas by 5 dB or more, where the post project CNEL or [L_{dn}] will remain equal to or below 60 dB;

  (b) Increase the noise level at existing noise-sensitive receptors or areas by 3 dB or more, where the post project CNEL or [L_{dn}] would exceed 60 dB.

  This policy shall not be interpreted in a manner that would limit the ability of the County to require noise related mitigation measures or conditions of approval for projects that may generate lesser increases than the above. Special consideration may also be applied to special events or activities subject to permit requirements, or to land use development permits for uses and activities exempted from County noise control regulations.

- **Policy 9.2.3.** Incorporate noise considerations into the site plan review process, particularly with regard to parking and loading areas, ingress/egress points and refuse collection areas.
- **Policy 9.2.4.** For all new commercial and industrial developments which would increase noise levels above the normally acceptable standards in Table 9-2 [Table 3.12-5 in this EIR] or the maximum allowable standards in Table 9-3 (shown as Table 3.12-6 in this EIR), the best available control technologies shall be used to minimize noise levels. In no case shall the noise levels exceed the standards in Table 9-3 [Table 3.12-6 in this EIR].

Table 3.12-5 County of Santa Cruz Land Use – Noise Compatibility Standards

Use	Community Noise Exposure (L_{dn} or CNEL, dBA) Normally Acceptable[1]	Community Noise Exposure (L_{dn} or CNEL, dBA) Conditionally Acceptable[2]	Community Noise Exposure (L_{dn} or CNEL, dBA) Normally Unacceptable[3]	Community Noise Exposure (L_{dn} or CNEL, dBA) Clearly Unacceptable[4]
Residential/Lodging –Single Family, Duplex, Mobile Homes, Multi Family	Under 60	60-75	N/A	Above 75
Schools, Libraries, Religious Institutions, Meeting Halls, Hospitals	Under 60	60-75	N/A	Above 75
Outdoor Sports Arena or Facility, Playgrounds, Neighborhood Parks	Under 65	65-70	70-80	Above 80
Office Buildings, Business Commercial and Professional	Under 65	65-80	N/A	Above 80
Industrial, Manufacturing, Utilities, Agriculture	Under 70	Above 70	N/A	N/A

Notes: N/A=Not applicable

[1] Specific land use is satisfactory, based upon the assumption that any buildings involved are of conventional construction, without any special noise insulation requirements, and can meet the indoor noise standards.

[2] New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design to meet interior and exterior noise standards, where applicable.

[3] New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be conducted and needed noise insulation features included in the design to meet interior and exterior noise standards, where applicable.

[4] New construction or development should generally not be undertaken.

Source: Santa Cruz County 2020: Table 9-2.

Table 3.12-6 County of Santa Cruz Maximum Allowable Noise Exposure for Stationary Noise Sources[1]

	Daytime (7 a.m. to 10 p.m.)[2]	Nighttime (10 p.m. to 7 a.m.)[2, 3]
Hourly L_{eq} (dB)	50	45
Maximum level (dB)	70	65
Maximum level, Impulsive Noise (dB)	65	60

Notes: dB = decibel

[1] Noise levels are to be determined at the property line of the receiving land use. When determining the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers or other property line noise mitigation measures.

[2] Allowable levels shall be raised to the ambient noise levels where the ambient levels exceed the allowable levels. Allowable levels shall be reduced by 5 dB if the ambient hourly L_{eq} is at least 10 dB lower than the allowable level.

[3] Nighttime standards only apply where the receiving land use operates or is occupied during nighttime hours.

Source: Santa Cruz County 2020: 9-14.

- **Policy 9.2.5.** The following noise mitigation strategies are preferable to construction of conventional masonry noise barriers where these strategies are a feasible option to reduce impacts on sensitive uses:
  - Avoid placement of noise sensitive uses in noisy areas.

- Avoid placement of significant noise generators in noise sensitive areas.
- Increase setbacks between noise generators and noise sensitive uses.
- Orient buildings such that the noise sensitive portions of a project (e.g. bedrooms) are shielded from noise sources (such as through careful design of floor plan).
- Use sound-attenuating architectural design and building features.
- Employ technologies that reduce noise generation, such as alternate pavement materials on roadways, when appropriate.
- Employ traffic calming measures where appropriate.

► **Policy 9.2.6.** Require mitigation and/or best management practices to reduce construction noise as a condition of project approvals, particularly if noise levels would exceed 75 dB at neighboring sensitive land uses or if construction would occur for more than 7 days.

Santa Cruz County Code

Chapters 8.30 and 13.15 of the Santa Cruz County Code include the following regulations regarding noise:

Section 8.30.010. Offensive noise.

A) No person shall make, cause, suffer, or permit to be made any offensive noise.

B) "Offensive noise" means any noise which is loud, boisterous, irritating, penetrating, or unusual, or that is unreasonably distracting in any other manner such that it is likely to disturb people of ordinary sensitivities in the vicinity of such noise, and includes, but is not limited to, noise made by an individual alone or by a group of people engaged in any business, activity, meeting, gathering, game, dance, or amusement, or by any appliance, contrivance, device, tool, structure, construction, vehicle, ride, machine, implement, or instrument.

C) The following factors shall be considered when determining whether a violation of the provisions of this section exists:

1) Loudness (Intensity) of the Sound.

a) Day and Evening Hours. For purposes of this factor, a noise shall automatically be considered offensive if it occurs between the hours of 8:00 a.m. and 10:00 p.m. and it is:

i) Clearly discernible at a distance of 150 feet from the property line of the property from which it is broadcast; or

ii) In excess of 75 decibels at the edge of the property line of the property from which the sound is broadcast, as registered on a sound measuring instrument meeting the American National Standard Institute's Standard S1.4-1971 (or more recent revision thereof) for Type 1 or Type 2 sound level meters, or an instrument which provides equivalent data.

A noise not reaching this intensity of volume may still be found to be offensive depending on consideration of the other factors outlined below.

b) Night Hours. For purposes of this factor, a noise shall be automatically considered offensive if it occurs between the hours of 10:00 p.m. and 8:00 a.m. and it is:

i) Made within 100 feet of any building or place regularly used for sleeping purposes; or

ii) Clearly discernible at a distance of 100 feet from the property line of the property from which it is broadcast; or

iii) In excess of 60 decibels at the edge of the property line of the property from which the sound is broadcast, as registered on a sound measuring instrument meeting the American National Standard Institute's Standard S1.4-1971 (or more recent revision thereof) for Type 1 or Type 2 sound level meters,

or an instrument which provides equivalent data. A noise not reaching this intensity of volume may still be found to be offensive depending on consideration of the other factors outlined below.

2) Pitch (frequency) of the sound, e.g., garbage collecting, street repair, permitted construction activities;

3) Duration of the sound;

4) Time of day or night;

5) Necessity of the noise, e.g., garbage collecting, street repair, permitted construction activities;

6) The level of customary background noise, e.g., residential neighborhood, commercial zoning district, etc.; and

7) The proximity to any building regularly used for sleeping purposes.

Section 13.15.040. Exemptions.

A) Noise sources normally and reasonably associated with construction, repair, remodeling, or grading of any real property, provided a permit has been obtained from the County as required, and provided said activities take place between the hours of 8:00 a.m. and 5:00 p.m. on weekdays unless the Building Official has in advance authorized said activities to start at 7:00 a.m. and/or continue no later than 7:00 p.m. Such activities shall not take place on Saturdays unless the Building Official has in advance authorized said activities, and provided said activities take place between 9:00 a.m. and 5:00 p.m. and no more than three Saturdays per month. Such activities shall not take place on a Sunday or federal holiday, or during earlier morning or later evening hours of a weekday or Saturday.

B) Emergency Work. The provisions of this chapter shall not apply to the emission of sound for the purpose of alerting persons to the existence of an emergency or in the performance of emergency work.

C) Entertainment or Special Events. The provisions of this chapter shall not apply to those reasonable sounds emanating from authorized school bands, school athletic and school entertainment events, and occasional noncommercial private outdoor or indoor gatherings and community events, conducted between the hours of 8:00 a.m. and 10:00 p.m. or the applicable permitted timeframe, in compliance with Chapter 8.30 SCCC, Noise, (governing offensive noise) and as long as any applicable requirements for special event permits or temporary use permits are met.

Section 13.15.050. General noise regulations and unlawful noise.

B) Backup emergency generators shall only be operated during power outages and for other temporary purposes. If the generator is located within 100 feet of a residential dwelling unit, noise attenuation measures shall be included to reduce noise levels to an A-weighted maximum exterior noise level of 60 dB at the property line and a maximum interior noise level of 45 dB within nearby residences.

Section 13.15.060. Special requirements for air conditioning/mechanical units in or near residential uses. Where the intruding noise source is a residential air-conditioning unit, or a commercial air-conditioning or other mechanical unit located within 100 feet of any building or place regularly used for sleeping purposes, that operates more or less continually and/or during most hours, the A-weighted exterior noise level when measured at any neighboring property line shall not exceed 60 dB for units installed before, and 55 dB for units installed after, the effective date of this chapter, and a maximum interior noise level of 45 dB within nearby residences. In permitting or designing buildings with air conditioning or mechanical units, such units shall be located away from rooms used for sleeping purposes and shall incorporate sound-attenuating measures if feasible, and/or shall provide mitigation for such rooms, such as sound-rated windows or other measures as approved by the Building Official.

City of Santa Cruz General Plan

The Hazards, Safety, and Noise Element of the City of Santa Cruz 2030 General Plan (City of Santa Cruz 2012) includes the following policies related to noise in the city that may be relevant to the 2021 LRDP:

- **Policy HZ3.1.1.** Require land uses to operate at noise levels that do not significantly increase surrounding ambient noise.
- **Policy HZ3.1.2.** Use site planning and design approaches to minimize noise impacts from new development on surrounding land uses.
- **Policy HZ3.1.3.** Ensure that construction activities are managed to minimize overall noise impacts on surrounding land uses.
- **Policy HZ3.1.4.** Minimize the impacts of intermittent urban noise on residents.
- **Policy HZ3.1.6.** Require evaluation of noise mitigation measures for projects that would substantially increase noise.
- **Policy HZ3.1.7.** Protect residential areas from excessive noise from traffic and from road projects.
- **Policy HZ3.1.9.** Limit truck traffic in residential and commercial areas to designated truck routes.
- **Policy HZ3.1.11.** Require soundwalls, earth berms, setbacks, and other noise reduction techniques for new development, when appropriate and necessary, as conditions of approval.
- **Policy HZ3.2.** Ensure that noise standards are met in the siting of noise-sensitive uses.
- **Policy HZ3.2.1.** Apply noise and land use compatibility table and standards to all new residential, commercial, and mixed-use proposals, including condominium conversions in accordance with standards set forth in the Land Use-Noise Compatibility Standards Figure 2 [shown as Table 3.12-7 in this EIR].

Table 3.12-7 City of Santa Cruz Land Use – Noise Compatibility Standards

Use	Community Noise Exposure (L_{dn} or CNEL, dBA) Normally Acceptable[1]	Community Noise Exposure (L_{dn} or CNEL, dBA) Conditionally Acceptable[2]	Community Noise Exposure (L_{dn} or CNEL, dBA) Normally Unacceptable[3]	Community Noise Exposure (L_{dn} or CNEL, dBA) Clearly Unacceptable[4]
Residential – Low Density Single Family, Duplex, Mobile Homes	Under 60	55-70	70-75	Above 75
Residential – Multi Family	Under 65	60-70*	70-75	Above 75
Transient Lodging - Motels, Hotels	Under 65	60-70	70-80	Above 80
Schools, Libraries, Churches, Hospitals, Nursing Homes	Under 70	60-70	70-80	Above 80
Auditoriums, Concert Halls, Amphitheaters	N/A	Under 70	N/A	Above 65
Sports Arenas, Outdoor Spectator Sports	N/A	Under 75	Above 70	N/A
Playgrounds, Neighborhood Parks	Under 70	67.5-75	Above 72.5	N/A
Golf Courses, Riding Stables, Water Recreation, Cemeteries	Under 70	N/A	70-80	Above 80
Office Buildings, Business Commercial and Professional	Under 70	67.5-75.5	Above 75	N/A
Industrial, Manufacturing, Utilities, Agriculture	Under 75	70-80	Above 75	N/A

Notes: N/A=Not applicable

1 Specified land use is satisfactory assuming all buildings involved are of conventional construction, without special noise insulation requirements.

2 New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is conducted, and needed noise attenuation features are included in the construction or development.

3 New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be conducted and needed noise attenuation features shall be included in the construction or development.

4 New construction or development shall not be undertaken.

Source: City of Santa Cruz 2012: Figure 2.

- **Policy HZ3.2.2.** Establish L_{dn} noise level targets of 65 dBA for outdoor activity areas in new multifamily residential developments.
- **Policy HZ3.2.3.** Require that interior noise in all new multifamily housing not exceed a L_{dn} of 45 dBA with the windows and doors closed (State of California Noise Insulation Standards) and extend the requirement to single-family homes.

City of Santa Cruz Municipal Code

The City of Santa Cruz Municipal Code Section 9.36 includes the following noise regulations:

Section 9.36.010. Curfew – Offensive Noise

(a) No person shall between the hours of 10:00 p.m. and 8:00 a.m. make, cause, suffer or permit to be made any offensive noise (1) which is made within one hundred feet of any building or place regularly used for sleeping purposes, or (2) which disturbs, or would tend to disturb, any person within hearing distance of such noise.

(e) Subsection (a) shall not apply to any person engaged in the performance of a public or private construction project where either the chief building official, public works director, planning and community development director or water department director, in his or her sole discretion, determines that the specific tasks herein below delineated to be undertaken in connection with the subject construction project require an extended period of time to complete or, due to concerns based on public health and safety, those tasks should be undertaken between the hours of 10:00 p.m. and 8:00 a.m. When this determination has been made, the chief building official, public works director, planning and community development director or water department director may authorize such tasks to commence, be completed or be undertaken between the hours of 10:00 p.m. and 8:00 a.m.; however, no such tasks shall be undertaken during these hours without the express written permission of the chief building official, public works director, planning and community development director or water department director and then only to the extent and between the hours specifically authorized in writing by the chief building official, public works director, community development director or water department director. At a minimum, notice of the dates and times such tasks will be undertaken shall be provided by the contractor in accordance with city instructions to all residents, tenants and property owners who occupy or own property within three hundred feet of the site at which such tasks will be performed.

3.12.3 Environmental Setting

SENSITIVE LAND USES

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels, and because of the potential for nighttime noise to result in sleep disruption. Additional noise-sensitive land uses include schools, transient lodging, historic sites, places of worship, daycare centers, and hospitals. These land use types are also considered vibration-sensitive, as are commercial and industrial buildings where vibration could interfere with operations within the building, such as the operation of sensitive equipment which could be affected at vibration levels that may be well below those associated with human annoyance.

As shown in Chapter 2, "Project Description," the LRDP area is made up of the UC Santa Cruz main residential campus and the Westside Research Park. The northern part of the main residential campus, north campus, is bordered by primarily undeveloped, unincorporated Santa Cruz County to the north, east, and west, with the exception of the Cave Gulch neighborhood located along a portion of the main residential campus' northwestern border. The central campus is bordered by primarily undeveloped and/or recreational land to the east and west. The lower campus is bordered by the undeveloped land to the west and primarily residential development to the south and east. As shown in Figure 3.12-1, existing noise-sensitive receptors located in close proximity to the main residential campus include:

- Medium to low-density residences located south and southeast of the main residential campus along High Street and Bay Drive;
- Low-density residences southeast of the main residential campus along Limestone Lane, Quarry Lane, Rockridge Lane, and Spring Court;
- Santa Cruz Waldorf School and low-density residences in the Cave Gulch neighborhood west of the main residential campus, specifically along Llama Ranch Lane, El Refugio Way, and Cave Gulch; and
- Westlake Elementary School and United Church of Christ located southeast of the main residential campus along High Street.

No sensitive receptors were identified to the east or north of the main residential campus. As shown in Figure 3.12-1, the elementary school and residences in the Cave Gulch neighborhood are the only noise-sensitive receptors located in the unincorporated county. All other identified sensitive receptors are located within the city of Santa Cruz.

As shown in Figure 3.12-1, existing noise-sensitive receptors located in proximity to Westside Research Park include residences to the east along Natural Bridges Drive and along Delaware Avenue to the southwest and southeast, as well as the Pacific Shores Apartment Complex along Shaffer Road to the northwest.

Several noise-sensitive receptors are located within the main residential campus. The northern portion of the main residential campus is largely undeveloped, providing recreational trails to students, staff, and visitors. Educational facilities located within the LRDP area are generally concentrated in the central part of the main residential campus. Existing sensitive receptors in the central part of the main residential campus include the McHenry Library, Early Education Services (i.e., childcare center), and student housing facilities (e.g., Redwood Grove Apartments, Graduate Student Housing, dormitories, and housing in the colleges). Housing facilities for staff and faculty are also primarily located in the lower portion of the main residential campus (e.g., Ranch View Terrace, Hagar Court) and student housing at the Village.

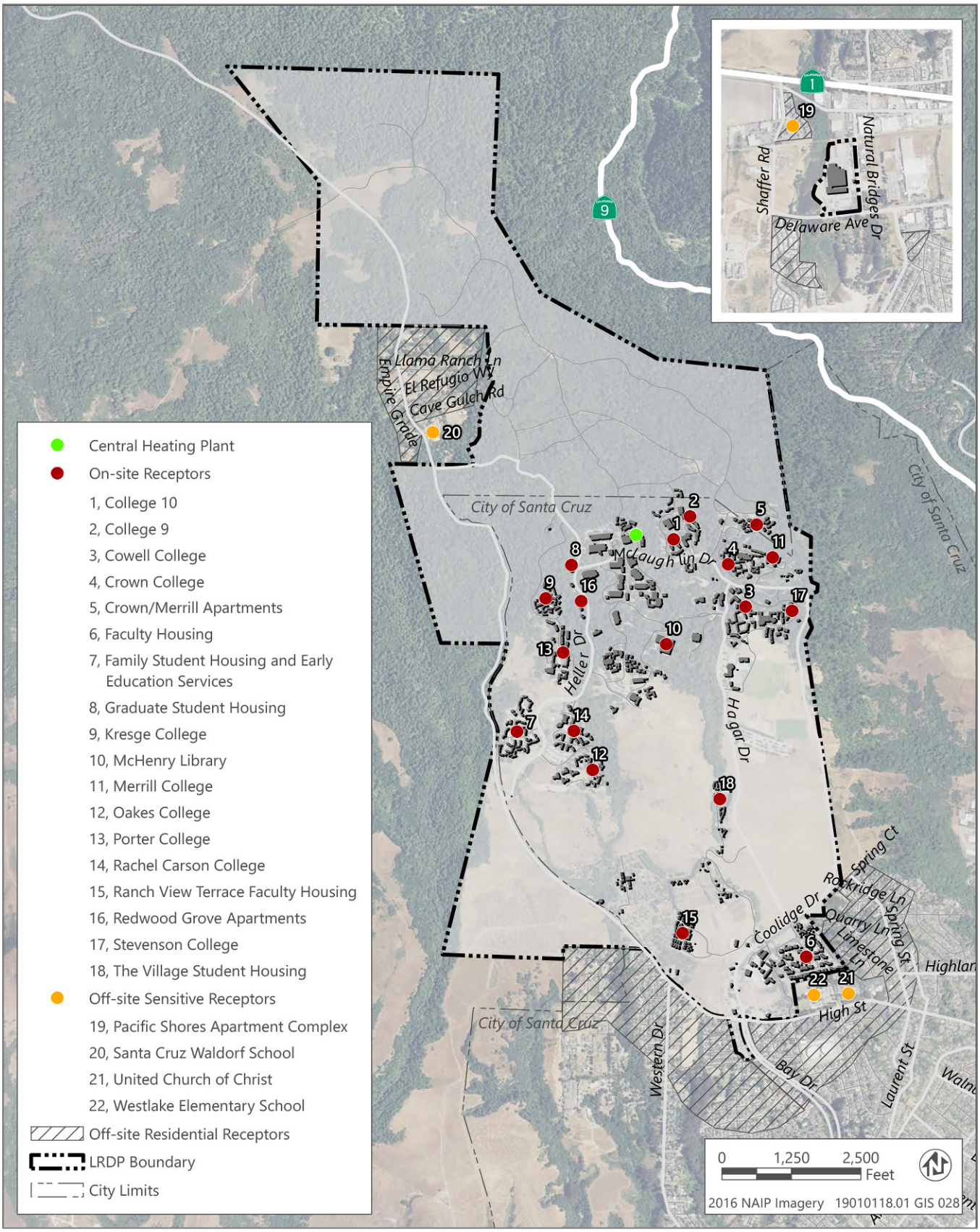
EXISTING NOISE ENVIRONMENT

The sound levels in most communities fluctuate, depending on the activity of nearby and distant noise sources, time of the day, or season of the year (i.e., periods when school is in session or not). Within and in the vicinity of the LRDP area, regional noise sources include traffic on roadways and highways, freight and passenger rail service (e.g., seasonal and special event recreational service), special events occurring on the UC Santa Cruz campus and in the City of Santa Cruz, and noise associated with typical residential, commercial, and agricultural uses. Due to the COVID-19 pandemic, the main residential campus and the Westside Research Park have not operated under normal conditions during EIR preparation and noise-generating activity levels in the LRDP area are not considered representative. For example, because more students are taking classes remotely, fewer students, staff, and faculty are commuting to and from campus, which affects traffic noise levels. Additionally, social distancing restrictions have reduced the number and magnitude of events and gatherings (e.g., sport practices, student club meetings) that would typically occur on-campus. These conditions are anticipated to be temporary in nature; and thus, noise measurements were not collected to characterize the ambient noise environment. However, the predominant expected noise in the area is traffic noise, and this is addressed below.

Mobile Source Noise

The existing noise environment in the LRDP area is primarily influenced by noise from vehicular traffic on the surrounding roadway network. Most vehicles enter the main residential campus at one of two main entrances, located at the intersection of High and Bay Streets and at the intersection of Empire Grade and Heller Drive. The main on-campus roadway system follows a loop formed by Coolidge Drive, Hagar Drive, McLaughlin Drive, and Heller Drive. Vehicular traffic is heaviest during the daytime and comprises mostly of passenger vehicles and buses.

Westside Research Park is surrounded on two sides by natural open space. Vehicular traffic on Natural Bridges Drive and Delaware Avenue is the predominant existing noise source near Westside Research Park, along with noise associated with the industrial and commercial land uses located to the north and east.



Source: Adapted by Ascent in 2020

Figure 3.12-1 Noise Sensitive Receptors

Existing traffic noise levels (using pre-COVID-19 traffic data) on roadway segments within the LRDP area and the surrounding roadway network were modeled using calculation methods consistent with FHWA Traffic Noise Model, Version 2.5 (FHWA 2004). The modeling is based on the reference noise emission levels for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and ground attenuation factors. Average daily traffic (ADT) volumes were obtained from Fehr & Peers based on the transportation modeling and analysis.

Table 3.12-8 below summarizes the modeled existing traffic noise levels at 100 feet from the centerline of each area roadway segments, and lists distances from each roadway centerline to the 65 and 60 L_{dn} traffic noise contours. For further details on traffic-noise modeling inputs and parameters, refer to Appendix H.

Table 3.12-8 Summary of Modeled Existing Traffic Noise Levels

Roadway[1]	Predicted Noise Level (L_{dn}) 100 ft from Centerline	Predicted Distance (feet) to 60 dB (L_{dn}) Noise Contour	Predicted Distance to 65 dB (L_{dn}) Noise Contour
Bay Street	62.1	162	51
Empire Grade	61.2	130	41
Coolidge Drive	60.7	117	37
Hagar Drive	62.7	187	59
Heller Drive	55.9	39	12
High Street[2]	62.4	88	28
State Route (SR) 17	72.4	1754	555
McLaughlin Drive	52.6	18	6
Mission Street/Cabrillo Highway	65.2	328	104
Natural Bridges Drive	57.2	53	17
Western Drive	54.5	28	9

Note: L_{dn} = Day-Night Noise Level.

[1] Based on results from the Regional Transportation Commission modeling, as summarized in Section 3.16, "Transportation," and provided in Appendix I, the segment with the largest ADT volume was modeled and displayed for each applicable roadway to ensure a conservative analysis.

[2] Predicted traffic noise levels modeled at 50 feet from centerline due to noise sensitive receptors being located closer than 100 feet from the roadway centerline.

Sources: Noise levels modeled by Ascent Environmental in 2020. Refer to Appendix H.

Stationary Source Noise

Noise within the LRDP area is also generated by the operation of stationary and area noise sources, including recreational areas (i.e., sport fields, playgrounds), school events (e.g., graduation, orientation), and building mechanical equipment (e.g., HVAC systems). The Central Heating Plant located in the northeastern corner of Science Hill contains cooling towers, a cogeneration plant, and other infrastructure machinery that generate localized noise in this part of the campus.

3.12.4 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, the 2021 LRDP would result in a potentially significant noise impact if it would result in:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Generation of excessive groundborne vibration or groundborne noise levels.

- For a project located within the vicinity of a private airstrip or 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, the exposure of people residing or working in the project area to excessive noise levels.

Because the 2021 LRDP would generate noise and vibration from a variety of sources, the various criterion noise levels and definitions that are used in the analysis of each noise source are provided in Table 3.12-9.

Table 3.12-9 Thresholds of Significance for Noise Analysis

Noise Source	Criterion Noise Level
Construction Noise (Temporary)	**On-Campus** ▶ Daytime (8 a.m. to 10 p.m.) construction noise levels at or above 80 dB L_{eq} at the on-campus noise-sensitive uses (e.g., student or employee housing). ▶ Nighttime (10 p.m. to 8 a.m.) construction noise levels at or above 70 dB L_{eq} at on-campus noise-sensitive uses (e.g., student or employee housing). **Off-Campus** ▶ Daytime (8 a.m. to 10 p.m.) construction noise levels at or above 70 dB L_{max} at a residential property line.[1] ▶ Nighttime (10 p.m. to 8 a.m.) construction noise levels at or above 65 dB L_{max} at a residential property line.[1]
Construction Vibration	▶ Vibration levels at or in excess of 0.2 PPV in/sec for potential damage to structures.[2] ▶ Vibration levels at or in excess of 80 VdB for human disturbance.[3] ▶ Vibration levels at or in excess of 65 VdB for sensitive laboratory equipment.[4]
Operational Noise - Roadway/Vehicular Sources	▶ A 5 dB increase in traffic-related noise, where the post-project noise level would remain equal to or lower than 60 dB L_{dn}, or a 3 dB increase in traffic-related noise where the post-project noise level would exceed 60 dB L_{dn}.[5]
Operational Noise - Stationary Sources	▶ Daytime (8 a.m. to 10 p.m.) stationary source noise levels at or above 70 dB L_{max} or 50 dB L_{eq} at a residential property line or at an on-campus structure with noise-sensitive uses (e.g., student or employee housing, childcare). Nighttime (10 p.m. to 8 a.m.) stationary source noise levels at or above 65 dB L_{max} or 45 dB L_{eq} at a residential property line or at on-campus noise-sensitive uses.[6]

Notes: CNEL = Community Noise Equivalent Level; dB = A-weighted decibels; L_{eq} = hourly average noise level

1. Adapted from County of Santa Cruz General Plan Policy 9.2.4. The County's L_{max} standards for stationary noise are applied because this type of noise source best represents construction noise, and the City has not established any construction-specific standards.

2. Adapted from Caltrans as an industry-standard threshold for structural damage from construction vibration. These standards are shown in Table 3.12-4.

3. Adapted from FTA as an industry-standard threshold for human disturbance from construction vibration. These standards are shown in Table 3.12-3.

4. Adapted from FTA as an industry-standard threshold for disturbance to sensitive interior operations (e.g., laboratory equipment) from construction vibration. These standards are shown in Table 3.12-3.

5. Adapted from the County of Santa Cruz General Plan Policy 9.2.2. The County's incremental noise increase standard for noise-sensitive receptors is applied because the City has not established any transportation-specific noise standards.

6. Based on the County of Santa Cruz General Plan Policy 9.2.4 and the stationary noise standards shown in Table 3.12-6. The County's stationary noise standards are applied because the City has not established any standards specific to stationary noise sources.

ANALYSIS METHODOLOGY

Construction activities as part of the development or redevelopment of campus facilities and additional roadway traffic generated by student and faculty increases would be the primary noise sources associated with implementation of the project. Other noise sources would include those associated with the general operations of the campus, including noise generated by stationary equipment for building operations (e.g., HVAC equipment); regular and infrequent facility maintenance activities, and intermittent special events on campus (e.g., sporting events, conferences). Because noise would be generated from a variety of noise sources, each source was evaluated using different methodologies, which are discussed separately and in further detail below.

Construction Noise and Vibration

To assess potential short-term (construction-related) noise and vibration impacts, sensitive receptors and their relative exposure were identified. Potential LRDP-related construction source noise and vibration levels were determined based on methodologies, reference emission levels, and usage factors from FHWA's *Roadway Construction Noise Model User's Guide* (FHWA 2006). Reference levels for noise and vibration emissions for specific equipment or activity types are well documented and the usage thereof is common practice in the field of acoustics. Construction noise impacts were evaluated based on the applicable noise and vibration standards.

Operational Noise and Vibration

With respect to operational noise from non-transportation sources (e.g., stationary) associated with project implementation, the assessment of long-term (operational-related) impacts was based on reconnaissance data, reference noise emission levels, and measured noise levels for activities and equipment associated with project operation (e.g., heating, ventilation and air conditioning [HVAC] units, parking facilities), and standard attenuation rates and modeling techniques.

To assess potential long-term (operation-related) noise impacts due to project-generated increases in traffic, noise levels were estimated using calculations consistent with the Federal Highway Administration's Traffic Noise Model Version 2.5 (FHWA 2004) and project-specific traffic data obtained from the traffic analysis prepared for the project (Appendix H). The analysis is based on the reference noise emission levels for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and ground attenuation factors. Truck usage and vehicle speeds on area roadways were estimated from field observations and the project-specific traffic data. Note that the modeling conducted does not account for any natural or human-made shielding (e.g., the presence of walls or buildings) or reflection off building surfaces.

Operational groundborne vibration levels were evaluated qualitatively, based on representative vibration levels commonly associated with project operation (e.g., traffic, stationary sources).

ISSUES NOT EVALUATED FURTHER

Operational Vibration Levels

Implementation of the 2021 LRDP would not introduce any major sources of long-term or permanent ground vibration (in contrast to construction vibration, which is evaluated in impact analysis, below). Additionally, no major stationary sources of groundborne vibration were identified in the LRDP area that would result in the long-term exposure of on- or off-campus receptors to unacceptable levels of ground vibration. Thus, long-term or permanent groundborne vibration levels are not anticipated as a result of implementation of the 2021 LRDP, and this issue is not discussed further.

Airport/Airstrip-Related Noise Exposure

The LRDP area is not located within an airport use plan or within 2 miles of a public airport, public use airport, or private airstrip. The nearest airport to the LRDP area is Bonny Doon Village Airport, a private, single-runway airport located four miles from the LRDP area boundary. Therefore, the project would not result in the exposure of people to excessive noise levels associated with airport activity, and this issue is not discussed further.

IMPACTS AND MITIGATION MEASURES

Impact 3.12-1: Generate Substantial Temporary Construction Noise

Implementation of the 2021 LRDP would result in construction activities associated with the development of on-campus facilities to accommodate future growth in support of the UC Santa Cruz's academic mission. Although construction activities would be intermittent and temporary, construction noise could reach high levels at nearby noise-sensitive land uses, resulting in human disturbance. Therefore, this impact would be **significant**.

Development of on-campus facilities to support UC Santa Cruz's academic mission and accommodate increases in student, faculty, and staff populations would result in increases in noise-generating construction activities. The projected increases in building space under the 2021 LRDP include academic and support space as well as residential space, requiring a total of approximately 5.6 million asf (assignable square feet) of new building space.

Noise generated during construction of buildings and associated structures is typically associated with the operation of heavy-duty equipment and vehicles such as heavy trucks, excavators, pavers, and building equipment. Noise levels associated with construction activities during the more noise-sensitive evening and nighttime hours (10 p.m. to 8 a.m.) are of increased concern because noise generated during these times can result in increased annoyance and potential sleep disturbance in nearby residential areas.

Construction equipment and methods used at a given time would vary depending on the phase of construction and specific activities underway. Typical construction activities include grubbing/clearing of project sites; excavation and relocation of soil/rock; backfilling and compaction of soils; construction of utilities (i.e., potable and non-potable water conveyance, wastewater conveyance, storm water drainage facilities, and electrical and natural gas infrastructure); and construction of proposed buildings. Typical noise levels generated at 50 feet from the source by various types of construction equipment likely to be used are identified in Table 3.12-10.

Table 3.12-10 Typical Construction Equipment Noise Levels

Equipment	Noise Level (dBA at 50 feet) L_{max}
Backhoes	80
Air Compressors	80
Cranes	85
Concrete Pump Truck	82
Drill Rigs	84
Dump Trucks	84
Excavator	85
Generator	82
Grader	85
Front End Loaders	80
Pneumatic Tools	85
Pumps	77
Rollers	85
Scrapers	85
Tractor	84

Source: FHWA 2006

Short-term construction noise levels near a particular project site would fluctuate depending on the type, number, and duration of use of different pieces of equipment. The noise effects of construction largely depend on the type of construction activities being performed, noise levels generated by those activities, distances to noise-sensitive receptors, existing ambient noise levels, and the relative locations of noise-attenuating features such as vegetation and existing structures. Typically, the site preparation/grading phase generates the most noise because the heaviest, loudest equipment (e.g., graders, excavators, dozers, etc.) is used for these activities.

As shown in Figure 2-4 of Chapter 2, "Project Description," it is anticipated that the majority of development under the 2021 LRDP would occur in the central and lower campus. Implementation of individual projects proposed under the 2021 LRDP would necessitate construction activities near existing development, both on- and off-campus. Construction activities generally occur in phases and would be dispersed throughout the campus. However, construction activities could also occur adjacent to existing residential land uses and could, depending on the

equipment used and distance to nearby noise-sensitive land uses, exceed the acceptable daytime noise levels of 80 dB L_{eq} (see Table 3.12-9) at existing on-campus sensitive land uses and 70 dB L_{max} at off-campus sensitive land uses. Specific construction-related details (e.g., location, schedule, equipment) for individual projects are unknown at this time. Therefore, as an example, construction noise levels were modeled conservatively assuming that up to six pieces of heavy construction equipment would operate simultaneously along the border of the construction site. Based on the modeling conducted, construction-related noise levels could be approximately 93 dB L_{max} and 89 L_{eq} at 50 feet from a construction site. Based on the estimated construction noise levels, implementation of individual projects proposed under the 2021 LRDP would exceed the daytime construction noise standard (i.e., 80 dB L_{eq}) for existing on-campus sensitive land uses at approximately 140 feet. The 70 dB L_{max} construction noise standards for off-campus sensitive land uses would be exceeded at approximately 690 feet. See Appendix H for detailed noise modeling and inputs.

While the majority of construction activities would occur during the daytime (i.e., 8:00 a.m. to 10:00 p.m.) when higher construction noise levels are acceptable and allowed, some activity may be required outside of these hours depending on the circumstance and location. Outdoor construction would be permitted to occur during the nighttime hours only if there are no other reasonable options. For example, some foundation designs require that once the pouring of concrete begins, the pour must continue without pause until complete. In some instances, such a concrete pour may take 20 hours or more, requiring work to occur during nighttime hours. It is unknown at this time if the 2021 LRDP would include construction that would require outdoor nighttime construction. Therefore, to ensure a comprehensive evaluation of potential environmental effects, this EIR assumes the potential for outdoor nighttime construction activity. Depending on the type of construction activities required, equipment used, and distance to noise-sensitive land uses, nighttime construction could exceed the acceptable nighttime noise levels of 70 dB L_{eq} (see Table 3.12-9) at existing on-campus sensitive land uses and 65 dB L_{max} at off-campus sensitive land uses. Based on the estimated construction noise levels, implementation of individual projects proposed under the 2021 LRDP would exceed the nighttime construction noise standard (i.e., 70 dB L_{eq}) for existing on-campus sensitive land uses at approximately 440 feet. The 65 dB L_{max} construction noise standards for off-campus sensitive land uses would be exceeded at 1,225 feet.

Because both daytime and nighttime construction activities associated with implementation of the 2021 LRDP could result in the exceedance of both daytime and nighttime construction noise standards, this impact would be **significant**.

Mitigation Measures

Mitigation Measure 3.12-1: Implement Construction Noise Reduction Measures

As part of construction of new/renovated facilities associated with 2021 LRDP implementation, UC Santa Cruz shall implement or incorporate the following noise reduction measures into construction specifications for the contractor(s) to implement during project construction:

- All construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturer recommendations. Equipment engine shrouds shall be closed during equipment operation.
- Where available and feasible, construction equipment with back-up alarms shall be equipped with either audible self-adjusting backup alarms or alarms that only sound when an object is detected. Self-adjusting backup alarms shall automatically adjust to 5 dBA over the surrounding background levels. All non-self-adjusting backup alarms shall be set to the lowest setting required to be audible above the surrounding noise levels.
- All construction equipment and equipment staging areas shall be located as far as feasible from nearby noise-sensitive land uses and, when feasible, staging areas shall be located such that existing or constructed noise attenuating features (e.g., temporary noise wall or blankets) block line-of-sight between affected noise-sensitive land uses and construction staging areas.

- Individual operations and techniques shall be replaced with quieter procedures (e.g., using welding instead of riveting, mixing concrete off-site instead of on-site) where feasible, and shall be consistent with building codes and other applicable laws and regulations.
- Stationary noise sources such as generators or pumps shall be located as far away from noise-sensitive uses as feasible.
- No less than 1 week prior to the start of construction activities at a particular location, notification shall be provided to nearby off-campus, noise-sensitive land uses (e.g., residential uses, elementary schools) that are located within 690 feet of the construction site and where projected construction noise levels are anticipated to exceed acceptable daytime L_{max} noise standards.
- When construction would occur within 140 feet of on-campus housing or 690 feet of off-campus noise-sensitive uses (e.g., residences, elementary schools, churches) and may result in temporary noise levels in excess of established standards at the exterior of the adjacent noise-sensitive structure, temporary noise barriers (e.g., noise-insulating blankets or temporary plywood structures) shall be erected, if deemed to be feasible and effective, between the noise source and sensitive receptor such that construction-related noise levels are reduced to acceptable noise levels at the receptor.
- Loud construction activity (i.e., construction activity such as jackhammering, concrete sawing, asphalt removal, and large-scale grading operations) shall not be scheduled during the Campus's finals week.
- When construction of a project requires material hauling, a haul route plan shall be prepared for the project, for review and approval by UC Santa Cruz, that designates haul routes as far as feasible from sensitive receptors.
- The contractor shall designate a disturbance coordinator and post that person's telephone number conspicuously around the construction site, as well as provide it to nearby residences. The disturbance coordinator shall receive all public complaints and be responsible for determining the cause of the complaint and implementing any feasible measures to alleviate the problem.
- Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the hours of 8:00 a.m. and 10:00 p.m., when feasible. For any construction activity that must extend beyond the daytime hours of 8:00 a.m. and 10:00 p.m. and occurs within 440 feet of an on-campus residential building or 1,225 feet of an off-campus sensitive land use, UC Santa Cruz shall require the use of one or more of the following or equivalent measures to reduce interior noise levels to less than 45 dB L_{eq} at the nearest receptor:
  - Use of noise-reducing enclosures around stationary noise-generating equipment (e.g., concrete mixers, generators, compressors).
  - Installation of temporary noise curtains installed as close as possible to the boundary of the construction site within the direct line of sight path of the nearby sensitive receptor(s). The curtains shall consist of durable, flexible composite material featuring a noise barrier layer bounded to sound-absorptive material on one side. The noise barrier layer shall consist of rugged, impervious, material with a surface weight of at least one pound per square foot.
  - Retain a qualified noise specialist to develop a noise monitoring plan and conduct noise monitoring to ensure that noise reduction measures are achieved the necessary reductions such that levels at the receiving land uses do not exceed exterior noise levels of 45 dBA L_{eq} for construction activity occurring during noise-sensitive nighttime hours.
  - If restricting construction activities to daytime hours (8 a.m. to 10 p.m.) is infeasible and the application of all feasible mitigation, as listed above, does not successfully reduce interior noise levels to lower than 45 dB L_{eq} at the nearest residential noise-sensitive receptor, UC Santa Cruz will offer hotel accommodations to residents who would temporarily be exposed to nighttime interior noise levels that exceed the interior noise standard of 45 L_{eq}. Alternative overnight accommodations should be in a location that is not adversely affected by nighttime construction noise.

Significance after Mitigation

The implementation of Mitigation Measure 3.12-1 would limit the time periods during which construction activities in the vicinity of nearby noise-sensitive land uses would occur. Additionally, Mitigation Measure 3.12-1 would provide substantial reductions in levels of construction noise exposure at noise-sensitive receptors by requiring the use of properly maintained equipment, alternatively powered equipment, exhaust mufflers, engine shrouds, equipment enclosures, and temporary noise barriers (noise curtains typically can reduce noise by up to 10 dBA [EPA 1971]). Additionally, short-term lodging would be offered to residents if they would be temporarily exposed to nighttime (after 10PM) interior noise levels that exceed the interior noise standard of 45 L_{eq}.

Although substantial noise reduction would be achieved through implementation of these measures, due to the uncertainty related to specific construction details (e.g., proximity to receptors, schedule, equipment) for individual projects, it cannot be ensured that the reductions necessary to comply with the daytime and nighttime construction noise standards would be achieved with the implementation of Mitigation Measure 3.12-1. Additionally, it cannot be ensured that Mitigation Measure 3.12-1 would mitigate nighttime noise levels to a less-than-significant level in all cases as it would require the resident accepting the hotel accommodation offer, and if the offer was not accepted, exposure to the elevated noise levels would still occur. Furthermore, running equipment at reduced power would reduce ambient noise levels, as the primary noise would be associated with engine noise; however, such a measure is not considered enforceable and could result in hazardous conditions for construction workers. As a result, it is considered infeasible. Thus, even with implementation of all feasible mitigation, construction noise associated with some projects under the 2021 LRDP could still potentially exceed applicable noise standards. Therefore, this impact would be **significant and unavoidable**.

Impact 3.12-2: Generate Substantial Temporary (Construction) Vibration Levels

Implementation of the 2021 LRDP would include construction activities that may require the use of vibration-generating equipment. If pile driving would be required during construction of future projects, nearby sensitive receptors could be exposed to levels of ground vibration resulting in structural damage and/or human disturbance. Therefore, this impact would be **significant**.

As shown in Table 3.12-11, construction activities generate varying degrees of temporary ground vibration depending on the specific construction equipment used and activities involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increased distance. Construction-related ground vibration is normally associated with impact equipment, such as pile drivers and jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. Blasting activities also generate relatively high levels of ground vibration and vibration noise. The effects of ground vibration may be imperceptible at low levels. At moderate levels, ground vibration may be detectible as low rumbling sounds; whereas at high levels, ground vibration cause annoyance or sleep disturbance.

Table 3.12-11 Representative Ground Vibration Levels for Construction Equipment

Equipment	PPV (in/sec)[1] at 25 feet	Approximate VdB at 25 feet[2]
Impact Pile Driver	1.518	112
Blasting	1.13	109
Sonic Pile Driver	0.734	105
Vibratory Roller	0.21	94
Large Bulldozer	0.089	87
Loaded Truck	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Notes: PPV = peak particle velocity; VdB = vibration decibels.

Source: FTA 2018:184

As shown in Table 3.12-11, pile driving and blasting are the construction activities that typically generate the greatest levels of ground vibration. However, construction associated with the 2021 LRDP is not anticipated to include the use of impact or sonic pile driving or blasting. Construction activities would often occur in close proximity to existing on- and off-site sensitive receptors, though the locations of individual project sites, specific construction methods used, and the distance to the nearest sensitive receptors is not known at this time. Table 3.12-12 shows the distances at which vibrations generated by anticipated equipment, which excludes pile-driving equipment and blasting, to be used during construction within the LRDP area would exceed the significance threshold of 0.2 in/sec PPV for building structural damage and the significance thresholds of 80 VdB for human disturbance and 65 VdB for sensitive (i.e., laboratory) equipment.

Table 3.12-12 Estimated Distance at Which Ground Vibration for Construction Equipment Would Exceed Thresholds

Equipment	Distance (feet) at Which 0.2 PPV (in/sec)[1] Would Be Exceeded	Distance (feet) at Which 80 VdB Would Be Exceeded	Distance (feet) at Which 65 VdB Would Be Exceeded
Vibratory Roller	25	75	235
Large Bulldozer	15	45	125
Loaded Truck	15	40	125
Jackhammer	10	25	75
Small Bulldozer	2	5	15

Notes: PPV = peak particle velocity; VdB = vibration decibels.

For further details on vibration modeling inputs and parameters, refer to Appendix H.

Source: Modeled by Ascent Environmental in 2020 using data from FTA 2018

As shown in Table 3.12-12, depending on the distance to the nearest sensitive receptor, construction equipment could exceed the thresholds for building structural damage, human disturbance, and sensitive (e.g., laboratory) equipment. Depending on the location of specific structures that would be constructed under the 2021 LRDP, implementation of the 2021 LRDP could expose existing on- and off-site sensitive receptors and structures to levels of ground vibration that could exceed applicable thresholds, and this impact would be **significant**.

Mitigation Measures

Mitigation Measure 3.12-2a: Implement Measures to Reduce Ground Vibration

For any future construction activity that would involve construction activities within 75 feet of an existing sensitive land use or occupied building, the following measures shall be implemented:

- Earthmoving and ground-impacting operations shall be phased so as not to occur simultaneously in areas close to sensitive receptors (i.e., within 75 feet). The total vibration level produced could be significantly less when each vibration source is operated at separate times.
- In the event that simultaneous earthmoving and ground-impacting operations in close proximity to sensitive receptors (i.e., within 75 feet) cannot be avoided, no such construction activities shall be undertaken without prior approval from UC Santa Cruz. Prior to the commencement of such activities, the contractor shall apply for and obtain an exemption from UC Santa Cruz. The application for exemption shall be submitted to UC Santa Cruz and shall include the following information:
  - Explanation as to why operating earthmoving and ground-impacting operations in close proximity to sensitive receptors (i.e., within 75 feet) at separate times is not feasible.
  - Dates and times that the simultaneous earthmoving and ground-impacting operations construction activities would occur.
  - Distance from sensitive receptors at which simultaneous earthmoving and ground-impacting operations construction activities would occur.

  - Identify the on- and off-site sensitive receptors and structures that could be exposed to levels of ground vibration that could exceed applicable thresholds and apply Mitigation Measure 3.12-2b if applicable.

- Rubber-tired equipment shall be used, where feasible, instead of tracked equipment.
- Where there is flexibility in the location of use of heavy-duty construction equipment, the equipment shall be operated as far away (up to 250 feet) from vibration-sensitive sites.

Mitigation Measure 3.12-2b: Develop and Implement a Vibration Control Plan

To assess and, when needed, reduce vibration and noise impacts from construction activities, the following measures shall be implemented:

- A vibration control plan shall be developed prior to initiating any construction activities within 50 feet of a sensitive use (75 feet if vibratory equipment is required) and within 125 feet of a structure with laboratory or other similarly sensitive equipment (235 feet if vibratory equipment is required). Applicable elements of the plan shall be implemented before, during, and after construction activities. The plan will include measures sufficient to reduce vibration at sensitive receptors to levels below applicable thresholds (i.e., 0.2 in/sec PPV for building structural damage, 80 VdB for human disturbance and 65 VdB for sensitive equipment). Items that will be addressed in the plan may include, but are not limited to, the following:
  - Pre-construction surveys shall be conducted to identify any pre-existing structural damage to buildings that may be affected by project-generated vibration.
  - Identification of minimum setback requirements for different types of ground-vibration-producing activities (e.g., use of a vibratory roller) for the purpose of preventing damage to nearby structures and preventing adverse effects on people. Factors to be considered include the nature of the vibration-producing activity, local soil conditions, and the fragility/resiliency of the nearby structures. Initial setback requirements can be reduced if a project- and site-specific analysis is conducted by a qualified geotechnical engineer or ground vibration specialist that indicates that no structural damage to buildings or structures would occur.
  - Identification of vibration-sensitive equipment and existing vibration control measures for the identified equipment. If, upon evaluation and prior to construction, vibration levels at the nearby equipment would exceed 65 VdB, UC Santa Cruz shall either provide additional vibration dampening (e.g., mounting) for the equipment or relocate the equipment to another suitable location on campus until construction vibration would decrease to below 65 VdB.
  - Vibration levels shall be monitored and documented at the nearest sensitive land use within the aforementioned distances to document that applicable thresholds are not exceeded. Recorded data shall be submitted on a twice-weekly basis to UC Santa Cruz. If it is found at any time that thresholds are exceeded, construction activities shall cease in that location, and methods shall be implemented to reduce vibration to below applicable thresholds, or an alternative pile installation method shall be used at that location.

Significance after Mitigation

Implementation of Mitigation Measures 3.12-2a and 3.12-2b would require the contractor(s) to minimize vibration exposure at nearby receptors by locating equipment far from receptors and phasing operations. Further, if pile driving would be required, a vibration control plan would be prepared and implemented to refine appropriate setback distances and identify other measures to reduce vibration, if necessary, and identify and implement alternative methods to pile driving if required. These measures would ensure compliance with recommended levels to prevent damage to structures and human annoyance. Thus, this impact would be reduced to a **less-than-significant** level.

Impact 3.12-3: Generate Substantial Long-Term Stationary Noise

The new buildings and facilities constructed as part of the 2021 LRDP may result in increased noise levels as a result of new stationary noise sources and equipment (e.g., HVAC units, backup generators), and other new sources such as gathering spaces, loading docks, corporation yards, and parking lots. Depending on the distance to noise-sensitive receptors, intervening shielding, and noise-reduction features incorporated in the project, noise levels associated with new stationary noise sources could result in the exceedance of exterior noise limits at existing noise-sensitive land uses, resulting in disturbance to human activities during the daytime or sleep disruption at night. Therefore, this impact would be **significant**.

Implementation of the 2021 LRDP would result in the expansion of on-campus housing, academic/administrative building space, and the Campus Natural Reserve, and a reduction in recreation and athletic areas. Expansion of on-campus housing and academic building space would result in the construction and installation of new stationary sources on the campus including outdoor event space, other gathering spaces, loading docks, corporation yards, and building mechanical equipment such as HVAC units and emergency generators.

Activities occurring within the Campus Natural Reserve (e.g., outdoor classes, habitat/ecological research activities) and other open space areas on-campus are not anticipated to generate substantial noise due to the nature of these land uses. The 2021 LRDP would result in a net decrease in recreation and athletic facilities; and thus, noise levels associated with these facilities are not anticipated to increase as a result of 2021 LRDP implementation. Additionally, the proposed area designated for recreation and athletics, as shown in Figure 2-5 in Chapter 2, "Project Description," is located adjacent to the central campus and is not located near any off-campus noise-sensitive receptors. Further, the 2021 LRDP does not propose the construction of any new facilities where large outdoor events (e.g., concerts, sporting events) would occur. Large events, such as graduation and student orientation, are a part of existing conditions, occur infrequently, and are required to follow UC policies regarding large events, obtaining the applicable permits when necessary. Therefore, noise levels associated with large events are not anticipated to increase as a result of 2021 LRDP implementation. While the 2021 LRDP may include construction of parking facilities, such development would be limited and consolidated at the periphery of the academic core. The 2021 LRDP would emphasize public transit provided by Santa Cruz Metropolitan Transit District (METRO) and internal campus shuttles, as well as expanding and improving pedestrian and bicycle facilities. Personal automobile access would be restricted throughout many parts of campus, and it is not anticipated that expanded parking facilities would generate substantial noise levels at on- or off-campus sensitive receptors. Finally, operational maintenance activities (e.g., landscaping, trash pickup) are not expected to generate noise levels substantially higher than existing conditions near new noise-sensitive receptors because the 2021 LRDP would not include an expansion of the campus boundary, and no land use types that do not already exist on-campus are being proposed under the 2021 LRDP.

On-campus Gatherings

Development throughout campus as implemented under the 2021 LRDP would likely include small gathering spaces such as courtyards where groups would occasionally meet, such as for student clubs or academic functions. Although these on-campus gatherings would not utilize broadly amplified sound through large loudspeakers, small, portable speakers may occasionally be used to project music or speech in the direct vicinity of the gathering. Such gatherings would involve a small number of people, would occur intermittently, and would be required to follow all UC policies related to noise and events. Therefore, on-campus gatherings are not anticipated to expose off-site receptors to noise levels that would exceed applicable standards, including no outdoor amplification beyond 10 p.m.

Loading Dock and Corporation Yard Activity

Some buildings constructed as part of the 2021 LRDP may have loading docks or designated areas for receiving shipments by commercial trucks. Additionally, corporation yards constructed or expanded as part of the 2021 LRDP would be used for storage of fleet vehicles and equipment (e.g., garbage trucks, maintenance trucks), as well as for providing operational maintenance and support facilities such as vehicle fueling facilities, repair facilities, and office space. Noise generated by loading docks and corporation yard activities would be similar in nature by virtue of the primary noise source for both uses being truck activity. Noise sources from truck activity associated with delivery

areas and corporation yards are usually short-term and can include activities such as vehicle idling, engine revving, and the release of air brakes on heavy trucks. Measured noise levels for these noise-generating activities are summarized in Table 3.12-13. Most of the noise-generating activities listed in Table 3.12-13 last for a period ranging from a few seconds (e.g., release of air brakes) to a few minutes (e.g., idling) and can reoccur multiple times during a single truck visit.

As shown in Table 3.12-13, the loudest measured truck-related noise is the release of a truck's air brakes after it comes to a stop, which generates noise levels as high as 86 dB L_{max} at 50 feet. Due to the short-term nature of loading dock and corporation yard truck noise and because the County standards are more stringent, the County's daytime and nighttime L_{max} standards for stationary noise are applied in this analysis. Based on the highest noise level (86 dB L_{max} at 50 feet) listed in Table 3.12-13, noise levels would attenuate to the County's daytime standard of 70 dB L_{max} at a distance of 320 feet and the County's nighttime standard of 65 dB L_{max} at a distance of 560 feet. Depending on the distance to noise-sensitive receptors, intervening shielding, and noise-reduction features incorporated into the loading dock or corporation yard design, on- or off-campus noise-sensitive receptors located close to on-site delivery areas or corporation yards could be exposed to noise levels that exceed the County's daytime and nighttime standards of 70 dB L_{max} and 65 dB L_{max}, respectively.

Table 3.12-13 Noise Levels Generated by Truck Activity at Delivery Areas

Noise-Generating Activity	Noise Level (dB L_{max}) at 50 feet
Idling 18-wheel heavy truck	64–65
Truck with trailer driving at 5 mph	65
Truck with trailer driving at 10 mph	66–68
Truck revving engine	69-80
Truck releasing air brakes at a stop	74–86

Notes: dB = decibel; mph = miles per hour.

Sources: Measurement data collected by EDAW in August 2006 and presented in the Merced Wal-Mart Distribution Center EIR (City of Merced 2009:4.8-21)

Building Mechanical Equipment

Implementation of the 2021 LRDP would result in increased stationary source noise levels associated with building mechanical equipment, primarily emergency generators and HVAC units. Emergency/back-up generators would only be used for continued periods of time during power outages or building equipment malfunctions and, therefore, do not substantially contribute to increases in average ambient noise levels. Further, back-up equipment would be tested periodically for short periods of time during the daytime hours (i.e., 8:00 a.m. to 10:00 p.m.)., consistent with typical work shifts of maintenance personnel. Thus, due to the infrequent, intermittent, and temporary use characteristics of these noise sources, in combination with that fact that typical maintenance activity would occur during the less sensitive times of the day, noise generated from new emergency/back-up generators would not be considered a substantial permanent increase in noise that could disturb nearby receptors.

Detailed information regarding the stationary equipment to be installed for facilities constructed under the 2021 LRDP is not available at this time. However, noise levels commonly associated with larger commercial-use air conditioning systems can reach levels of up to 78 dB at 3 feet (Lennox 2019). Commonly installed building equipment, such as HVAC systems, can be located in the interior of the structure, on rooftops, or in direct line-of-sight to adjacent land uses. Based on the reference noise level, HVAC units would generate a noise level of 54 dB L_{eq} at 50 feet. Due to the long-term and ambient nature of HVAC noise, the aforementioned daytime and nighttime L_{eq} standards for stationary noise are applied in this analysis. Based on the reference noise level, HVAC noise would attenuate to the County's daytime standard of 50 L_{eq} at a distance of 75 feet and the County's nighttime standard of 45 L_{eq} at a distance of 135 feet. Although noise-sensitive receptors could be located within these distances, individual projects constructed under the 2021 LRDP would be required to follow all requirements in the UC Santa Cruz Campus Standards Handbook regarding noise generated by building mechanical equipment, including selection of HVAC systems that are appropriate for the project and its location and appropriate controls, as needed. Thus, the increase

in ambient noise levels associated with HVAC systems at nearby noise-sensitive land uses would not exceed applicable noise standards.

Summary

On-campus gatherings are not anticipated to expose off-site receptors to noise levels that exceed applicable standards. Additionally, building mechanical equipment would not generate substantial operational noise levels and their design would be required to follow all UC building regulations. However, depending on the distance to noise-sensitive receptors, intervening shielding, and noise-reduction features incorporated into the loading dock or corporation yard design, noise-generating activity at these land uses could expose nearby noise-sensitive receptors to noise levels that exceed noise thresholds. Therefore, this impact would be **significant** regarding noise generated by loading dock and corporation yard activity.

Mitigation Measures

Mitigation Measure 3.12-3a: Implement Noise Reduction Measures to Reduce Long-Term Noise Impacts from Loading Dock Activity

To minimize noise levels generated by loading docks and delivery activity to levels that do not exceed the daytime standard of 70 dB L_{max} or nighttime standard of 65 dB L_{max}, the following measures shall be implemented for construction projects that include loading docks:

- New loading docks only used during daytime hours (8 a.m. to 10 p.m.) shall be located at least 320 feet from all residential receptors, and new loading docks used during daytime and nighttime hours shall be located at least 560 feet from all residential receptors. If this is not feasible, UC Santa Cruz shall reduce the noise level at all residential receptors to 70 dB L_{max} during daytime hours and 65 dB L_{max} during nighttime hours by incorporating one or more of the following mitigation strategies, the effectiveness of which shall be determined on a project-level basis by an acoustical professional:
  - Design and build sound barriers near loading docks and delivery areas that block the line of sight between truck activity areas and residential land uses. Sound barriers may consist of a wall, earthen berm, or combination thereof.
  - Constructing loading dock pits that are below grade relative to the surrounding parking area or placing loading docks on the side of a building that does not directly face noise-sensitive receptors.
  - Incorporate a setback distance from loading docks to noise-sensitive receptors, and prohibit truck travel and activity within the setback area by posting signs and/or by installing gates that restrict truck access

Mitigation Measure 3.12-3b: Implement Noise Reduction Measures to Reduce Long-Term Noise Impacts from Corporation Yard Activity

To minimize noise levels generated by corporation yard activity to levels that do not exceed the daytime standard of 70 dB L_{max} or nighttime standard of 65 dB L_{max}, the following measures shall be implemented for the construction of new corporation yards:

- New corporation yards only used during daytime hours (8 a.m. to 10 p.m.) shall be located at least 320 feet from all residential receptors, and new corporation yards used during daytime and nighttime hours shall be located at least 560 feet from all residential receptors. If this is not feasible, UC Santa Cruz shall reduce the noise level at all residential receptors to 70 dB L_{max} during daytime hours and 65 dB L_{max} during nighttime hours by incorporating one or more of the following mitigation strategies, the effectiveness of which shall be determined on a project-level basis by an acoustical professional:
  - Design and build sound barriers around corporation yards that block the line of sight between truck activity areas and residential land uses. Sound barriers may consist of a wall, earthen berm, or combination thereof.

- Incorporate a setback distance from corporation yards to noise-sensitive receptors, and prohibit travel and activity of trucks or other heavy equipment within the setback area by posting signs and/or by installing gates that restrict truck access.

Significance after Mitigation

Implementation of Mitigation Measures 3.12-3a and 3.12-3b would ensure that both on- and off-campus residential land uses would not be exposed to noise generated by loading dock or corporation yard activity such that the daytime or nighttime noise standards of 70 and 65 dB L_{max}, respectively, would be exceeded. For instance, a specific loading dock may utilize a 100-foot setback and a sound wall offering 5-dB of attenuation to ensure that residential receptors would not be exposed to noise levels that exceed the daytime noise standard of 70 dB L_{max}. Alternatively, setback distances could be shorter if more noise-reducing design features were implemented or if loading docks were placed strategically relative to noise-sensitive land uses. Therefore, implementation of Mitigation Measures 3.12-3a and 3.12-3b would reduce impacts related to loading dock and corporation yard activities to **less than significant**.

Impact 3.12-4: Generate a Substantial Increase in Permanent (Traffic) Noise Levels

Population growth and development associated with implementation of the 2021 LRDP would increase traffic within and outside UC Santa Cruz main residential campus and Westside Research Park. However, project-generated traffic volumes would not be at levels high enough to cause substantial increases in traffic noise (i.e., 5 dB increase in traffic-related noise, where the post-project noise level would remain equal to or lower than 60 dB L_{dn}, and a 3 dB increase in traffic-related noise where the post-project noise level would exceed 60 dB L_{dn}). This impact would be **less than significant**.

Development associated with the 2021 LRDP would result in some increases in traffic volumes along affected roadway segments and potentially generate an increase in traffic source noise levels. Generally, a doubling of a noise source (such as twice as much traffic) is required to result in an increase of 3 dB, which is perceived as noticeable by people (Caltrans 2013a: 2-10). This analysis focuses on the potential for the additional roadway volumes associated with implementation of the 2021 LRDP to exceed the aforementioned incremental noise increase standard for sensitive receptors (i.e., 5 dB increase in traffic-related noise, where the post-project noise level would remain equal to or lower than 60 dB L_{dn}, and a 3 dB increase in traffic-related noise where the post-project noise level would exceed 60 dB L_{dn}) in the absence of other applicable transportation-specific noise standards.

To assess this impact, traffic noise levels associated with the 2021 LRDP under existing and existing-plus-project conditions were modeled for select roadway segments. See Appendix H for detailed modeling assumptions. Table 3.12-14 summarizes the increases in noise on project-affected roadway segments.

Table 3.12-14 Predicted Increases in Traffic Noise Levels

Roadway[1]	Predicted dBA L_{dn}, 100 Feet from Centerline Existing	Predicted dBA L_{dn}, 100 Feet from Centerline Existing Plus Project	Predicted Change (dBA)	Applicable Incremental Noise Increase Standard (dBA)	Significant Increase?
Bay Street	62.1	63.0	0.9	3	No
Empire Grade	61.2	62.3	1.1	3	No
Coolidge Drive	60.7	61.9	1.2	3	No
Hagar Drive	62.7	63.5	0.8	3	No
Heller Drive	55.9	59.1	3.2	5	No
High Street[2]	62.4	63.4	1.0	3	No
SR 17	72.4	72.5	0.1	3	No
McLaughlin Drive	52.6	55.8	3.2	5	No
Mission Street/ Highway 1	65.2	65.4	0.2	3	No
Natural Bridges Drive	57.2	57.3	0.1	5	No
Western Drive	54.5	55.7	1.2	5	No

Notes: Traffic noise levels were calculated using methods consistent with the FHWA roadway noise prediction model, based on data obtained from the traffic analysis prepared for this project; dBA=A-weighted decibel; Ldn = Day-Night Noise Level.

[1] Based on results from the Regional Transportation Commission modeling, as summarized in Section 3.16, "Transportation," and provided in Appendix I, the segment with the largest ADT volume was modeled and displayed for each applicable roadway to ensure a conservative analysis.

[2] Predicted traffic noise levels modeled at 50 feet from centerline due to noise sensitive receptors being located closer than 100 feet from the roadway centerline.

Source: Modeled by Ascent Environmental, Inc, in 2020

As shown in Table 3.12-14, development of the 2021 LRDP would result in predicted increases in traffic noise levels ranging from approximately 0.1 to 3.2 dBA along affected area roadway segments. Additionally, as shown in Table 3.12-14, the incremental traffic noise increase standards applicable to each individual roadway would not be exceeded. Therefore, implementation of the project would not result in a substantial increase (i.e., 5 dB increase where the post-project noise level would remain equal to or lower than 60 dB L_{dn}, and 3 dB where the post-project noise level would exceed 60 dB L_{dn}) in traffic noise. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

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3.13 POPULATION AND HOUSING

This section describes the baseline population and housing conditions for UC Santa Cruz, Santa Cruz County, the city of Santa Cruz, and other nearby cities and communities. This section estimates the growth in population (students, faculty, and staff) related to the implementation of the 2021 LRDP, and the potential population and housing impacts that could result from 2021 LRDP implementation.

Comments received on the NOP (See Appendix B) related to population and housing included concerns regarding increased population in the city of Santa Cruz and in the county, increased demand for off-campus housing, changes in housing availability, and the cost of housing. Issues pertaining to economic issues, such as housing affordability, are not directly subject to CEQA (refer to State CEQA Guidelines Sections 15064 and 15131), unless they would indirectly result in physical environmental impacts; those issues are not addressed in this EIR. All other population and housing-related comments are addressed in the environmental analysis in this section.

3.13.1 Regulatory Setting

FEDERAL

There are no federal regulations related to population and housing that apply to the 2021 LRDP.

STATE

Regional Housing Needs Plan

California general plan law requires each city and county to have land zoned to accommodate a fair share of the regional housing need. The share is known as the regional housing needs allocation and is based on a regional housing needs plan developed by councils of government. Association of Monterey Bay Area Governments (AMBAG) is the lead agency responsible for overseeing the Regional Housing Needs Allocation process for jurisdictions in Monterey and Santa Cruz counties (AMBAG 2020; City of Santa Cruz 2011). If approved, the 2021 LRDP would be included as part of future housing need projections developed by AMBAG.

California Education Code

The University of California Master Plan for Higher Education provides enrollment goals for new and transfer students. The California Education Code contains several provisions mandating enrollment access levels. Section 66202.5 of the Education Code states the following:

> The State of California reaffirms its historic commitment to ensure adequate resources to support enrollment growth, within the systemwide academic and individual campus plans to accommodate eligible California freshmen applicants and eligible California Community College transfer students, as specified in Sections 66202 and 66730.
>
> The University of California and the California State University are expected to plan that adequate spaces are available to accommodate all California resident students who are eligible and likely to apply to attend an appropriate place within the system. The State of California likewise reaffirms its historic commitment to ensure that resources are provided to make this expansion possible, and shall commit resources to ensure that students from enrollment categories designated in subdivision (a) of Section 66202 are accommodated in a place within the system.

Similarly, Section 66011(a) of the California Education Code provides that all resident applicants to California institutions of public higher education, who are determined to be qualified by law or by admission standards established by the respective governing boards, should be admitted to either (1) a district of the California Community Colleges, in accordance with Section 76000; (2) the California State University; or (3) the University of California.

Section 66741 of the California Education Code requires acceptance of qualified transfer students at the advanced standing level.

California Public Resources Code

Under Section 21080.09(b) of the California Public Resources Code, the environmental effects relating to changes in enrollment are to be considered for each campus or medical center of public higher education in the EIR prepared for the LRDP for the campus or medical center. California Public Resources Code Section 21080.09(d) states the following:

> Compliance with this section satisfies the obligations of public higher education pursuant to this division to consider the environmental impact of academic and enrollment plans as they affect campuses or medical centers, provided that any such plans shall become effective for a campus or medical center only after the environmental effects of those plans have been analyzed as required by this division in a long range development plan environmental impact report or tiered analysis based upon that environmental impact report for that campus or medical center, and addressed as required by this division.

UNIVERSITY OF CALIFORNIA

University of California Operating Budget/Enrollment Plan and State Budget Act

The State of California's has directed the University to increase its enrollment capacity to accommodate growing demand for a UC undergraduate and graduate education in California. These directives are reflected in recent operating budgets of the UC and recent State Budget Acts. The State Budget Act of 2019-20 included $49.9 million to support enrollment of 4,860 additional California resident undergraduates over 2018-19 enrollment levels by 2020-21. The resumption of State support for undergraduate enrollment growth is a positive development. Nevertheless, actual California resident enrollment growth has far outpaced the levels supported in recent Budget Acts. Undergraduate enrollment growth beyond the levels supported by State funds creates an ongoing challenge to UC system campuses as they strive to maintain the quality of a UC education (UC n.d.).

Each campus within the UC system and within the California State University system provides varying amounts of on-campus housing. The State of California does not plan, budget, or direct a set amount of planned or desired housing for campuses within California. Each UC campus provides student housing within the overall objective of first meeting the UC mission of teaching, research, and public service for California. Based on local housing markets, historic construction rates at each campus, availability of campus land and infrastructure to support additional housing, and student desires related to housing type, location, and affordability, each campus plans for housing needs and new housing projects.

University of California President's Student Housing Initiative

On January 20, 2016, UC President Janet Napolitano announced a housing initiative aimed at supporting current students and future enrollment growth across the UC system. Through the initiative, UC planned to expand the pool of student housing through 2020 and to accelerate the timetable for completing student housing developments that are already in the planning phase. This includes the creation of new beds for undergraduates in residence halls and the addition of more graduate student housing and other apartments that are generally open to all students. Recent estimates for the UC system project that 14,000 new affordable student housing beds are targeted for occupancy before fall 2020. Projects resulting in an additional 15,000 student beds across the UC system are planned to open before fall 2024. As a result of UC Santa Cruz participation in the President's Student Housing Initiative, the campus planned the Student Housing West Project, which at buildout in 2024 would result in 3,072 student beds (a net increase of 1,972 beds within the main residential campus) at UC Santa Cruz (UCOP 2018).

UC Santa Cruz Housing Policy

The Student Housing Office guarantees housing for both incoming first-year students and incoming transfer students, provided students meet specific requirements and deadlines. These are offers of housing, and are not mandatory and UC Santa Cruz does not require students to live on campus or within a certain distance of campus.

LOCAL

As noted in Section 3.0.1, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the university's educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

County of Santa Cruz County General Plan

The Santa Cruz County General Plan Housing Element contains the following policies related to population and housing in the county and that may be relevant to the 2021 LRDP:

- Policy 1.1: Ensure that currently available sites that are able to accommodate a range of housing types continue to be zoned appropriately for housing and mixed use developments, so that opportunity to develop projects and provide affordable housing choices for all income levels is maintained through the planning period.

City of Santa Cruz General Plan

The City of Santa Cruz General Plan contains the following policies related to population and housing in the city and that may be relevant to the 2021 LRDP:

- Policy CC2.1: Provide community services and facilities in keeping with the needs of a growing and diverse population.
- Policy CC2.1.5: Work with UCSC in planning for community facilities and services on and off campus.
- Policy CC2.1.6: Utilize faculty, staff, and student expertise in the areas of resource protection, enhancement, and restoration.
- Policy LU3.1.2: Work with representatives from regional, State, and federal agencies to include Santa Cruz in any incentives programs that link housing to transportation and jobs.
- Policy LU3.1.3: Work with the County and other agencies to develop strategies for improving the region's jobs/housing balance and matching employment opportunities with housing costs.
- Policy ED4.2.1: Encourage the expansion and selective attraction of commercial businesses and industries that create diverse opportunities for employment at wages adequate to buy or rent decent housing in Santa Cruz.
- Policy CC7.2.7: Support housing projects that promote the proprietary interest of residents in their neighborhoods and apartment complexes.

City of Santa Cruz Municipal Code Chapter 16.22, Impact Mitigation – University Growth

In response to UC Santa Cruz's approval of the 2005 LRDP, the City of Santa Cruz adopted an ordinance in 2008 that codified the City's opposition to further growth of UC Santa Cruz "unless all significant impacts are fully mitigated." It also established policy that the City shall not expand services (water and sewer) to UC Santa Cruz "beyond existing city limits without prior approval of the Local Agency Formation Commission (LACFO)."

City of Santa Cruz Measure U

Measure U, approved by voters in 2018, established a policy for the City to provide input on population growth proposed by UC Santa Cruz as part of the 2021 LRDP planning and implementation process. While the City of Santa Cruz and its residents have no direct regulatory authority over UC Santa Cruz, Measure U is intended to guide City officials in participating in and responding to development proposed in the 2021 LRDP. Specifically, Measure U directs City officials to actively and fully participate in the 2021 LRDP review process; to take policy and legal actions to limit the growth proposed for UC Santa Cruz by the Regents; and to eliminate or, at a minimum, reduce the adverse effects of additional UC Santa Cruz growth, particularly in the areas of housing, traffic, and water.

3.13.2 Environmental Setting

POPULATION

Regional Population

The population of Santa Cruz County, including its four cities, was estimated to be 271,233 persons in 2020 (DOF 2020a), of which the city of Santa Cruz represents the largest incorporated city with an estimated 2020 population of 64,424. Table 3.13-1 shows the total population of the county, the four incorporated cities, and the unincorporated area for 2019 and 2020. The population of the City of Santa Cruz has increased by approximately 14,713 people (30 percent) from 1990 to 2020. The City's estimated population also decreased by approximately 817 people (1 percent) from 2019 to 2020.

Table 3.13-1 Regional Population Characteristics

County/City	1990	2019	2020	Numeric Change, 1990-2020	Percent Change, 1990-2020
Santa Cruz County	**229,734**	**272,501**	**271,233**	**41,499**	
Capitola	10,171	10,130	10,108	63	-0.6
Santa Cruz	49,711	65,241	64,424	14,713	30
Scotts Valley	8,667	11,646	11,693	3,026	35
Watsonville	31,099	51,672	51,515	20,416	66
Unincorporated	99,648	133,812	133,493	33,845	34

Source: DOF 2020a, DOF 2007

UC Santa Cruz Enrollment and Population

Within the context of CEQA, population typically refers to residents within a particular jurisdiction. Within the context of a university like UC Santa Cruz, the term "on-campus population" is more encompassing and refers to residents (including students, faculty/staff, and dependents of UC students/faculty/staff residents), students living off-campus, faculty/staff who commute to/from campus on a given day, and non-UC employees (e.g., daycare facility staff and third-party vendor support staff) that similarly commute from their residence to the UC Santa Cruz main residential campus and/or the Westside Research Park. Additional population related to UC Santa Cruz is located on the Coastal Science Campus, Scotts Valley Center, and at Monterey Bay Education, Science and Technology (MBEST) Center. However, as noted previously, those three sites are not within the scope of the 2021 LRDP and are not included in the 2021 LRDP impact analysis in this section.

Table 3.13-2 presents the main residential campus and Westside Research Park enrollment, employment, and other related population for the baseline year of 2018-2019.

Table 3.13-2 Baseline Campus Enrollment and Population

Population Type	Baseline Condition (2018-2019)
Students[1]	18,518[1]
Faculty and Staff[2]	2,800[2]
Non-UC employees	640
Other Daily Population	386[3]
Total	**22,344**

[1] Three-quarter average FTE enrollment of UC Santa Cruz-based student population in the 2018-2019 academic year.

[2] The 2,800 three quarter average employee FTE represents 3,657 headcount employees.

[3] Other daily population is estimated based on 270 homes for faculty and staff located at Phase 1 of Ranch View Terrace, Laureate Court, Cardiff Terrace, Hagar Meadows Townhomes, and Hagar Court, and an average household size of 2.43 persons for the city of Santa Cruz (DOF 2019).

Source: UC Santa Cruz 2020a

HOUSING

Regional Housing

Housing in the region surrounding UC Santa Cruz is concentrated in the cities of Capitola, Santa Cruz, Scotts Valley, and Watsonville. Santa Cruz County has approximately 106,135 total housing units, while the city of Santa Cruz has 23,954, as shown below in Table 3.13-3. This table does not account for housing units that were lost in the recent (summer 2020) CZU Lightning Complex Fire. Based on preliminary data, approximately 1,000 housing units were damaged by the fire, with the majority (911) destroyed. (Santa Cruz County 2020a)

Table 3.13-3 Regional Housing Characteristics (2020 estimates)

County/City	Total Dwelling Units	Occupied Dwelling Units	Vacancy Rate (%)	Persons per Household
Santa Cruz County	**106,135**	**97,831**	**7.8**	**2.63**
Capitola	5,554	4,773	14.1	2.09
Santa Cruz	23,954	22,608	5.6	2.36
Scotts Valley	4,739	4,522	4.6	2.53
Watsonville	14,226	13,772	3.2	3.70
Unincorporated	57,662	52,156	9.5	2.53

Source: DOF 2020c

A vacancy rate of 7.8 percent overall for the county suggests a housing market with relative housing availability. However, this data does not seem to be reflected in local housing conditions. Vacancy rates could reflect second-home ownership—the area is a tourist destination—and other factors, such as some housing in disrepair.

In fact, other data suggest a very tight housing market, especially as it relates to rental housing. According to the U.S. Housing and Urban Development (HUD), the county housing market is influenced by several factors, including proximity to major job centers, low for-sale inventory, and an "extremely tight" rental market, where vacancies sit at a very low 1.9 percent, down from 3.5 percent in 2010. The economic drivers behind the tight housing market are UC Santa Cruz, with an annual economic impact of $1.3 billion (2018), the tourist industry, and proximity to major job centers such as Silicon Valley (HUD 2019).

The CZU Lightning Complex Fire and pandemic have factored into recent housing dynamics. According to information in the Santa Cruz Sentinel, the pandemic has allowed more people from the San Jose/Silicon Valley job centers to work remotely, and a lot of families have relocated to the county. People displaced by the fire have sought affordable temporary (rental) housing. Because of the pandemic and its effect on UC Santa Cruz (i.e., classes are being provided remotely), some local housing that may have been used by students has been available to displaced families. However, a general housing shortage still exists (Santa Cruz Sentinel 2020).

City of Santa Cruz Housing and Planning

Per the City of Santa Cruz 2015-2023 Housing Element Update: Housing Characteristics, housing units are defined as a single-family home, multi-family home, and mobile home. Table 3.13-4 summarizes housing growth and trends in the city of Santa Cruz from 2010 to 2020 (City of Santa Cruz 2016). The number of housing units has increased from 23,316 in 2010 to 23,954 in 2020.

Table 3.13-4 Housing Trends in the City of Santa Cruz

	Population	Housing Units	Occupied	Vacancy Rate	Persons per Household
2010	59,946	23,316	21,657	7.1%	2.39
2015	64,223	23,535	22,039	6.4%	2.42
2020	64,424	23,954	22,608	5.6%	2.36

Sources: DOF 2020a, 2020b, 2020c

The city benefits from a range of amenities that distinguish it from other jurisdictions in the county: the city's Central Business District, a growing connection with the Silicon Valley, and an emerging base of technology, financial, and health-related employment. In addition to being home to UC Santa Cruz, the city provides many private schools and a variety of cultural institutions.

Between 2008 and 2013, there was a downturn in the city's housing market that reflected much of the national and local Great Recession economy. However, housing prices have escalated since 2013 and finding "affordable housing" remains a struggle for residents. The primary challenge identified for the 2015-2023 Housing Element is to accelerate the ability to develop suitable and affordable housing within the city. In addressing the community's housing needs, Santa Cruz must also balance competing goals of the City's General Plan. For example, Santa Cruz attaches great importance to protecting its environmental and cultural amenities and resources. The desire is reflected in permanent greenbelts that preserve important habitat and open space areas. In keeping with this commitment, Housing Element goals and policies continue to protect the city's unique environment (City of Santa Cruz 2016).

As of August 2020, the City is considering or has approved several projects that would offer additional housing within the community. A description of the currently contemplated, as well as recently approved residential development projects within the city of Santa Cruz are presented below in Table 3.13-5. As shown, over 1,400 units are approved or proposed.

Table 3.13-5 Housing Projects within the City of Santa Cruz

Name/Location	Type	Level of Development	Status
190 West Cliff	Mixed-use residential (condominium)	4-story, mixed-use residential building with 89 condominiums, parking, and commercial space	Approved
908 Ocean Street	Mixed-use residential	408 small ownership units and commercial space	Proposed
1930 Ocean Street Extension	Residential (condominium)	32-unit residential condominium development	Approved
Front Street/Riverfront	Mixed-use residential (condominium)	7-story, mixed-use building with 175 residential condominiums (15 of which will be affordable units) and 11,498 square feet of ground floor and levee front commercial space	Proposed
Pacific Front Mixed-Use Development	Mixed-use residential (apartments)	6-story, 315,698 square foot mixed-use building with 205 residential apartments and 10,656 square feet of ground floor commercial space	Approved
111 Errett Circle	Single-family residential	10 single-family parcels and 6 condominium units	Approved
126 Eucalyptus Avenue	Senior living community	100-unit senior housing development	Proposed
101 Felix Street	Multi-family residential (apartments)	100-unit apartment units with existing 240-unit apartment complex	Proposed
530 Front Street	Mixed-use residential (condominium)	6-story, mixed-use building with 8,839 square feet of commercial uses and 170 residential condominiums	Proposed
119 Coral Street	Supportive Housing	120-studio units for permanent supportive housing	Proposed
Downtown Mixed Use Project	Mixed-use residential	Modern library on ground floor with minimum 50 affordable units on upper floors, parking structure with up to 400 spaces	Approved

Source: Data compiled by Ascent Environmental in 2020 based on data obtained from the City of Santa Cruz in 2020

UC Santa Cruz Campus Housing

At UC Santa Cruz, the majority of on-campus housing is provided for students, with some housing for employees (faculty and staff). UC Santa Cruz currently offers a mix of residence halls and apartments in 17 on-campus residential communities. UC Santa Cruz provided approximately 9,300 student beds in campus housing in 2018–2019, with more than 5,565 students living in residence halls and more than 3,180 students living in apartments. Approximately 69 acres of space and 270 housing units are designated for faculty/staff housing within the main residential campus (UC Santa Cruz 2020a).

Table 3.13-6 describes the baseline UC Santa Cruz campus housing capacity.

Table 3.13-6 Baseline Campus Housing (2018-2019)

	Baseline Condition (2018-2019)
Student Housing	9,283
Faculty and Staff Housing	270[1]
Total Housing Capacity	**9,522**

1. Includes 239 homes for faculty and staff located at Phase 1 of Ranch View Terrace, Laureate Court, Cardiff Terrace, Hagar Meadows Townhomes, and Hagar Court, as well as 24 units for Coordinators for Residential Education (CRE) housing and 7 homes for college provosts.

Source: UC Santa Cruz 2020a

Through implementation of planned-but-not-yet-operational projects, which are identified as cumulative projects in Chapter 4, "Cumulative Impacts," an increase of 2,175 student beds over baseline conditions would be provided on campus through redevelopment of Kresge College, construction of the Student Housing West project, and the Crown College Major Renovation Project. All projects were identified and planned as part of implementation of the 2005 LRDP. More specifically, the Kresge College Renewal and Expansion Project (Kresge project), which would involve the redevelopment of existing student housing facilities, would provide 187 additional student beds to its current total (552 total student beds). This project was approved by the Regents in March 2017 and is currently under construction. The Kresge project is anticipated be fully operational in fall 2023.

Student Housing West was originally approved by the Regents in April 2019, however project implementation was delayed due to a legal challenge to the EIR. The Superior Court upheld the adequacy of the EIR but overturned the approval based on issues with the Regents' findings. It is anticipated that the Regents will consider re-approval of the Student Housing West project prior to certification of the 2021 LRDP EIR. The project includes 2,712 undergraduate student beds and 220 graduate beds at the Heller site and 140 student beds for family student housing located at the Hagar site, for a total of 3,072 student beds. Redevelopment of the Heller site would remove 200 existing beds on-campus and approximately 900 additional beds would be removed from existing, densified student housing. Taking into consideration 16 additional student beds that would be realized within Crown College as a result of a current renovation effort, a total net increase of 2,175 would occur within the main residential campus, based on projects that have already been approved and will be constructed in the next several years.

EMPLOYMENT

The State of California Employment Development Department compiles current and historical employment data for California counties and metropolitan areas. Table 3.13-7 provides data related to employment sectors in Santa Cruz County from 2000 through 2020 (EDD 2020). As shown, the largest employment sector in the county is government agencies, followed by trade, transportation, and utilities, and educational and health services. From 2000 to 2020, employment in the county decreased by approximately 22,100 jobs (17 percent).

Table 3.13-7 Employment by Industry in Santa Cruz County 2000-2020

Industry Sector	2000	2005	2010	2015	2020
Government	19,800	21,800	21,600	22,000	23,200
Trade, Transportation and Utilities	18,900	18,000	16,300	16,800	15,300
Educational and Health Services	11,000	13,100	15,100	17,400	15,300
Goods Producing	13,000	12,100	7,800	9,700	10,600
Professional and Business Services	12,100	9,700	9,600	10,400	9,800
Manufacturing	8,700	6,600	4,900	6,100	6,500
Leisure and Hospitality	11,300	11,000	10,800	13,600	5,100
Farm	6,700	7,600	6,800	7,200	4,100

Industry Sector	2000	2005	2010	2015	2020
Mining and Natural Resources	4,300	5,500	2,900	3,600	4,100
Accommodation and Food Service	9,400	9,000	8,800	11,300	3,800
Financial Activities	4,100	3,700	3,300	3,500	3,300
Nondurable Goods	4,100	3,300	2,500	3,200	3,100
Other Services	4,500	3,700	3,700	4,400	2,800
Real Estate and Rental and Leasing	2,000	1,500	1,300	1,500	1,400
Arts. Entertainment, and Recreation	1,900	2,000	2,000	2,300	1,300
Total, All Industries	**131,800**	**130,605**	**117,400**	**133,000**	**109,700**

Source: EDD 2020

As noted above, UC Santa Cruz, which is the largest single employer in the county (UC Santa Cruz 2020b), employs approximately 2,800 faculty and staff within the LRDP area, which represents 2.6 percent of the total Santa Cruz County employment level in 2020.

Growth Projections

AMBAG produced regional growth projections through 2040 for the entire AMBAG planning area as well as counties and incorporated cities within its jurisdiction. Table 3.13-8 identifies AMBAG's growth projections for the City of Santa Cruz and Santa Cruz County. AMBAG projects that the city's employment growth rate would increase as the population levels rise through 2040. The city is expected to have higher population, housing, and employment percentage growth rates than the county based on AMBAG projections. As shown in Table 3.13-8, employment, population, and housing within the city are anticipated to increase by approximately 20-30 percent between 2015 and 2040, while countywide (incorporated cities and unincorporated area) is anticipated to increase by approximately 10-20 percent between 2015 and 2040. The rate of growth seen recently in the city and county vary from AMBAG growth projections. However, as shown in Table 3.13-5, substantial housing growth has been approved and is also newly proposed in the city, which would comport with a reversal of growth rates.

Table 3.13-8 Growth Projections

	2015	2020	2030	2040	Percent Change (2015-2040)
City of Santa Cruz					
Population	63,830	68,381	75,571	82,266	29%
Housing Units	23,535	26,365	28,634	30,167	28%
Employment	40,986	43,090	46,153	49,085	20%
Santa Cruz County					
Population	273,594	281,147	294,238	306,881	12%
Housing Units	105,221	109,179	114,326	118,152	12%
Employment	116,050	120,761	129,275	137,265	18%

Source: AMBAG 2018

As described in Section 3.11 (Land Use and Planning), AMBAG prepares regional housing, population, and employment forecasts that are used in a variety of regional plans, including the Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS).

The 2040 MTP/SCS was adopted in 2018 and is the current MTP/SCS for the Monterey Bay Area. As part of the 2040 MTP/SCS, AMBAG worked closely with stakeholders to develop a new growth forecast and an updated multimodal transportation network with land use patterns and strategies based on reasonably available revenues. The regional growth forecast expressed and included as part of the 2040 MTP/SCS identifies a growth at UC Santa Cruz in student enrollment by 2040 to 27,000-28,000 FTE students (AMBAG 2018).

3.13.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, the project would result in a potentially significant impact on population and housing if it would:

- induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure); or
- displace substantial numbers of people and existing housing, necessitating the construction of replacement housing elsewhere.

ANALYSIS METHODOLOGY

This evaluation of population, employment, and housing impacts is based on information obtained from review of the plans for the project including enrollment and employment projections for UC Santa Cruz, and a review of available population, employment, and housing projections from the City of Santa Cruz, AMBAG, the U.S. Census Bureau, California Department of Finance (DOF), and other sources; and review of applicable elements and policies from the City of Santa Cruz General Plan and Santa Cruz County General Plan.

ISSUES NOT EVALUATED FURTHER

Displacement of Substantial Numbers of Existing Housing or People

No housing would be permanently removed through implementation of the 2021 LRDP, nor would there be any actions that would displace substantial numbers of existing people. The 2021 LRDP includes a substantial addition of new housing; if some existing student housing is demolished, it would be replaced by an equal or greater amount of new housing. Therefore, there would be no environmental impact associated with displacement resulting from the construction of replacement housing elsewhere. Students may be displaced temporarily as a result of redevelopment of UC Santa Cruz campus and housing facilities; however, UC Santa Cruz would be expected to plan project construction to minimize displacement impacts. In summary, there would be no impacts associated with displacement of substantial numbers of people or housing, necessitating the construction of replacement housing elsewhere. This topic is not discussed further.

IMPACTS AND MITIGATION MEASURES

Impact 3.13-1: Directly or Indirectly Induce Substantial Unplanned Population Growth and Housing Demand

Implementation of the 2021 LRDP would allow physical development to accommodate projected increases in student enrollment, UC Santa Cruz faculty/staff, non-UC employees, and on-campus faculty/staff families/dependents, up to the levels anticipated when the campus was founded. To account for projected increases in the total on-campus population, the 2021 LRDP would provide additional housing on the main residential campus and potentially at the Westside Research Park. Up to 28,000 students (baseline plus project) would be accommodated by the plan, and this is consistent with regional growth projections. The 2021 LRDP sets aside an adequate amount of land for housing to accommodate 100 percent of the increase in student enrollment above 19,500 and for 25 percent of the increase in the number of employees, based on demand. Existing data on vacancy rates, as well as planned development nearby, suggest that housing is generally available or planned to be available within the county and city of Santa Cruz to accommodate the additional students, faculty/staff, and non-UC employees for whom on campus housing would not be accommodated. However, other data, such as affordability, suggest a tighter housing market. Further, due to the recent (summer 2020) loss of homes associated with the CZU Lightning Complex fire, the availability of housing has tightened. Therefore, the total on-campus population increase accommodated by the 2021 LRDP may directly or indirectly induce substantial housing demand in the region. This impact would be **significant**.

Implementation of the 2021 LRDP would accommodate a projected increase in the total on-campus population, which includes undergraduate and graduate/professional students, faculty, staff, dependents living in employee housing, non-UC employees working on campus (e.g., consultants, employees of private businesses), visitors, and construction workers. As noted in Chapter 2, "Project Description," Some of this population resides on campus, while the majority is present only during the daytime. In response to the projected increase in total on-campus population implementation of the 2021 LRDP also includes land use designation changes to allow for on-campus increases in building space (academic, research, and support; residential).

The 2021 LRDP would accommodate planned student population growth, which is inherent to a long-term campus plan, much like a city or county general plan. The issue evaluated in this section is whether the 2021 LRDP would indirectly result in substantial unplanned population growth and housing demand beyond the projected population increases described above by inducing additional growth beyond the capacity of the facilities identified in the 2021 LRDP, such that physical environmental impacts could occur outside the campus.

Total student population on campus, as of the 2018-2019 academic year, was 18,518 FTE students. The 2021 LRDP would accommodate a total student enrollment of 28,000 FTE students by the 2040-41 academic year, an increase of 9,482 students. AMBAG projects a total of up to 28,000 FTE students at UC Santa Cruz by 2040 in its MTP/SCS, and when the campus was founded, the City and UC planned for enrollment to reach 28,000. Therefore, the increase in student population accommodated by the 2021 LRDP would be consistent with regional growth projections.

Projected Increase in Total On-Campus Population

As described in Table 3.13-9, the growth in students at full implementation of the 2021 LRDP would accommodate a total on-campus population increase of 12,830 persons, for a total on-campus population of 35,230 by the 2040-2041 academic year. This represents a 56 percent increase over a period of approximately 20 years from the total on-campus population of 22,344 in the 2018-2019 academic year. On-campus student enrollment is projected to increase by an additional 9,482 FTE students by 2040–2041, which would equate to an average annual increase of 431 additional students (assuming student enrollment growth occurred linearly; in actuality annual enrollment growth could fluctuate from year to year). Between the 2018-2019 and 2040-2041 academic years, the 2021 LRDP would also accommodate additional faculty and staff of approximately 2,200 persons, for an estimated total (baseline plus project) of approximately 5,000 faculty and staff. As noted in Chapter 2, "Project Description," projected faculty and staff population does not include employees associated with the Coastal Science Campus, Scotts Valley Center, and Monterey Bay Education, Science, and Technology Center (MBEST) because this LRDP only pertains to the main residential campus and Westside Research Park.

In addition, the 2021 LRDP would accommodate a projected increase of 350 non-UC employees, from a current total of about 640 persons to approximately 990 persons by 2040-2041. The 2021 LRDP also anticipates an increase in other daily population, including dependent population, that would be associated with the additional on-campus housing. This population is projected to increase by 445 persons, from about 342 persons in 2018-2019 to 787 persons by 2040-2041.

Table 3.13-9 Baseline and Potential FTE Campus Enrollment and Population

Population	Baseline Condition (2018–2019)	Potential 2021 LRDP Population in 2040-2041	Net New Compared to 2018–2019
Students[1]	18,518[1]	28,000	9,482
Faculty and Staff	2,800[2]	5,000	2,200
Non-UC Employees	640	990	350
Other Daily Population	386[3]	1,240[3]	798[3]
Total	**22,344**	**35,230**	**12,830**

[1] Three-quarter average enrollment of UC Santa Cruz-based student population in the 2018-2019 academic year.

[2] The 2,800 three quarter average employee FTE represents 3,657 headcount employees.

[3] Other daily population is estimated based on 270 homes for faculty and staff located at Phase 1 of Ranch View Terrace, Laureate Court, Cardiff Terrace, Hagar Meadows Townhomes, and Hagar Court, and an average household size of 2.43 persons for the city of Santa Cruz (DOF 2019).

Source: UC Santa Cruz 2020a

AMBAG does not forecast total campus population (students plus faculty/staff and other support); its growth forecast is based solely on student attendance.

Projected Increases in Building Space under the 2021 LRDP

The 2021 LRDP includes increases in both residential and academic space, to accommodate the projected increase in campus population (Table 3.13-10). Approximately 5.6 million assignable square feet (asf) (8.4 million gross square feet [gsf]) of building space would be required to accommodate the projected growth on the campus under the 2021 LRDP. Through implementation of the 2021 LRDP, total building space on the campus would increase from approximately 3.8 million asf (5.8 million gsf) in 2018-2019 to approximately 9.4 million asf (14.1 million gsf).

Table 3.13-10 Projected Increases in Building Space under the 2021 LRDP

	Baseline Condition (2018–2019)	Net New under 2021 LRDP	Baseline + 2021 LRDP (2040-2041)
Academic and Support Space			
Instruction and Research	858,627	1,127,373	1,986,000
Academic and Administrative Support	765,368	1,290,438	2,055,806
Student Support and Public Services	348,628	608,110	956,738
Facilities & Operations	115,805	57,903	173,708
Academic and Support Space ASF Subtotal	*2,088,428*	*3,083,824*	*5,172,252*
Residential Space			
Student Housing	1,346,938	1,885,000	3,231,938
Beds	*9,283*	*8,500*	*17,783*
Faculty & Staff Housing	317,622	660,000	977,622
Units	*270*	*558*	*828*
Residential Space ASF Subtotal	*1,664,560*	*2,545,000*	*4,209,560*
Total	3,752,988	5,628,824	9,381,812

Notes: ASF = assignable square feet; LRDP = Long Range Development Plan.

Source: UC Santa Cruz 2020a

Demand for Additional Housing

Housing is an important issue and, as described in Section 3.13.2, has become even more so in light of the loss of housing from the CZU Lightning Complex fire that destroyed homes in the county. The analysis below considers the degree to which the 2021 LRDP would accommodate increased demand in housing, and the potential demand for additional housing in the community. According to the City of Santa Cruz 2015-2023 Housing Element, housing affordability, including rental units, is a significant challenge. Students at UC Santa Cruz and Cabrillo College struggle to find affordable housing, and frequently live with several other students in single-family homes. (City of Santa Cruz 2016) The Santa Cruz City Council is actively engaged in strategies to address housing needs in the community, with the Mayor conducting a listening tour, the City Council holding housing study sessions, development of engagement reports, and creation of a Housing Blueprint Committee. This committee developed recommendations, many of which have been adopted by the City to provide for accessory dwelling units, creation of a rental housing task force, other measures (City of Santa Cruz n.d.).

The demand for additional housing would likely contribute to the housing issues facing the City, especially in light of the current extremely low rental vacancy rate. To determine whether there is adequate on-campus housing capacity for additional students and employees accommodated by the 2021 LRDP, UC Santa Cruz has compared the future demand for housing (projected increases in student enrollment and employees between the 2018-2019 and 2040-2041 academic years) with available on-campus housing capacity (net new on-campus housing capacity under 2021 LRDP). The results of this comparative analysis are shown in Table 3.13-11 and summarized below.

Table 3.13-11 Baseline and Projected On-Campus Housing Capacity and Demand

	New Housing Under 2021 LRDP (Compared to 2018–2019)	Projected Housing Demand	Demand Not Provided on Campus	Would All of the Increased Housing Demand Be Accommodated On-Campus?
Student Housing (beds)	8,500[1]	9,482 students	982 beds	No
Employee Housing(homes)	558	2,550 employees	1,992 residences	No
Totals	**9,058**	**12,032**	**2,974**	

Source: UC Santa Cruz 2020a

Additional Housing Demand

Current enrollment at UC Santa Cruz (2018-2019 academic year) is 18,518 students; 9,283 beds are currently provided on campus. A total of 270 units of on-campus housing is provided for faculty and staff; 2,800 faculty and staff are employed under baseline conditions.

The 2021 LRDP would accommodate a projected increase in enrollment of 9,482 students between the 2018-2019 and 2040-2040 academic years. If it is assumed that all new students are also from outside the UC Santa Cruz commute, this would equate to a demand for 9,482 new beds (one bed per student). The project would add up to 8,500 beds. This would result in a demand for an additional 982 beds that would not be provided on campus.

Moreover, an additional 558 housing units for employees would be provided on campus under the 2021 LRDP. Assuming all employees would be new residents, which is an overstatement, this would create a demand for an additional 1,992 residences, assuming each employee lives in their own residence. This is an oversimplification of potential demand, as it would be expected that some employees already live in the region, some may share residences with others, etc., but it would be speculative to specify more refined estimates of demand for residences over the next 20-year period.

As shown in Table 3.13-11, This could create additional demand for housing in the community, including the city of Santa Cruz. Of note, this does not consider additional student beds associated with the planned-but-not-operational projects associated with the 2005 LRDP, including Student Housing West, Kresge Housing, and the Crown College Major Maintenance Project. This projection also does not include additional employee housing units associated with the planned-but-not-operational projects associated with the 2005 LRDP, including the second phase of development of Ranch View Terrace. If these planned projects were included, regional housing needs created by the 2021 LRDP would be met and exceeded; however, these planned housing developments are considered cumulative

projects and are therefore not included in the evaluation and analysis of baseline plus project conditions. Please see Chapter 4, "Cumulative Impacts."

To determine the effects on local housing, it is conservatively assumed that the additional students would share housing with one other student, thereby resulting a potential additional demand of 496 new residential units. Students have a high propensity to live near campus.

With regard to employees, their residential distribution is more predictable. Based on 2019 zip code information for UC employees, 85% live within Santa Cruz County and 15% live outside the county. This analysis assumes that the 1,992 additional employees would reside within and outside the county at the same ratio. That means that an estimated 1,694 additional employees would seek housing within the county, with the remaining 298 additional employees seeking residence outside of the county. While a portion of the additional employees may already live in the county and not result in demand for housing, that number is not known at this time, so for purposes of this analysis UC Santa Cruz has assumed that there would be demand for 1,694 additional homes by 2040-2041.

Combined with the projected student demand identified above, the 2021 LRDP may result in an off-campus housing demand for 2,190 residential units within Santa Cruz County. This additional demand is anticipated to incrementally increase over the approximately 20-year planning period of the 2021 LRDP and would not all occur at a single point in time.

With respect to the 298 employees that are assumed to live outside of Santa Cruz County, housing estimates for the four counties adjacent to Santa Cruz County indicate that there are currently approximately 60,000 vacant units (DOF 2020c). As a result, the additional 298 employees of UC Santa Cruz that may seek residence outside of the County are not anticipated to result in substantial unplanned housing demand.

According to DOF data presented in Table 3.13-3, there are an estimated 106,135 total dwelling units in Santa Cruz County in 2020. Of that, 97,831 are occupied, resulting in 8,304 unoccupied dwelling units and a vacancy rate of 7.8 percent. However, based on the HUD analysis, this vacancy rate does not appear to translate into truly available housing, and both the for-sale and rental housing markets are extremely tight. As shown in Table 3.13-5, there are over 1,400 proposed or approved new residential units within 2 miles of the LRDP area in the City of Santa Cruz. In addition, and as shown in Table 3.13-8, AMBAG anticipates that 12,931 additional housing units will be built in Santa Cruz County between 2015 and 2040. While these data suggest there are ongoing and future reactions to the existing apparent housing shortage, and that numbers of existing vacant dwelling units and future housing units will exceed the demand for 1,667 additional homes by 2040-2041, these units are not available for use now.

One consideration is the 911 housing units in Santa Cruz County (1 percent of total dwelling units) that were lost in 2020 due to the CZU Lightning Complex Fire (Santa Cruz County 2020a). Many of these housing units are expected to be rebuilt, others perhaps not. As described in Section 3.13.2, there is already a shortage of temporary housing for those displaced by the fire (San Francisco Chronical 2020b). While a majority of homes may be rebuilt, it will take time. For example, in Sonoma County, about 85% of the 5,600 homes destroyed in the Tubbs Fire in 2017 are either rebuilt or are in some stage of the permitting or construction process (San Francisco Chronicle 2020a). Because there are many complex factors related to the amount of housing that will be rebuilt in Santa Cruz County (e.g., cost, ability to obtain/afford insurance, government planning and permitting decisions, personal choices of residents and property owners), it is likely that some the lost housing will never be rebuilt. Therefore, the 2019 (HUD) and 2020 (DOF) data as to availability of housing and the tight housing market estimates may not be reflective of the existing and near-term housing market; it is expected to be even tighter.

Another consideration is the uncertainty surrounding the degree to which the vacant dwelling units within Santa Cruz County would be available to additional employees. Dwelling units can be unoccupied for many reasons, some of which would not preclude their availability to additional employees. As described in Section 3.13.2, there are a variety of reasons vacant homes are unavailable, including their status as a vacation rental, or second home, or a house in disrepair. Based on information maintained by Santa Cruz County, there are several hundred vacation rentals, especially within the City of Santa Cruz and Rio Del Mar (Santa Cruz County 2020b).

Based on the information presented above, including the number of units that have been approved by the City of Santa Cruz, balanced against information in the City of Santa Cruz Housing Element and other information in Section 3.13.2, and the need to pursue additional housing under existing conditions (e.g., efforts by the Santa Cruz Blueprint Housing Committee), it is likely the 2021 LRDP will result in demand for new housing that would not already be provided. UC Santa Cruz has determined that while the future housing market is not entirely predictable, it is possible that there will not be adequate off-campus housing units to meet the housing demand of additional students and employees in the years leading up to 2040-2041. Therefore, implementation of the 2021 LRDP could further reduce the available housing market in the County and induce unplanned levels of substantial housing demand because of the projected increase in UC and non-UC employees. This impact is **potentially significant**.

Mitigation Measures

UC Santa Cruz is planning to provide at least 8,500 student housing beds and 558 employee residences under the 2021 LRDP. Additional beds and residences are expected to be provided under the 2005 LRDP as part of the Kresge Housing and Student Housing West projects (see Chapter 4, Cumulative Impacts). As a result and in consideration of the 2021 LRDP objectives, no feasible mitigation measures are available to reduce the anticipated impact. However, as set forth below, with incorporation of cumulative projects on and off campus, UC Santa Cruz anticipates that it will be able to provide housing to all students projected under the LRDP and the impact associated with student housing demand is expected to be less-than-significant.

Significance after Mitigation

The 2021 LRDP is a physical development plan for UC Santa Cruz's main residential campus and Westside Research Park, based on projected increases in student and employee populations. There is uncertainty regarding whether a significant impact would occur, as substantial housing is planned in the region including on campus.

Lesser development and/or lesser enrollment could reduce the potential impacts associated with population growth but would not achieve the anticipated necessary level of development consistent with UC and UC Santa Cruz policy direction. As a result and because they would result in substantively different projects, these actions are not considered feasible as mitigation. Reduced enrollment is considered as an alternative to the 2021 LRDP (refer to Chapter 6, "Alternatives.") As currently proposed, the 2021 LRDP involves the placement of residential units within dense nodes in order to minimize the potential impact of LRDP-development and increased enrollment on the environment (e.g., aesthetic impacts, biological resource impacts, cultural resource impacts, etc.). It is possible that the additional employees, who would not be able to reside on campus, would be able to find available housing stock within the County, including the city of Santa Cruz, however due to uncertainties surrounding the availability of housing stock (including those associated with the CZU Lightning Complex fire and the level of rental/vacation homes in the Santa Cruz area), this impact would be considered **significant and unavoidable**.

3.14 PUBLIC SERVICES

This section characterizes public services relevant to the 2021 LRDP and whether there would be changes to the physical environment if there is a need to expand such services. The analysis that follows evaluates the on-campus population increases under the 2021 LRDP and the associated demand for public services, including police, fire, schools, and libraries that could be provided by the campus and/or by the City and County of Santa Cruz. Existing public services on campus and in the city and county are described below in the "Environmental Setting" section to provide a context for the impact analysis. Impacts associated with recreation services (i.e., parks and other facilities related to recreation) are evaluated in Section 3.15, "Recreation."

Comments received on the NOP (see Appendix B) related to public services included concerns regarding increased demand for public services, adequate on-campus emergency vehicle access, and construction of new public services facilities necessary to meet on-campus demand for services. Concerns regarding adequate on-campus emergency vehicle access are discussed in Section 3.16, "Transportation, Circulation, and Parking."

3.14.1 Regulatory Setting

FEDERAL

Higher Education Opportunity Act

The Campus Fire Safety Right-to-Know Act, an amendment to the Higher Education Opportunity Act, was signed by President Bush on August 1, 2008. Specifically, the legislation requires that a Fire Safety Report be distributed by the University containing statistics concerning the following in each on-campus student housing facility during the most recent calendar year for which data are available:

- number of fires and the cause of each fire;
- number of injuries related to a fire that resulted in treatment at a medical facility;
- number of deaths related to a fire;
- value of property damage caused by a fire;
- description of each on-campus student housing facility's fire safety system, including the fire sprinkler system;
- number of regular mandatory supervised fire drills;
- policies or rules on portable electrical appliances, smoking, and open flames (such as candles); procedures for evacuation; and policies regarding fire safety education and training programs provided to students, faculty, and staff; and
- plans for future improvements in fire safety, if determined necessary by such institution.

STATE

California Fire Code

The California Fire Code (CFC) contains regulations relating to construction, maintenance, and use of buildings. Topics addressed in the CFC include fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, provisions intended to protect and assist fire responders, industrial processes, and many other general and specialized fire-safety requirements for new and existing buildings and the surrounding premises. The Fire Code contains specialized technical regulations related to fire and life safety. It is located in Part 9 of Title 24 of the CCR. The CFC is revised and published every 3 years by the California Building Standards Commission.

CFC Section 505.1 Address Identification

New and existing buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be not less than 4 inches (102 millimeters) high with a minimum stroke width of 1/2 inch (12.7 millimeters). Where required by the fire code official, address identification shall be provided in additional approved locations to facilitate emergency response. Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole, or other sign or means shall be used to identify the structure. Address identification shall be maintained.

California Health and Safety Code

State fire regulations are set forth in Section 13000 et seq. of the California Health and Safety Code. This includes regulations for building standards (as also set forth in the California Building Code [CBC]), fire protection and notification systems, fire protection devices such as extinguishers and smoke alarms, high-rise building and childcare facility standards, and fire suppression training.

California Occupational Safety and Health Administration

In accordance with CCR Title 8 Section 1270, "Fire Prevention," and Section 6773 "Fire Protection and Fire Equipment," the California Occupational Safety and Health Administration has established minimum standards for fire suppression and emergency medical services. The standards include guidelines on the handling of highly combustible materials, fire hose sizing requirements, restrictions on the use of compressed air, access roads, and the testing, maintenance and use of all firefighting and emergency medical equipment.

California Code of Regulations

The CCR Title 5 Education Code governs all aspects of education within the state.

California Building Code

The State of California provides minimum standards for building design through the CBC, which is located in Part 2 of Title 24 (California Building Standards Code) of the CCR. The CBC is based on the International Building Code but has been amended for California conditions. It is generally adopted on a jurisdiction-by-jurisdiction basis, subject to further modification based on local conditions. Commercial and residential buildings are plan-checked by local building officials for compliance with the CBC. Typical fire safety requirements of the CBC include: the installation of sprinklers in all high-rise buildings; the establishment of fire resistance standards for fire doors, building materials, and particular types of construction; and the clearance of debris and vegetation within a prescribed distance from occupied structures in wildfire hazard areas.

2018 State of California State Hazard Mitigation Plan

The State Hazard Mitigation Plan represents the state's primary hazard mitigation guidance document that includes discussions on wildfire and structural fire hazards and provides a mitigation plan for an effective wildfire suppression plan. The State Hazard Mitigation Plan also includes goals and objectives related to reducing risks associated with wildfire.

UNIVERSITY OF CALIFORNIA

There are no UC plans and policies specifically related to public services that apply to the 2021 LRDP.

LOCAL

As noted in Section 3.0.1, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the University's educational purposes. However, UC Santa Cruz may

consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

There are no County policies relevant to the 2021 LRDP.

City of Santa Cruz General Plan

The City of Santa Cruz General Plan 2030 contains the following goals and policies that are relevant to public services in the city and may be relevant to the 2021 LRDP:

- **Policy CC 7.3:** Cooperate with other agencies in ensuring public safety and emergency preparedness.
  - **Action CC 7.3.2:** Encourage UCSC participation and support in providing safety and emergency services within the city.
- **Policy CC 9.4:** Encourage provision of and access to a full range of adequately distributed health services for city residents.
  - **Action CC 9.4.1:** Maintain paramedic and emergency medical services, consistent with population growth, through the Joint Powers Authority.
  - **Action CCC 9.4.2:** Make operational improvements toward providing emergency services at accident or disaster scenes within an average time of 4 minutes or less and within 5 minutes or less 90 percent of the time.
- **Policy HZ 1.1:** Ensure emergency preparedness.
- **Policy HZ 1.2:** Respond to emergencies rapidly.
  - **Action HZ 1.2.1:** Annually review data on calls for service, response times, and changing risk probabilities.
  - **Action HZ 1.2.2:** Make continuous operational improvements in an effort to arrive on emergency scenes within an average time of 4 minutes or less and within 5 minutes or less 90 percent of the time.
- **Policy HZ 1.4:** Continue to meet fire safety and firefighting needs.
  - **Action HZ 1.4.1:** Ensure department readiness through ongoing equipment maintenance and personnel training.
  - **Action HZ 1.4.5:** Operate cooperative fire protection services with UC Santa Cruz, the County fire districts, and the California Department of Forestry.

3.14.2 Environmental Setting

FIRE PROTECTION

UC Santa Cruz

UC Santa Cruz operated its own fire department between 1973 and 2014, when the department was disbanded. In 2014, UC Santa Cruz contracted with the City of Santa Cruz Fire Department (SCFD) for fire response services via an Agreement for Fire Protection and Emergency Services between the City of Santa Cruz and the Regents on behalf of UC Santa Cruz. Pursuant to the terms of the agreement, UC Santa Cruz agreed to pay its share of the City's net actual expenses for fire protection services plus the associated administrative fees. In exchange for payment, the City agreed to provide fire protection services to the UC Santa Cruz campus, including off-campus facilities owned by UC Santa Cruz. The share amount was agreed to as an equitable cost-sharing arrangement based on existing circumstances at the time the agreement was drafted. However, the amount can be adjusted based on changes in certain circumstances. UC Santa Cruz and the City agreed to consider modifications to the share amount upon the occurrence of the following circumstances:

Nonexclusive list of factors that indicate possible decrease in UC Santa Cruz's share:

- City contacts to provide fire services to another jurisdiction
- City adds one or more fire companies or fire stations
- City does not provide the level of service described in the agreement
- Proposed changes to the City's budget or accounting methodology that may impact calculation of the City's Net Actual Expenses (and tend to increase Net Actual Expenses)
- UC Santa Cruz decreases student housing within the campus area, which results in a net decrease in the number of bed space capacity within the campus area by more than 20 percent from the number of bed spaces within the campus area in the base year.

Nonexclusive list of factors that indicate possible increase in UC Santa Cruz's share:

- The percentage that represents the ratio of incidents that the SCFD responds to within the campus area to all incident responses, averaged over the immediately preceding consecutive 3-year period, exceeds the base year percentage by more than 10 percentage points
- Proposed changes to City's budget or accounting methodology that may impact calculation of City's Net Actual Expenses (and tend to decrease Net Actual Expenses)
- University completes construction of contemplated additional student housing within the campus area, which results in a net increase in the number of bed space capacity within the campus area by more than 20 percent from the bed space capacity within the campus area in the base year.

SCFD Fire Station 4, located at 701 Chinquapin Road, remains a University-owned building but was leased to the City and designated as SCFD Fire Station 4. The fire engines previously owned by UC Santa Cruz were sold to the City but remain on campus at Station 4 (UC Santa Cruz 2018a, 2020a).

UC Santa Cruz, and the entire UC system, fall under the jurisdiction of the California Office of the State Fire Marshal (OSFM). Pursuant to a memorandum of understanding between the UC system and OSFM, UC personnel serve as local campus fire marshals, deputy marshals, and inspectors. The UC Santa Cruz Fire Marshal and Deputy Fire Marshal are employed within the UC Santa Cruz Office of Emergency Services and trained and certified through the Designated Campus Fire Marshal program facilitated by OSFM. The UC Santa Cruz Fire Marshal provides fire protection consultation, engineering design criteria, code interpretations, and recommendations to Physical Planning & Construction staff on campus building construction and renovation activities. In addition, the UC Sant Cruz Fire Marshal reviews and approves all construction plans and inspects buildings during construction/renovation, including acceptance tests for fire alarms, sprinkler systems, and other fire safety systems. The UC Santa Cruz Deputy Fire Marshal coordinates the campus building inspection program, performing comprehensive fire code compliance inspections of all campus buildings on an annual basis and monitoring necessary follow-up activities (UC Santa Cruz 2019).

City of Santa Cruz Fire Department

SCFD operates four stations and one lifeguard headquarters. Apparatus include four engines, one type 3 engine, and one truck. SCFD personnel is comprised of 59 full-time uniformed personnel, 2 full time non-uniformed personnel, and 73 seasonal/part-time uniformed personnel (lifeguards, hydrant maintenance workers). SCFD apparatus includes four engines, one type 3 engine, and one ladder truck. The location and personnel for each fire station is provided below (Oatey, pers. comm., 2020):

- Fire Station 1, located at 711 Center Street, is staffed by 9 personnel per day, including a Battalion Chief.
- Fire Station 2, located at 1103 Soquel Avenue, is staffed by 3 personnel per day.
- Fire Station 3, located at 335 Younglove Avenue, is staffed by 3 personnel per day.
- Fire Station 4, located on the UC Santa Cruz campus at 701 Chinquapin Road, is staffed by 3 personnel per day.

SCFD response goal for emergency medical services is 8 minutes or less for 90 percent of all calls. SCFD response goal for fire suppression is 10 minutes and 10 seconds, or less, for structural firefighting. During the 2018 – 2019 academic school year, SCFD responded to 628 emergency and non-emergency calls originating from the UC Santa Cruz campus. The mean response time during the 2018 – 2019 school year ranged from 5 minutes and 43 seconds to 6 minutes and 7 seconds, which is below the SCFD emergency medical services and fire suppression response goals (Oatey, pers. comm., 2020).

California Department of Forestry and Fire Protection

The California Department of Forestry and Fire Protection (CAL FIRE) responds to wildfires within the State Responsibility Area, which includes unincorporated Santa Cruz County and north campus. The central campus and lower campus fall within SCFD jurisdiction; however, CAL FIRE will respond to these areas of the main residential campus to assist pursuant to the mutual aid agreement with SCFD (Mosher, pers. comm., 2020).

Bonny Doon Station No. 32 at 975 Martin Road in Santa Cruz, which is staffed by volunteers, and Fire Station No. 33 (Big Creek) at 240 Swanton Road in Davenport, which has paid staff present at all times, are open year-round regardless of seasonal fire risk levels. At least three firefighters staff the Big Creek station at any given time. During the fire season, typically May through October, two extra fire stations are put in service: Felton Station at 6509 Highway 9 with full-time staff, and Soquel Station at 4750 Old San Jose Road, which is staffed with volunteers.

POLICE PROTECTION

UC Santa Cruz Police Department

The UC Santa Cruz Police Department (UC Santa Cruz PD) provides police protection services to the UC Santa Cruz campus. UC Santa Cruz PD provides uniformed response calls for service, enforces traffic laws, investigates criminal activity, provides safety presentations, assists other divisions as needed, and acts as a visible deterrent to crime. Officers patrol the UC Santa Cruz main residential campus, the Westside Research Park, and the Coastal Science Campus using marked patrol cars, bicycles, and are also on foot. The UC Santa Cruz PD station is located at 1156 High Street in the Emergency Response Center, and on-site personnel includes 32 sworn members and support staff. Sworn members include the Chief of Police, two lieutenants, five sergeants, and 24 officers. Support staff includes two managers, nine public safety dispatchers, three administrative specialists, and five parking enforcement officers. UC Santa Cruz PD also employs five Information Technology Services (ITS) personnel that are supervised jointly by the Police Department and ITS and are responsible for physical security systems (Oweis, pers. comm., 2020).

UC Santa Cruz PD has an adopted service ratio of 1.4 officers per 1,000 campus population. The campus population during the 2018-2019 school year was 22,300, this equates to 1.43 officers per 1,000 campus population, which meets the UC Santa Cruz PD–adopted service ratio. The UC Santa Cruz PD emergency response goal is between 3 and 5 minutes from the time the call is dispatched, and the nonemergency response goal is between 8 and 10 minutes. UC Santa Cruz PD is currently meeting their emergency and non-emergency response goals. UC Santa Cruz PD responded to 32,106 calls in 2018 and 30,972 calls in 2019. Calls for service include felony and misdemeanor crimes in progress, reports for theft and burglary, traffic collisions, traffic enforcement, medical aids, mental health concerns and welfare checks, disturbing the peace, assault and battery, suspicious persons, alarm calls, trespassing, and property checks (Oweis, pers. comm., 2020).

Santa Cruz County Sheriff's Office

The Santa Cruz County Sheriff's Office, located at 5200 Soquel Avenue, provides police protection services to 441 square miles of unincorporated Santa Cruz County, and the cities of Santa Cruz, Watsonville, Capitola, and Scotts Valley. In 2018, the County Sheriff's Office employed 167 sworn officers, 119 corrections staff, and 70 professional staff (Santa Cruz County Sheriff's Office 2018). The County Sheriff's Office does not patrol the UC Santa Cruz campus, but can assist the UC Santa Cruz PD upon request. Assistance can include crime investigation support, crowd control, and coroner's duties (UC Santa Cruz 2018b:4.10-5).

City of Santa Cruz Police Department

The City of Santa Cruz Police Department (SCPD), located at 155 Center Street, provides police protection services to the city, including University-owned and leased off-campus facilities. SCPD is also available to provide support to UC Santa Cruz PD as needed. In 2018, SCPD employed 94 sworn officers assigned to patrol, traffic, parks, community services, downtown, investigation, and undercover task force assignments (SCPD 2020). The estimated 2018 citywide population was approximately 64,643; this equates to 1.45 sworn officers per 1,000 residents (U.S. Census 2020). During the 2018-2019 school year, SCPD responded to 103 calls originating on the main residential campus, and 143 calls originated at the Westside Research Park (Donovan, pers. comm., 2020). These response calls were made at the request of the UC Santa Cruz Police Department. The City of Santa Cruz General Plan 2030, Action CCC 9.4.2 directs the City to make operational improvements toward providing emergency services at accident or disaster scenes within an average time of 4 minutes or less and within 5 minutes or less 90 percent of the time (City of Santa Cruz 2012).

SCHOOLS

Santa Cruz City Schools

Santa Cruz City Schools (SCCS) provides kindergarten through grade 12 education for the city of Santa Cruz and county locations from Davenport to Soquel. Facilities within SCSD include four elementary schools; two middle schools; three high schools; and the Branciforte Small Schools Campus, which includes one continuation high school, one independent studies program, a home school program, and a community school (SCCS 2020a). The school enrollment for 2019-2020 academic school year for SCCS schools in shown in Table 3.14-1; there is available capacity at all schools.

Table 3.14-1 Baseline Enrollment and Capacity of Santa Cruz City Schools

School	Capacity	2019-2020 Enrollment	Difference
Elementary Schools			
Bay View, K-5	546	428	118
DeLaveaga, TK-5	619	530	89
Gault, TK-5	457	336	121
Westlake, K-5	565	548	17
Middle Schools			
Branciforte, 6-8	481	460	21
Mission Hill, 6-8	625	626	-1
High Schools			
Harbor, 9-12	1,158	935	223
Santa Cruz, 9-12	1,134	1,106	28
Soquel, 9-12	1,173	1,078	95
Branciforte Small Schools	517	306	211
Total	**7,275**	**6,353**	**922**

Sources: SCCS 2020a, 2020b, 2016; City of Santa Cruz 2012

SCCS projects that enrollment for the 2020-21 academic school year will decrease to 1,762 elementary students, 1,049 middle students, 3,140 high school students, and 333 students for the Branciforte Small Schools Campus, for a total of 6,284 students. Enrollment is projected to continue to decrease through the 2024-2025 academic school year (SCCS 2020c). SCCS collects developer impacts fees to fund capital improvements, although UC Santa Cruz is not subject to fee requirements such as those paid by developers pursuant to California Government Code Sections 53080, 65995, and 66001. Development impact fees for SCCS are $1.78 per square of residential development and $0.11 of senior citizen housing development to fund elementary schools, $1.58 per square foot of residential development and $0.22 of senior citizen housing development to fund high schools, and $0.29 per square foot of commercial development to fund middle and high schools (SCCS 2020d).

Live Oak School District

The Live Oak School District (LOSD) provides kindergarten through grade 8 education for the unincorporated community of Live Oak located southeast of the main residential campus. Facilities within LOSD include three elementary schools, one middle school, one alternative school, and one charter school (LOSD 2020a). Enrollment for the 2019-2020 academic school year for LOSD schools was 1,813 students, which is below the available capacity (Kyle, pers. comm. 2020). LOSD collects developer impacts fees to fund capital improvements, although and as noted above, UC Santa Cruz is not subject to these fee requirements. Development impact fees for LOSD are $1.34 per square of residential development and $0.24 per square foot of commercial development (LOSD 2020a).

Scotts Valley Unified School District

Scotts Valley Unified School District (SVUSD) provides kindergarten through grade 12 education for the unincorporated community of Scotts Valley, located northeast of the main residential campus. Facilities within SVUSD include two elementary schools, one middle school, and one high school (SVUSD 2020a). The total enrollment capacity for SVUSD schools is 2,787. Enrollment for 2018-2019 academic school year at SVUSD schools was 2,421 students, which is below the available capacity (Simonovich, pers. comm., 2020). SVUSD collects developer impacts fees to fund capital improvements, although and as noted above, UC Santa Cruz is not subject to these fee requirements. Development impact fees for SVUSD are $3.14 per square of single detached residential development, $3.48 per square foot of multi-family attached residential development, and $0.56 per square foot of commercial/industrial development (SVUSD 2020b).

Soquel Union Elementary School District

Soquel Union Elementary School District (SUESD) provides kindergarten through grade 8 education for the cities of Santa Cruz and Capitola, and the unincorporated community of Soquel. Facilities within SUESD include four elementary schools and one middle school (SUESD 2020) Total enrollment for 2018-2019 academic school year at SUESD schools was 1,954 (Ed-Data 2020). Data regarding capacity of the school district was not available as of the issuance of the Draft EIR.

LIBRARY SERVICES

UC Santa Cruz Library

The UC Santa Cruz University Library system manages two facilities: the McHenry Library and the Science and Engineering Library. The McHenry Library is located in the central campus on Steinhart Road and houses collections in Arts, Humanities, and Social Sciences. The facility also includes a café, yoga and meditation space, and study rooms. The Science and Engineering Library is located on Science Hill in the central campus and houses collections in engineering, physical sciences, and biological sciences. The facility also features study rooms and a video gaming lab (UC Santa Cruz 2020b). Individual colleges located on the main residential campus also include small library facilities that serve associated students and faculty. These include Oakes, Stevenson, Crown, and Cowell colleges. The UC Santa Crus Arboretum also includes a separate botanical library (UC Santa Cruz 2005).

3.14.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Thresholds of significance are based on Appendix G of the State CEQA Guidelines. 2021 LRDP implementation would result in a significant impact on public services if it would:

- result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, and/or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:

- fire protection,
- police protection,
- schools,
- parks, and
- other public facilities (e.g., libraries).

ANALYSIS METHODOLOGY

This analysis evaluates the potential for adverse physical impacts to occur as a result of the provision of new or altered public service facilities to campus development under the 2021 LRDP, including facilities or facility expansions needed to accommodate increases in demand for services and service personnel, or to enable service providers to maintain level of service standards. Increased demand for public services that would result from implementation of the 2021 LRDP is determined by comparing projected population growth with existing service ratios, response times, capacities, and/or other performance objectives identified for each service to determine whether there would be unmet need. An unmet need for services could indicate that new facilities would be needed or that additional staff or equipment would be needed, which could result in a need for expanded facilities.

ISSUES NOT EVALUATED FURTHER

Parks

Impacts associated with parks and other facilities related to recreation that could result from 2021 LRDP implementation are evaluated in Section 3.15, "Recreation."

Other Public Facilities

Libraries are public facilities that could be affected by 2021 LRDP implementation. UC Santa Cruz manages two facilities: the McHenry Library and the Science and Engineering Library. Individual colleges located on the main residential campus also contain small library facilities that serve associated students and faculty. These include Oakes, Stevenson, Crown, and Cowell colleges. The UC Santa Cruz Arboretum also includes a separate botanical library. While UC Santa Cruz does not have an adopted numeric standard for library facilities, it does have a goal to provide adequate library services and facilities to meet the needs of the growing campus. The 2021 LRDP identifies land for Academic & Support land use. Under the 2021 LRDP, approximately 608,110 assignable square feet would be developed for student support and public services, this includes libraries, collaboration learning spaces, and study commons. The construction of new library facilities on-campus would occur when warranted by increased demand and when financially feasible. The potential impacts associated with the physical construction and operation of these facilities are programmatically analyzed in this EIR. This issue is not discussed further.

IMPACTS AND MITIGATION MEASURES

Impact 3.14-1: Impacts on Fire Facilities

The increase in campus population under the 2021 LRDP would increase the demand for on-campus and off-campus fire services. To address impacts of the increased population on campus, as part of the 2021 LRDP, UC Santa Cruz could either modernize and upgrade the existing SCFD Station 4 or construct a new facility on-campus under the 2021 LRDP within the Facilities and Operations land use designation, as warranted by additional development (either height or intensity of on-campus development). The facility would be placed on an area designated for this use in the 2021 LRDP, and the impacts of development under the 2021 LRDP are addressed throughout this EIR. Impacts associated with increases in population living off-campus would be addressed through development impact fees collected by those jurisdictions, as called for in their respective fee programs. In general, impacts would be less than significant, however due to timing considerations related to the availability of on-campus fire equipment (and associated fire facility) to serve taller/larger on-campus facilities included as part of the 2021 LRDP, impacts are considered **significant**.

2021 LRDP implementation would increase campus population and result in additional students, faculty and staff living on campus and in the surrounding communities (refer to Section 3.13, "Population and Housing," of this EIR). 2021 LRDP implementation would also result in the development of additional academic, support, housing, and other building spaces on the main residential campus as well as at the Westside Research Park.

On-Campus Fire Service and Facilities

Emergency response times are used by SCFD to determine adequacy of service. UC Santa Cruz is served by SCFD Station 4, located on-campus, which adheres to the SCFD response time goal of 8 minutes for emergency medical services, and 10 minutes and 10 seconds, or less, for fire suppression. The mean response time during the 2018 – 2019 school year ranged from 5 minutes and 43 seconds to 6 minutes and 7 seconds, which is below the SCFD response goals for both emergency medical services and fire suppression. However, according to SCFD, Station 4 is not equipped to accommodate the proposed increase in on-campus population. The existing station would need to be expanded, or a new station would need to be constructed to accommodate population growth under the 2021 LRDP. Further, the SCFD would require a hook-and-ladder to accommodate fire safety needs for taller structures on-campus.

The 2021 LRDP identifies several areas for Facilities and Operations land use, which includes development of public service facilities such as fire stations. Under the 2021 LRDP, approximately 608,110 assignable square feet would be developed for student support and public services. UC Santa Cruz could either a modernize and upgrade SCFD Station 4 or construct of a new facility on-campus under the 2021 LRDP. Further, based on information provided by the SCFD, the potential height of new on-campus structures may exceed the limits of the existing equipment, especially the current SCFD ladder truck. As a result, the construction of new or physically altered SCFD on-campus facilities necessary to provide adequate facilities for the additional equipment are already considered as part of the overall development envisioned under the 2021 LRDP. The potential impacts associated with the physical construction and operation of these facilities are analyzed throughout this EIR. There are no unique considerations that would suggest a new or expanded fire station, developed within the Academic & Support land use would result in environmental impacts that are additional to other land uses within this category. However, if the timing of construction of the new facilities, including the fire station, is not tied to specific development under the 2021 LRDP, impacts would be considered significant if the new equipment (and associated facility) is not available to serve taller/larger on-campus facilities included as part of the 2021 LRDP.

UC Santa Cruz pays its share of the City's net actual expenses for fire protection services plus the associated administrative fees; please see the discussion in Section 3.14.2.

Off-Site Fire Service and Facilities

As discussed in Chapter 2, "Project Description," and Section 3.13, "Population and Housing," new student enrollment growth and some future employees (i.e., faculty/staff) would be accommodated in on-campus housing. Through implementation of the 2021 LRDP, there will be a projected total of 558 new employee housing units on campus, while

the remaining projected increase of new employees (approximately 1,650) would be anticipated to seek housing in the region. Some individuals may find housing in existing units, and some may increase the demand to construct new housing in adjacent communities. A prediction of the extent and location of new housing is speculative, but a summary of planned and approved-but-not-yet-built housing projects is included in Section 3.13, "Population and Housing". Typically, when new housing is built, fees for fire protection services are included in building permits as part of the jurisdiction's development fee impact program.

Through the collection and use of development impact fees, increases in the demand for public services associated with faculty and staff living off-campus, including fire facilities, would be addressed in the respective jurisdiction (e.g., City of Santa Cruz, Capitola, Scotts Valley,) in which the new faculty, and staff choose to reside. This would ensure that the level of fire protection services would be maintained.

As development occurs under the 2021 LRDP, there is a potential for increases in the number of vehicles on-campus. The additional vehicles could increase delays for emergency response vehicles during peak commute hours, especially in the immediate vicinity of the 2021 LRDP area. Emergency responders maintain response plans which include use of alternate routes, sirens, and other methods to bypass congestion and minimize response times. California law requires drivers to yield the right-of-way to emergency vehicles and remain stopped until the emergency vehicle passes. Therefore, fire service response times are not expected to be notably affected by campus development under the 2021 LRDP.

Further, development under the 2021 LRDP would be designed to comply with building and fire codes and include appropriate fire safety measures and equipment, including but not limited to, use of fire retardant building materials, inclusion of emergency water infrastructure (fire hydrants and sprinkler systems), installation of smoke detectors and fire extinguishers, emergency response notification systems and provision of adequate emergency access ways for emergency vehicles.

In general, impacts related to fire services would be less than significant. However, if the timing of construction of the new facilities, including the fire station, is not tied to specific development under the 2021 LRDP, impacts would be considered significant if the new equipment (and associated facility) is not available to serve taller/larger on-campus facilities included as part of the 2021 LRDP. Therefore, impacts related to fire service facilities would be considered **significant**.

Mitigation Measures

Mitigation Measure 3.14-1: Require Acquisition of New Fire Equipment and Construction/Expansion of On-Campus Fire Station to Meet Fire Access Requirements

During the design and planning of individual on-campus structures under the 2021 LRDP, UC Santa Cruz in coordination with SCFD shall determine if proposed development would exceed the height of existing on-campus response vehicles of the existing fire station. If it is determined that proposed development would exceed height capacity of existing on-campus response vehicles, UC Santa Cruz shall initiate the design and planning of a new on-campus fire station that can accommodate the required response vehicle(s) and adequately serve the development. Prior to operation of the on-campus development that would trigger the need for additional fire protection facilities, UC Santa Cruz shall initiate operation of the new on-campus fire station in cooperation with the City and pursuant to existing agreements related to fire protection service provided by SCFD.

Significance after Mitigation

Implementation of Mitigation Measure 3.14-1 would ensure that adequate fire access and facilities are available to serve UC Santa Cruz prior to operation of new facilities that would require the additional ladder height. Implementation of this mitigation measures would reduce impacts related to fire facilities to a **less-than-significant** level.

Impact 3.14-2: Impacts on Police Facilities

The increase in population under the 2021 LRDP would increase demand for on-campus and off-campus police services. UC Santa Cruz PD would need additional sworn officers, dispatchers, and support staff, to meet the increased demand for services, but would not require the construction of new or additional police facilities. Funding and planning for additional staff members is carried out through UC Santa Cruz's capital planning process. The projected demand for off-campus police services would be distributed across various surrounding communities. The collection of development impact fees and tax revenue for increases in the demand for public services, including police facilities off-site, would ensure that the level of police protection services would be maintained. Therefore, this impact would be **less than significant**.

UC Santa Cruz PD provides law enforcement services on-campus and would continue to provide these services under the 2021 LRDP. UC Santa Cruz PD currently includes 32 officers that patrol the campus and has adopted a service ratio of 1.4 officers per 1,000 students/employees. At this level, the UC Santa Cruz PD would need to have 8 additional sworn members, 2 additional dispatchers, and additional support staff to serve the projected increase in campus population (Oweis, pers. comm., 2020). The existing UC Santa Cruz PD station may require remodeling to accommodate additional staffing levels but would not require new police facilities. Funding and planning for additional staff members is carried out through UC Santa Cruz capital planning process. As described in Chapter 1, "Introduction," capital planning is a continuous and iterative process that evaluates capital needs identified and assesses alternatives to meet such needs in the context of anticipated capital resources. Due to the location of the existing UC Santa Cruz PD station, response vehicles often get delayed when responding to emergency calls on the main residential campus. As noted under Impact 3.14-2, construction of new or physically altered SCFD on-campus facilities may be necessary to meet on-campus demand. The potential for a new SCFD facility would provide an opportunity to co-locate the UC Santa Cruz PD in the same location to better support emergency responses on the main residential campus.

Additional on-campus housing would be provided under the 2021 LRDP for 8,500 students. With respect to the 2,200 new faculty and staff, approximately 558 would be housed in new on-campus housing and the remainder, approximately 1,650 new faculty and staff, would live off campus in the surrounding communities. The projected demand for off-campus housing would be distributed across various surrounding communities, as noted in Section 3.13, "Population and Housing." The increased demand police protection services associated with the incremental increase in the number of faculty and staff that would reside off-campus would be accommodated through local development impact fees. This would ensure that the level of police protection services would be maintained.

While implementation of the 2021 LRDP could result in the need for additional sworn officers, dispatchers, and support staff, this would not necessitate that need for new or additional police facilities. Therefore, the impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.143-3: Impacts on School Facilities

The increase in campus population, particularly faculty and staff (who may have children) that is expected to occur under the 2021 LRDP could result in increased enrollment at area schools. However, adequate existing capacity coupled with projections of decreased enrollment in SCCS suggests that additional students can be accommodated in existing classrooms. No new facilities would be needed. Therefore, this impact would be **less than significant**.

Under the 2021 LRDP, the number of students and faculty/staff living on campus is anticipated to increase, which could contribute additional primary and secondary students to local school districts. The largest area of potential impact would be the SCCS, because housing would be provided on campus (within the SCCS boundaries) for 558 employees (faculty/staff). While housing would also be provided for students, the number of school-age children associated with enrolled college students is expected to be minimal given their typical age range. However, to be

conservative, this Draft EIR assumes that the 140 units dedicated to on-campus student family housing would be occupied by newly enrolled students with children. Based on student generation rates established by SCCS, a new dwelling unit (for faculty/staff and existing student family housing units) would generate 0.273 students for grades K-6, and 0.207 students for grades 7-12 (City of Santa Cruz 2011). As noted above, student enrollment for SCCS schools is anticipated to decrease through the 2024-2025 academic school year.

A total of 558 new dwelling units for faculty and staff housing is expected to generate 153 students in grades K-6 and 116 students in grades 7-12. The existing 140 student family housing units would generate 38 students in grades K-6 and 30 students in grades 7-12. As shown in Table 3.14-1, SCCS schools have a combined available capacity to accommodate 922 students. Even if all children living in on-campus student family housing and the roughly 1,650 faculty/staff not living on campus lived in the SCCS (resulting in 450 K-6 students and 341 grade 7-12 students), or a total of 1,123 students, they would barely exceed the forecasted capacity of SCCS schools. Realistically, a sufficient percentage of faculty and staff would live outside the SCCS in more dispersed communities, that the capacity of SCCS schools is not expected to be exceeded. Further, SCCS has established procedures for interdistrict transfers to students who would otherwise attend a different district. SCCS existing schools have adequate capacity to serve existing enrollment levels in addition to enrollment generated by the 2021 LRDP. Some percentage of faculty/staff may reside in areas outside the SCCS. Based on the available information noted above, the nearby school districts have available capacity to accept new students and declining enrollment. Given that, only a fraction of the total 1,055 estimated students generated by employees associated with the 2021 LRDP would attend schools in these districts, it is expected that adequate capacity will be available to accommodate these students. Therefore, implementation of the 2021 LRDP would have a **less-than-significant** impacts on schools.

Mitigation Measures

No mitigation is required.

3.15 RECREATION

This section characterizes existing recreation facilities and opportunities within the LRDP area and surrounding area and evaluates whether potential increased demand for recreation facilities under the 2021 LRDP could lead to physical deterioration of existing recreation facilities or require the construction or expansion of recreation facilities that might have an adverse physical effect on the environment. The analysis that follows evaluates the increase in population under the 2021 LRDP and the associated demand for recreation resources that could be provided by the UC Santa Cruz and/or by the City and/or County of Santa Cruz.

Public comments received in response to the NOP (see Appendix B) related to recreation raised concerns regarding increased demand for existing on-campus and off-campus recreational facilities, construction of new recreation facilities, and continued public access to on-campus trails. These issues are considered below and addressed where appropriate.

3.15.1 Regulatory Setting

FEDERAL

There are no federal laws and regulations addressing recreation that pertain to the 2021 LRDP.

STATE

Quimby Act

The Quimby Act (California Government Code Section 66477) preserves open space and parkland in urbanizing areas of the state by authorizing local governments to establish ordinances requiring developers of new subdivisions to dedicate land for parks, pay an in-lieu fee, or perform a combination of the two. The Quimby Act provides two standards for the dedication of land for use as parkland. If the existing area of parkland in a community is 3 acres or more per 1,000 persons, then the community may require dedication based on a standard of 5 acres per 1,000 persons residing in the proposed subdivision. If the existing amount of parkland in a community is less than 3 acres per 1,000 persons, then the community may require dedication based on a standard of only 3 acres per 1,000 persons residing in the proposed subdivision. The Quimby Act requires a city or county to adopt standards for recreational facilities in its general plan recreation element if it is to adopt a parkland dedication/fee ordinance.

UNIVERSITY OF CALIFORNIA

Office of the President Policies and Procedures

UC Office of the President (UCOP) establishes systemwide policies and procedures that guide various operational and functional areas. Systemwide policies are guiding principles that express the institutional culture, goals, and philosophy. Policies promote consistence and operational efficiency, enhance the UC's mission and mitigate significant institutional risk. Procedures are step-by-step descriptions of the tasks required to support and carry out organizational policies. Procedures articulate the process for accomplishing controls, document a course of action accomplished in a defined order, and ensure the consistent and repetitive approach to accomplish control activities (UCOP 2020a). The UCOP Facilities and Resources policies and procedures establish requirements for the maintenance of real property and equipment (UCOP 2019).

Office of the President Facilities Manual

UCOP Facilities Manual Volume 6, "Plant Operations and Maintenance," establishes operation and maintenance policies for the UC (UCOP 2020b). Maintenance is defined as the upkeep of property, machinery, systems, and facilities, including buildings, utility infrastructure, roads, and grounds. Maintenance consists of those activities

necessary to keep facilities and systems operational and in good working order; it consists of the preservation, but not the improvement, of buildings and grounds, other real property improvements and their components.

UC Santa Cruz Construction and Maintenance Policy

The UC Santa Cruz construction and maintenance policy sets forth the policy, authorities, and requirements for authorization for all construction and maintenance activities carried out in UC owned and operated facilities. The intent is to ensure that work is in compliance with UCOP Policies and Procedures, the UCOP Facilities Manual, the construction and maintenance policies and regulatory requirements that govern construction and maintenance on campus. In accordance with UCOP Facilities Manual, the UC Santa Cruz construction and maintenance policy outlines procedures for preventative maintenance, general replacement and repair, electrical repairs, ventilation, plumbing, painting, and furniture/cabinetry work (UC Santa Cruz 2005).

UC Santa Cruz Student Life Facilities Fee

UC Santa Cruz administers the Student Life Facilities fee to fund operation and maintenance of Office of Athletics and Recreation facilities. The fee is included as part of the undergraduate and graduate student registration fees. A portion of the fee revenue is used to fund salaries for Athletics and Recreation staff and student employees, including lifeguards, maintenance workers, and facility operations personnel, as well as supplies, equipment, and utilities. The remaining funds are placed into a reserve for major repairs and maintenance to existing facilities. The Student Advisory Committee, in consultation with Athletics and Recreation staff, make recommendations for potential use of reserve funds based on estimated project costs and student needs (UC Santa Cruz 2016).

LOCAL

As noted in Section 3.0.2, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of its educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

Santa Cruz County General Plan

The Santa Cruz County General Plan and Local Coastal Program contains the following policy that is relevant to recreation and that may be relevant to the 2021 LRDP:

- **Policy 7.13.1 Community Use of School Facilities.** Encourage broad community recreational and cultural use of school facilities by taking full advantage of the role and services of the community schools, the University of California at Santa Cruz, and Cabrillo College as training, recreational, and cultural centers.
- **Policy 7.1.5 Access to Recreation Facilities.** Provide physical access to all recreation facilities through provision of public transportation, trail system development, protection of prescriptive rights to beach access trails, and recreation programs.

Santa Cruz County Code

Chapter 15.01 of the Santa Cruz County Code establishes park dedication requirements and fees for residential development, including mobile homes. Fees are determined and paid as of the date of the issuance of a building permit, or, in case of land division, at the time the final map or parcel map is filed. The revenue collected is held in trust by the County and administered by the Department of Parks, Open Space and Cultural Services to fund the ongoing maintenance of the Countywide parks system. This fee is not applicable to residential development at UC Santa Cruz.

City of Santa Cruz General Plan

The City of Santa Cruz General Plan 2030 contains the following policies related to recreation that are relevant to the 2021 LRDP.

- Policy PR 1.7: Require developers to mitigate the impacts of their property improvements on City parks, recreation facilities, and open space areas.
- Policy PR 1.9: Maintain a Parks and Recreation Facilities excise tax on new construction or improvement of residential housing.

City of Santa Cruz Municipal Code

Chapter 5.72 of the Santa Cruz Municipal Code imposes a "Parks and Recreation Facilities Tax" on new residential development, including mobile homes, within the City. Fees are payable at the time of issuance of a building permit for any residential dwelling unit, or prior to connection of a mobile home lot to the City sewer. The revenue collected is placed into a special fund which is used and expended solely for the acquisition, improvement and expansion of public parks, playgrounds, and recreational facilities in the City. This fee is not applicable to residential development at UC Santa Cruz.

3.15.2 Environmental Setting

UC Santa Cruz provides a range of on-campus indoor and outdoor open space, recreational, and athletic facilities that are available to students, staff and faculty, retirees, alumni, and local community members. Off-campus recreational opportunities are maintained by the City and County of Santa Cruz, and the California State Park System. On- and off-campus recreational are discussed in more detail in the following sections.

ON-CAMPUS RECREATIONAL FACILITIES

UC Santa Cruz provides amenities for active and passive recreation in the LRDP area. Facilities for active recreation include athletic fields, courts, fitness equipment, and a swimming pool. Facilities for passive recreation includes natural areas, undeveloped open space, and trails. On-campus indoor and outdoor open space, recreational, and athletic facilities are available to students, staff and faculty, retirees, alumni, and local community members. Indoor recreational facilities include courts (i.e., basketball, volleyball, racquetball, and badminton), and areas for fitness training, group exercise classes, weightlifting, and dance. Outdoor facilities include athletic fields (e.g., soccer), running tracks, courts (e.g., tennis), and swimming pools. In addition to developed recreational and athletic facilities, UC Santa Cruz incudes a network of open spaces including the Arboretum and Botanic Garden, Chadwick Garden, UC Santa Cruz Farm, Campus Natural Reserve, natural open space, and trails. On-campus recreational opportunities are discussed in more detail below.

UC Santa Cruz Office of Athletics and Recreation

Athletics and Recreation manages 15 acres of land designated for recreation and athletic facilities on the UC Santa Cruz campus. Athletics and Recreation also provides a variety of recreational activities including physical education classes, intramural sports, sports clubs, intercollegiate sports, group exercise classes, and outdoor adventure programs. The following facilities and programs are available to students, staff and faculty, retirees, alumni, and local community members with a valid UC Santa Cruz Student ID, Athletics & Recreation Facility Usage Membership Card, or Day Pass (UC Santa Cruz 2019):

- The East Field House Complex, located in the lower campus off of Hagar Drive and to the south of Cowell and Stevenson Colleges, includes a 6,500 square foot Wellness Center, 6,185 square foot gym, 1,460 square foot martial arts room, 3,200 square foot dance studio, 1,145 square foot activity room for group exercise, a number of 800 square foot racquetball courts, 1,920 square foot multi-purpose room, tennis courts, swimming pool, the Upper East Field (a 9-acre field that can be configured to accommodate four soccer fields or two rugby fields), and the Lower Field (a 4.2-acre field that can be configured to accommodate two soccer fields or one rugby field).
- The West Field House Complex, located in the central campus east of Heller Drive and within the Rachel Carson College footprint, includes a 7,625 square foot gym with basketball, volleyball, and badminton courts, and six standard tennis courts.

- UC Santa Cruz Community Boating Center, located at the Santa Cruz Yacht Harbor, offers student and community classes throughout the school year. Participants can attend sailing, rowing, and kayaking classes.
- UC Santa Cruz Disc Golf Course is located east of the East Field House Complex and managed by Athletics and Recreation. The UC Santa Cruz Disc Golf Club practices off-campus, which makes the UC Santa Cruz Disc Golf Course more available to other UC users.

UC Santa Cruz On-Campus Housing Amenities

Each college on the main residential campus includes indoor and outdoor space for students. Indoor facilities include game rooms, media rooms, and computer laboratories. Outdoor facilities typically include a quadrangle, courtyard, and outdoor seating that students can use to study, socialize, relax, and dine. Family student housing also includes community open space for recreation. Facilities include open space and pedestrian pathways.

UC Santa Cruz Arboretum and Botanic Garden

The UC Santa Cruz Arboretum and Botanic Garden is a living museum located in the lower campus along Empire Grade. The Arboretum and Botanic Garden features plant specimens of more than 300 plant families of Mediterranean climates. The garden maintains collections of rare and threatened plants of unusual scientific interest, including world conifers, primitive angiosperms, and bulb-forming plant families. Large assemblages of plants from Australia, New Zealand, South Africa, and California natives are displayed on site. The Arboretum and Botanic Garden is open to students and the public for self-guided tours seven days a week. On-site events include educational workshops, plant sales, guided tours, and art exhibits (UC Santa Cruz 2020a). The arboretum is considered a passive recreational use on campus.

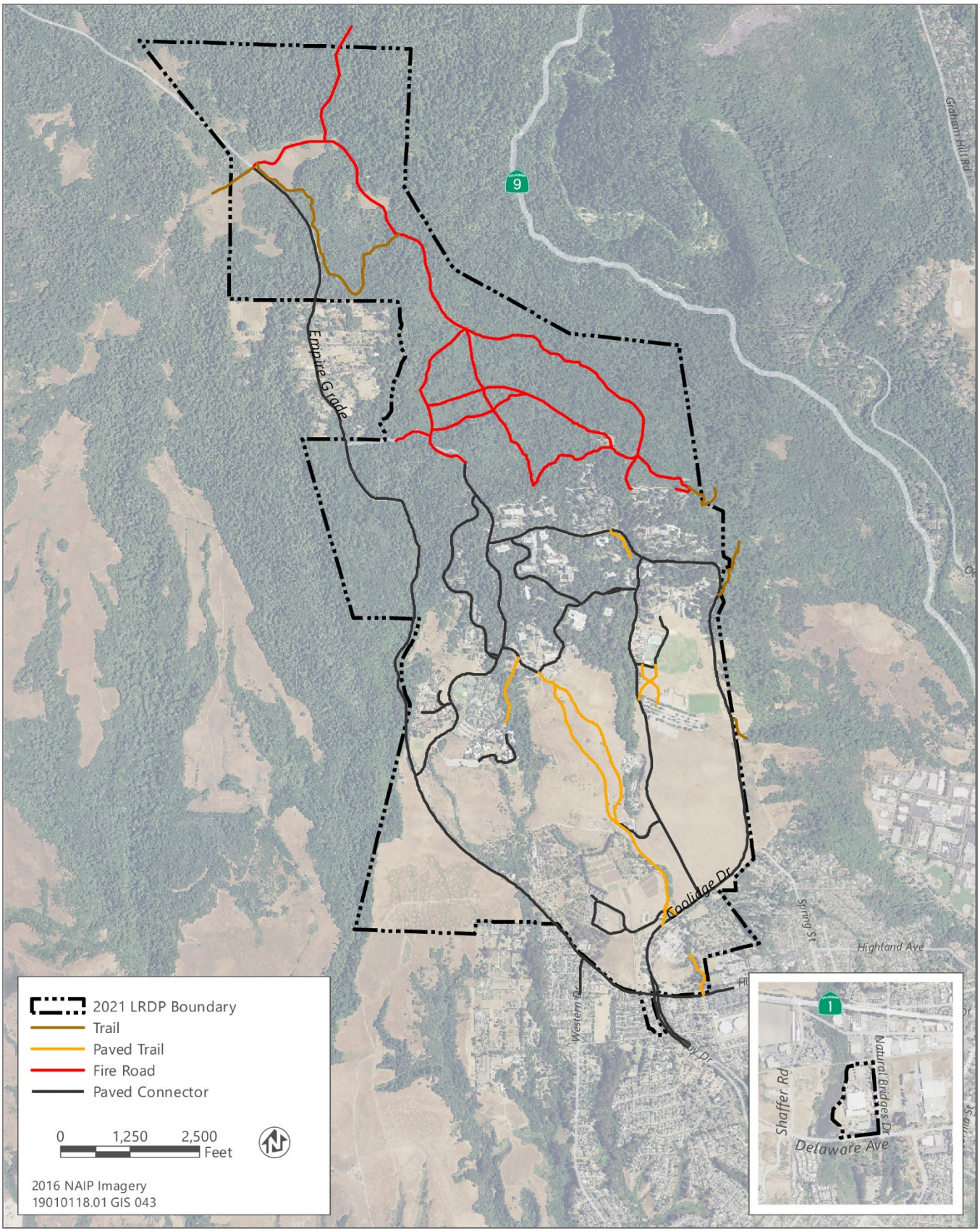
Center for Agroecology and Sustainable Food Systems

The Center for Agroecology and Sustainable Food Systems (CASFS) manages the UC Santa Cruz Farm and the 2-acre Alan Chadwick Garden. The Farm includes gardens of annual and perennial food and ornamental crops, mechanically cultivated row crops, orchards, and research plots. The Alan Chadwick Garden features a diverse collection of plants including ornamentals, annual and perennial food crops, fruit trees (including more than 120 apple varieties), and native California plant species. Both facilities are open to students and the public for self-guided tours seven days a week. Docent-led tours are also available the first Sunday of the month from April through November (UC Santa Cruz 2020b). The UC Santa Cruz Farm and the Chadwick Garden are considered passive recreational uses on campus.

Open Space Land Use and Trails

Open space land uses on the main residential campus under the 2005 LRDP include land designated for Outdoor Research, Campus Natural Reserve, and Natural Space. As discussed in Chapter 2, "Project Description," the Arboretum, Botanic Garden, and CASFS are designated for outdoor research and account for approximately 1,419 acres of open space within the main residential campus. As shown in Figure 3.15-1, the main residential campus also includes a network of pathways, trails, and service roads that are used by pedestrians, bicyclists, and equestrians. The north campus features a network of multi-use trails maintained by UC Santa Cruz, including the Cowell Wilder Regional Trail, Fuel Break Road, and West Road. The Cowell Wilder Regional Trail connects the north campus to Wilder Ranch State Park, located to the west, and Henry Cowell State Park via Pogonip City Park, located to the east. The Webster Way Bike Path through the Great Meadow is a paved trail located in the lower campus which connects Coolidge Drive with Meyer Drive in the central campus. In addition to formally designated trails, there are numerous undesignated trails resulting from ad hoc use.

The Westside Research Park, located adjacent to Natural Bridges State Park and the Pacific Ocean, features a public access trail with benches and trash containers along the western property boundary adjacent to Antonelli Pond. The pond and associated trails are managed by the Land Trust of Santa Cruz County. The City of Santa Cruz is currently constructing a segment of the Coastal Rail Trail, a paved multi-use trail in the former railroad corridor that terminates at Natural Bridges Drive adjacent to the Westside Research Park.



Source: data downloaded received from UCSC in 2020

Figure 3.15-1 Trail Network On the Main Residential Campus

OFF-CAMPUS RECREATION FACILITIES

Off-campus recreation facilities are provided by the California State Park System, the City of Santa Cruz, and Santa Cruz County. Off-campus recreation facilities located within about 2 miles of UC Santa Cruz are discussed in more detail below and shown in Figure 3.15-2.

California State Parks

California State Parks (CSP) manages 280 state park units, over 340 miles of coastline, 970 miles of lake and river frontage, 15,000 campsites, and 4,500 miles of trails throughout the State. The Santa Cruz unit of CSP oversees 32 state parks located within Santa Cruz and San Mateo counties. The following state parks are located within 2 miles of the main residential campus and Westside Research Park (CSP 2020):

- Henry Cowell Redwoods State Park is located on Big Trees Park Road, directly east of the main residential campus. This park covers 4,650 acres of forested and open land, including a 40-acre grove of old-growth redwood trees. The park also features hiking trails, campground, the Roaring Camp Railroad, and a garden.
- Natural Bridges State Beach is located off Delaware Avenue, directly south of Westside Research Park. This park provides beach access and includes a large area of coastal scrub and grasslands. Moore Creek flows through the park and forms a freshwater wetland and salt marsh. The Monarch Grove, located on the state beach property, serves as a temporary home to monarch butterflies during the late fall and winter seasons.
- Lighthouse Field State Beach is located on Pelton Avenue, 1.4 miles east of the Westside Research Park. This park features the Mark Abbott Memorial Lighthouse and the Santa Cruz Surfing Museum. The museum overlooks an internationally renowned surfing hotspot and showcases photographs, surf boards, and 100 years of surfing history in Santa Cruz.
- Santa Cruz Mission State Historic Park is located at 144 School Street, 1 mile southeast of the main residential campus. This park features a California Mission founded in 1791, patio, and gardens. The mission exhibits depict the story of the Ohlone and Yokuts Native Americans before and during European contact, and archaeological excavations.
- Wilder Ranch State Park is located on Old Coast Road, directly southwest of the main residential campus. This park covers 7,000 acres of open space including 35 miles of trails. The park also features an 1897 Victorian home, 1859 Gothic Revival farmhouse, 1896 water-powered machine shop, rodeo arena, barns, and other historic buildings.

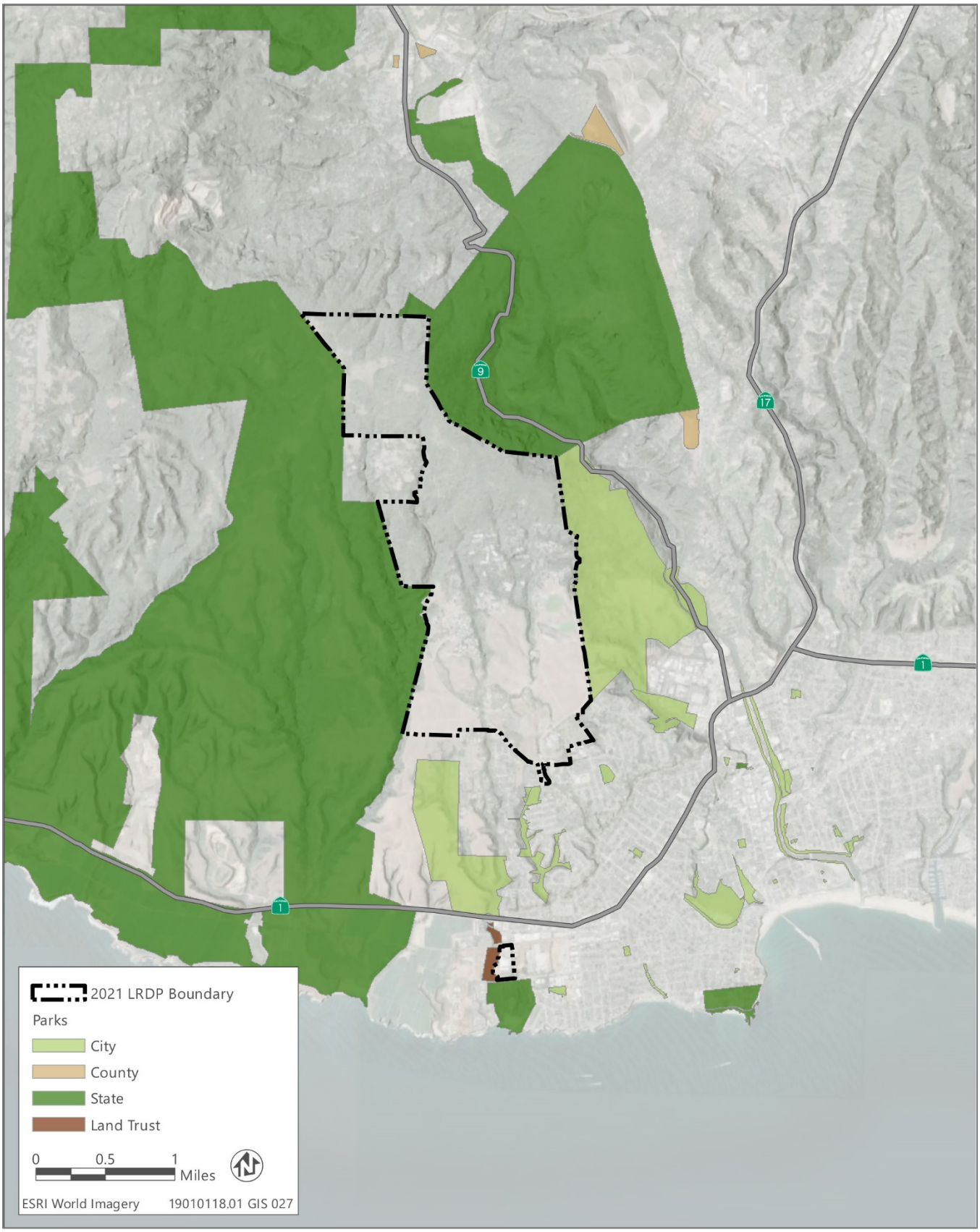
Land Trust of Santa Cruz County

The Land Trust of Santa Cruz County (Land Trust) is responsible for the management and restoration of Antonelli Pond and the lower Moore Creek Corridor. The main entrance to the 19-acre park, which is open from dawn to dusk, is located on Delaware Avenue between Natural Bridges Drive and Shaffer Road, directly adjacent to the Westside Research Park. The park was donated to the Land Trust in four parcels between 1982 and 1994 and features a freshwater pond, riparian lands, and trails.

Santa Cruz County Department of Parks, Open Space, and Cultural Services

Santa Cruz County Department of Parks, Open Space, and Cultural Services manages 29 parks and three coastal beaches throughout the county. The following County parks are located within 2 miles of the main residential campus and Westside Research Park:

- Felton Covered Bridge Park is located on Graham Hill Road at Mount Hermon Road, 1.8 miles north of the main residential campus. This park features a covered wooden bridge, picnic area, walking paths, a playground, and volleyball court.
- Felton Deck Park is located along Highway 9, 1.9 miles north of the main residential campus. This park offers a shaded deck with benches.



Source: Data downloaded from Santa Cruz County in 2020

Figure 3.15-2 City, County, and State Recreation Facilities Located within 2 Miles of UC Santa Cruz

- Felton Discovery Park is located on Gushee Street in Downtown Felton, 1.8 miles north of the main residential campus. This park features a pollinator garden, natural play areas, benches, and pedestrian pathways.
- Graham Hill Showgrounds is located at 1145 Graham Hill Road, 0.9 mile northeast of the main residential campus. The show grounds feature two horse competition arenas, two round pens, a large campground, a large clubhouse, and parking.
- Michael Gray Field Park is located at 3650 Graham Hill Road, 1.7 miles northeast of the main residential campus. This park features a 3-acre softball field, picnic tables, barbecue areas, and restrooms.
- Veterans Memorial Building is located at 846 Front Street, 1.5 miles southeast of the main residential campus. This facility is a historical landmark built in 1932.

City of Santa Cruz Parks and Recreation Department

The City of Santa Cruz Parks and Recreation Department manages four beaches, two community centers, five recreational facilities, six open space areas, four community and regional parks, and 28 neighborhood parks (City of Santa Cruz 2020a). The City of Santa Cruz's adopted service standards for recreation facilities is to provide 2.0 acres of neighborhood parks per 1,000 persons, 2.5 acres of community parks per 1,000 persons, and the national standard for regional parks which is 20 acres per 1,000 persons (City of Santa Cruz 2012:110). To meet the adopted service standards for recreation facilities, the City would need to acquire 67 acres of parkland to serve the forecasted population growth associated with the City of Santa Cruz General Plan 2030 (City of Santa Cruz 2018: 2.4-18). The following City recreation facilities are located within 2 miles of the main residential campus and Westside Research Park (City of Santa Cruz 2020b):

- Arroyo Seco Canyon features 0.37 mile of hiking trails from Grandview Street to Meder Street. This trail is located 0.1 mile from the main residential campus.
- Beach Flats Park is located at 133 Leibrandt Avenue, 1.9 miles south of the main residential campus. This park features a playground, picnic tables, murals, and a stage.
- Bethany Curve trail, which runs from Delaware Avenue to West Cliff Drive, provides pedestrian and bicycle access and benches. This trail is located 0.9 mile from the Westside Research Park.
- Carmelita Cottages Park is located at 321 Main Street, 1.8 miles south of the main residential campus. This park features a youth hostel.
- Central Park is located at 301 Dakota Avenue, 1.6 miles southeast of the main residential campus. This neighborhood park features a playground.
- Chestnut Park is located at the end of Chestnut Street, 1.6 south of the main residential campus. This park features a playground, picnic tables, barbecue areas, and a basketball half-court.
- Depot Park is located at 119 Center Street, 1.6 south of the main residential campus. This park features soccer fields, picnic areas, a playground, bicycle storage lockers, and restroom facilities.
- Garfield Park is located at 634 Almar Avenue, 0.8 mile east of the Westside Research Park. This park features a basketball court, ping pong table, a playground, a picnic table, and barbecue pits.
- Grant Park is located at 150 Grant Street, 1.4 miles southeast of the main residential campus. This park features a basketball court, bocce ball court, playground, baseball field, designated dog area, picnic table, and barbecue pits.
- Harvey West Park is located at 326 Evergreen Street, 0.3 mile east of the main residential campus. This park features two pools, a clubhouse, picnic areas, ballfields, bocce ball court, playground equipment, and restroom facilities.
- Jesse Street Marsh, located East Cliff Street and Lemos Avenue, features 0.15 mile of hiking trails. This trail is located 1.8 miles from the main residential campus.
- Laurel Park is located at 301 Center Street, 1.2 miles southeast of the main residential campus. This park features a basketball court, playground, chess table, table tennis, and a pickle ball court.

- Lighthouse Avenue Park is located at 251 Lighthouse Avenue, 1.5 miles east of the Westside Research Park. This park features a playground, community garden, and benches.
- Mimi De Marta Dog Park is a 0.5 acre off-leash dog park, located on Broadway near Dakota Avenue, 1.5 miles from the main residential campus.
- Mission Plaza is located at 103 Emmett Street, 0.9 mile southeast of the main residential campus. This park features a water fountain, benches, and walking paths.
- Moore Creek Preserve is a 246-acre greenbelt with two entrances located on Meder Street and Highway 1 across from Shaffer Road. The greenbelt features hiking trails through open meadows with views of Monterey Bay. Trails are open to pedestrians only. The preserve is located 0.2 mile from the main residential campus.
- Neary Lagoon is located at 110 California Street, 1.1 miles south of the main residential campus. This park features a wildlife refuge, pollinator garden, two playgrounds, greenbelt trails, tennis courts, basketball court, and barbecue pits.
- Oceanview Park is located at 102 Ocean View Avenue, 1.9 miles southeast of the main residential campus. This park features a basketball half-court, playground, picnic tables, and off-leash dog area.
- Poet's Park and Beach Flats Community Garden is located at 200 Raymond Street, 1.9 miles southeast of the main residential campus. This park features picnic tables, a drinking fountain, benches, play equipment, community garden plots, and artwork.
- Pogonip City Park is located at 333 Golf Club Drive, directly adjacent to the main residential campus. This park features approximately 11.5 miles of trails open to pedestrians. A portion of the trails are designated for multi-use and are open to hikers, bicyclists, and equestrians. The 640-acre park is adjacent to the eastern boundary of the main residential campus.
- Rincon Park is located at 601 Chestnut Street, 1 mile southeast of the main residential campus. This neighborhood park features a small demonstration garden and pedestrian pathways.
- Riverside Gardens Park is located at 262 San Lorenzo Boulevard, 1.6 miles southeast of the main residential campus. This park features a community garden, elliptical trainer, playground, picnic tables, benches, and bike racks.
- Round Tree Park is located at 305 Nobel Drive, 0.3 mile south of the main residential campus. This 0.28-acre neighborhood park features a small grass field.
- San Lorenzo Park is located at 137 Dakota Avenue, 1.4 miles southeast of the main residential campus. This park features a duck pond, 9-hole disc golf course, playground, and lawn bowling green.
- Scope Park is located on the corner of Pacific Avenue and Mission Street, 1.1 miles southeast of the main residential campus. This 0.1-acre area park features a mural.
- Sergeant Derby Park is located at 508 Woodland Way, 0.3 mile east of the Westside Research Park. This park features a skateboard bowl, large grass field, a playground, wings, tennis courts, pickle ball courts, and a disc golf course.
- Town Clock Park is located at 101 Water Street, 1.1 miles southeast of the main residential campus. This 0.19-acre park features a plaza with benches, art, and a water fountain.
- Trescony Park is located on Trescony Street, 0.8 mile south of the main residential campus. This park features a tot lot, playground, community garden, and picnic tables.
- University Terrace Park is located on Meder Street, 0.04 mile south of the main residential campus. This park features a basketball court, two tennis courts, a playground, large lawn area, picnic tables, and a fenced dog park.
- Westlake Park is located on Bradley Drive, 0.2 mile south of the main residential campus. This park features a lake, two playgrounds, large lawn area, and picnic tables.

3.15.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, implementation of the 2021 LRDP would result in a significant recreation impact if it would:

- increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
- include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

ANALYSIS METHODOLOGY

The analysis of environmental impacts on recreation is based on a review of documents pertaining to the plan area and surrounding area (i.e., within 2 miles of the plan area) and focuses on the potential for implementation of the 2021 LRDP to result in substantial physical deterioration of existing facilities and construction or expansion of recreation facilities. As part of this review, local planning documents and publicly available information were reviewed, including policies, ordinances, and other regulations pertinent to recreation, to inform the analysis.

ISSUES NOT EVALUATED FURTHER

No issues related to recreation have been eliminated from further discussion in this EIR.

IMPACTS AND MITIGATION MEASURES

Impact 3.15-1: Impacts on Campus Recreation Facilities

The increase in campus population under the 2021 LRDP would increase demand for on-campus recreation facilities. However, UC Santa Cruz has an adequate amount of recreation facilities to serve existing and future campus populations under the 2021 LRDP, and maintenance of existing on-campus recreation facilities would continue to occur to offset demand for recreation facilities. Therefore, this impact would be **less than significant**.

Deterioration of On-Campus Recreation Facilities

Campus population may grow from about 22,350 persons[1] at the present time to 35,230 persons at full development under the 2021 LRDP. This on-campus population includes students, faculty, staff, non-UC employees (e.g., construction workers, seasonal employees), and dependents of students, faculty and staff who live on campus. The projected increase in population is expected to result in increased demand for and usage of recreation facilities, which could result in the accelerated deterioration of on-campus recreation facilities if use of the facilities is not properly managed, sufficient maintenance is not provided, or new facilities are not constructed as part of the campus growth. Recreation facilities at UC Santa Cruz are maintained as needed to prevent deterioration based on the use levels. In accordance with UCOP Facilities Manual, the UC Santa Cruz construction and maintenance policy outlines procedures for preventative maintenance, general replacement and repair, electrical repairs, ventilation, plumbing, painting, and furniture/cabinetry work. In addition, revenue from the Student Life Facilities fee, administered by Athletics and Recreation, is used to fund maintenance of existing recreation facilities. Although on-campus facilities

1 As noted in Chapter 2, "Project Description," the existing campus population of approximately 22,350 (2018 – 2019 academic year) includes 2,800 three-quarter-average full-time-equivalent (FTE) employees, which represents 3,657 headcount employees. An FTE student is (1) an undergraduate student who enrolls for 45 credit hours per academic year; or (2) a graduate student (master's level or doctoral student not yet advanced to candidacy) enrolled in 36 hours per year; or (3) a graduate doctoral student who has been advanced to candidacy. The 2021 LRDP campus population forecast accounts for students studying at the main residential campus and the Westside Research Park.

are heavily utilized, substantial deterioration of those facilities is not apparent. The level of management and maintenance of on-campus recreation facilities would increase throughout the implementation of the 2021 LRDP to prevent the accelerated deterioration that could result from increased demand and usage. Therefore, maintenance of existing facilities would continue to occur, and substantial deterioration of on-campus recreation facilities is not anticipated. The impact would be **less than significant**.

Construction of On-Campus Recreational Facilities

The existing campus population of approximately 22,350 (2018 – 2019 academic year) is served by 15 acres of developed on-campus active recreation and athletic facilities and 1,419 acres of on-campus passive recreational space (i.e., land designated as Outdoor Research, Campus Natural Reserve, and Natural Space under the 2005 LRDP). This equates to approximately 64 acres per 1,000 persons, which exceeds the parkland dedication standards established by the Quimby Act. Although the Quimby Act does not apply to the 2021 LRDP on-campus recreation facilities, it is used as a gauge to ensure an appropriate level of recreation facilities are provided. Under the Quimby Act, if the existing area of parkland is 3 acres or more per 1,000 persons, then the standard of up to 5 acres per 1,000 persons should be used for new development.

As discussed in Chapter 2, "Project Description," a total of 67 acres is designated for Athletics & Recreation in the 2021 LRDP; this represents a decrease of approximately 19 acres of designated land compared to the land use plan in the 2005 LRDP. This decrease is attributable to the removal of a secondary Athletics & Recreation area on the west side of the campus, which was identified in the 2005 LRDP and is not included in the 2021 LRDP. Instead, in recognition of the need for distributed recreational facilities to support increased housing throughout the campus, recreation and athletics facilities have also been included as a supporting use in the Colleges & Student Housing land use designation. As with Rachel Carson College, these may include small field houses offering courts and exercise rooms and may also include small playing fields and open areas suitable for informal use. In addition, the open space land use designations on the main residential campus were revised in the 2021 LRDP to include four designations—Outdoor Research, Natural Space, Campus Natural Reserve, and Campus Habitat Preserve—which provide passive recreational opportunities on campus. Collectively, the open space land use designations include approximately 1,419 acres, which represents a decrease of approximately 15 acres compared to the 2005 LRDP. This decrease is attributable to reallocation of acreages per land use designation as discussed in Chapter 2, "Project Description." As noted above, under the 2021 LRDP, on-campus population could increase to 35,230 students, faculty, staff, non-UC employees by 2040-2041. The projected on-campus population would be served by the 15 acres of developed recreation and athletic facilities, and the 1,419 acres of open space land uses. This equates to approximately 40 acres per 1,000 persons. Although less than the existing parkland ratio, the new ratio would still exceed the Quimby Act parkland dedication standards.

Although the amount of land designated for Athletics & Recreation would decrease, the total acreage of existing recreation and athletic facilities would not decrease and land would still be available for expansion of recreation facilities in the LRDP area, as needed. The 2021 LRDP provides for the construction of new recreational facilities. As discussed in Chapter 2, "Project Description," new multi-use pathway corridors would be developed to connect key locations on campus and existing pathways would be improved. New corridors could include separated bicycle facilities with adjacent pedestrian paths or combined bicycle and pedestrian facilities. In addition, new trail networks could be developed to provide connections to adjacent public lands surrounding the campus and the existing trail network could be improved. New unpaved multi-use trail networks include east-west connections from Wilder Ranch State Park to Henry Cowell State Park and Pogonip City Park; and north-south trail networks through Moore Creek Preserve and the Great Meadow, connecting to the east-west trail network in the north campus. Additional trail improvements could include improved connections between the Spring Trail and Spring Street within the LRDP area. The Spring Trail also provides pedestrian connection to Highway 9. Trail corridors that provide access to research areas would be limited to pedestrians only, such as Red Hill Road gravel fire road in the North Campus. Additionally, recognizing the need for distributed recreational facilities to support increased housing throughout the LRDP area, minor/supporting recreation and athletic facilities would be included as a supporting/accessory use within areas designated as Colleges and Student Housing under the 2021 LRDP. Similar to the facilities at Rachel Carson College, new facilities may include small field houses offering courts and exercise

rooms and may also include small playing fields and open areas suitable for informal use. However, the timing or exact location of proposed facilities are not known at this time. The construction of new facilities would occur when warranted by increased demand and when financially feasible. The potential impacts associated with the physical construction and operation of these facilities are programmatically analyzed throughout this EIR.

Summary

UC Santa Cruz will continue to maintain existing on-campus recreation facilities, and on-campus recreational facilities would be adequate to serve the demand. In addition, the 2021 LRDP sets aside an adequate amount of land for the continued passive use and development of recreation facilities to serve the projected campus population. The construction of new facilities would occur when warranted by increased demand and when financially feasible, and the potential impacts associated with the physical construction and operation of these facilities are programmatically analyzed in this EIR. Therefore, the impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.15-2: Impacts on Off-Campus Recreation Facilities

The increase in campus population under the 2021 LRDP could increase demand for off-campus recreation facilities. This would be particularly the case for an increase in the number of students/employees who live off campus. However, any necessary recreational facility improvements as a result of substantial deterioration of existing facilities or requirements for new facilities within neighboring communities related to new UC Santa Cruz-related population growth would be addressed through development impact fees of the respective community, such as fees charged by the County and the City of Santa Cruz. In addition, the amount of recreation facilities on-campus is adequate to accommodate the increase in population under the 2021 LRDP and would help offset the demand for off-campus facilities. Therefore, this impact would be **less than significant**.

Deterioration of Off-Campus Recreation Facilities

The projected increase in UC Santa Cruz population associated with 2021 LRDP implementation could result in increased use of off-campus recreation facilities. Use of off-campus recreation facilities by UC Santa Cruz students, faculty, staff, non-UC employees could occur in two ways: (1) UC Santa Cruz students, faculty, staff, and non-UC employees who live off campus would use recreation facilities near their residences; or (2) UC Santa Cruz students, faculty, staff, non-UC employees who live on-campus could use recreation facilities off campus in the surrounding neighborhoods.

The 2021 LRDP identifies locations and sets aside adequate land so that on-campus student beds can be provided for 100 percent of new enrollment beyond 19,500. The 2021 LRDP would accommodate 558 new dwelling units for the anticipated increase of 2,200 faculty and staff members. Therefore, an estimated 982 students and 1,992 employees would seek housing opportunities off-campus.

The projected demand for off-campus housing would be distributed across various surrounding communities, as noted in Section 3.13, "Population and Housing." Any increase in housing in nearby communities would be subject to the Quimby Act parkland dedication standards, which allows a city or county to require the dedication of land or impose a requirement for payment of in lieu fees, or a combination of both, for park or recreational purposes as a condition for the approval of a tentative map or parcel map for private development projects. City of Santa Cruz Municipal Code Chapter 5.72 requires the City to impose the parks and recreation facilities fee on new residential development (including mobile homes) within the City, payable at the time of issuance of a building permit for any residential dwelling unit, or prior to connection of a mobile home lot to the City sewer. The revenue collected from the parks and recreation facilities tax are expended to fund the acquisition, improvement and expansion of public park, playground and recreational facilities in the city. Consistent with Santa Cruz Municipal Code, the Santa Cruz General Plan 2030 Policy PR 1.7 requires developers to mitigate the impacts of their property improvements on City parks, recreation facilities, and open space areas. Similarly, Santa Cruz County Code Chapter 15.01 establishes park dedication requirements and fees to

fund the ongoing maintenance of the Countywide parks system. Therefore, any necessary recreation facility improvements within neighboring communities related to new UC Santa Cruz-related population growth would be addressed through development impact fees and other taxes of the respective community.

Use of off-campus recreation facilities by UC Santa Cruz students, faculty, and staff who live on-campus could also increase incrementally due to implementation of the 2021 LRDP. However, the amount of recreation facilities on-campus is adequate to accommodate the increase in those living on-campus and would help offset the demand for off-campus facilities. As discussed under Impact 3.15-1, the projected on-campus population of 35,230 under the 2021 LRDP would be adequately served by the on-campus recreation facilities. Further, UC Santa Cruz provides a variety of active and passive recreation facilities in the LRDP area; therefore, the on-campus population is not incentivized for this reason to use nearby off-campus facilities. Thus, implementation of the 2021 LRDP is not anticipated to result in a significant increase in use of off-campus recreation facilities by the on-campus population.

Construction of Off-Campus Recreation Facilities

As discussed above, the use of off-campus recreational facilities by UC Santa Cruz students, faculty, staff, and non-UC employees who live on-and off-campus could increase under the 2021 LRDP. However, any necessary recreation facility improvements within neighboring communities related to new UC Santa Cruz-related population growth would be addressed through development impact fees and other taxes of the respective community. In addition, UC Santa Cruz provides a variety of active and passive recreation facilities in the LRDP area that reduces the need for on-campus populations to use nearby off-campus facilities. Therefore, the increased use of off-campus facilities by UC Santa Cruz students, faculty, staff, and non-UC employees would not require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

Summary

In summary, the increased population associated with implementation of the 2021 LRDP is not expected to cause substantial deterioration of or require improvements to off-campus recreation facilities that would not be addressed through development impact fees. This impact would be **less than significant**.

Mitigation Measures

No mitigation measures are necessary.

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3.16 TRANSPORTATION

This section identifies applicable regulatory requirements related to transportation and describes the existing transportation system within and in the vicinity of the LRDP area. The transportation impact analysis presented in this chapter, identifies the environmental effects resulting from implementation of the 2021 LRDP and, if necessary, mitigation measures are set forth to reduce significant transportation impacts. Consistent with CEQA Guidelines, impacts associated with bicycle, pedestrian, and transit facilities; the generation of vehicle miles traveled (VMT); transportation hazards; and emergency access are evaluated as part of this analysis.

Comments received on the NOP (Appendix B) included concerns related to roadways and intersection operations/level of service, parking supply and management, the generation of VMT, transit availability and cost, bicycle and pedestrian facilities and safety, potential hazards related to a design feature or incompatible use, roadway and intersection infrastructure improvements, emergency access, and transportation safety. As further explained below under Regulatory Setting (under SB 743), measurements of congestion (e.g., level of service) are no longer considered environmental impacts under CEQA. Parking concerns raised in the NOP are also not considered environmental impacts under CEQA because parking shortfalls are not a physical effect on the environment. All other scoping comments are addressed in the analysis that follows.

3.16.1 Regulatory Setting

FEDERAL

There are no federal laws and regulations addressing transportation that pertain to the 2021 LRDP. However, federal regulations relating to the Americans With Disabilities Act, Title VI, which prohibits discrimination based on race, color, and national origin, and Environmental Justice (Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) are applicable to the manner in which transit service is provided.

STATE

California Building Code

The California Building Standards Code (CBC) (California Code of Regulations, Title 24) provides minimum standards for the design and construction of buildings and structures in California. Minimum standards are organized under Part 1 to 12 and include code standards for buildings, mechanical, plumbing, energy, historical buildings, fire safety, and green building standards. State law mandates that local government enforce these regulations, or local ordinances, with qualified reasonably necessary and generally more restrictive building standards than provided in the CBC. Title 24 is applicable to all occupancies, or structures, throughout California, whether or not the local government takes an affirmative action to adopt Title 24.

Senate Bill 743

Senate Bill (SB) 743, passed in 2013, required the California Governor's Office of Planning and Research (OPR) to develop new guidelines that address transportation metrics under CEQA. As stated in the legislation, upon adoption of the new guidelines, "automobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment pursuant to this division, except in locations specifically identified in the guidelines, if any."

OPR published its proposal for the comprehensive updates to the CEQA Guidelines in November 2017 which included proposed updates related to analyzing transportation impacts pursuant to SB 743. The updated CEQA Guidelines were adopted on December 28, 2018; and according to the new CEQA Guidelines Section 15064.3, VMT replaced congestion as the metric for determining transportation impacts. The guidelines state that "lead agencies may elect

to be governed by these provisions of this section immediately. Beginning July 1, 2020, the provisions of this section shall apply statewide."

To provide guidance to agencies implementing the new CEQA requirements, OPR published the *Technical Advisory on Evaluating Transportation Impacts in CEQA* (*Technical Advisory*) in December 2018. The *Technical Advisory* describes considerations agencies may use in selecting VMT metrics, calculation methodologies, and significance thresholds. The *Technical Advisory* does not mandate the use of specific metrics, methodologies or significance thresholds, because agencies have discretion to select those that are appropriate for the local land use and transportation context. The intent of SB 743 should be considered in these decisions:

[To] more appropriately balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of greenhouse gas emissions.

California Department of Transportation

The California Department of Transportation (Caltrans) is responsible for planning, designing, constructing, operating, and maintaining the State Highway System. Federal highway standards are implemented in California by Caltrans. Any improvements or modifications to the State Highway System within the transportation impact study area (study area) would need to be approved by Caltrans. Within the study area, Caltrans owned and operated facilities include State Route (SR) 1, SR 9, and SR 17.

Vehicle Miles Traveled-Focused Transportation Impact Study Guide

On May 20, 2020, Caltrans adopted the Transportation Impact Study Guide (TISG) to provide updated guidance to Caltrans Districts, lead agencies, tribal governments, developers, and consultants based on changes to Caltrans' review process for local development intergovernmental review under the updated CEQA Guidelines (Caltrans 2020a). This guidance is non-binding and is intended to be used as a reference and informational document. The guidance may be updated based upon need, or in response to updates of the OPR's *Technical Advisory*. The TISG replaces the *Guide for the Preparation of Traffic Impact Studies* (Caltrans 2002) and does not apply to transportation projects on the State Highway System. The TISG does not prescribe VMT calculation methodologies, metrics, or significance criteria; but rather provides guidance based primarily on what is detailed in the *Technical Advisory*.

Interim Land Development and Intergovernmental Review (LDIGR) Safety Review Practitioners Guidance

In July 2020, Caltrans released the *Interim LDIGR Safety Review Practitioners Guidance* to provide immediate direction regarding the transportation safety analysis and review while the final guidance document is being developed (Caltrans 2020b). The interim transportation safety guidance is intended to apply to proposed land use projects and plans affecting the State Highway System. Specific effects may include, but are not limited to, the addition of new automobile, bicycle, or pedestrian trips to state roadways; modification of access to state roadways; or effecting the safety of connections to or travel on state roadways. The interim guidance does not establish thresholds of significance for determining safety impacts under CEQA. The document states that significance of impacts should be determined with careful judgment on the part of a public agency and based, to the greatest extent possible, on scientific and factual data consistent with Caltrans' CEQA guidance contained in Caltrans' Standard Environmental Reference, Chapter 36, "Environmental Impact Report," and CEQA guidelines found in the California Code of Regulations, title 14, division 6, chapter 3, article 5, section 15064, "Determining the Significance of the Environmental Effects Caused by a Project."

UNIVERSITY OF CALIFORNIA

University of California Sustainable Practices Policy

The University of California (UC) updated its Sustainable Practices in July 2020. The policy applies to all campuses and contains the following goals related to reducing vehicle travel (UCOP 2020):

- The UC recognizes that single-occupant vehicle (SOV) commuting is a primary contributor to commute GHG emissions and localized transportation impacts.

- By 2025, each location shall strive to reduce its percentage of employees and students commuting by SOV by 10 percent relative to its 2015 SOV commute rates.
- By 2050, each location shall strive to have no more than 40 percent of its employees and no more than 30 percent of all employees and students commuting to the location by SOV.

Each location (campus) will develop a business-case analysis for any proposed parking structures serving UC affiliates or visitors to campus to document how a capital investment in parking aligns with each campus' Climate Action Plans and/or sustainable transportation policies.

University of California Facilities Manual

The UC updated its Facilities Manual that applies to all campuses and contains the UC policies, procedures, and guidelines for its facilities. The Facilities Manual states that UC is the Authority Having Jurisdiction (AHJ) for matters of code regulations on projects on UC campuses (UCOP 2019). The Facilities Manual contains the following with regards to transportation:

- Volume 2: Planning, Chapter 3 Long Range Development Plans, 3.1.2. LRDP Elements
- *Circulation and Transportation*. The LRDP shows how people move to and through the site in the future. All forms of travel are considered: pedestrian, bicycle, mopeds, motorcycles, cars, service and delivery vehicles, emergency vehicles, and hazardous material transportation. The LRDP indicates which paths and roads are shared by one or more forms of travel and which are segregated. Parking for all vehicle types is addressed.
- Volume 6: Plant Operations & Maintenance, Chapter 5 Energy and Water Conservation and Management, 5.1.2. Operational Guidelines
- Suggest that personnel minimize individual automobile use through carpooling and use of public transportation.

UC Santa Cruz 2017-22 Campus Sustainability Plan

UC Santa Cruz updated the UC Santa Cruz 2017-22 Campus Sustainability Plan in 2019 that contains the following goals related to reducing vehicle travel.

- Reduce commute travel mode impacts relative to a 2017 baseline by: reducing Scope 3 commuter greenhouse gas emissions 10 percent by 2022; reducing commute VMT five percent by 2022; and reducing per capita parking demand 10 percent by 2022.
- Increase transit ridership to/from campus by 10 percent.
- Develop an outreach strategy to promote sustainable transportation culture and prioritize human-powered on-campus travel at UC Santa Cruz.
- Explore creative funding options for sustainable transportation programs that reduce vehicle trips and address social justice implications of the current fee structure being heavily supported by student fees.

UC Santa Cruz Traffic and Parking Regulations

The UC Santa Cruz Traffic and Parking Regulations (UC Santa Cruz 2013) include provisions that promote the safe and orderly movement of traffic on all UC Santa Cruz properties, including the main residential campus and Westside Research Park. The regulations supplement the provisions identified in the California Vehicle Code to establish the 'rules of the road' for the UC Santa Cruz main residential campus and other UC Santa Cruz properties. Rules and standards included in the regulations pertain to vehicle, bicycle, and other wheeled device operations and parking, as well as emergency vehicle access within the main residential campus and other properties. The regulations note that both vehicles and bicycles shall yield the right of way to pedestrians.

UC Santa Cruz Bicycle Plan

The UC Santa Cruz Bicycle Plan (UC Santa Cruz 2008) serves as a guide for the continued improvement and encouragement of bicycling as a significant mode of transportation to, from, and on the UC Santa Cruz main residential campus and other UC Santa Cruz properties. The plan describes existing policies and facilities related to campus bicycling and includes a list of projects and programs intended to improve the UC Santa Cruz cycling environment in the future.

LOCAL

As noted in Section 3.0.2, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the UC's educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

Santa Cruz County General Plan

The Circulation Element of the Santa Cruz County General Plan (Santa Cruz County 1994), some pages of which were updated in 2020, contains the following objectives, policies, and programs related to transportation that may be relevant to the 2021 LRDP[1]:

Objective 3.1: Vehicle Miles. To limit the increase in VMT to achieve as a minimum, compliance with the current Air Quality Management Plan.

- **Policy 3.1.1: Land Use Patterns (Jobs/Housing Balance).** Encourage concentrated commercial centers, mixed residential and commercial uses, and overall land use patterns which reduce urban sprawl and encourage the reduction of vehicle miles traveled per person.

Objective 3.2: Vehicle Occupancy. To increase the average number of persons per commute vehicle to 1.35 persons per vehicle while pursuing a goal of reducing automobile trips to a maximum of 60 percent of all trips through encouragement of alternative transportation by transit, bicycles and walking.

- **Policy 3.2.1: Trip Reduction.** Require all existing and proposed development to comply with all provisions of the Trip Reduction ordinance.
- **Policy 3.2.2: Mode Split.** Encourage large employers to provide incentives to carpoolers, bicyclists, pedestrians and transit riders such as priority parking, company car use, bicycle lockers, bus passes etc. in conjunction with the Trip Reduction ordinance.
- **Policy 3.2.3: Employee Carpool Program**. Encourage large new developments to establish employee pool programs for car, van or bus pools.

Objective 3.4: Transit Network Capacity. To plan and develop an integrated countywide transit system which may include fixed guideway as well as buses, and is capable of accommodating as much as 30 percent of all trips and at least 10 percent in public transit and 1 percent in school transit, consistent with the Regional Transportation Plan by 2005.

- **Policy 3.4.1: Transit Facilities and Roadway Design.** Include transit facilities in the design of road improvements along designated existing and proposed bus routes.
- **Policy 3.4.2: Transit Centers/Park & Ride Lots.** Support development of additional transit centers and Park & Ride lots, as well as improving informal Park & Ride lots and making permanent where feasible.
- **Policy 3.4.4: On-Site Transit Facilities.** Require developers of major traffic generating activities to provide fixed transit facilities, such as bus shelters and pullouts, consistent with the anticipated demand. Locate these facilities in areas convenient to pedestrians' use.

[1] It should be noted that since only some pages of the Circulation Element were updated, some of the horizon dates defined in the policies are outdated but were included for consistency purposes.

- **Policy 3.4.5: Bus Pullouts.** Require developers of new large projects located on transit routes to dedicate the right-of-way and construct a bus pullout bay.

Objective 3.6: Transit Promotion. To promote opportunities for regular transit use to commute to school, shopping, employment, and recreational resources.

Programs

- **(LCP) b:** Develop coordinated transit marketing efforts with the transit district, hotels, motels, restaurants, convention facilities, [UC Santa Cruz], and local merchants. Request recreation-oriented sites and developments to include publicity and scheduling information for transit use in their advertising. (Responsibility: Board of Supervisors, Planning Department)
- **(LCP) c:** Develop programs and funding which facilitate transit use by providing intermodal transportation or monetary savings such as the bicycle racks on buses and bus pass programs of the Santa Cruz Metropolitan Transit District. (Responsibility: Board of Supervisors, Planning Department, Transportation Commission, Transit District)
- **(LCP) d:** Request coordinated operations and use of transit facilities by local transit and inter-County carriers. (Responsibility: Board of Supervisors, Planning Department, Transportation Commission, Transit District)

Objective 3.8b: Coordination. To coordinate the County's bikeway planning efforts with local cities and adjacent counties and other agencies to provide an integrated regional bikeway system and to actively seek all available means of financing bikeways including state and federal grants.

Objective 3.8c: Bicycle Use. To encourage bicycle travel as a major form of transportation in order to increase bicycle use to 20 percent of all work trips and to increase general bicycle trips to 5 percent of all trips by the year 2010.

- **Policy 3.8.1: System Continuity.** Plan a bikeway network to integrate with other modes of transportation (train or transit stations and Park and Ride lots, etc.) in order to encourage and support the use of bicycling and reduce the use of motor vehicles.
- **Policy 3.8.2: Commuting.** Design regional bicycle routes to connect residential areas with major activity centers (employment, educational, civic, etc.) by including bikeway network development as part of the Capital Improvements Program to prioritize construction or retrofits for completion of specific routes.
- **Policy 3.8.3: Modal Interaction.** Encourage other modes of transportation (buses, trains, etc.) to plan for, and provide space for carrying recreational and commuting bicyclists on public transportation systems. Include secure bicycle parking facilities with development of transit shelters incorporating Santa Cruz County Transit District design approval.
- **Policy: 3.8.4 User Convenience.** Encourage the provision of bicycle racks, showers, lockers and other storage facilities at destinations, where practical and economically feasible, when reviewing discretionary permits for major activity centers and employer sites. These facilities should be provided at a level consistent with the County goal of 5 percent total bicycle travel
- **Policy 3.8.5: Regional Continuity.** Coordinate with other jurisdictions to adopt a system of bikeways that is functional throughout the County and region.
- **Policy 3.8.8: Trail Network.** Plan, develop, and maintain a network: of countywide regional trails in both incorporated and unincorporated areas, through cooperative efforts with cities, property owners, and other interested persons in Santa Cruz County.

Objective 3.9: Bicycle Safety. To reduce the conflict between bicycles and other modes of travel and to decrease the number of accidents involving bicycles.

- **Policy 3.9.1: Design.** Design and construct regional bikeways in accordance with County and Caltrans standards in order to maximize safety and minimize potential conflicts with pedestrians and motor vehicles.
- **Policy 3.9.3: Parking.** Limit on-street parking where the need for a clear bike lane exists. Stripe all arterials for bike lanes and strictly enforce parking limitations.

- **Policy 3.9.4: Maintenance.** Require that contractors and utility companies doing roadside work maintain the road edge in the best possible condition during construction and, upon project completion, improve the road shoulder to the pre-construction condition or better.

Objective 3.10: Pedestrian Travel. To encourage pedestrian travel as a viable means of transportation, by itself and in combination with other modes to achieve at least 7 percent of all trips through walking, by increasing and improving pedestrian facilities, particularly in urban areas and reducing the conflicts between pedestrians and other modes of travel.

- **Policy 3.10.3: Lighting.** Require adequate lighting for pedestrian and transit patron's movement where appropriate.
- **Policy 3.10.4: Pedestrian Traffic**. Require dedication and construction of walkways for through pedestrian traffic and internal pedestrian circulation in new developments where appropriate.
- **Policy 3.10.5: Access.** Ensure safe and convenient pedestrian access to the transit system, where applicable in new developments.
- **Policy 3.10.8: Americans With Disabilities Act (ADA) Requirements.** Incorporate ADA standards in design of new projects and reconstruction where applicable. Prohibit landscaping and all other obstacles, such as telephone poles and fire hydrants, which would prevent pedestrian movement within this walkway. Require the use of materials which will provide an all-weather surface for walking.
- **Policy 3.10.9: Americans With Disabilities Act (ADA) Existing Development.** Retrofit all existing comers to be compatible with ADA standards.
- **Policy 3.10.10: Americans With Disabilities Act (ADA) New Development.** All new development shall incorporate ADA standards into the design, where applicable.

Objective 3.11: Roadway Network Function. To provide a road system capable of carrying a maximum of 77 percent of all trips by automobile mode by the year 2005, consistent with the Santa Cruz County Regional Transportation Plan.

- **Policy 3.11.1: Functional Street Classification and Street Standards in Urban Areas.** Design and develop new street and interior circulation systems according to the following principles:

    (a) Plan streets according to their functional street classification. The purposes of functional street classifications are:

        - to provide guidance in defining and prioritizing roadway improvements;
        - to provide guidance in determining which traffic control devices and signs are appropriate;
        - for funding applications; and
        - to provide guidance in identifying local streets where traffic management techniques are appropriate.

    (b) Define street classification according to the character of the street.

    (c) Minimize the number of intersections and side traffic interference along arterial.

    (d) Limit driveways, mid-block access points, intersections and on-street parking along major arterial whenever possible.

    (e) Locate and design public facilities and new developments to facilitate transit, pedestrian, and bicycle access, as well as auto access, both within the development and outside it.

Objective 3.13: Neighborhood Traffic Control. To protect residential neighborhoods from disruption caused by high traffic volumes and speeds through design, signs, and traffic control devices.

- **Policy 3.13.1: Limiting Traffic Volumes.** Seek to limit traffic volumes and speeds in residential neighborhoods through alignment and improvement of existing and proposed local streets.

- Policy 3.13.2: Planning of New Residential Streets and Improving Existing Streets. Plan roadway networks in residential areas and subdivisions to inter-connect adjacent residential areas while discouraging through traffic on local streets.
- Policy 3.13.4: Design and Enforcement Measures. Emphasize design and enforcement solutions to slow and discourage through traffic.
- Policy 3.13.5: Physical Devices. Physical devices may be used but should not unduly restrict access to neighborhoods, particularly by emergency vehicles. All devices should be consistent with the Caltrans Traffic Manual.
- Policy 3.13.6: Street Closures. Utilize new and existing street closures only when necessary to protect residential neighborhoods from high volumes of through traffic. Terminate all street closures with full cul-de-sac improvements and maintain emergency secondary access where feasible and where required by County design standards.
- Policy 3.13.7: Through Auto Traffic. Discourage inter-neighborhood and through auto traffic movement on local streets through street alignment and intersection design.

2040 Santa Cruz County Regional Transportation Plan

The Santa Cruz County Regional Transportation Commission (RTC) periodically completes a Regional Transportation Plan according to state guidelines to guide short- and long-range transportation planning and project implementation for the county. The 2040 Regional Transportation Plan (2040 RTP) is the RTC's comprehensive planning document that provides guidance for transportation policy and projects through the year 2040. The 2040 RTP is based on a sustainability framework using the Sustainable Transportation Analysis and Rating System (STARS) to identify the goals, policies and thus the projects and programs to achieve a more sustainable transportation system. Sustainability is defined as balancing economic, environmental, and equity interests. Individual projects listed in the 2040 RTP must still undergo separate design and environmental processes, and can only be implemented as local, state and federal funds become available. The 2040 RTP, along with those from Monterey and San Benito Counties, has also been incorporated into a metropolitan transportation plan/sustainable communities strategy (MTP/SCS) covering the three-county Monterey Bay area to comply with state and federal guidelines.

The 2040 RTP includes a list of transportation projects within the county, including the City of Santa Cruz, the County of Santa Cruz, Caltrans, and UC Santa Cruz.

For UC Santa Cruz, the projects listed are both "constrained" (i.e., projects that can be funded by 2040) and "unconstrained" (i.e., projects that will not receive funding prior to 2040 without identification of new funding sources). The total project costs for UC Santa Cruz is around $290 million, with about $178 million with secured funding. The funding for these projects would be provided by UC Santa Cruz and other sources. As of August 2020, an updated RTP is being prepared, and is planned for adoption in 2022.

City of Santa Cruz General Plan

The Mobility Element of the City of Santa Cruz 2030 General Plan (City of Santa Cruz 2012) contains the following transportation goals and policies that may be relevant to the 2021 LRDP:

GOAL M1. Land use patterns, street design, parking, and access solutions that facilitate multiple transportation alternatives.

- Policy M1.1: Reduce automobile dependence by encouraging appropriate neighborhood and activity center development.
- Policy M1.2: Create livable streets. "Livable streets" support the intent of Section 65302(b) of the California Government Code to create "complete streets" planned, designed, operated, and maintained to provide safe mobility for all users, including "bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation, and seniors."
- Policy M1.3: Create pedestrian-friendly frontage and streetscapes and attractive pedestrian-oriented areas.

- **Policy M1.4:** Ensure that sidewalks, transit centers, and major transit stops are conveniently located, usable, and accessible to all. This policy and Action M1.4.1 support the intent of Section 65302(b) of the California Government Code to create "complete streets."
- **Policy M1.5:** Reduce the need for parking and promote parking efficiency.

GOAL M2. A safe, sustainable, efficient, adaptive, and accessible transportation system.

- **Policy M2.1:** Provide leadership on sustainable regional mobility.
- **Policy M2.3:** Increase the efficiency of the multi-modal transportation system.
- **Policy M2.4:** Support and promote the efficient use of transit.
- **Policy M2.5:** Consider innovative transportation solutions.

GOAL M3. A safe, efficient, and adaptive road system.

- **Policy M3.1:** Acknowledge and manage congestion.
- **Policy M3.2:** Ensure road safety for all users.
- **Policy M3.3:** Discourage, reduce, and slow through-traffic and trucks on neighborhood streets.

GOAL M4. A citywide interconnected system of safe, inviting, and accessible pedestrian ways and bikeways.

- **Policy M4.1:** Enable and encourage walking in Santa Cruz.
- **Policy M4.2:** Provide and maintain a complete, interconnected, safe, inviting, and efficient citywide bicycle network.
- **Policy M4.3:** Require pedestrian and bicycle improvements in major activity centers and activity areas.
- **Policy M4.4:** Assure a high level of bicycle user amenities.
- **Policy M4.5:** Support pedestrian and bicycle safety improvements.

City of Santa Cruz Active Transportation Plan

The City of Santa Cruz Active Transportation Plan serves as a blueprint for active transportation in and around the City. Active transportation is defined as non-motorized forms of transportation, focusing on walking and biking. The Active Transportation Plan describes the existing conditions related to active transportation and outlines which projects in Santa Cruz to focus on that will promote active transportation throughout the City (City of Santa Cruz 2017). A graphic showing the existing and planned bicycle routes based on the Active Transportation Plan within the study area is included in the Environmental Setting below.

2040 Metropolitan Transportation Plan

Association of Monterey Bay Area Governments (AMBAG) is the federally designated metropolitan planning organization (MPO) for the counties of Monterey, San Benito, and Santa Cruz. As the MPO, AMBAG develops the MTP/SCS and updates it every four years through a bottom-up process involving numerous stakeholders. Transportation investments in the Monterey Bay Area that receive state and federal funds or require federal approvals must be consistent with the MTP/SCS and included in AMBAG's Metropolitan Transportation Improvement Program (MTIP). The MTIP is a four-year program and represents the near-term commitments of the MTP/SCS.

The 2040 MTP/SCS is the current MTP/SCS for the Monterey Bay Area and is a technical update to the 2035 MTP/SCS which was adopted in 2014. AMBAG is currently preparing a 2045 update to the 2040 MTP/SCS, which was adopted in 2018. As part of the 2040 MTP/SCS, AMBAG worked closely with stakeholders to develop a new growth forecast and an updated multimodal transportation network with land use patterns and strategies based on reasonably available revenues. AMBAG developed the 2040 MTP/SCS in close coordination with its three regional transportation planning agencies (RTPAs). Each of the three counties in the Monterey Bay Area has a RTPA responsible for countywide transportation planning and implementation. The three RTPAs consist of the Transportation Agency for Monterey County, the Santa Cruz County RTC and the San Benito County Council of Governments. AMBAG also

worked in close coordination with the region's transit operators, local jurisdictions, Caltrans, the Monterey Bay Area Air Resources District, state and federal resource agencies, local agency formation commissions and other special purpose public agencies. The regional growth forecast expressed and included as part of the 2040 MTP/SCS identifies a growth in student enrollment by 2040 to between 27,000 and 28,000 FTE (AMBAG 2018). The MTP/SCS also considers the UC Santa Cruz transit service to be a regionally significant local transit service (AMBAG 2018:2-10)

3.16.2 Environmental Setting

The following section describes the roadway, bicycle, pedestrian, and transit facilities in the study area.

STUDY AREA

The transportation impact analysis addresses the transportation effects of the 2021 LRDP for the UC Santa Cruz main residential campus and the Westside Research Park at 2300 Delaware Avenue. The study area for transportation analysis includes the main residential campus and the Westside Research Park, and the transportation network serving both sites. Figure 3.16-1 shows the existing transportation network within the study area.

ROADWAY SYSTEM

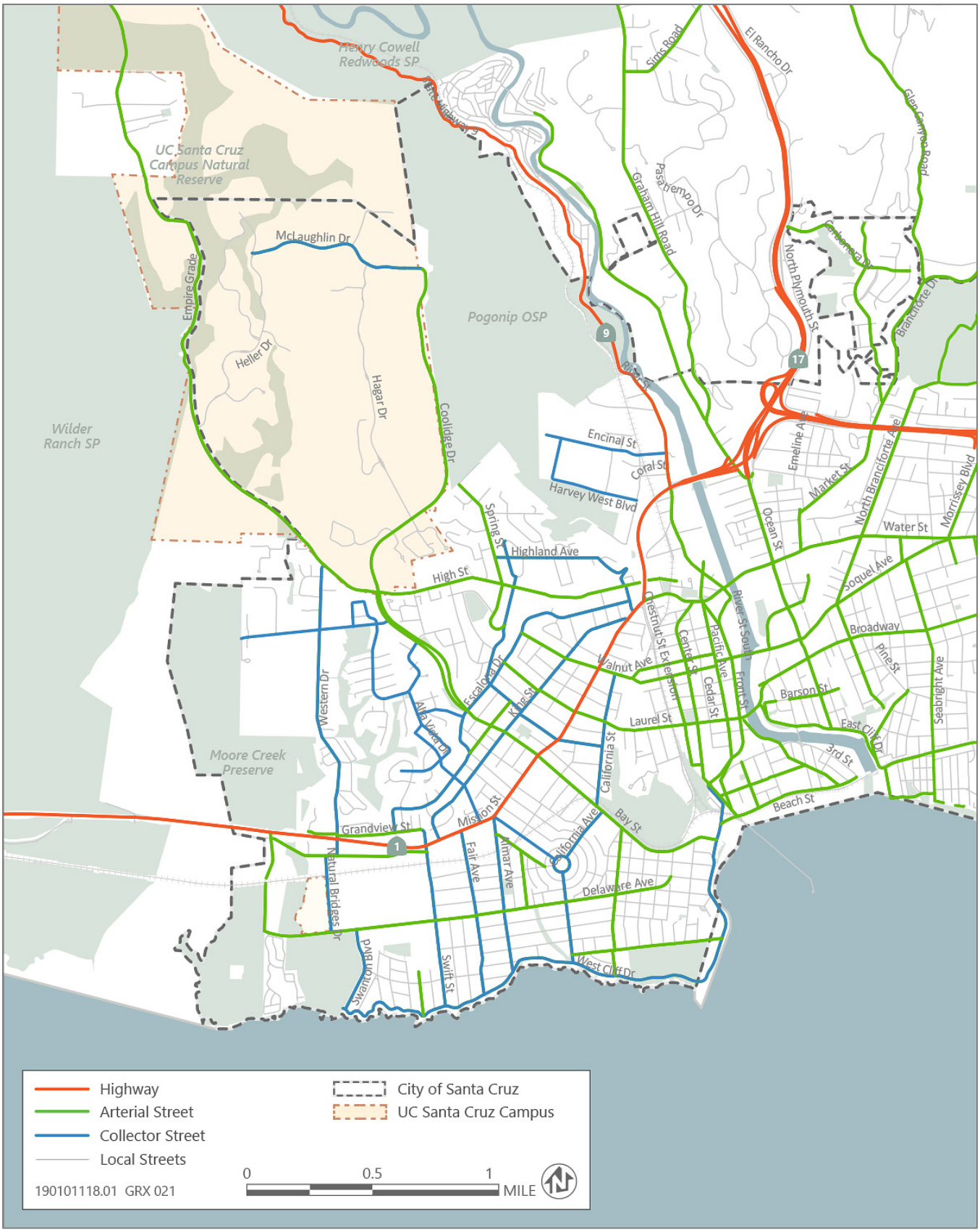
The roadway system in the vicinity of the main residential campus and Westside Research Park is comprised of arterial highways and arterial streets, collector streets, as well as local streets. In addition, truck routes have been designated. The functional roadway classifications described in the City of Santa Cruz General Plan are defined as follows:

- Arterial Highways and Streets: Arterial highways and streets carry the heaviest traffic volumes and provide regional and inter-city access.
- Collector Streets: Collector streets provide access to travel within and between residential neighborhoods and commercial and industrial areas. Collector streets provide connections between local streets and the arterial highways and streets.
- Local Streets: Local streets provide access to nearby properties and connect to arterial and collector streets. Transit routes are not typically located on local streets.
- Truck Routes: Truck routes are intended to channel trucks through the community and away from residential and other areas where they would be a nuisance.

Regional Roadways/Off-Campus Roadway System

Key off-campus streets used by traffic associated with the main residential campus and Westside Research Park are described below.

State Route 1, also referred to as Highway 1, is a State highway that runs parallel to the coast, and generally runs in an east-west alignment through the City of Santa Cruz. South of the junction with SR 17, SR 1 is a four-lane highway. North of the junction, SR 1 becomes a four-lane highway. At the intersection with Mission Street, the Highway becomes Mission Street to the southwest up to its intersection with Swift Street. At that point, the highway resumes and becomes a two-lane highway. The speed limit before the SR 17 junction is 65 miles per hour (mph) and the speed limit after the junction is 40 mph. To the west of Swift Street, the speed limit is 45 mph.



Source: City of Santa Cruz 2030 General Plan

Figure 3.16-1 Existing Circulation Roadway Network

State Route 9 is a highway that runs north-south starting from the SR 1/River Street junction to the south and extending north of the UC Santa Cruz campus. SR 9 is a two-lane highway with a speed limit of 35 mph within the City limits.

State Route 17 is a highway that runs north-south starting from San Jose in the north and terminating at the SR 1 junction in Santa Cruz. SR 17 is a four-lane highway with a speed limit of 50 mph.

Bay Street/Bay Drive is two-lane arterial street and runs northwest-southeast within the city. North of Mission Street, Bay Street is a two- to four-lane road and serves as one of the primary access routes to and from the UC Santa Cruz main residential campus. The two-lane section between Mission Street and Escalona Drive serves residential land uses. North of Escalona Drive, Bay Street becomes Bay Drive, a four-lane divided street with limited access to adjacent properties. South of Mission Street, Bay Street serves primarily residential uses and allows on-street parking. Bicycle lanes are provided in both directions from High Street to West Cliff Drive.

Chestnut Street is a two-lane collector street south of Laurel Drive and two-lane arterial street north of Laurel Drive extending north-south from Mission Street to Neary Lagoon Park. It serves a mix of residential and commercial uses and provides a primary access route to downtown Santa Cruz. On-street parking is provided and bike lanes are present north of Laurel Street.

Delaware Avenue is a two-lane arterial street extending east-west from Shaffer Road in the west to Bay Street in the east. Delaware Avenue serves a mix of residential and low-intensity commercial uses on the west end. It is a primary east-west alternative to Mission Street/SR 1 and the primary access route to Westside Research Park. On-street parking and bike lanes/bike routes are provided along the street.

Empire Grade is an arterial County road that extends from High Street at the City limit in the south to Alba Road in the north. It provides access to small rural communities north of the campus including the Cave Gulch and Bonny Doon neighborhoods. It also provides access to the campus - the western entrance to the main residential campus is located on this road at Heller Drive. Bike lanes and shoulders are provided south of Heller Drive. North of Heller Drive, Empire Grade becomes a winding roadway with relatively steep grades on some sections. The posted speed limit is 40 mph.

High Street is an arterial street that runs east-west, starting from Mission Santa Cruz in the east and turns into Empire Grade at the City limit. It is a two-lane street, with limited on-street parking, bike lanes, and a speed limit of 30 mph. Between Highland Avenue and Storey Street, High Street is a one lane, westbound street. High Street serves as one of the primary access routes to and from the campus. It also provides access to a public elementary school and numerous churches.

Laurel Street is a collector street west of Mission Street and is an arterial street east of Mission Street. It is a two-lane roadway extending east-west from Escalona Drive in the west to Broadway Avenue in the east. It has speed bumps, bike lanes, and on-street parking in primarily residential neighborhoods. To the east of Mission Street, Laurel Street serves a mix of uses and accommodates the most heavily traveled Santa Cruz Metropolitan Transit District (Metro) transit routes that serve the campus.

Mission Street is an arterial street that runs east-west through western Santa Cruz, beginning at the Water Street/ Pacific Avenue intersection in the east to the Mission Street/SR 1 junction at Swift Street in the west. Mission Street becomes SR 1 at the Chestnut Street/SR 1 junction. Mission Street varies from two to four lanes to the east of SR 1, with a speed limit of 25 mph. Between Shaffer Road and Swift Street, Mission Street is a two-lane local street and has bike routes and on-street parking.

Natural Bridges Drive is a two-lane collector street extending north-south from Delaware Avenue in the south to Mission Street in the north. It has bike lanes, on-street parking, and provides access to Westside Research Park.

River Street extends north-south from Front Street in the south to SR 9 at SR 1 at the City limit in the north. South of SR 1, River Street is a two- to four-lane arterial street with bike lanes and limited on-street parking. River Street serves primarily commercial and industrial uses both north and south of SR 1, and is a primary access route to downtown Santa Cruz.

Swift Street is a two-lane collector street extending north-south from West Cliff Drive in the south and turns into Grandview Street in the north. On-street parking and bike lanes are provided on both sides from Mission Street to Wanzer Street/Modesto Avenue, and a bike lane only on the southbound direction south of Wanzer Street/Modesto Avenue. Swift Street serves a mix of low-intensity commercial offices and residential uses and also functions as the primary access route from Mission Street/SR 1 to the Westside Research Park via Delaware Avenue.

West Cliff Drive is a two-lane collector street south of Bay Street and a three-lane (two southbound) collector street north of Bay Street. The road is one-way between Pacific Avenue and Beach Street. It is adjacent to the coastline, carries sightseeing traffic, and has an adjacent off-street bike path.

Western Drive is a two-lane collector street extending north-south from High Street in the north to Mission Street/SR 1 in the south. On-street parking is provided intermittently along the street, along with bike lanes.

Local Roadways/On-Campus Roadway System

UC Santa Cruz's main residential campus is served by two roadway entrances: the main entrance at the Bay Drive/ Coolidge Drive/High Street intersection and the west entrance at Empire Grade/Heller Drive intersection. Internal circulation in the campus is provided by internal roadways, which include the following roadways that provide primary circulation within the campus (listed in alphabetical order):

Coolidge Drive is a County-owned arterial road that extends north into the campus from the main entrance, forms a portion of the eastern perimeter of the campus and then curves west to become McLaughlin Drive, a campus roadway. Coolidge Drive is a two-lane road with bike lanes on each side and no on-street parking or sidewalks for most of its length. The speed limit from High Street to Hagar Drive is 25 miles mph. Between Hagar Drive and McLaughlin Drive the speed limit is 45 mph.

Hagar Drive is a campus street that runs north-south, starting from the intersection with Coolidge Drive to the south and terminating at the intersection with McLaughlin Drive to the north. It is a two-lane street, with bike lanes and adjacent sidewalks for some of its length, and no on-street parking. The speed limit is 35 mph between Coolidge Drive and the East Remote Parking Lot and 25 mph from there north to McLaughlin Drive.

Heller Drive is a campus street that runs north-northeast from the west campus entrance at the Empire Grade/Heller Drive intersection. The street experiences high volumes of pedestrian crossings and transit vehicles in the vicinity of Rachel Carson and Porter Colleges. It is a two-lane street and has discontinuous bike lanes and sidewalks in some areas, but is served by a series of off-street paths that parallel the road or connect it to other parts of the campus. On-street parking is not allowed. The speed limit is 25 mph.

McLaughlin Drive is the primary east-west campus street serving the campus core, connecting with Heller Drive at its west intersection and turning into Coolidge Drive on its east side. It is a two-lane street and experiences high volumes of use by campus pedestrians, bicycles, and transit vehicles. McLaughlin Drive has sidewalks on both sides for most of its length and no bike lanes. The speed limit is 15 mph.

Meyer Drive is a campus street that runs east-west, starting from Heller Drive in the west to the Music Library and Webster Way Bike Path through the Great Meadow in the east. It is a two-lane road with a discontinuous sidewalk on the north side and does not have bike lanes. Meyer Drive does not currently connect Heller Drive and Hagar Drive. The speed limit is 25 mph.

Steinhart Way is a campus street that runs east-west, starting from the intersection with McLaughlin Drive to the west and terminating at the intersection with Hagar Drive to the east. It is a two-lane street with adjacent sidewalks for some of its length and no on-street parking. The speed limit is 10 mph.

Truck Routes

Truck routes provide designated routes for trucks through the city so that they avoid residential and other areas (except for direct deliveries). The City has designated the following roads as truck routes in the study area:

- SR 1/Mission Street
- SR 9

- Bay Drive/Bay Street north of Mission Street
- High Street west of Bay Drive

BICYCLE FACILITIES

Bicycle facilities are typically classified into four categories as described below:

- **Bicycle paths (Class I)** provide a completely separate right-of-way and are designated for the exclusive use of bicycles and pedestrians with vehicle cross-flow minimized.
- **Bicycle lanes (Class II)** provide a restricted right-of-way and are designated for the use of bicycles for one-way travel with a striped lane on a street or highway. Bicycle lanes are generally a minimum of five feet wide. Vehicle parking and vehicle/pedestrian cross-flow are permitted.
- **Bicycle routes (Class III)** provide right-of-way designated by signs or pavement markings for shared use with motor vehicles. These include sharrows or "shared-lane markings" to highlight the presence of bicyclists.
- **Class IV Bikeways (Class IV)** cycle tracks or "separated" bikeways provide a right-of-way designated exclusively for bicycle travel within a roadway and are protected from other vehicle traffic by physical barriers, including, but not limited to, grade separation, flexible posts, inflexible vertical barriers such as raised curbs, or parked cars.

Both UC Santa Cruz and the City of Santa Cruz have a comprehensive system of bicycle facilities, which can be seen in Figure 3.16-2.

Existing On-Campus Bicycle Facilities and Services

Bicycle facilities within the UC Santa Cruz main residential campus include Class II and Class III bicycle facilities along the major roads on campus, and Class I bicycle facilities off-street, as can be seen in Figure 3.16-2. The primary routes to access the main campus (i.e., Coolidge Drive, Hagar Drive, and Heller Drive) include Class II bicycle facilities. Portions of Heller Drive have bike lanes, although only in the northbound direction between Meyer Drive and McLaughlin Drive.

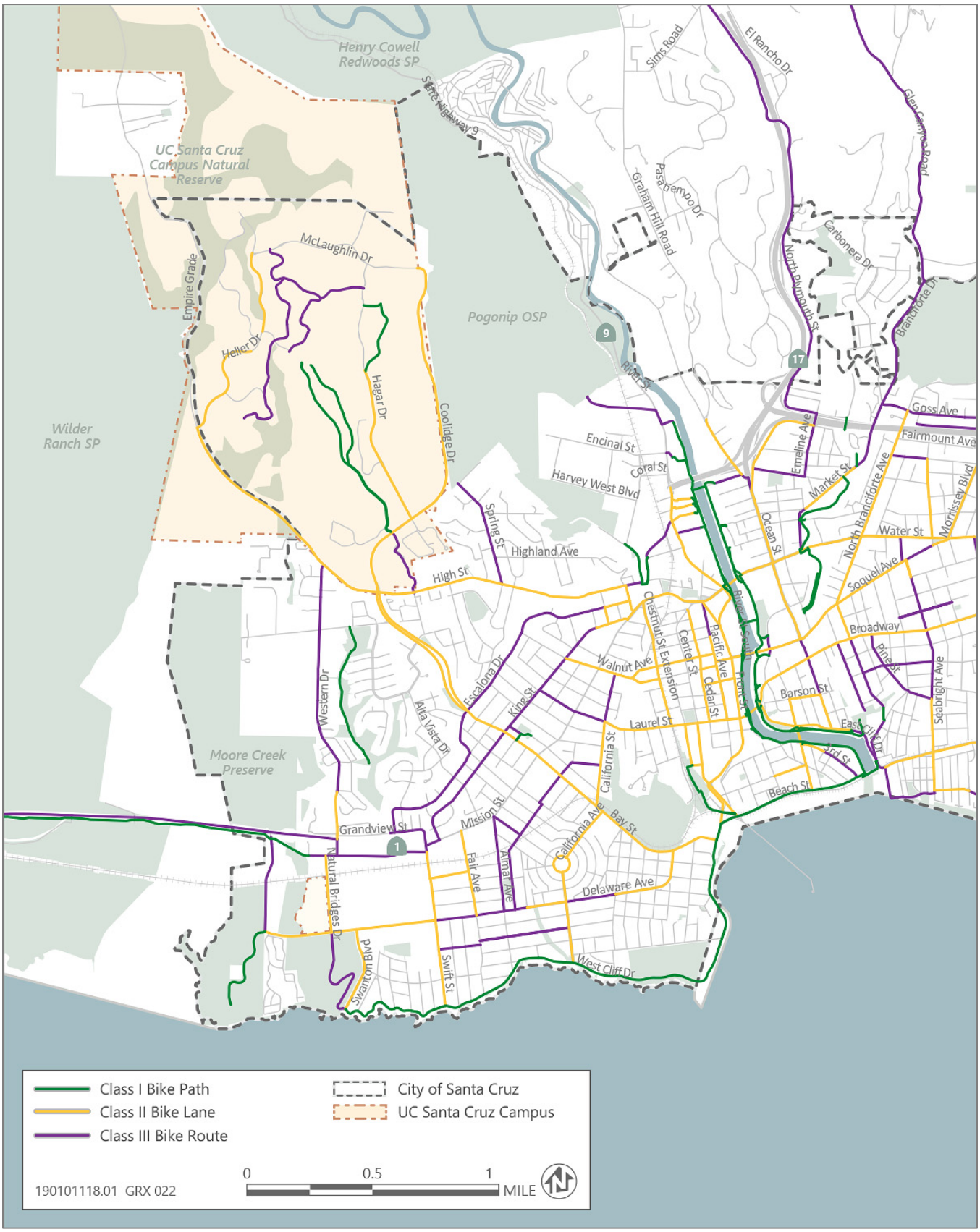
Based on the spring 2019 cordon count conducted by UC Santa Cruz Transportation and Parking Services (TAPS), on average about 440 bicycles use the main entrance (i.e., Coolidge Drive) and about 90 bicycles use the west entrance (i.e., Heller Drive) during an average day. The roads in the northern part of campus, such as Steinhart Way, include Class III bicycle facilities. Additionally, a Class I bicycle facility runs north-south, connecting Coolidge Drive in the south to Meyer Drive in the north with another Class I bicycle facility between the East Remote Parking Lot to the Athletics and Recreation Services Wellness Center. McLaughlin Drive does not include any designated bicycle facilities, though bicycle travel is permitted on all local streets.

Around Westside Research Park, there are Class II Bike Lanes on Delaware Avenue and Natural Bridges Street. Along Mission Street, there is a Class III Bike Route.

Bicycle racks are provided at transit stops on campus and near most major buildings. The total capacity of on-campus bicycle parking is more than 3,300 bicycle rack spaces. Thirty-two bicycle lockers are offered at various campus locations.

TAPS operates a bicycle shuttle service from the intersection of Mission and Olive Streets to the campus, with the Lower Campus METRO stop and Engineering 2 Circle as the drop-off points. The shuttle provides service during weekday mornings and afternoons and is only provided to UC Santa Cruz affiliates.

Some Campus Transit buses and all vanpool vehicles have front-loading bicycle racks, and bicycles are not allowed inside the buses. All Santa Cruz METRO buses are equipped with front-loading bicycle racks that can fit three standard bicycles.



Source: City of Santa Cruz Active Transportation Plan

Figure 3.16-2 Existing Bicycle Circulation Network

Campus Bicycle Programs

UC Santa Cruz offers a number of classes and events regarding biking and bike safety that are either free or low cost. The bicycle classes are meant to help new riders get acclimated to biking around the campus and Santa Cruz.

UC Santa Cruz offers a bicycle library, in which UC Santa Cruz affiliates can use a bicycle for free for a quarter. UC Santa Cruz affiliates must be accepted into the program, which includes a safety orientation, maintenance assistance, helmet, lock, and set of lights to borrow. TAPS offers a weekly bicycle maintenance clinic to help UC Santa Cruz affiliates keep their bicycles operational and safe. TAPS has also installed Fixit bicycle repair stations at Baskin Engineering, Main Entrance, McHenry Library, Performing Arts, and Athletics and Recreation.

The Bike Commuter Shower Program is available to UC Santa Cruz staff and faculty who commute to the campus via bicycle. The program provides free access to the shower facilities at the East Field House. Staff and faculty must apply online to get access; students can show their ID cards to get access to the shower facilities.

All bicycles on campus must be registered with a current California bicycle license. Bicycles can be registered for free with the Santa Cruz Police Department using an online link, with the sticker being mailed to the applicant.

UC Santa Cruz also provides a network of bike racks and lockers for secure bike parking at various destinations on the main residential campus and WRP, including 32 bike lockers on the main campus through BikeLink and an indoor bicycle parking facility at WRP.

Existing Off-Campus Bicycle Facilities and Parking

The City of Santa Cruz Active Transportation Plan describes the existing and proposed bicycle facilities within the city. The existing bicycle facilities in Santa Cruz consist primarily of Class II and Class III bikeways. Class II bicycle lanes are present on all the primary routes leading to the campus, including High Street, Bay Drive/Street (not present between Mission Street and King Street at night due to daytime on-street parking restriction), Delaware Avenue, and Empire Grade.

On the west side of Santa Cruz, the bicycle network is linked with Class II and Class III bikeways. One of the primary difficulties for bicyclists is traveling along or crossing Mission Street to access bicycle routes leading to the campus, because the street carries heavy vehicle traffic volumes and does not include continuous bicycle lanes. The east side of Santa Cruz provides a more connected bicycle network, with bicycle lanes on many streets, especially for east-west travel to access the campus. Bicycle racks and lockers are available throughout the city. The City of Santa Cruz offers 16 bicycle lockers and bicycle racks in the parking lot adjacent to the METRO station in downtown Santa Cruz.

PEDESTRIAN FACILITIES

On-Campus Pedestrian Circulation

The main residential campus provides a pedestrian circulation network of pathways through forests and grasslands, and sidewalks adjacent to streets, as shown in Figure 2-8 in Chapter 2, "Project Description." While the pedestrian network connects the various colleges and destinations on campus, the topography, campus size, and various roadway crossings contribute to long walking times for many of the pedestrian routes. Manual traffic control is used at high-volume traffic/pedestrian intersections to allow pedestrians to cross during class changeovers. Additionally, some cross-campus pedestrian routes and bridges are not ADA-compliant.

Near Westside Research Park, there are sidewalks along Natural Bridges Drive and Mission Street and on the north side of Delaware Avenue to the west of Natural Bridges Drive, with a crosswalk at the intersection of Mission Street and Natural Bridges Drive. The pedestrian facilities provide access to the nearby transit stops.

Off-Campus Pedestrian Circulation

In Santa Cruz, most of the streets have sidewalks, but there are also many streets that either do not have sidewalks or have sidewalks in need of repair. Continuous sidewalks are present on the primary roadways serving the campus, within a half-mile of the High Street/Bay Drive intersection, with the exception of Bay Drive south of Iowa Street/Nobel Drive. Between Iowa Street/Nobel Drive and Escalona Drive, Bay Street has a pedestrian walkway in the median. At the Empire Grade/Heller Drive intersection, there is a crosswalk on the east side of Empire Grade. However, Empire Grade and Heller Drive do not have sidewalks within a ¼ mile radius of the intersection.

TRANSIT SERVICE AND FACILITIES

Due to COVID-19, both the on-campus and off-campus transit agencies have either reduced service or temporarily stopped service on some routes. This section details the transit service available in spring 2020 prior to COVID-19. Figure 3.16-3 shows off-campus transit services and Figures 3.16-4 and 3.16-5 show on-campus transit services within the study area. Table 3.16-1 shows on-campus and off-campus transit service schedules. Both on- and off-campus transit service are described in more detail on the following pages.

On-Campus Transit

TAPS operates buses that serve the main residential campus. TAPS also works with other regional transit agencies (currently only SCMTD) to coordinate services. Transit services to the main residential campus and other UC Santa Cruz facilities are described below.

UC Santa Cruz Campus Transit

Campus Transit is the campus shuttle bus system operated by TAPS to serve the main residential campus. As shown in Figures 3.16-4 and 3.16-5, the three on-campus routes offered by TAPS include The Loop, Upper Campus, and the Night Core.

While it is subject to change based on a variety of factors, including but not limited to season, ridership demand and campus population, Campus Transit schedules are typically similar to the following: the Loop operates from Monday to Friday from 7:25 AM to 9:30 PM (last bus departs at 6:35 PM on Fridays), with buses every 15 minutes running in both the clockwise and counterclockwise directions. The Upper Campus route provides service only to the upper campus, to and from the West Remote and East Remote parking lots. The Upper Campus route operates from Monday to Friday from 7:30 AM to 8:45 PM (last bus departs at 5:00 PM on Fridays) with buses every 15 minutes during peak hours. The Night Core service operates every day from 8:00-11:30 PM on weekdays (starts at 6:00 PM on Fridays), and 5:00 – 11:00 PM on weekends with buses every 30 minutes.

The Loop has the most ridership of the three on-campus routes, with about 5,600 daily weekday riders, whereas Upper Campus has around 1400 daily weekday riders and Night Core has around 800 daily riders.

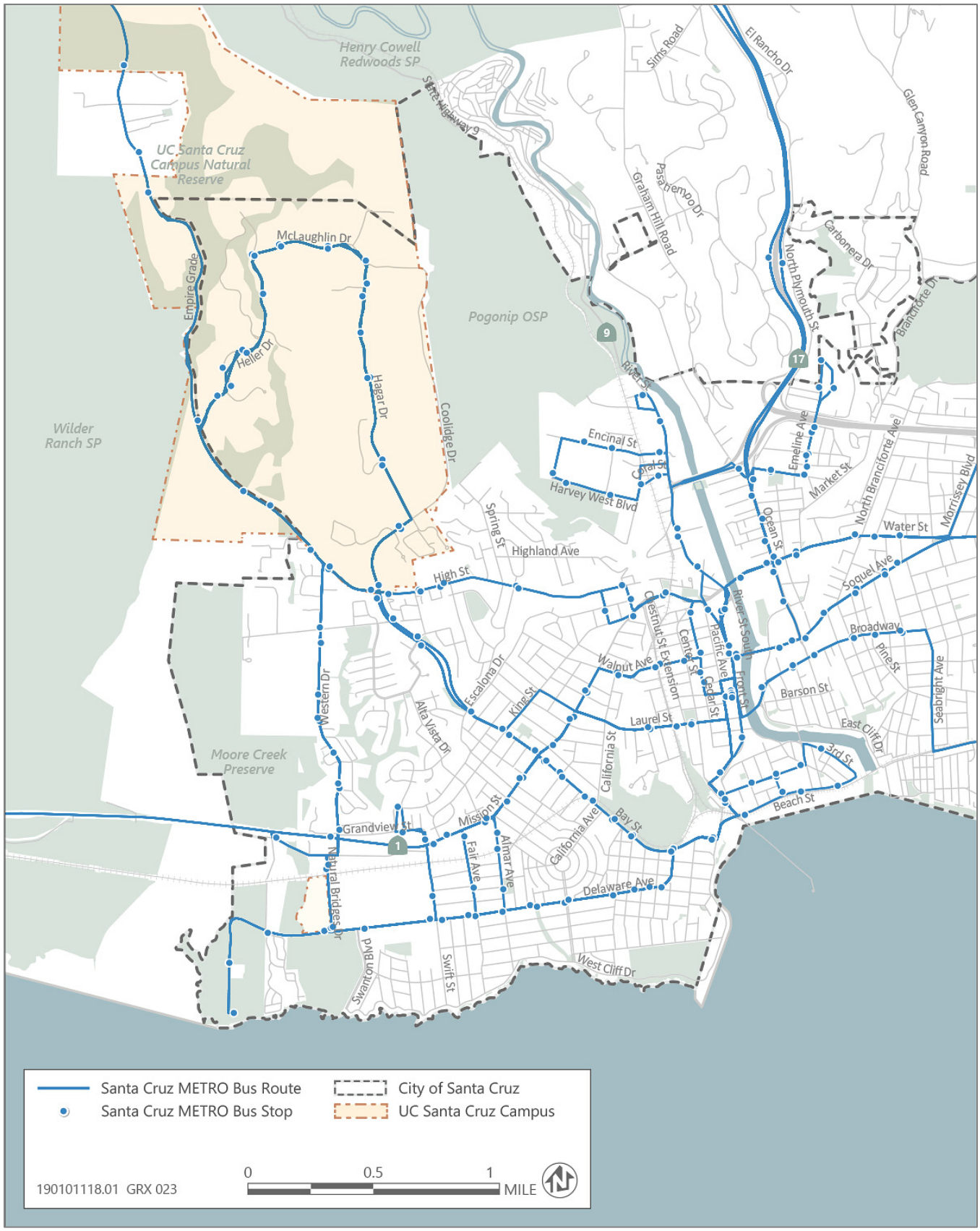
TAPS Disability Van Service

The Disability Van Service (DVS) provides on-campus wheelchair lift-equipped transportation for all employees, students, and visitors with temporary or permanent mobility impairments. No fare is charged to use the service, but rides must be arranged ahead of time and current medical documentation is required.

METRO Bus Service to UC Santa Cruz

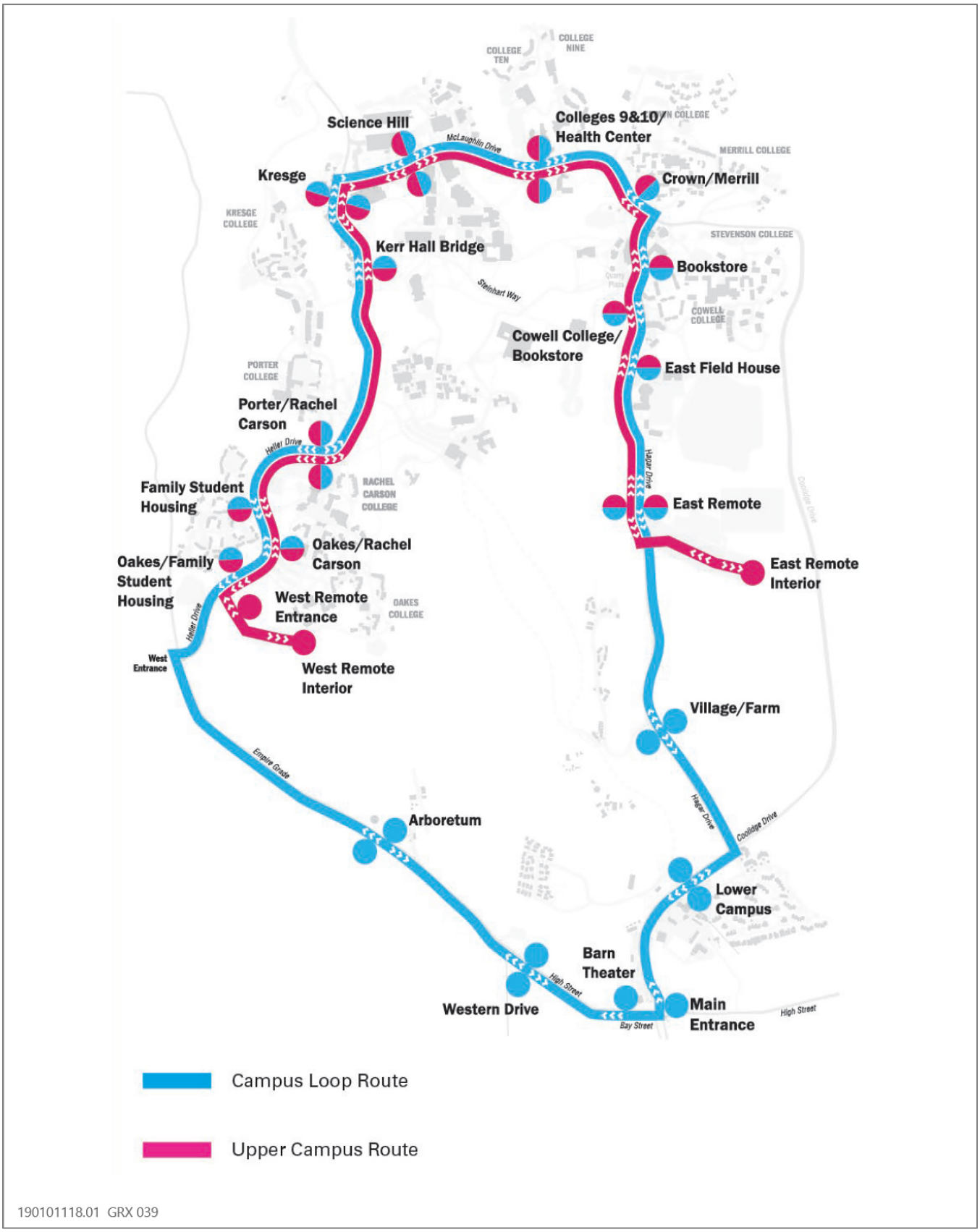
The METRO bus system is operated by the Santa Cruz Metropolitan Transit District (SCMTD) and provides public transit for Santa Cruz County. METRO buses run both clockwise and counterclockwise routes around the campus. Bus shelters are located at most transit stops on campus.

The METRO routes that serve the LRDP area (Routes 10, 15, 16, 19, 20, 20D, and 22) account for almost 60 percent of all METRO ridership and are described in more detail below.



Source: Santa Cruz METRO

Figure 3.16-3 Existing METRO Transit Routes to UC Santa Cruz (Pre-COVID-19)



Source: UC Santa Cruz Transportation Parking Services

Figure 3.16-4 Existing Campus Loop and Upper Campus Routes (Pre-COVID-19)

Source: UC Santa Cruz Transportation Parking Services

Figure 3.16-5 Existing Night Core Routes (Pre-COVID-19)

Table 3.16-1 Existing Transit Service

Route	From	To	Weekday Operating Hours	Weekday Peak Headway (minutes)	Weekend Operating Hours	Weekend Peak Headway (minutes)	Average Daily Ridership
On-Campus (TAPS, Spring 2020)							
The Loop (Clockwise)	Barn Theater Transit Stop	Barn Theater Transit Stop	(M-Th) 7:25 AM - 9:30 PM (Fri) 7:25 AM - 6:35 PM	15	No Weekend Service	No Weekend Service	5600 (both clockwise and counterclockwise)
The Loop (Counterclockwise)	Main Entrance Transit Stop	Main Entrance Transit Stop	(M-Th) 7:25 AM - 9:30 PM (Fri) 7:30 AM - 6:35 PM	15	No Weekend Service	No Weekend Service	See above
Upper Campus	West Remote	East Remote	(M-Th) 7:30 AM - 8:45 PM (Fri) 7:30 AM - 5:00 PM	15	No Weekend Service	No Weekend Service	1400
Night Core	Quarry Plaza	Quarry Plaza	(M-Th) 8:00 PM - 11:30 PM (Fri) 6:00 PM - 11:30 PM	30	5:00 PM - 11:00 PM	30	800
Off-Campus (METRO, Spring 2020)							
3	Santa Cruz Metro Center	Santa Cruz Metro Center	7:30 AM - 5:30 PM	120	9:50 AM - 5:50 PM	120	60
10	Santa Cruz Metro Center	Santa Cruz Metro Center	7:20 AM - 7:15 PM	30	9:50 AM - 4:50 PM	60	800
15	Santa Cruz Metro Center	Santa Cruz Metro Center	7:15 AM - 7:45 PM	30	No Weekend Service	No Weekend Service	2600
16	Santa Cruz Metro Center	Santa Cruz Metro Center	6:40 AM - 12:07 AM	15	8:10 AM - 11:07 PM	30	3000
19	Santa Cruz Metro Center	Santa Cruz Metro Center	7:25 AM - 11:25 PM	30	10:00 AM - 7:00 PM	60	1100
20D	Bay & Laguna	Delaware & Liberty	7:15 AM - 6:15 PM	60	No Weekend Service	No Weekend Service	600
20	Santa Cruz Metro Center	Santa Cruz Metro Center	7:15 AM - 8:20 PM	60	11:20 AM - 8:20 PM	60	700
22	Seymour Center	Seymour Center	7:15 AM - 7:35 PM	60	No Weekend Service	No Weekend Service	800
41	Santa Cruz Metro Center	Santa Cruz Metro Center	5:50 AM and 8:00 AM	Two trips	No Weekend Service	No Weekend Service	20
42	Santa Cruz Metro Center	Santa Cruz Metro Center	3:30, 5:30, and 8:30 PM	Three trips	8:30 AM and 4:30 PM	Two trips	40

1 UC Santa Cruz Transportation and Parking Services for On-Campus Schedule and Average Daily Ridership (9/1/18 – 6/30/19).

2 Santa Cruz Metropolitan Transit District for Off-Campus Schedule and Average Daily Ridership (July 2018 – June 2019).

Source: data received from UC Santa Cruz and adapted by Fehr & Peers in 2020.

Off-Campus Transit

METRO

The SCMTD provides the METRO bus service throughout Santa Cruz County. All METRO buses are wheelchair accessible. Monterey Salinas Transit offers service between the Santa Cruz METRO Center in downtown Santa Cruz and Monterey. The routes depart from the METRO Center. The routes within the study area include:

- Route 3 – Mission/Seymour Center/Beach (serves Westside Research Park) – provides a connection between the Santa Cruz Metro Center, Westside Research Park, UC Santa Cruz Coastal Science Campus, and Santa Cruz Wharf.
- Route 10 – UC Santa Cruz via High – provides a connection between the Santa Cruz Metro Center and UC Santa Cruz campus via High Street, going around the campus in a counterclockwise direction.
- Route 15 – UC Santa Cruz via Laurel West – provides a connection between the Santa Cruz Metro Center and UC Santa Cruz campus via Laurel Street and Bay Drive, going around the campus in a clockwise direction.
- Route 16 – UC Santa Cruz via Laurel East – this route has the most ridership of any Santa Cruz METRO route, with around 3,000 daily riders and provides a connection between the Santa Cruz Metro Center and UC Santa Cruz campus via Laurel Street and Bay Drive, going around the campus in a counterclockwise direction.
- Route 17 – Amtrak Highway 17 Express, which provides a connection from the METRO Center in downtown Santa Cruz to the Diridon Station in San Jose and San Jose State University. Diridon Station provides access to Caltrain and will serve as a future station for Bay Area Rapid Transit and California High-Speed Rail. Highway 17 serves out-of-county affiliates.
- Route 19 – UC Santa Cruz via Lower Bay - provides a connection between the Santa Cruz Metro Center and UC Santa Cruz campus via Bay Street/Drive, going around the campus in a clockwise direction.
- Route 20D – UC Santa Cruz via Delaware – the route is only provided during the school term and provides a connection between Westside Research Park and UC Santa Cruz campus, going around the main campus in a counterclockwise direction,
- Route 20 – UC Santa Cruz via Westside – provides a connection between the Santa Cruz Metro Center, Westside Research Park, and UC Santa Cruz campus, going around the main campus in a counterclockwise direction.
- Route 22 – UC Santa Cruz/Coastal Science Campus - provides a connection between UC Santa Cruz Coastal Science Campus, Westside Research Park, and UC Santa Cruz main residential campus, going around the main residential campus in a counterclockwise direction.
- Route 41 – Bonny Doon (serves Bay Street corridor, and the main and west entrances to the main residential campus as it travels up Empire Grade to Bonny Doon) – provides a connection between the Santa Cruz METRO Center, UC Santa Cruz main residential campus, and Bonny Doon via High Street/Empire Grade.
- Route 42 – Davenport/Bonny Doon (serves Bay Street corridor, and the main and west entrances to the main residential campus as it travels down south Empire Grade from Bonny Doon) – provides a connection between the Santa Cruz METRO Center, UC Santa Cruz main residential campus, Bonny Doon, and Davenport via High Street/Empire Grade.

Greyhound

The Greyhound bus terminal is located at the METRO Center in downtown Santa Cruz and provides access to more regional destinations.

PARKING FACILITIES

Although parking and the effects of a project on parking are no longer considered as potential physical environmental impacts, the following is provided for informational purposes.

On-Campus

TAPS plans, manages, maintains, and monitors the campus parking supply, excluding certain residential parking which is managed by Colleges, Housing, and Educational Services (CHES), to ensure existing parking capacity is utilized before additional parking is constructed and to ensure excess parking capacity does not encourage single-occupant vehicle use. Parking capacity is managed in an area-specific manner by parking permit type to maximize utilization and turnover.

Information on parking capacity and utilization is updated annually, with the most recent information reflecting conditions observed during spring 2019. Table 3.16-2 shows the campus parking supply by type.

At the time the survey was conducted, 3,603 vehicles were parked, which is just over 60 percent of total parking capacity (with campus housing).

Variations in parking utilization appear to be due to location. and permit type. The permit-controlled parking in the central campus (e.g., Hahn Student Services, East Field House, Performing Arts, etc.) averaged 97 percent utilization, whereas Stone House and Barn Theater averaged around 58 percent utilization. Of the 75 inventoried on-campus parking lots, 22 of them had average daytime utilization rates among permit-controlled parking spaces of 90 percent or greater. This includes the parking lots at the Crown/Merrill apartments, central campus, West Remote parking lot, and Cowell/Stevenson Colleges.

A total of 306 motorcycle parking spaces are offered around the campus. The utilization of motorcycle spaces is low, with around 37percent of spaces being occupied. This percentage matches the low mode share of motorcycles on campus (less than 1 percent) observed during the spring 2019 cordon modal count conducted by TAPS.

Table 3.16-2 Existing Main Residential Campus and Westside Research Park Parking Supply by Parking Program Category

Parking Program Categories	Parking Capacity
Accessible	159
Medical	77
Visitor	326
Motorcycle	306
University	99
Reserved	340
Loading	28
Student Commuter	1,399
Faculty/Staff/Grad Commuter	2,284
On Campus Student Housing	326
On Campus Employee Housing	473
Total (without on campus housing)	5,018
Total (with on campus housing)	5,817

Source: data received from UC Santa Cruz and adapted by Fehr & Peers in 2020.

Off-Campus

In the city of Santa Cruz, public parking is provided on-street and in various parking garages and lots, whereas off-street parking is both public and private. The City of Santa Cruz operates seven separate residential parking permit programs throughout the city in the following areas: Downtown, Westside, Beach Area, Lighthouse/Cowell Beach, East Side, and Seabright.

The City of Santa Cruz offers off-campus long-term parking for UC Santa Cruz students, with the Depot Parking Lot located off of Washington Street and Center Street, near bus stops that includes the UC Santa Cruz METRO routes (Routes 12,15,16,19, and 20).

Westside Residential Parking Permit Program

The Westside Residential Parking Permit Program was established to manage short- and long-term parking on streets in the westside of Santa Cruz. The program is meant to address non-residents, such as UC commuters, from using residential street parking to avoid campus fees and restrictions and then using public transit to access the campus. The program restricts parking on certain westside residential streets to residents or short-term guest parking through

permit-controlled parking. The program is enforced Monday through Friday during the academic year (September 15th – June 30th). The program affects the area between Western Drive, Mission Street, Gharkey Street, Bay Street, California Street, High Street, and Spring Court.

PLANNED REGIONAL TRANSPORTATION IMPROVEMENTS

The planned regional transportation improvements listed in this section are separate from the improvements identified as part of the 2021 LRDP. The 2040 RTP identifies the following planned transportation improvements and studies affecting the UC Santa Cruz campus and Westside Research Park:

- Delaware Avenue Complete Streets – Fill gaps in bicycle lanes, sidewalks, and sidewalk access ramps;
- Empire Grade Improvements – Add bike lanes, transit facilities, some sidewalks;
- SR 1/Mission Street at the Chestnut/King/Union Intersection Modification – Modify design of existing intersections to add lanes and upgrade traffic signal operations, provide access ramps and bike lanes on King and Mission;
- Monterey Bay Sanctuary Scenic Trail (MBSST) Network (Coastal Rail Trail): Segment 7 (Natural Bridges to Pacific Avenue) – 2.1 miles of MBSST Segment 7 along rail line;
- Swift Street/Delaware Avenue Intersection Roundabout or Traffic Signal – Install traffic signal or roundabout at intersection;
- West Cliff Drive/Bay Street Modifications – Install signal or roundabout to replace all-way stop; and,
- Coolidge Drive/Highway 9 Bike Path – Class 1 bike facility from Coolidge Drive to Highway 9 to provide eastern access to UC Santa Cruz (RTC 2018).

In addition to the listed improvements, the RTC recently completed the Unified Corridor Investment Study to identify multimodal transportation investments that best utilize SR 1 and the Santa Cruz Branch Rail Line to serve the community's transportation needs, which would benefit both the main residential campus and Westside Research Park by reducing the VMT for the two areas. The study recommends Bus on shoulder on Highway 1; mass transit (rail or BRT) on the rail corridor; multi-modal improvements on the Soquel Drive/Freedom Boulevard corridor). RTC is now working on a preferred alternative for the rail corridor as part of a Transit Corridor Alternative Analysis. UC Santa Cruz plans to integrate the planned mass transit and trail facilities into future mixed-used land uses at Westside Research Park.

The following projects have been identified in the City of Santa Cruz's two-year Capital Improvement Program for the fiscal years 2019-2021 for near-term construction, contingent on receiving approval and funding:

- Downtown Intersection Improvements – addressing deficiencies at Pacific/Laurel, Front/Laurel, and Front/Soquel;
- Bay Street/High Street Intersection Improvements – Install protected left-turns on High Street or a roundabout to improve mobility; and,
- SR 1/SR 9 Intersection Improvements.

CAMPUS TRAVEL CHARACTERISTICS

Existing Campus Trip Generation

TAPS conducts annual traffic counts on campus roadways and at the main and west entrances during fall and spring quarters. In spring 2019, the campus generated approximately 1,470 trips entering and exiting the campus during the peak AM hour and approximately 2,050 trips entering and exiting the campus during the peak PM hour. The campus generates approximately 22,700 total vehicle trips on an average weekday, as shown in Table 3.16-3.

The table below does not include counts for Westside Research Park, as no counts were recorded there.

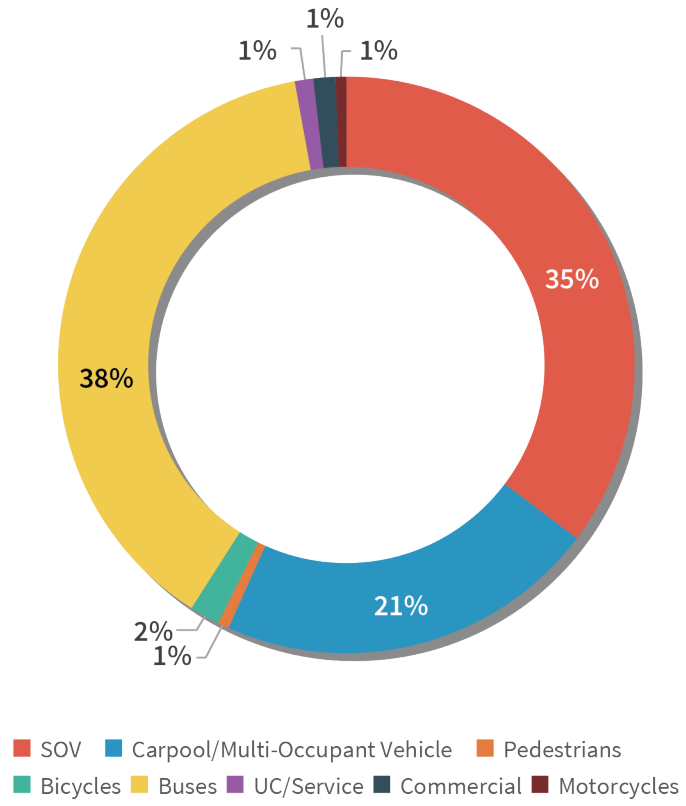
Table 3.16-3 Spring 2019 UC Santa Cruz Campus Traffic (Total of Main and West Entrances)

AM Peak Hour Traffic (8:30 AM – 9:30 AM) Inbound	AM Peak Hour Traffic (8:30 AM – 9:30 AM) Outbound	AM Peak Hour Traffic (8:30 AM – 9:30 AM) Total	PM Peak Hour Traffic (4:45 – 5:45 PM) Inbound	PM Peak Hour Traffic (4:45 – 5:45 PM) Outbound	PM Peak Hour Traffic (4:45 – 5:45 PM) Total	Average Daily Traffic
1,070	399	1,469	791	1,260	2,051	22,702

Source: UC Santa Cruz Transportation and Parking Services, counts taken in April – May 2019.

Campus Mode Share

The mode split counts conducted from 7 AM – 7 PM on May 22, 2019 by UC Santa Cruz TAPS show that SOVs account for 35 percent of all person trips to and from the campus. Carpools and multi-occupant vehicles (such as Uber/Lyft) account for 21 percent, Campus and Metro buses account for 38 percent, pedestrians and bicyclists account for around 3 percent and UC, commercial vehicles, and motorcycles make up the remaining 3 percent, as shown in Figure 3.16-6. Note that mode split counts account for person trips to and from the campus, and exclude telecommuting.



Source: UC Santa Cruz Transportation and Parking Services, counts taken in May 2019.

Figure 3.16-6 UC Santa Cruz Spring 2019 Mode Share (by person-trips)

Transportation Demand Management

Transportation demand management (TDM) is the practice of reducing single-occupant vehicle travel demand through different strategies to maximize traveler choices. These strategies can serve different goals, such as improving the reliability and convenience of transportation options such as transit or increasing vehicle occupancy and reducing parking demand.

Existing UC Santa Cruz TDM Programs

UC Santa Cruz manages a number of TDM programs, which are described below.

Parking Management

As is the case with all the UC campuses, UC Santa Cruz has a parking management program to manage the use of campus parking facilities. The parking management program consists of the following:

- Transportation systems and demand management (TSM/TDM) – Measures that discourage single occupant vehicles, and encourage transit, walking, and bicycling to reduce parking demand.
- Parking permits – UC Santa Cruz manages parking demand through issuing parking permits for commuters, residential parking, faculty/staff (both current and retired), graduate students, undergraduate students, reserved, and disabled/medical parking. Freshmen and sophomores living in UC Santa Cruz student housing are not allowed to purchase parking permits, except by appeal.
- Use of remote lots – The East and West Remote Lots provide parking supply for commuters and reduce demand for parking in the campus core, which are served by Campus Transit.

The construction of new parking is planned based on utilization of existing parking supply. Except for parking directly associated with housing, no new parking is allowed to be built unless TSM/TDM measures have been implemented and promoted and the utilization of the lots within a zone averages greater than 90 percent. The UC Sustainable Practices Policy also states that each location (campus) will develop a business-case analysis for any proposed parking structures serving UC affiliates or visitors to campus to document how a capital investment in parking aligns with each campus' Climate Action Plans and/or sustainable transportation policies.

Transit Programs

Since 1972, UC Santa Cruz has maintained a service agreement with SCMTD that provides any registered student access to any regularly scheduled transit route operating within Santa Cruz County without paying a fare. In 1989, this agreement was extended to include any UC Santa Cruz faculty or staff member displaying a UC Santa Cruz Employee Metro Bus Pass. Historically, compensation models have varied, and have included both a per-rider methodology and flat-fee. Currently, SCMTD bills UC Santa Cruz based on a per-trip model, which is scalable based on the level of service purchased per month. UC Santa Cruz routes account for around 50 percent of the total SCMTD ridership countywide, with average daily ridership during the 2018-19 academic year averaging around 10,100 students and 270 faculty and staff. UC Santa Cruz's payments to the SCMTD for 2019-2020 is around $3 million. The UC Santa Cruz Student Bus Pass Program with SCMTD and the Campus Shuttle Program are funded from a self-assessed quarterly Student Transit Fee (for student ridership billings) and parking revenues/employee bus pass fee (for faculty and staff ridership billings).

In addition to SCMTD service (METRO buses), TAPS operates the Campus Transit service described under Transit Services and Facilities section above. Campus Shuttles require no fare or ID and can be used by students, faculty, staff and the public.

Bike Shuttle Program

The Bike Shuttle provides bicyclists a ride up the hill from Mission Street to the campus, with the Lower Campus METRO stop and Baskin Circle as the drop-off points, during weekday mornings and afternoons. The program helps reduce on-campus parking demand and campus-related vehicle traffic, with about 130 daily riders.

UC Santa Cruz Vanpool Program

This program provides a commute alternative for faculty, staff, and students. TAPS operates approximately 14 vanpools originating from surrounding cities and towns, such as Aptos, Campbell, Monterey, San Jose/Bascom, South San Jose, Watsonville, and Castroville, with new routes to Los Gatos, Salinas/Prunedale, San Lorenzo Valley, and Scotts Valley being developed. Demand is higher than available capacity, as evidenced by the waitlist. About a dozen parking spaces in heavily utilized parking areas have been reserved for vanpool drivers. As of 2018-2019, about 130 people participate in the UC Santa Cruz Vanpool Program.

Emergency Ride Home Program

UC Santa Cruz employees who commute via a non-drive-alone mode at least one day a week are eligible to participate in the UC Santa Cruz Emergency Ride Home Program. Commuters who enroll in this program can call an Uber, Lyft, or cab for an emergency ride home, and the ride expense is reimbursed after the ride is complete and the receipt submitted.

Reserved Carpool Parking

There are separate carpool permits and about 50 parking spaces on the main residential campus designated for the carpool program to incentivize carpooling.

3.16.3 Environmental Impacts and Mitigation Measures

This section describes the analysis techniques and assumptions used to evaluate the effects of 2021 LRDP implementation on the transportation system. Transportation impacts are described and assessed for their significance, and mitigation measures are recommended for impacts identified as significant or potentially significant.

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, the proposed project would have a significant effect related to transportation if it would:

a. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

b. Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b), which establishes that transportation impacts should be measured based on vehicle miles traveled (VMT) and shall not be determined based on congestion, such as effects on level of service?

c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

d. Result in inadequate emergency access?

ANALYSIS METHODOLOGY

The following methodologies were used to evaluate impacts of the project.

Consistency with Programs, Plans, Ordinances, or Policies Addressing Roadway, Transit, Bicycle, and Pedestrian Facilities

As described in Chapter 2, "Project Description," Section 2.5.6, the 2021 LRDP would include several improvements to the existing on-campus roadway, bicycle, and pedestrian circulation networks, and transit-supportive improvements that would serve students, faculty, staff, and visitors accessing the main residential campus and Westside Research Park by car, bus, shuttle, bicycling, and walking. The analysis of potential conflicts with applicable planning efforts related to roadway, transit, bicycle, and pedestrian facilities was based on an assessment of other programs, plans, policies, or ordinances with which the 2021 LRDP and, through its implementation, proposed facilities under the 2021 LRDP, would interact.

Vehicle Miles Traveled

In its simplest form, VMT is a measure of the number of daily vehicle trips to and from a given location or by a particular individual multiplied by their respective trip lengths. VMT fluctuates based on the intensity and type of development, TDM at and nearby the development, and the number of people associated with the development. Stated another way, VMT is an accessibility performance metric that evaluates the effect that changes in TDM programs, and land use patterns, regional transportation systems, and other built environment characteristics have

on roadway travel.[2] The land use changes associated with the 2021 LRDP would affect the VMT generated by the campus and the total VMT within the region. To evaluate the potential VMT impact, UC Santa Cruz selected the appropriate metric, threshold, and methodology described below and documented in more detail in Appendix I.

CEQA Guidelines Section 15064.3, subdivision (b) is reproduced below, with emphasis added to highlight the key points relevant to this EIR:

Criteria for Analyzing Transportation Impacts:

(1) Land Use Projects. Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high-quality transit corridor should be presumed to cause a less than significant transportation impact. Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be presumed to have a less than significant transportation impact.

(2) Transportation Projects. Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements. To the extent that such impacts have already been adequately addressed at a programmatic level, such as in a regional transportation plan EIR, a lead agency may tier from that analysis as provided in Section 15152.

(3) Qualitative Analysis. If existing models or methods are not available to estimate the vehicle miles traveled for the particular project being considered, a lead agency may analyze the project's vehicle miles traveled qualitatively. Such a qualitative analysis would evaluate factors such as the availability of transit, proximity to other destinations, etc. For many projects, a qualitative analysis of construction traffic may be appropriate.

(4) Methodology. A lead agency has discretion to choose the most appropriate methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household or in any other measure. A lead agency may use models to estimate a project's vehicle miles traveled and may revise those estimates to reflect professional judgment based on substantial evidence. Any assumptions used to estimate vehicle miles traveled and any revisions to model outputs should be documented and explained in the environmental document prepared for the project. The standard of adequacy in Section 15151 shall apply to the analysis described in this section.

VMT Metrics

The OPR *Technical Advisory* sets forth guidance regarding metrics that may be calculated to evaluate VMT impacts from three types of land uses: residential, office, and retail. An institutional land use such as a university campus is not specifically addressed in the advisory. However, for purposes of this EIR, the campus is treated as a mixed-use development with its residential land uses corresponding to the residential land uses addressed in the advisory and its non-residential land uses corresponding to office use in the advisory.

With regard to metrics, the advisory recommends use of a total VMT per capita metric, which is estimated based on the total VMT generated by a project divided by the project's total service population. For VMT purposes, service population is defined as the sum of all residents and employees. Thus, residents who are also workers are counted twice within the service population. For residential land uses, the advisory suggests a metric based on only home-based vehicle trips, and for office uses, it suggests a metric based on home-based work vehicle trips.

This EIR uses all three metrics to evaluate the project impact analysis:

1) total project generated VMT per service population,

[2] For example, if you have a project with 50 people and 100 percent of them drive to work individually with an average trip length of 8 miles, the project would generate 400 VMT (50 people x 100% drive x 8 miles) or 8.0 VMT per project population (400 miles/50 people). However, if 20 percent of the people shift to walking, biking, or taking transit to work, then the project has a VMT of 320 miles (50 people x 80% drive x 8 miles) or 6.4 VMT per project population (320 miles/50 people).

2) home-based project generated VMT per campus resident student, faculty and staff (residential VMT), and

3) home-based project generated employment VMT per faculty, and staff (employee VMT).

Commuter students are accounted for in the total per service population VMT.[3] These metrics are consistent with the OPR Technical Advisory and appropriate for use for the land use mix on the campus, which functions both as a workplace (for commuting faculty, staff and students) and as a residence (for on-campus student and faculty/staff residents).

VMT Significance Thresholds

In June 2020, City of Santa Cruz adopted the VMT significance thresholds, which are consistent with those developed by Santa Cruz County. The City and County VMT thresholds are generally consistent with OPR's *Technical Advisory* that recommends a threshold of a VMT level that is at least 15 percent below per capita baseline conditions for an established geography (typically a city, county, or MPO). The County of Santa Cruz and City of Santa Cruz established Santa Cruz County as the geography for VMT analysis. While UC Santa Cruz could develop its own VMT thresholds, the analysis presented in this chapter applies City and County of Santa Cruz thresholds for regional consistency and reflects the adopted approaches for assessing VMT impacts by both the City and the County. The specific VMT thresholds applied are presented in Table 3.16-4.

Table 3.16-4 VMT Thresholds by Land Use

VMT	Methods	VMT Threshold[1]
Residential	15% below existing county-wide average VMT per capita	8.8 miles
Employment[2]	15% below existing county-wide average Work VMT per employee for all employment types.	8.9 miles
Total Campus[3]	15% below existing campus average VMT per capita	7.7 miles

1 The VMT thresholds presented differ from those presented in the City of Santa Cruz's June 2020 resolution adopting VMT as the new transportation measure of environmental impacts. Since adoption of the resolution, the County of Santa Cruz had updated their model and refined the VMT thresholds. The VMT thresholds presented in Table 3.16-4 are consistent with the County's most recent model as of December 10, 2020. The County of Santa Cruz is in the process of updating its VMT thresholds and its final VMT thresholds may differ slightly from those presented. This EIR uses the best available information at the time of Draft EIR publication.

2 The campus' faculty and staff land uses are different than standard office land uses, and the VMT threshold applied for this analysis is VMT for all employment uses in the County. This is consistent with "Other employment" threshold described in the City's June 2020 VMT adoption resolution.

3 Since the campus uses are unique within the County, the total campus VMT per capita is compared to itself and not countywide averages.

Source: Calculated using the County model by Fehr & Peers 2020.

Additional information regarding the selected VMT metrics and VMT impact significance thresholds is provided in Appendix I.

VMT Calculation Methodology

As noted earlier, VMT in its simplest from is a measure of the number trips associated with a project multiplied by their trip lengths. The most common method of calculating the VMT is with a travel demand forecasting model. A travel demand forecasting model uses a specialized software tool to reflect the interactions between different land use and roadway elements in a large area, thereby producing information on the number and length of trips.

To evaluate the effects on VMT associated with implementation of the 2021 LRDP, the VMT analysis was conducted using the Santa Cruz County (SCC) Regional Travel Demand Model (SCC Travel Model). The SCC Travel Model was applied to develop baseline and future year VMT estimates, both for the project-generated VMT metrics (for the Project impact analysis) and the countywide VMT metrics (for the cumulative impact analysis presented in Chapter 4, "Cumulative Impacts"). The model was adjusted for students, faculty, staff and other employees to account for the campus growth and development described in Chapter 2, "Project Description." The SCC Travel Model was initially developed by Santa Cruz County RTC and includes a base year of 2019 and a forecast year of 2040 based on the AMBAG's 2018 MTP/SCS.

[3] Service population correlates to information included in Table 2-1 of Chapter 2, "Project Description," and includes resident and commuter students, resident and commuter faculty/staff, and non-UC employees.

Prior to applying the SCC Travel Model to generate VMT forecasts, a validation check was performed of the model's 2019 traffic volume estimates at the High Street and Heller Drive entrances to the UC Santa Cruz campus. Based on this volume check, the model overestimated observed campus traffic volumes by 35 to 40 percent. The model was adjusted to include the following to more accurately account for UC Santa Cruz travel characteristics:[4]

- The SCC Travel Model assumes different trip generation rates for resident students and commuter students. Estimates from observed UC Santa Cruz data (campus gateway traffic counts and campus transportation survey results) show that resident students generate approximately 2.21 daily person trips per student (to/from the campus) and commuter students generate approximately 2.01 daily person trips per student (to/from the campus). The SCC Travel Model's commuter student trip rate was increased from 0.22 trips per commuting student to 1.83 trips per commuting student and the resident student trip rate was decreased from 6.31 trips per student to 2.06 trips per resident student to match the rates derived from campus-specific data.
- Campus employees in the SCC Travel Model were generally classified as public/government employees which assumes they generate an estimated 6.88 daily person trips per employee, which is reflective of civic government uses and not necessarily campus travel characteristics, where employees typically stay on campus from the time they arrive until they leave. Estimates based on the observed UC Santa Cruz data (i.e., spring 2019 cordon counts) for the number of trips generated suggest a more appropriate range is between 1.5 to 2.0 daily trips per employee. Therefore, campus employees were classified as industrial employees, which generate a more closely associated approximately 1.8 trips per employee within the SCC Travel Model.
- The uncongested travel speeds on High Street, Bay Drive, and Mission Street south of the UC Santa Cruz main residential campus were adjusted to prevent the model from over-estimating the volume on neighborhood roadways, consistent with the observed counts.

Appendix I includes a detailed summary of the model evaluation and adjustments that were made based on travel data collected at the campus in spring 2019.

The goals established within various UC and UC Santa Cruz sustainability planning efforts, including the Sustainable Practices Policy, that would reduce project-generated VMT, were not reflected in the model adjustments; since these goals do not mandate achievement of specific targets with respect to alternative transportation. However, the 2021 LRDP actively supports the sustainability planning efforts and if these goals that reduce vehicle travel are achieved/exceeded, VMT associated with UC Santa Cruz would be less than estimated. Therefore, the modeling provided herein is considered to be a reasonably conservative estimate of campus travel.

After the above adjustments were incorporated into the model, the number of daily vehicle trips traveling to and from campus obtained from the model run were within 10 percent of the observed count data as shown in Table 3.16-5. This result meets the California Transportation Commission (CTC) established guidelines for determining whether a model is valid and acceptable for forecasting future year auto volumes (*2017 Regional Transportation Plan Guidelines for Metropolitan Transportation Planning Organizations,* California Transportation Commission 2017). As explained in further detail in Appendix I, although there is no specified threshold for the model/count ratio, a threshold of within 10 percent is a standard engineering practice that was applied.

Table 3.16-5 Driveway Comparison of Daily Vehicle Counts and Calibrated Model Outputs[1]

Count[1]	Model	Percent Variation (Model values minus Count)
22,702	24,160	6%

1 Values represent the sum of driveway data for the Coolidge Drive and Heller Drive entrances.

[4] The SCC Travel Model includes a limited number of different land use types that are meant to represent a broad range of the most common land uses. For example, the model's service employment land use category is meant to capture anything from warehousing and food services uses, which individually have a broad range of trip generation characteristics and in the model are represented as an average. Thus, when looking at specific sites within a model, it is not uncommon to make adjustment to more accurately reflect the unique travel characteristics of the proposed land use.

Roadway Design Hazards

As noted above under criteria (c), the 2021 LRDP includes conceptual roadway, bicycle and pedestrian network changes, and UC Santa Cruz has not progressed to the stage of developing detailed designs in this program-level EIR. As a result, the evaluation of potential hazards is based on a review of applicable regulations and guidance, including documents published by UC Santa Cruz that would inform the manner in which transportation network improvements and changes under the 2021 LRDP would occur.

Emergency Access

As noted above under criteria (d), the 2021 LRDP includes conceptual roadway, bicycle and pedestrian network changes, and UC Santa Cruz has not progressed to the stage of developing detailed designs. As a result, the evaluation of the adequacy of emergency access for campus development under the 2021 LRDP is based on a review of applicable regulations and guidance, including documents published by UC Santa Cruz and the Santa Cruz County Emergency Evacuation Plan that would inform and dictate the manner in which emergency access to the main residential campus and Westside Research Park would be maintained.

IMPACTS AND MITIGATION MEASURES

Impact 3.16-1: Conflict with a Program, Plan, Ordinance, or Policy Addressing Roadway, Transit, Bicycle, and Pedestrian Facilities

The 2021 LRDP includes on-campus improvements to transit service and infrastructure, off-campus transit service, and the on-campus roadway, bicycle and pedestrian network. These improvements are consistent with relevant non-university plans related to circulation, including the 2040 RTP, the City of Santa Cruz General Plan, and the Santa Cruz County General Plan. Therefore, the 2021 LRDP would not conflict with relevant programs, plans, ordinances or policies addressing transit, roadway, bicycle or pedestrian facilities. This would be a **less-than-significant** impact.

Roadway Modifications and Design

As noted above, the LRDP area is currently served by a network of on-campus and off-campus roadways. UC Santa Cruz's main residential campus is served by two roadway entrances: the main entrance at the Bay Drive/Coolidge Drive/High Street intersection and the west entrance at Empire Grade/Heller Drive intersection. Internal circulation in the campus is provided by numerous internal roadways, including Hagar Drive, Heller Drive, McLaughlin Drive, and Meyer Drive. Westside Research Park is bordered on the east and south by Natural Bridges Drive and Delaware Avenue, respectively. The existing roadway network provides access to campus facilities and residences and allows for multiple modes of travel between destinations, both on and off campus. As discussed in further detail in Chapter 2, "Project Description," the 2021 LRDP includes the following new roadways and improvements across the campus to provide multimodal connections:

- East-West Extension of Meyer Drive From Heller Drive to Coolidge Drive – An east/west extension of Meyer Drive from Heller Drive to Coolidge Drive, crossing Hagar Drive. This extension would facilitate cross campus bus travel as well as provide a new east/west walking and bicycling route.
- Northern Entrance – A connection to provide a third access and egress point to UC Santa Cruz, which will help facilitate north campus access for all campus populations, as well as emergency access.
- Western Drive Extension – Western Drive would be extended across High Street at a new signalized intersection to provide access to the Ranch View Terrace employee housing site.
- Vehicular Access Restrictions – Personal automobile access may be restricted on limited portions of upper Hagar Drive, Meyer Drive Extension, McLaughlin Drive, and internal roadways to prioritize transit, bicycle and pedestrian access and reduce vehicle/pedestrian conflicts.
- Steinhart Way Corridor – Steinhart Way would be converted from a service road to a pedestrian and bicycle priority corridor with automobile access for private automobile traffic limited to the far east and west segments accessing local parking facilities.

Because these changes would add campus access points and provide a more inter-connected internal campus roadway network, they would further improve intra-campus circulation and access to the campus from the off-campus roadway network. The planned network improvements would also reduce congestion on campus by adding new roadways; further reduce trip lengths and associated VMT on campus by providing shorter routes for some trips, such as how the Meyer Drive Extension to Coolidge Drive could provide a shorter connection; improve emergency access to the campus by adding an access point and shortening travel routes between destinations on campus; and potentially improve evacuation procedures on campus by adding a third campus entrance and new roadways on campus, as also discussed in Sections 3.9, "Hazards and Hazardous Materials" and 3.18, "Wildfire." While emergency access and evacuation capacity would be improved due to the proposed new entrance on Empire Grade, growth in typical daily vehicular travel demand would not be induced because some of the daily campus traffic that currently passes through existing intersections to the south of the proposed new access point would use the new northern entrance to access existing and proposed development north of the campus core. The changes are in alignment with the City and County goals and policies related to circulation and connectivity, including City of Santa Cruz General Plan Policy M3.1: Acknowledge and manage congestion and Policy M3.2: Ensure road safety for all users, and the associated supporting actions; and Santa Cruz County General Plan Objective 3.11: Roadway network function and its supporting policies. Therefore, the 2021 LRDP is consistent with the roadway objectives and policies of UC Santa Cruz, the City of Santa Cruz General Plan, and the Santa Cruz County General Plan.

Transit Facilities

As noted above, UC Santa Cruz currently provides multiple transit options and facilities throughout the LRDP area. The 2021 LRDP includes several transit improvements to further enhance transit connections on-campus and to the City of Santa Cruz. As noted in Chapter 2, "Project Description," the proposed improvements include:

- Meyer Drive extension to Coolidge Drive to improve reliability and overall efficiency of the transit network;
- Enhancement of transit boarding areas at mobility hubs;
- Supporting METRO improvements to bus fleet such as route modifications and roadway improvements that enhance transit travel time and reliability; and
- Meyer Drive and East Remote mobility hubs as primary transfer points.

Due in part to the existing transit facilities and also the aforementioned planned improvements, the 2021 LRDP is in alignment with the goals set out by other plans related to transit for UC Santa Cruz, such as the UC Santa Cruz Campus 2017-22 Sustainability Plan goal of increasing transit ridership to and from the campus by 10 percent, and the 2040 RTP goal #1, Establish livable communities that improve people's access to jobs, schools, recreation, healthy lifestyles and other regular needs in ways that improve health, reduce pollution and retain money in the local economy. While UC Santa Cruz already provides adequate transit access with the Loop buses every 15 minutes running in both the clockwise and counterclockwise directions on weekdays, the Upper Campus route running buses every 15 minutes during weekday peak hours, and the Night Core service operating every 30 minutes during night hours and weekend, the proposed improvements would improve the efficiency of the transit network and encourage more people to use transit as an alternative means of transportation to access and move within the campus. For example, the proposed East-West Extension of Meyer Drive from Heller Drive to Coolidge Drive would fill gaps in the existing roadway system and facilitate cross campus bus travel. Further, proposals to create mobility hubs as multimodal transfer points by including high quality bus stops with route and timing information, and connecting them with multiple options to connect to campus destinations, including bikeshare, electric shuttles, and key bicycle and pedestrian corridors. This is consistent with the above policies; furthermore, the 2021 LRDP's proposed transit-related improvements do not conflict with future planning efforts of the Santa Cruz METRO, including projects listed in RTC's 2040 RTP, Appendix F. Additionally, the proposed 2021 LRDP transit improvements are aligned with and do not conflict with City and County transit goals and policies, including City of Santa Cruz General Plan Policy M2.4: Support and promote the efficient use of transit, and its supporting actions; and Santa Cruz County General Plan Objective 3.4: Transit Network Capacity and Objective 3.6: Transit Promotion, and their supporting policies. The 2021 LRDP transit improvements are in alignment with and do not conflict with these policies because they promote efficient and convenient transit service, and encourage transit use. Therefore, the 2021 LRDP is generally consistent

with the transit objectives and policies of UC Santa Cruz, the Santa Cruz County 2040 RTP, the City of Santa Cruz General Plan, and the Santa Cruz County General Plan.

Bicycle Facilities

As noted above, UC Santa Cruz currently provides multiple bicycle facilities throughout the LRDP area, including multi-use, paved, off-street and on-street facilities throughout the central and lower campuses. In addition, bicycle lanes are located along Natural Bridges Drive and Delaware Avenue, adjacent to Westside Research Park. The 2021 LRDP includes bike network changes to improve bicycle connectivity on-campus and to off-campus facilities. The proposed improvements, described in the 2021 LRDP and shown in Chapter 2, Figure 2-9, include:

- Improved bike parking at primary campus destinations;
- Implementation of campus bicycle facilities that support mobility for all ages and abilities, such as new east-west connection on the Upper Campus north of Science Hill and a lower campus connection between Hagar Drive and East Field Services Road;
- Promotion of safe integration with transit buses and facilities through design, such as using bicycle islands or shared, raised facilities at bus stops;
- Focus on improvements that relieve demand on existing facilities, such as widening existing pathways and accommodating bicycles along existing pedestrian routes, such as bridges, where safe and feasible;
- Identification of new trail connections south of the main residential campus to provide access to Westside Research Park and Coastal Science Campus; and
- Manage North Campus recreational bike access.

The proposed 2021 LRDP bicycle improvements detailed above would be designed in accordance with UC Facilities Manual standards and interface with the City of Santa Cruz's existing bike network as well as planned facilities listed in the UC Santa Cruz Bicycle Plan (November 2008) and City of Santa Cruz Active Transportation Plan (February 2017). The proposed 2021 LRDP infrastructure improvements would further the existing opportunities for bicycle travel available to students, faculty/staff, and visitors to UC Santa Cruz. These improvements create safer bicycle environments by filling in the gaps of the existing bicycle network on the main residential campus and restricting personal automobile traffic in certain areas to create safer bicycle and pedestrian environments. The 2021 LRDP proposes Steinhart Way to be converted from a service road to a pedestrian and bicycle priority corridor with automobile access for private automobile traffic limited to the far east and west segments accessing local parking facilities in order to promote the campus core as a bicycle and pedestrian priority area. These improvements and policies are in alignment with and do not conflict with the City and County goals and policies related to bicycle improvements, including City of Santa Cruz General Plan Policy M4.2: Provide and maintain a complete, interconnected, safe, inviting, and efficient citywide bicycle network, Policy M4.3: Require pedestrian and bicycle improvements in major activity centers and activity areas, Policy M4.4: Assure a high level of bicycle user amenities, and Policy M4.5: Support pedestrian and bicycle safety improvements, and their supporting actions; and Santa Cruz County General Plan Objectives 3.8a System Development, 3.8b Coordination, 3.8c Bicycle Use, and 3.9 Bicycle Safety, and their supporting policies. The 2021 LRDP bicycle improvements are in alignment with and do not conflict with these policies because they promote safe and convenient bicycling and encourage bicycling to/from and within the campus. Therefore, the 2021 LRDP would not conflict with any bicycle objectives, plans, or policies of UC Santa Cruz, the City of Santa Cruz General Plan, or the Santa Cruz County General Plan.

Pedestrian Facilities

Based on general observations, walking is the primary mode of travel for students on the campus. The 2021 LRDP includes several pedestrian network improvements to provide enhanced pedestrian connections on-campus and to the City of Santa Cruz. The proposed improvements, described in the 2021 LRDP and shown in Figure 2-8 of Chapter 2, "Project Description," include:

- construction of new pedestrian pathways and bridges;
- focus on improvements that relieve demand on existing pathways, such as widening existing pathways and adding enhanced pedestrian crossings on McLaughlin Drive, and access to transit facilities; and

- expansion of ADA accessibility and access for mobility-impaired pedestrian travel, including more direct routes to the "front door" of buildings and elevators. Barrier-free paths of travel would be evaluated and implemented on connecting pedestrian routes.

The pedestrian improvements in the 2021 LRDP would be designed in accordance with UC Facilities Manual standards and complement the City of Santa Cruz's existing pedestrian network as well as planned facilities listed in the Santa Cruz Active Transportation Plan (February 2017). As discussed in Section 4.3 of the 2021 LRDP and in Chapter 2, "Project Description," all new roadways are envisioned as multimodal "complete streets," and would create safer pedestrian environments by imposing vehicular access restrictions in certain high pedestrian areas and providing a key east/west campus bicycle/pedestrian corridor along Steinhart Way. Thus, the proposed infrastructure improvements are in alignment with the City and County goals and policies related to pedestrian improvements, including City of Santa Cruz General Plan Policy M1.3: Create pedestrian-friendly frontage and streetscapes and attractive pedestrian-oriented areas, Policy M4.1: Enable and encourage walking in Santa Cruz, Policy M4.3: Require pedestrian and bicycle improvements in major activity centers and activity areas, and Policy M4.5: Support pedestrian and bicycle safety improvements and their supporting actions, and Santa Cruz County Objective 3.10: Pedestrian Travel and its supporting policies. The 2021 LRDP pedestrian improvements are in alignment with and do not conflict with these policies because they would improve connectivity of the pedestrian network and encourage more people to walk to move around the campus.

Summary

As described above, the 2021 LRDP includes on-campus improvements to transit service and infrastructure, off-campus transit service, and the on-campus roadway, bicycle and pedestrian network. These improvements are consistent with relevant non-university plans related to circulation, including the 2040 RTP, the City of Santa Cruz General Plan, and the Santa Cruz County General Plan. Therefore, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.16-2: Conflict or Be Inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b) Related to Vehicle Miles Traveled

Implementation of the 2021 LRDP would reduce total campus VMT per capita and residential VMT per campus resident compared to baseline conditions. Residential VMT per campus resident would be below the significance threshold of 15 percent below baseline VMT per campus resident. However, commuter VMT per worker would increase relative to baseline conditions and would not meet the significance threshold of 15 percent below baseline commuter VMT per employee. Therefore, this impact would be **significant**.

Total Campus VMT

Table 3.16-6 below summarizes the baseline and growth assumptions for the analysis scenarios and Table 3.16-7 presents the total daily VMT generated by the UC Santa Cruz main residential campus and Westside Research Park (i.e. "Total Campus" VMT). The total campus VMT per capita was calculated using the total number of people living, working, and attending school at UC Santa Cruz. This includes faculty/staff living on campus, their associated family members (i.e., spouse and child(ren), students living on campus, any associated family members for on-campus student residents, students living off campus, non-UC employees (e.g., vendors), and visitors to campus.

As shown in Table 3.16-7, the implementation of the 2021 LRDP would result in a decrease in total campus VMT per capita from 9.1 to 7.9 miles, which represents a 13 percent reduction. The reduction in total campus VMT per capita is primarily related to the increase in available housing on campus which would reduce the number of per capita vehicular trips to and from the main residential campus. However, the project-generated total campus VMT per capita would marginally exceed the significance threshold of 7.7 miles (15 percent below 9.1 miles or 9.1 miles x (1.0 – 0.15) = 7.7 miles) and the project-generated total campus VMT per capita impact would be significant.

It should be noted that the UC Santa Cruz 2017-2022 Campus Sustainability Plan includes a goal to reduce commute VMT by five percent by 2022. While the results in Table 3.16-6 do not measure VMT between the years 2017 and 2022, it does indicate that the proposed 2021 LRDP would support the goal.

Table 3.16-6 2021 LRDP Land Use Summary and Model Inputs Vehicle Trip and Total Vehicle Miles Traveled Summary

Land Use/Campus Population	VMT Metric Applied[1]	2019 Baseline	2019 Plus 2021 LRDP
Resident Students	Residential, Total Campus	9,283	17,783
Commuter Students	Total Campus	9,235	10,217
Total Enrollment		**18,518**	**28,000**
Resident Faculty and Staff	Residential, Employment, and Total Campus	270	828
Commuter Faculty and Staff	Employment, Total Campus	3,387	5,702
Non-UC Santa Cruz Employees (Commuters)	Employment, Total Campus	640	990
Total Employment		**4,297**	**7,520**
Faculty and Staff Housing	Residential, Total Campus	270	828
Non-UC Employee Housing	Residential, Total Campus	386	1,184
Total Faculty and Staff Household Population		**656**	**2,012**

[1] VMT metric (residential VMT, employment VMT, or total campus VMT) in which each land use is accounted for.

Table 3.16-7 2021 LRDP Vehicle Trip and SB 743 Vehicle Miles Traveled Summary

Service Population	Land Use[1]	VMT Metric Applied[2]	Calculation	2019 Baseline	2019 Plus 2021 LRDP
Residents	Resident Students + Total Faculty and Staff Household Population	Residential, Total Campus	A	9,939	19,795
Employees	Total Employment	Employment, Total Campus	B	4,297	7,520
Students	Total Enrollment	Total Campus	C	18,518	28,000
		Total Service Population (Residents + Employees + Students)[3]	**D (A + B + C)**	**32,754**	**55,315**
		Total Campus Vehicle Trips (from SCC Travel Model)	**E**	**28,900**	**44,700**
		Average Trip Length in miles) (from SCC Travel Model)	**F**	**10.3**	**9.8**
		Total Campus Vehicle Miles Traveled (VMT) in miles (from SCC Travel Model [3]	**G (E x F)**	**298,000**	**439,000**
		Total Campus VMT per Capita in miles*	**H (G/D)**	**9.1**	**7.9**
		VMT per Capita Threshold (15 percent below existing)	**2019 Baseline H x (1.00-0.15)**	**7.7 miles**	

1 Land use/campus population inputs from Table 3.16-6.

2 VMT metric (residential VMT, employment VMT, or total campus VMT) in which each land use is accounted for.

3 Service population is defined as those populations generating residential and commute activity; thus, resident students are captured both under "Residents" and "Students," because resident students generate both residential and commute trips.

4 Total campus vehicle trips multiplied by average trip length (rounded to nearest thousand)

5 Total campus VMT divided by total service population.

It is also critical to explain that the project impact analysis does not incorporate planned-but-not-yet-operational on-campus housing projects (Student Housing West, Crown College Major Maintenance Project, and Kresge Housing). Because these projects were approved pursuant to the 2005 LRDP and are not proposed as part of the 2021 LRDP, they are considered cumulative projects in this EIR. The aforementioned projects are expected to be constructed well before full implementation of the 2021 LRDP and collectively will provide 2,175 on-campus beds, allowing a significantly larger number of students to live on campus than are calculated in the "project" analysis for VMT. As reflected in the cumulative impact analysis, the addition of these projects would further reduce VMT per capita.

Residential VMT

The VMT per capita forecasts from the modified SCC Travel Model for the campus' residential population under the 2021 LRDP are summarized in Table 3.16-8, below.

Table 3.16-8 2021 LRDP Generated Residential and Employment VMT Per Capita

VMT Metric	2019 Countywide Average	15% Below Countywide Average[1]	UC Santa Cruz Campus 2019 plus 2021 LRDP
Residential VMT per Capita	10.4	8.8	5.6
Employment VMT per Capita	10.5	8.9	12.5

Note: 15% below Countywide average is used for impact determination.

Source: Modified SCC Travel Model

As shown in Table 3.16-8, campus development under the 2021 LRDP would generate 5.6 VMT per resident, which is below the significance threshold of 15 percent below the countywide average for residents (i.e., 8.8 VMT per resident). Thus, the impact related to the residential VMT per capita would be less than significant.

Employment VMT

The employment VMT per capita forecasts from the modified SCC Travel Model for resident and commuter faculty and staff (commuters) upon full implementation of the 2021 LRDP are summarized in Table 3.16-8, above. As shown in Table 3.16-8, with the implementation of the 2021 LRDP, faculty, staff and students living off campus would generate 12.5 VMT per worker, which is above the significance threshold of 15 percent below the countywide average for workers (i.e., 8.9 VMT per worker). Therefore, the 2021 LRDP would result in a significant impact related to the employment VMT.

Summary

The project-generated resident VMT per resident would not exceed the stated significance thresholds. However, the total campus VMT per capita and employment related VMT per worker with implementation of the proposed 2021 LRDP would exceed their respective VMT thresholds of significance. Therefore, the 2021 LRDP would result in a **significant impact for total campus VMT per capita and employment VMT per worker**.

Mitigation Measures

Mitigation Measure 3.16-2: Implement TDM Program and Monitoring

UC Santa Cruz shall prepare and implement a TDM program as part of the 2021 LRDP that will adaptively manage campus-related VMT. At a minimum, the TDM program shall include the following:

- performance standards that are deemed sufficient to demonstrate annually that UC Santa Cruz will reduce the total campus VMT per capita to 15 percent below baseline campus average and the total employment VMT per employee to 15 percent below the countywide average;
- parking management strategies that reduce the per student/faculty/staff parking rates to reduce travel and associated VMT;
- campus features and TDM measures that will be used to achieve the performance standard commitments; and
- a monitoring and reporting program.

UC Santa Cruz shall initiate preparation of the TDM program within three months of adoption of the 2021 LRDP and shall adopt and initiate program implementation within one academic year of LRDP adoption. This mitigation measure is in alignment with the goals outlined in the UC Santa Cruz 2017-22 Campus Sustainability Plan, including reducing commute VMT by five percent and reducing per capita parking demand by ten percent by 2022.

Performance Standard

The TDM Program is intended to reduce the total daily VMT per capita to 15 percent below the baseline campus average and the employment VMT per employee to 15 percent below the countywide average. To accurately monitor performance, the TDM Program will develop specific VMT thresholds (i.e., VMT per capita and VMT per employee) and new baseline conditions to measure VMT thresholds against, based on the same methodology and data sources proposed for the monitoring component of the TDM program by which UC Santa Cruz may adaptively manage campus VMT. For example, if 10 percent of UC Santa Cruz employees were to work remotely, the overall target VMT and VMT per employee would be achieved (i.e., a 2-percent reduction in overall VMT). The VMT metrics presented in this chapter were developed using the SCC Travel Model, while the annual monitoring would occur using data collection. Based on current technologies, the campus' VMT performance could be most effectively monitored by using hose counts to measure the number of trips and anonymous cell phone data, which is "big data" that aggregates trip data using cellphones and navigation divides, to determine trip lengths. Since current technologies, including anonymous cell phone data, do not allow the tracking of employment trip lengths separately from the trip lengths generated by other campus uses (i.e., residential trips), the TDM Program shall develop a performance standard for the employment VMT threshold that is a weighted average of VMT generated by campus commuters and other campus users.

TDM Program Elements

A reduction in daily trips and VMT could be achieved through a significantly enhanced and robust TDM program. For the campus, the TDM program includes both campus features proposed as part of the 2021 LRDP and additional programmatic TDM elements that would support employment (faculty, staff, and student) trip reductions, as outlined below, such as employee housing, additional transit, and parking management tools. The campus would have the flexibility to manage implementation of TDM measures as long as the campus is meeting the VMT performance standards. If the campus is not meeting its performance standard, it would need to evaluate the effectiveness of TDM program and implement additional TDM elements to achieve the performance standards. Potential TDM measures may include, but are not limited to:

Implementation Level 1

- Work with appropriate agencies to implement an intelligent transportation system (ITS) program for the Campus Transit system to provide real-time vehicle location and time-to-arrival information at major on-campus shuttle bus stops.
- Encourage SCMTD to implement ITS program for campus routes to provide real-time vehicle location and time-to-arrival information at major SCMTD bus stops on- and off-campus (*project is currently in development with delivery planned for 2021*).
- Continue to expand Commuter Vanpool program.
- Expand Bike Shuttle hours of operations, routes and increase frequency of service, as needed.
- Improve transit service between Coastal Science Campus, Westside Research Park, and the main residential campus.
- Work with local agencies to provide additional secure bike parking and/or "bike stations" at or near off-campus transit stops.
- Where feasible, implement a 4-day/10-hour or 9-day/80-hour work schedule option for staff.
- Where feasible, promote increased use of telecommuting options for students, staff, and faculty.
- Replace monthly/annual parking fee with "pay at exit" use-based, daily or other alternative, dynamic payment mechanisms and parking fee policies that encourage off-peak travel.

Implementation Level 2

- Implement reduced on-campus parking fees for arrivals and departures occurring during off-peak hours, to better manage existing and reduce the need for new parking.
- Work with local agencies to implement a series of off-campus bike circulation improvements (bike boulevards, secure bike parking at major transit stops, etc.).
- Work with appropriate agencies to identify and develop a Westside Santa Cruz multi-modal hub, to connect Westside shuttle service with expanded automobile and bike parking and (ultimately) regional access via the adjoining rail right-of-way.
- Work with appropriate agencies to identify and develop remote Park & Ride facilities with transit service.
- Explore opportunities to construct new student/staff housing along off-campus transit corridors, including the RTC mass transit rail-trail corridor.

Potential VMT Reduction by Program Measure

Employee Housing – The 2021 LRDP identifies sites with capacity to house as many as 25 percent of new employees, based on demand associated with the 2021 LRDP. Employee housing would be predominantly located near the main entrance to the campus at Bay and High Streets and at Westside Research Park to make trips to services such as grocery stores and schools as convenient as possible for employees and their families. Inclusion of support uses such as child-care, small park spaces, and community-use rooms located on-campus could also help reduce the number of trips taken by employees. The California Air Pollution Control Officers Association (CAPCOA) conducted a study to quantify greenhouse gas (GHG) mitigation measures, which also assess how certain policies/actions can reduce VMT, and subsequently reduce GHG. Per CAPCOA, land use/location measures could reduce VMT by up to 5 percent for a suburban development.

Telecommuting - Continue to allow and encourage employees to telecommute when possible. Specifically, shift work schedules such that travel occurs outside of peak congestion periods so that employees do not drive longer routes to avoid traffic or providing opportunities for employees to work from home one or a few days a week can reduce travel to the campus. While schedule shifts would still result in commute trips to campus, they could encourage use of transit by moving trips to times of day when buses are less crowded and/or allow commuters to travel outside of peak commute periods where people may choose longer routes to avoid traffic. Telecommuting is an easy and low-cost way to reduce VMT and GHG. Per CAPCOA, alternative work schedules and telecommuting could reduce work VMT by up to 5.5 percent.

Additional Transit - Add express service from major regional destinations or provide fair share contribution to regional mass transit improvements. Add select long-distance bus service to/from campus. Per CAPCOA, transit system improvements could reduce VMT by up to 10 percent, which is also consistent with the campus' Sustainability Plan.

TDM Program Expansion - Expand TDM programs and prioritize investments in transportation programs before constructing on-campus parking facilities, such as implementing multimodal transit hubs and working with partner agencies to increase transit and active transportation connectivity to the campus. Provide additional subsidies for transit use by commuters. Provide additional subsidized commuter vanpool routes to locations with concentrated employee residences, real-time ride matching, and reserved carpool and vanpool parking spaces. Per CAPCOA, a commute trip reduction program could reduce work VMT anywhere from 1 percent to 21 percent, depending on if it is voluntary or required.

Parking Management Tools - Improve parking management and enforcement system. Establish "no net new commuter parking" and other parking management or eligibility policies. Per CAPCOA, parking policy/pricing could reduce VMT by up to 20 percent.

Each of the TDM strategies can be combined with others to increase the effectiveness of vehicle trip and VMT reduction; however, the interaction between the various strategies is complex. Generally, with each additional measure implemented the incremental benefit of vehicle trip and VMT reduction may be less than the benefit that

measure would have if it was considered on its own.[5] Thus, overall, the TDM measures could reduce VMT by up to an additional 15 percent, given the land use context and anticipated effectiveness of the TDM measures.

Annual Monitoring Program

Starting in the next full academic year after adoption and initiation of a TDM Program implementation, including establishment of baseline data, UC Santa Cruz shall conduct cordon counts at the two campus entrances for at least two weeks, on the fourth week of fall and spring quarters, and other methods to quantify mode choice and trip length, to determine whether the campus is achieving a 15 percent reduction in the per capita VMT over baseline to a maximum of 7.7 VMT per capita. A big data service could be used, to estimate the VMT generated by the campus during the same academic year as the cordon count data collected or other methods such as a mandatory employee travel survey. As noted earlier, the VMT generated by employees cannot be measured separately, so a ratio will be applied to estimate the VMT generated by employees, if big data is only used.

An annual monitoring report shall be developed to describe: (a) specific steps taken to implement the TDM program; (b) results of the annual cordon counts and other data collected, including the methodology used to calculate VMT; (c) findings regarding whether the campus has met the VMT performance standard; and (d) an outline of additional TDM measures (i.e., a corrective action plan) to be implemented in subsequent years should the VMT performance standard of at least 15 percent below baseline VMT levels is not reached.

Significance after Mitigation

Development under the 2021 LRDP represents the type of synergistic development envisioned by SB 743 to reduce VMT, as it supports infill development, transit and multimodal travel. As demonstrated above, the VMT per resident associated with the existing campus baseline would be reduced to below the applicable significance threshold; however, total campus VMT per capita and VMT per worker would not decrease to below the applicable significance threshold. Successful implementation of Mitigation Measure 3.16-2 would reduce total campus VMT per service population to a maximum of 7.7 VMT per capita, a level which corresponds to meeting the employment VMT per worker significance threshold. With successful implementation of this mitigation (i.e., demonstrated achievement of the performance standard) as outlined above, this impact would be reduced to a **less-than-significant** level.

Impact 3.16-3: Substantially Increase Hazards Due to a Geometric Design Feature (e.g., Sharp Curves or Dangerous Intersections) or Incompatible Uses (e.g., Farm Equipment)

The development associated with the 2021 LRDP would be subject to, and constructed in accordance with the UC Facilities Manual, and all applicable industry standard roadway design and safety guidelines. Therefore, the 2021 LRDP would not substantially increase hazards due to a geometric design feature or incompatible uses. This impact would be **less than significant**.

The 2021 LRDP includes conceptual roadway network changes and has not progressed to the stage of developing detailed designs. Any roadway extensions and new streets would be required to comply with the UC Facilities Manual, which requires UC Santa Cruz to comply with the Title 24 California Building Standards Code, Parts 1-12, and all amendments. To the extent indicated in the UC Facilities Manual, UC Santa Cruz would also comply with state of the practice roadway design guidance such as the Caltrans Highway Design Manual and the California Manual on Uniform Traffic Control Devices.

Though UC Santa Cruz is the Authority Having Jurisdiction (AHJ) for matters of code regulations on university projects, local jurisdictions can review the emergency access plans for UC Santa Cruz projects, analyzing items such as road location, configuration, turning radius, and width. This would be particularly important for locations where the UC Santa Cruz and City/County networks interface. As the AHJ, UC Santa Cruz would ensure all proposed on-campus transportation network changes meet the above-mentioned code requirements, and would work collaboratively with the City of Santa Cruz and Santa Cruz County to ensure that connections to non-university facilities are appropriately

[5] For example, a theoretical TDM measure A and B may have an effectiveness of 10 percent each when they are considered on their own. However, if the two measures are combined, the reduction may only be 15 percent and not the 20 percent expected by adding the two measures together.

designed to minimize hazards and meet the local jurisdictions' standards. Therefore, development of the 2021 LRDP would be subject to, and constructed in accordance with, applicable UC and industry standard roadway design and safety guidelines and would not create hazards due to geometric design or incompatible uses. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.16-4: Result in Inadequate Emergency Access

Implementation of the 2021 LRDP would not result in inadequate emergency access. Future roadway modifications would be designed in a manner consistent with applicable regulations, including those related to roadway widths and turning radii. In addition, UC Santa Cruz would coordinate with other agencies, as appropriate and consistent with the 2021 LRDP and per City/County policies, to ensure the safe transition between UC Santa Cruz facilities and other infrastructure. This would be a **less-than-significant** impact.

Efficient operations of UC Santa Cruz roadways help to reduce response times for emergency responders. The emergency access analysis was conducted to determine if the 2021 LRDP has the potential to impact emergency vehicle access by creating conditions that would substantially affect the ability of drivers to yield the right-of-way to emergency vehicles, or preclude the ability of emergency vehicles to access streets within the study area. Potential impacts associated with temporary road closures due to construction activities within the LRDP area are addressed in Section 3.9, "Hazards and Hazardous Materials."

The 2021 LRDP proposes three new roadways across the campus to provide multimodal connections, as shown in Figure 2-6 in Chapter 2, "Project Description," and are listed below:

- East-West Extension of Meyer Drive to Coolidge Drive – an east-west extension of Meyer Drive from Heller Drive to Coolidge Drive, crossing Hagar Drive. This extension would facilitate cross campus bus travel as well as provide a new east/west walking and bicycling route.
- Northern Entrance – A connection to provide a third access and egress point to UC Santa Cruz, which may help facilitate Upper Campus and emergency access.
- Western Drive Extension – Western Drive would be extended across High Street at a new signalized intersection to provide access to the Ranch View Terrace employee housing site.
- Steinhart Way is proposed as a pedestrian and bicycle priority corridor with restricted automobile access.

Any roadway extensions and new streets would be designed and constructed to include bicycle, pedestrian and transit facilities, where physically feasible, and in a manner consistent with the UC Facilities Manual, which notes that the UC system, as a whole and inclusive of UC Santa Cruz, complies with the Title 24 California Building Standards Code, Parts 1-12 and all amendments. UC Santa Cruz would also comply with applicable federal and state regulations related to roadway and transportation facility design, and with local regulations where campus roadways connect to city and county facilities.

While adequate emergency access within the LRDP area is already provided, the proposed roadway extensions and new streets would provide improved network connections that could improve emergency vehicle access throughout the LRDP area. Adding an access point to Empire Grade could help provide additional emergency access to and from the campus. Similarly, the Meyer Drive extension to Coolidge Drive would improve internal campus circulation and emergency egress by enhancing overall campus access and interconnections of different areas of campus. Even though Steinhart Way would be closed to most vehicle traffic, emergency vehicles could use either McLaughlin Drive or Hagar Drive to access those areas.

As noted in Sections 3.9, "Hazards and Hazardous Materials" and 3.18, "Wildfire," UC Santa Cruz currently has an adopted EOP (adopted in 2016) that outlines campus-wide emergency preparedness and response procedures, including those related to evacuation. The existing roadway network and proposed new primary connections provide redundancy for travel pathways and options if one or more roadways are closed.

The increases in automobile, bicycle, and pedestrian demand associated with the 2021 LRDP would not substantially affect emergency vehicle access patterns; however, additional vehicles associated with 2021 LRDP implementation could increase delays for emergency response vehicles during peak commute hours, especially in the immediate vicinity of the study area. However, emergency responders maintain response plans which include use of alternate routes, sirens and other methods to bypass congestion and minimize response times. In addition, California law requires drivers to yield the right-of-way to emergency vehicles and remain stopped until the emergency vehicle passes to ensure the safe and timely passage of emergency vehicles.

Additionally, the City of Santa Cruz 2030 General Plan specifies policies to ensure the City maintains adequate emergency response times, and that developments of emergency facilities and delivery keep pace with development and growth in the city. Specific General Plan policies include:

- M3.2.3: Ensure that street widths are adequate to safely serve emergency vehicles and freight trucks
- CC7.3: Cooperate with other agencies [including UC Santa Cruz] in ensuring public safety and emergency preparedness.
- HZ1.1.3: Ensure that new development design, circulation, and access allows for maintaining minimum emergency response times.
- HZ1.2.2: Make continuous operational improvements in an effort to arrive on emergency scenes within an average time of 4 minutes or less and within 5 minutes or less 90 percent of the time.

As described in the Analysis Methodology section above, the 2021 LRDP includes a new internal roadway connection and a new access point on Empire Grade, which would improve emergency access to the campus and evacuation capacity. The existing roadway network and proposed new primary connections provide redundancy for travel pathways and options if one or more roadways are closed. As a result, the 2021 LRDP is not anticipated to result in inadequate emergency access, and the impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

3.17 UTILITIES AND SERVICE SYSTEMS

This section evaluates the adequacy of existing and planned utilities to serve the demands projected to result from campus development and growth with implementation of the 2021 LRDP. Specifically, this section addresses water supply, distribution, and treatment; wastewater treatment and disposal; relocation or construction of new or expanded utility facilities (e.g., electric power, natural gas, telecommunications, etc.); and solid waste disposal. Please refer to Section 3.6, "Energy," for an analysis of energy efficiency related to implementation of the project pursuant to State CEQA Guidelines, as amended in December 2018. Impacts related to stormwater collection and disposal are addressed in Section 3.10, "Hydrology and Water Quality."

Comments received in response to the NOP (See Appendix B) consisted of concerns related to the potential impacts of the campus's additional demand on water supplies and treatment and wastewater conveyance and treatment. Several comments were also received related to the City water service boundary. Additionally, concerns with the locations of new utility lines and the capacity levels of existing utility facilities and infrastructure were expressed.

3.17.1 Regulatory Setting

FEDERAL

Clean Water Act

The Clean Water Act (CWA) employs a variety of regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. The U.S. Environmental Protection Agency (EPA) established primary drinking water standards in Section 304 of the CWA. States are required to ensure that the public's potable water meets these standards.

Section 402 of the CWA creates the National Pollutant Discharge Elimination System (NPDES) regulatory program. Point sources must obtain a discharge permit from the proper authority (usually a state, sometimes EPA, a tribe, or a territory). NPDES permits cover various industrial and municipal discharges, including discharges from storm sewer systems in cities, storm water associated with numerous kinds of industrial activity, runoff from construction sites disturbing more than 1 acre, and mining operations and treated wastewater that is discharged to surface waters.

Safe Drinking Water Act

As mandated by the Safe Drinking Water Act (Public Law 93-523), passed in 1974, EPA regulates contaminants of concern to domestic water supply. Such contaminants are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by EPA primary and secondary maximum contaminant levels (MCLs). MCLs and the process for setting these standards are reviewed triennially. Amendments to the Safe Drinking Water Act enacted in 1986 established an accelerated schedule for setting drinking water MCLs. EPA has delegated responsibility for California's drinking water program to the State Water Resources Control Board (SWRCB) Division of Drinking Water. SWRCB Division of Drinking Water is accountable to EPA for program implementation and for adoption of standards and regulations that are at least as stringent as those developed by EPA.

STATE

California Green Building Standards Code

The State of California historically establishes progressive standards that serve as models for other states and even the federal government. With the adoption of the 2010 California Green Building Standards Code (CALGreen Code), California became the first state to incorporate green building strategies into its building code. The CalGreen Code comprises Part 11 of the California Buildings Standards Code in Title 24 of the California Code of Regulations.

CALGreen Code outlines mandatory and voluntary requirements for new residential and nonresidential buildings (e.g., retail, office, public schools, hospitals) throughout the state beginning on January 1, 2011.

The development and implementation of the CALGreen Code aims to (1) reduce GHG emissions from buildings; (2) promote environmentally responsible, cost-effective, healthier places to live and work; (3) reduce energy and water consumption; and (4) respond to directives by the Governor. Pursuant to the California Global Warming Solutions Act of 2006 (AB 32), CALGreen Code provides strategies to reduce building-related sources of GHG to attain California's 2020 and 2050 goals.

In implementing a statewide baseline for green building strategies, California recognized the adverse effects of anthropogenic climate change. CALGreen Code serves as a tool for California to reduce GHG emissions and physical waste, increase energy efficiency, and achieve water conservation and water efficiency.

The standards included in the 2016 CALGreen Code became effective on January 1, 2017. The CALGreen Code was developed to enhance the design and construction of buildings, and the use of sustainable construction practices, through planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental air quality.

Chapter 5 (Division 5.3) of the 2016 CALGreen Code describes measures to reduce indoor demand for potable water and to reduce landscape water usage. Division 5.4 requires all construction contractors to reduce construction waste and demolition debris by 65 percent. Code requirements include preparing a construction waste management plan that identifies the materials to be diverted from disposal by efficient usage, recycling, reuse on the project, or salvage for future use or sale; determining whether materials will be sorted on-site or mixed; and identifying diversion facilities where the materials collected will be taken. In addition, CALGreen Code requires that 100 percent of trees, stumps, rocks, and associated vegetation and soils resulting primarily from land clearing be reused or recycled.

California Water Code, Water Supply

According to California Water Code (CWC) Section 10910 (referenced in CEQA Guidelines Section 15155), cities and counties acting as lead agencies are required to identify the public water system(s) that would serve a project and assess whether the water supply is sufficient to provide for projected water demand associated with a project when existing and future uses are also considered (CWC Section 10910 [c] [3]). The definition of a water-demand project is the same as CEQA Guidelines Section 15155. This provision does not expressly apply to UC; however, as a matter of course, UC will address the required elements of this section.

California Water Code, Water Supply Wells and Groundwater Management

The CWC is enforced by DWR. DWR's mission is "to manage the water resources of California in cooperation with other agencies, to benefit the State's people, and to protect, restore, and enhance the natural and human environments." DWR is responsible for promoting California's general welfare by ensuring beneficial water use and development statewide. The laws regarding groundwater wells are described in CWC Division 1, Article 2 and Articles 4.300 to 4.311; and Division 7, Articles 1-4. Further guidance is provided by bulletins published by DWR, such as bulletins 74-81 and 74-90 related to groundwater well construction and abandonment standards.

Groundwater management is outlined in the CWC, Division 6, Part 2.75, Chapters 1-5, Sections 10750 through 10755.4. The Groundwater Management Act was first introduced in 1992 as Assembly Bill (AB) 3030, and has since been modified by Senate Bill (SB) 1938 in 2002, AB 359 in 2011, and AB 1739 in 2014. The intent of the Groundwater Management Act is to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions and to provide a methodology for developing a Groundwater Management Plan.

Sustainable Groundwater Management Act of 2014

The Sustainable Groundwater Management Act of 2014 (SGMA)[1] became law on January 1, 2015, and applies to all groundwater basins in the state (Water Code Section 10720.3). By enacting the SGMA, the legislature intended to

[1] The SGMA is comprised of three separate bills: Senate Bill 1168, Senate Bill 1319, and Assembly Bill 1739. All three were signed into law by the Governor on September 16, 2014.

provide local agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater within their jurisdiction (CWC Section 10720.1). The SGMA is a follow up to SB X7-6, adopted in November 2009, which mandated a statewide groundwater elevation monitoring program to track seasonal and long-term trends in groundwater elevations in California's groundwater basins. In accordance with this amendment to the CWC, DWR developed the California Statewide Groundwater Elevation Monitoring (CASGEM) program.

Pursuant to the SGMA, any local agency that has water supply, water management or land use responsibilities within a groundwater basin may elect to be a "groundwater sustainability agency" for that basin (CWC Section 10723). Local agencies were given until January 1, 2017 to elect to become or form a groundwater sustainability agency. In the event a basin is not within the management area of a groundwater sustainability agency, the county within which the basin is located is to be presumed to be the groundwater sustainability agency for the basin. However, the county may decline to serve in this capacity (CWC Section 19724).

The SGMA also requires DWR to categorize each groundwater basin in the state as high-, medium-, low-, or very low priority (CWC Sections 10720.7, 10722.4). All basins designated as high- or medium-priority basins must be managed by a groundwater sustainability agency under a groundwater sustainability plan that complies with Water Code Section 10727 et seq. If required to be prepared, groundwater sustainability plans must be prepared by January 31, 2020 for all high- and medium-priority basins that are subject to critical conditions of overdraft, as determined by DWR, or by January 31, 2022 for all other high- and medium-priority basins.

On December 15, 2014, DWR announced its official "initial prioritization" of the state's groundwater basins for purposes of complying with the SGMA, and this priority list became effective on January 1, 2015. The Soquel-Valley Groundwater Basin (Basin Number 3-01) was identified by DWR as one of 21 groundwater basins to be reclassified as critically overdrafted. In September 2015, the Soquel-Aptos Groundwater Management Committee was formed which includes representatives from the County of Santa Cruz, Central Water District, Soquel Creek Water District (SqCWD), the City of Santa Cruz, and private well owners. This group was superseded by the Santa Cruz Mid-County Groundwater Agency (MGA) in March of 2016, through a joint powers agreement to oversee management of the basin. The City of Santa Cruz receives a minor amount (5 percent) of drinking water from groundwater basins. The easterly area of the City is located within the Santa Cruz Mid-County Groundwater Basin, and the westerly area is within the West Santa Cruz Terrace Basin.

Water Conservation Act of 2009

Requirements regarding per capita water use targets are defined in the Water Conservation Act of 2009 that was signed into law in November 2009 as part of a comprehensive water legislation package. Known as SB X7-7, the legislation sets a goal of achieving a 20 percent reduction in urban per capita water use statewide by 2020. SB X7-7 requires that retail water suppliers define in their 2010 urban water management plans the gallons-per-capita-per-day targets for 2020, with an interim 2015 target. Water purveyors are required to select one of the four methods that the legislation defines for establishing a gallons-per-capita-per-day target.

California's Integrated Waste Management Act of 1989

The California Integrated Waste Management Act (CIWMA) of 1989 created the California Integrated Waste Management Board, now known as the California Department of Resources Recycling and Recovery (CalRecycle). CalRecycle is the agency designated to oversee, manage, and track California's 92 million tons of waste generated each year. CalRecycle provides grants and loans to help cities, counties, businesses, and organizations meet the state's waste reduction, reuse, and recycling goals. CalRecycle promotes a sustainable environment in which these resources are not wasted, but can be reused or recycled. In addition to many programs and incentives, CalRecycle promotes the use of new technologies to divert resources away from landfills. CalRecycle is responsible for ensuring that waste management programs are carried out primarily through local enforcement agencies.

The CIWMA is the result of two pieces of legislation, AB 939 and SB 1322. The CIWMA was intended to minimize the amount of solid waste that must be disposed of through transformation and land disposal by requiring all cities and counties to divert 25 percent of all solid waste from landfill facilities by January 1, 1995, and 50 percent by January 1, 2000.

The 50 percent diversion requirement is measured in terms of per-capita disposal expressed as pounds per day per resident and per employee. The per-capita disposal and goal measurement system uses an actual disposal measurement based on population and disposal rates reported by disposal facilities, and it evaluates program implementation efforts.

Assembly Bill 341

AB 341 requires CalRecycle to issue a report to the legislature that includes strategies and recommendations that would enable the state to recycle 75 percent of the solid waste generated in the state by January 1, 2020, requires businesses that meet specified thresholds in the bill to arrange for recycling services by July 1, 2012, and also streamlines various regulatory processes.

Assembly Bill 827

AB 827, as approved in October 2019, requires businesses that either generates 4 cubic yards or more of commercial solid waste or 8 cubic yards or more of organic waste per week to provide accessible easily visible recycling receptacles clearly marked with educational signage next to all trash bins, except in restrooms.

Assembly Bill 1826

AB 1826 requires a business that generates 4 cubic yards or more of organic waste per week to arrange for recycling services for that organic waste in a specified manner. The bill would also require a business that generates 4 cubic yards or more of commercial solid waste per week, on and after January 1, 2019, to arrange for organic waste recycling services and, if CalRecycle makes a specified determination, would decrease that amount to 2 cubic yards, on or after January 1, 2020. The bill would require each jurisdiction to report to CalRecycle on its progress in implementing the organic waste recycling program, and CalRecycle would be required to review whether a jurisdiction is in compliance with this act.

AB 1826 would require CalRecycle to identify and recommend actions to address permitting and siting challenges and to encourage the continued viability of the state's organic waste processing and recycling infrastructure, in partnership with the California Environmental Protection Agency and /other specified State and regional agencies. The bill also would require the department to cooperate with local jurisdictions and industry to provide assistance for increasing the feasibility of organic waste recycling and to identify certain State financing mechanisms and State funding incentives and post this information on its Internet Web site.

Senate Bill 1335

Approved in September 2018, SB 1335 enacts the Sustainable Packaging for the State of California Act of 2018, which prohibits food service facilities from dispensing prepared food using food service packaging unless it is reusable, recyclable, or compostable.

Senate Bill 1374

SB 1374, Construction and Demolition Waste Materials Diversion Requirements, requires that jurisdictions summarize their progress realized in diverting construction and demolition waste from the waste stream in their annual AB 939 reports. SB 1374 required CalRecycle to adopt a model construction and demolition ordinance for voluntary implementation by local jurisdictions.

Senate Bill 1383

The California Global Warming Solutions Act of 2006 designates the California Air Resources Board (CARB) as the State agency charged with monitoring and regulating sources of emissions of greenhouse gases. SB 1383 requires CARB, no later than January 1, 2018, to approve and begin implementing that comprehensive strategy to reduce emissions of short-lived climate pollutants to achieve a reduction in methane by 40 percent, hydrofluorocarbon gases by 40 percent, and anthropogenic black carbon by 50 percent below 2013 levels by 2030, as specified. The bill also establishes specified targets for reducing organic waste in landfills.

SB 1383 requires CalRecycle, in consultation with CARB, to adopt regulations that achieve the specified targets for reducing organic waste in landfills. The bill authorizes local jurisdictions to charge and collect fees to recover the local jurisdiction's costs incurred in complying with the regulations. SB 1383 requires, no later than July 1, 2020, for CalRecycle, in consultation with CARB, to analyze the progress that the waste sector, state government, and local governments have made in achieving the specified targets for reducing organic waste in landfills. The bill authorizes CalRecycle, depending on the outcome of that analysis, to amend the regulations to include incentives or additional requirements, as specified. By adding to the duties of local governments related to organic waste in landfills, SB 1383 imposes a State-mandated local program.

UNIVERSITY OF CALIFORNIA

UC Santa Cruz and City of Santa Cruz Water Services Agreements

Under the terms of the 1962 Water Services Agreement between the City of Santa Cruz and UC Santa Cruz, the City agreed to provide sufficient water to meet the demands associated with the projected growth of the campus. The agreement also states that the City will provide, at no expense to UC Santa Cruz, water and sewer lines up to the boundaries of the main residential campus. An additional agreement made between UC Santa Cruz and the City in 1965 states that the City will install a water system capable of supplying 2 million gallons per day (mgd) to UC Santa Cruz for fire flow and ordinary use. Through these agreements, UC Santa Cruz has contracted for adequate water service for the entire campus. In 1998, UC Santa Cruz also executed a Memorandum of Understanding with the City of Santa Cruz under which UC Santa Cruz agreed to pay the cost of certain pump upgrades that could be needed in the future to serve the campus.

Most of the UC Santa Cruz main residential campus and the entire Westside Research Park are located within the boundary of the current City of Santa Cruz Water Department (SCWD) water service area. A portion of the UC Santa Cruz main residential campus, including some of the envisioned development areas identified in Chapter 2, "Project Description," is located outside the City limit, in unincorporated Santa Cruz County. Specifically, 2021 LRDP development areas in the northernmost part of campus and to the west of Empire Grade are outside the current service boundary. However, the 1962 and 1965 agreements do not restrict water service to areas within the City limits; to the contrary, they require the City to provide water to the entire campus, irrespective of its location. On March 20, 2020, as UC Santa Cruz began planning for the next LRDP, the Regents sent a letter to the City asking for confirmation of the City's commitments under the 1962 and 1965 Agreements to provide water to the entire campus. The City has not confirmed its obligations and has taken the position that it is only required to provide water to areas of the campus within the service boundary unless otherwise approved under state and local law. UC Santa Cruz does not believe that further compliance with state or local laws, including approval by the Local Agency Formation Commission (LAFCO), is required for the campus to receive increased service for the development of those portions of the campus that lie in unincorporated Santa Cruz County. Accordingly, in October 2020, UC Santa Cruz requested judicial intervention to seek clarity regarding the City's legal obligations. That action is currently pending and will likely be resolved in 2021.

UC Sustainable Practices Policy

The University of California has a system-wide policy regarding sustainability practices and performance goals and targets. The policy covers nine areas of operational sustainability, which include: Green Building Design, Clean Energy, Climate Protection, Sustainable Transportation, Sustainable Procurement, Sustainable Building and Laboratory Operations, Zero Waste, Sustainable Food Services, and Sustainable Water Systems. The UC Sustainable Practices Policy is frequently updated. The most recent changes were adopted in July 2020. The policy changes include updating the targets and inclusion of additional requirements to Climate Protection, Zero Waste, and Sustainable Food Services sections. In addition, a new General Sustainability Performance Assessment section was added, and minor revisions were made to clarify the intent and improve the readability of other policy sections.

The Zero Waste section calls for the following goals and practices:

- The University will achieve zero waste through prioritizing waste reduction in the following order: reduce, reuse, and then recycle and compost (or other forms of organic recycling) as described in section V.F.6 [of the UC Sustainable Practices Policy]. Minimum compliance for zero waste, at all locations other than health locations, is as follows:
  - Reduce per capita total municipal solid waste generation by:
    - 25% per capita from [Fiscal Year] FY2015/16 levels by 2025
    - 50% per capita from FY2015/16 levels by 2030
    - Divert 90% of municipal solid waste from the landfill
- The University supports the integration of waste, climate and other sustainability goals, including the reduction of embodied carbon in the supply chain through the promotion of a circular economy and the management of organic waste to promote atmospheric carbon reduction. In support of this goal, waste reporting will include tracking estimated Scope 3 greenhouse gas emissions.
- By 2020, the University will prohibit the sale, procurement, or distribution of packaging foam, such as food containers and packaging material, other than that utilized for laboratory supply or medical packaging and products. The University seeks to reduce, reuse, and find alternatives for packaging foam used for laboratory and medical packaging products.
  - No packaging foam or expanded polystyrene (EPS) shall be used in foodservice facilities for takeaway containers.
- The University is committed to the reduction and elimination of single-use items in line with the University's and the State of California's Zero Waste goals and in recognition of the severe environmental impact single-use products have globally. In recognition of this commitment, locations will reduce single-use products by taking the following actions:
  - Eliminate plastic bags in all retail and foodservice establishments in campus facilities or located on university owned land no later than January 1, 2021.
  - Replace disposable single-use plastic foodware accessory items in all foodservice facilities with reusables or locally compostable alternatives and provide only upon request no later than July 1, 2021.
  - Provide reusable foodware items for food consumed onsite at dine-in facilities and to-go facilities no later than July 1, 2022.
  - Replace single-use plastic foodware items with reusable or locally compostable alternatives at to-go facilities no later than July 1, 2022.
  - Phase out the procurement, sale and distribution of single-use plastic beverage bottles. Non-plastic alternatives shall be locally recyclable or compostable.
    - Foodservice facilities will provide alternatives no later than January 1, 2023.
    - Locations are encouraged to prioritize the installation of water refill stations to support the transition from single-use plastics to reusables.
    - Locations will consider eliminating single-use plastic beverage bottles when contracting with suppliers, or upon contract renewal and/or extension if current contract terms prohibit (e.g., vending machines, departmental purchases, etc.).
  - When selecting prepackaged, sealed food that is mass produced off premises and resold at University locations (e.g., grab-and-go items, such as chips, candy, prepackaged sandwiches, etc.), preference should be given in contract award and negotiations to suppliers that utilize locally compostable or locally recyclable packaging options.

This policy section also applies to third-party foodservice facilities that lease space or provide contracted services at UC locations. Locations will include these Policy provisions in lease language as new leases and contracts are negotiated or existing leases are renewed and work to incorporate these practices, as much as possible, within the timeframe of current leases. When procuring catering services, where possible, select providers that can provide alternatives to single-use plastics.

The Sustainable Water Systems section calls for the following goals and practices:

- Locations will reduce growth-adjusted potable water consumption 20% by 2020, and 36% by 2025, when compared to a three-year average baseline of FY2005/06, FY2006/07, and FY2007/08. Locations that achieve this target early are encouraged to set more stringent goals to further reduce potable water consumption. Each Campus shall strive to reduce potable water used for irrigation by converting to recycled water, implementing efficient irrigation systems, drought-tolerant planting selections, and/or by removing turf.
- Each location will develop and maintain a Water Action Plan that identifies long term strategies for achieving sustainable water systems. […]
  - Campuses will include in this update quantification of total square feet of used turf and under-used turf areas on campus as well as a plan for phasing out un-used turf irrigated with potable water.
- Each location shall identify existing single-pass cooling systems and constant flow sterilizers and autoclaves in laboratories and develop a plan for replacement.
- New equipment requiring liquid cooling shall be connected to an existing recirculated building cooling water system, new local chiller vented to building exhaust or outdoors, or to the campus chilled water system through an intervening heat exchange system if available.
  - Once-through or single-pass cooling systems shall not be allowed for soft- plumbed systems using flexible tubing and quick connect fittings for short term research settings.
  - If no alternative to single-pass cooling exists, water flow must be automated and controlled to avoid water waste.

UC Santa Cruz Campus Sustainability Plan

The Campus Sustainability Plan 2017-2022 lays out UC Santa Cruz's sustainability goals for the period covered by the plan (2017-2022), and a new plan will be prepared covering the period beginning 2023. Recommendations made in the Campus Sustainability Plan are designed to facilitate the achievement of goals set forth in the UC Sustainability Policy. The Campus Sustainability Plan provides direction to development within four broad categories: Materials Management and Food Systems, Natural Environment and Infrastructure, Learning and Culture, and Climate and Energy. Goals and strategies specifically addressing water usage, solid waste recycling and waste management on the campus are detailed below.

The goals and strategies under Natural Environment & Infrastructure highlight the interrelated nature of campus lands and physical infrastructure and explores synergies related to the operational topics of Transportation, Land & Habitat Stewardship, Watershed & Stormwater, and Water Conservation.

GOAL 1: Conduct an assessment to address intersectional campus infrastructure needs that include and support sustainable transportation systems, reduce water consumption, manage stormwater, and steward campus natural and cultivated lands.

- **Strategy 1.1:** Develop a framework to define, identify and prioritize built and natural infrastructure improvement projects.
- **Strategy 1.2:** Measure effects of human activity on campus lands, watersheds, and infrastructure.
  - **Action 1.2.B & 5.1.B:** (new in 2019): Develop a campus land use management plan through the newly reconvened Campus Land Use and Management Action Committee (CLUMAC).

GOAL 2: Meet the UC Office of the President Sustainable Practices Policy goal to reduce potable water usage by 36 percent by weighted campus user by 2025 from a 2005-08 baseline.

- Strategy 2.1: Increase the use of non-potable water on campus.
  - Action 2.1.C: Explore feasibility of all potential non-potable water sources for the campus as part of the Long Range Development Planning process.
- Strategy 2.2: Reduce potable water use through technological innovations and physical improvements.
- Strategy 2.3: Improve communication about water management, use, and conservation to the campus and local community.
- Strategy 2.4: Identify new sources of funding for both potable water reduction and non-potable sourced development projects.
  - Action 2.4.A: Develop a life-cycle cost based funding model to account for potable water rate increases.

The goals and strategies under Material Management and Food Systems highlight of the environmentally preferred product purchases, address the UC Office of the President Sustainable Practices Policy goal of Zero Waste, and provide food security and access for the campus community. In 2018-2019, the campus started feeling the impacts of major shifts in the global recycling market for plastics. As a result, the campus experienced a significant increase in recyclable materials going directly to the landfill. To address this issue, additional Strategies and supporting Actions have been developed for 2019-2020 to support a strategic response to this issue.

GOAL 2: Achieve and maintain the UC Office of the President Sustainable Practices Policy goal of Zero Waste.

- Strategy 2.1: Improve operational infrastructure and business processes to increase waste diversion.
  - Action 2.1.A: Complete a compost/recycling collection and infrastructure rollout study that considers options for streamlining the waste stream across all collection areas.
- Strategy 2.3: Strive to increase the reuse of campus resources and disposable items that have not yet reached the end of their usable lifecycle.
  - Action 2.3.B: (New in 2019): Review current options and accessibility to reusable campus resources for students.
- Strategy 2.4: Develop effective waste reduction and Zero Waste education and training for students, staff and faculty.
  - Action 2.4.C: (new in 2019): Incorporate Zero Waste education into College Student Life curriculum development in 2020.
- Strategy 2.5 & 1.5: Advance the partial single-use bottled water ban and reduce the use of single-use plastics on campus.
  - Action 2.5.A & 1.5.A: Address barriers that event hosts face in switching from single-use plastics to more sustainable options.
  - Action 2.5.B & 1.5.B: (new in 2019): Pilot a durable/reusables program across Colleges, Housing and Educational Services (CHES) to reduce overall waste generation and limit bioware-based recycling contamination.
- Strategy 2.6 (new in 2019): Improve operational infrastructure and business processes to reduce waste generation.
  - Action 2.6.A: Engage key departments and campus stakeholders in strategic procurement and reduction planning.
- Strategy 2.7 (new in 2019): Improve campus waste and recycling contamination rates to levels acceptable to the City of Santa Cruz in order to facilitate proper processing of materials.

- **Action 2.7.A:** Engage the City of Santa Cruz Recycling and Waste Reduction team in regular audits of campus recycling loads.
- **Action 2.7.B:** Engage key departments and campus stakeholders in identifying, prioritizing, and implementing high impact measures to reduce recycling contamination.
- **Action 2.7.C:** Launch a campus-wide messaging campaign to spread awareness of the recycling contamination challenges and solutions.

UC Santa Cruz Water Action Plan

As required by the UC Sustainability Policy, UC Santa Cruz prepared a Water Action Plan (WAP) in December 2013, which was updated in December 2017. The 2017 WAP update reports that UC Santa Cruz has already exceeded the UC Sustainability Policy goal of a 20 percent reduction in water use per campus user by 2020 and marginally exceeded the goal of 36 percent water reduction by 2025 with 36.4 percent reduction from the FY2005/08 baseline. In response to a drought emergency declaration by the City of Santa Cruz in 2014, UC Santa Cruz consistently achieved a 22-28 percent monthly water use reduction from a 2012-13 peak season baseline and a 33 percent reduction from the target established in the City's 2009 Water Shortage Contingency Plan for UC Santa Cruz. During this time period, the campus saved 27.8 million gallons of water. The 2017 WAP identifies the following opportunities for additional reduction in potable water use on campus:

- Develop water reduction targets across campus, by type of use, to further water conservation practices and usage reduction in non-drought conditions;
- Evaluate the use of non-potable water sources for irrigation;
- Identify and prioritize sections of aging piping infrastructure that may have to be replaced to proactively prevent future leakage.
- Remove eligible turf irrigated by potable water; and
- Replace single-pass cooling systems, which draw large amounts of potable water.

LOCAL

As noted in Section 3.0.2, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of the university's educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

Groundwater Sustainability Plans

The City of Santa Cruz relies on groundwater for 5 percent of its potable supply. The City of Santa Cruz participates in groundwater sustainability planning for two Groundwater Sustainability Agencies—the Santa Cruz Mid-County Groundwater Agency and the Santa Margarita Groundwater Agency.

The Santa Cruz Mid-County Groundwater Agency has prepared a Groundwater Sustainability Plan (GSP), which covers a broad area in Santa Cruz County, including the easterly area of the City of Santa Cruz. It describes the steps needed to eliminate the adverse effects of groundwater overdraft. Adverse effects include seawater intrusion, reduction in water quality, and a reduction in streamflow. Solutions include conservation, aquifer replenishment, winter water transfers, and, potentially, a desalination plant (in Moss Landing) (Santa Cruz Mid-County Groundwater Agency 2019).

The Santa Margarita GSP is currently in preparation, with a planned completion data of 2022 (Santa Margarita Groundwater Agency 2020).

County of Santa Cruz General Plan

The County General Plan contains the following objectives and policies related to utilities and service systems in the county and that may be relevant to the 2021 LRDP:

Objective 7.18b: Water Conservation.

- Policy 7.18.3: Impacts of New Development of Water Purveyors. Review all new development proposals to assess impacts on municipal water systems, County water districts, or small water systems. Require that either adequate service is available or that the proposed development provide for mitigation of its impacts as a condition of project approval.
- Policy 7.18.4: Improvement of Water Systems. Support water system improvement programs for storage, treatment, and distribution facilities to meet necessary water supply and fire suppression requirements.
- Policy 7.18.6: Water Conservation Requirements. Utilize the best available methods for water conservation in new developments. Work with all water purveyors to implement demand management programs and water conservation measures. In areas where shortage or groundwater overdraft has been substantiated by the water purveyor, require water conservation measures for new and existing uses. Require the use of water-saving devices such as ultra low-flow fixtures and native drought-resistant planting in new development projects to promote ongoing water conservation.
- Policy 7.18.7: Water Reuse. Encourage the use and recycling of water where feasible and where reuse will not have a negative impact on public health or the environment, including the use of greywater systems, and recycling of irrigation water for irrigation purposes as acceptable to Environmental Health Services, State Department of Health Services, and Regional Water Quality Control Board.

Objective 7.22: Wastewater Reclamation and Energy Conservation.

- Policy 7.22.1: Wastewater Reclamation and Reuse Projects. Support the reclamation and reuse of energy, water and nutrients in wastewater management, and give funding priority to reclamation and reuse projects in capital expenditures for wastewater management.
- Policy 7.22.3: Use of Lower Energy Gravity Transfer Systems. Where feasible, encourage sewage disposal systems in new development to utilize natural gravity flows to the maximum extent, reducing the energy costs associated with pumping.

Objective 7.24c: Materials Recovery and Source Reduction.

- Policy 7.24.1: Materials Recovery. Establish, in conformance with state law, materials recovery through recycling, reuse and composting, as the primary and fundamental strategy of solid waste management by the County, with landfill disposal as a secondary and essential component. Designate materials recovery and reuse projects as a funding priority in allocating capital expenditures for solid waste management.
- Policy 7.24.8: Meeting State and Local Landfill Diversion Goals. Consider mandatory recycling or material-specific landfill disposal prohibitions if state and local landfill diversion goals are not met through the use of voluntary programs.
- Policy 7.24.10: Small Scale Recycling Collection Facilities. Recognize small scale recycling collection facilities as a compatible accessory use in all land use designations, subject to appropriate zoning standards.
- Policy 7.24.11: On-Site Yard Waste Composting. Allow properly managed on-site yard waste composting for materials generated on-site in all land use designations. Provide support for on-site composting through education and technical assistance.
- Policy 7.24.20: Materials Recovery and Processing Programs. Materials recovery and processing programs shall include a public education and information component to ensure public awareness and understanding of program participation requirements, program objectives, and accomplishments and program costs and benefits.

Objective 7.25a: Refuse Collection.

- **Policy 7.25.1: Requiring Space for Refuse Collection.** Require all new projects, except single-family dwellings, to provide sufficient and accessible space for the storage and collection of refuse separate from, and in addition to, space for recyclable materials collection.

Objective 7.26: Electrical Distributing System.

- **Policy 7.26.8: Reusable Energy Sources.** Consider the development of municipal solar utilities or other financing mechanisms which increase public access to renewable energy sources and provide opportunities for small-scale decentralized local facilities and controls.

City of Santa Cruz General Plan

The City General Plan contains the following polices related to utilities and service systems in the city and that may be relevant to the 2021 LRDP:

- **Policy CC3.1:** Implement the City's Integrated Water Plan.
- **Policy CC3.3:** Safeguard existing surface and groundwater sources.
- **Policy CC3.4:** Maintain and improve the integrity of the water system.
- **Policy CC3.5:** Promote maximum water use efficiency.
- **Policy CC3.6:** Coordinate major land use planning decisions in all three jurisdictions served by the City water system based on water supply availability.
- **Policy CC3.7:** Allow extension of the Water Service Area only if an application is approved by city council and/or LAFCO.
- **Policy CC3.10:** Investigate new supply options to meet planned growth.
- **Policy CC3.11:** Conserve water resources. Cf. NRC1.3.1 and 3.1.
- **Policy CC4.3:** Explore the potential for recycling wastewater.
- **Policy CC6.1:** Lead the community in recycling and in reducing waste in an effort to achieve the goal of Zero Waste.
- **Policy CC6.2:** Provide convenient, economical, and efficient waste and recycling collection service.
- **Policy NRC7.4:** Promote energy-efficiency in the provision and use of water.

City of Santa Cruz Urban Water Management Plan

As a public water supplier, the City of Santa Cruz is required under State law to prepare and adopt an urban water management plan (UWMP) and to update it every five years. The 2015 plan was adopted by City Council at its August 23, 2016 meeting. The 2015 UWMP covers:

- A description of the City's water service area, including current and projected population through the year 2035 and other factors affecting water management planning,
- Existing and planned sources of water supply,
- Past, current, and projected water use,
- An assessment of forecasted water supplies and demands during normal, dry, and multiple dry water years to ensure water supply reliability,
- A description of measures to promote water conservation and efficient water use, and
- A summary of the City's water shortage contingency plan.

Data and analyses from the UWMP is included in the discussion below. The City is currently in the process of preparing a 2020 update to its UWMP.

3.17.2 Environmental Setting

WATER

Potable Water

The SCWD provides water to 95,251 customers through approximately 24,534 service connections in the City of Santa Cruz, the UC Santa Cruz campus, a portion of the unincorporated area of Santa Cruz County, and a small portion of the City of Capitola. The UC Santa Cruz main residential campus receives potable water through nine points of connection to the SCWD system (four locations each with two meters and a fifth location serving only the Barn Theater). SCWD pumps potable water to three consecutive in-line reservoirs at separate elevations ranging from 400 feet to 1,113 feet at a point in the north campus. The campus water system then distributes water to campus facilities in eight separate pressure zones.

Water Demand

Historically, the general trend in the City's water demand was one in which water use rose roughly in parallel with account and population growth over time, except during two major drought periods in the late 1970s and the early 1990s. Around 2000, this pattern changed and system demand began a long period of decline, accelerated by pricing changes, drought, economic downturn, and other factors. In 2015, after two years of water rationing, annual water use fell to a level of about 2.45 billion gallons, similar to the level experienced during the 1970s drought (West Yost 2020:18). Table 3.17-1 shows the City's existing and projected water demand. In 2015, the average daily demand was approximately 6,718 gpd.

Table 3.17-1 City of Santa Cruz Existing and Projected Water Demand, MGY

Use Type	2015	2020	2025	2030	2035
Single Family	835	1,277	1,223	1,191	1,170
Multi Family	538	772	714	690	678
Commercial	485	574	541	525	519
Industrial	43	56	59	60	61
UC Santa Cruz	160	196	234	271	308
Institutional/Governmental	35	46	42	40	40
Landscape (Dedicated Irrigation)	46	112	119	134	144
Landscape (Golf Irrigation)	87	58	52	47	47
Water Losses	223	236	241	247	253
Total	**2,452**	**3,327**	**3,225**	**3,205**	**3,220**

Notes: MGY = million gallons per year

Source: West Yost 2020:20

According to the City of Santa Cruz's 2015 UWMP, UC Santa Cruz's demand for potable water is projected to constitute 5.9 percent of the SCWD supply in 2020, 7.3 percent in 2025, and 9.6 percent in 2035 under business-as-usual consumption based on data leading up to 2015. The City of Santa Cruz's 2015 UWMP also included water demands for UC Santa Cruz based on the university's previously estimated demand of 349 MGY in 2035, which reflects the "high" projection for UC Santa Cruz (City of Santa Cruz 2015). The 308 MGY projection, as shown in Table 3.17-1, reflects the primary projection for UC Santa Cruz. The 349 MGY projection included the existing main residential campus water demand, the projected water demand estimated for the 2005 LRDP and 2008 Settlement Agreement, and existing and projected water demand for the Coastal Science Campus and the Westside Research Park (UC Santa Cruz 2017:10-11; West Yost 2020:1).

Water Supply

The SCWD currently has four water supply sources: 1) surface water diversions from three creeks and one natural spring on the Santa Cruz County North Coast; 2) surface water diversions from San Lorenzo River; 3) surface water from Loch Lomond Reservoir; 4) groundwater extracted from the Purisima Formation by the Live Oak well system. Ninety-five percent of SCWD's water supply comes from surface water sources. The main source of SCWD's water, the San Lorenzo River, makes up 55 percent of the supply. Other flowing sources include Majors Creek, Laguna Creek, and Liddel Spring, which account for 26 percent of supply. The only reservoir for the City of Santa Cruz is the Loch Lomond Reservoir, which holds 2.8 billion gallons; this accounts for 14 percent of supply. The remaining 5 percent is produced from the Live Oak wells (UC Santa Cruz 2017:10-11; West Yost 2020:22). Table 3.17-2 shows the City's existing and projected water supplies by supply source.

Table 3.17-2 City of Santa Cruz Existing and Projected Normal Year Water Supplies, MGY

Supply Source	2015	2020	2025	2030	2035
North Coast Surface Water Sources	382	637	642	671	671
San Lorenzo River	1,458	1,882	1,842	1,829	1,834
Loch Lomond Reservoir	495	595	551	540	547
Groundwater (Live Oak/Beltz Wells)	145	138	129	127	128
Total	**2,480**	**3,252**	**3,164**	**3,167**	**3,180**

Notes: MGY = million gallons per year

Source: West Yost 2020:10

Water Supply Constraints

The City of Santa Cruz is facing several obstacles in meeting its present and future water supply needs, all related to the limitation in where, when, and how much water is available, particularly during years when rainfall is below average (West Yost 2020:29-30).

- **Local Supply Variability:** The City water system draws almost exclusively on local surface water sources, whose yield varies from year to year depending on the amount of rainfall received during the winter season and generated runoff that provides beneficial inflows. This local variation has been a significant constraint in recent years as the Central Coast, and the State of California more generally, were held in the grip of a multi-year drought. The City's declaration of a Stage 3 Water Emergency in 2014 and 2015 underscores the effect of the drought on the City of Santa Cruz system.
- **Ecosystem Restoration and Protected Species:** Since 2002, the City of Santa Cruz has been working toward the development of a Habitat Conservation Plan that covers operation and maintenance activities at the North Coast streams and San Lorenzo River diversions as well as other activities which may result in "take" of threatened and/or endangered species. Adoption of the Habitat Conservation Plan would require that higher instream flows be maintained.
- **Source Water Quality and Treatment Capacity:** The primary issues with respect to water quality are the treatment challenges posed by future changes in the source water mix driven in part by ecosystem protection requirements. The Graham Hill Water Treatment Plant is a conventional surface water treatment plant that was commissioned in 1960 as a 12 mgd plant and has undergone an expansion and a number of improvements over the last 50 years. Except for groundwater from the Live Oak wells, all water delivered through the City system is treated at this plant.
- **The Water Rights Conformance Project for Water Rights and Entitlements:** The Newell Creek and San Lorenzo River permits to divert at Felton were originally granted as "diversion to storage," rather than as "direct diversion" rights. A diversion to storage is used when the water diverted is put into storage and is retained in storage for some time prior to being used. Current State Water Resources Control Board practice, however, requires rights of "direct diversion" as well as diversion to storage for the same operations as the City originally proposed and has historically undertaken.

Water Supply Augmentation Plan

In 2015, the City's Water Supply Advisory Committee made recommendations on how best to address an agreed-upon worst year gap of 1.2 billion gallons between water supply and water demand during times of extended drought. These recommendations included the following (West Yost 2020:33):

- **Element 0 Demand Management:** Additional water conservation with a goal of achieving an additional 200 to 250 million gallons per year of demand reduction by 2035 by expanding water conservation programs.
- **Element 1 In Lieu Recharge:** Passive recharge of regional aquifers by working to develop agreements for delivering surface water as an in lieu supply to the SqCWD and/or the Scotts Valley Water District (SVWD) so they can rest their wells, help the aquifers recover, and effectively store water for use by SCWD in drought years.
- **Element 2 ASR:** Active recharge of regional aquifers by using existing infrastructure and potential new infrastructure in the regionally shared Purisima aquifer in the Soquel-Aptos Basin and/or in the Santa Margarita/Lompico/Butano aquifers in Scotts Valley area to store water that can be available for use by the City in drought years.
- **Element 3 Advanced Treatment Recycled Water or Desalination:** A potable water supply using advanced-treated recycled water as its source as a supplemental or replacement supply in the event the groundwater storage strategies described above prove insufficient to meet the goals of cost-effectiveness, timeliness, or yield. In the event advanced-treated recycled water does not meet the City's needs, desalination would become Element 3.

Campus Infrastructure

The UC Santa Cruz main residential campus water system receives water through five connections to the City's water distribution system. Water is pumped from the City's Bay Street Reservoir to three consecutive inline reservoirs at different elevations. SCWD Reservoir No. 2 is at elevation 426 feet and supplies UC Santa Cruz's 1-inch Barn Theater connection. SCWD Reservoir No. 4 is at elevation 748 feet and supplies UC Santa Cruz's 6-inch Arboretum and 14-inch Heller Drive connections. SCWD Reservoir No. 5 is at elevation 982 feet and supplies UC Santa Cruz's 14-inch Cave Gulch connection. The Campus also has the ability to pump from SCWD Reservoir No. 5 to the UC Santa Cruz Emergency Water Storage Reservoir at elevation 1,113 feet through the 12-inch Pump Station connection. The campus water system has eight separate pressure zones isolated through 13 pressure-reducing stations. The UC Santa Cruz Emergency Water Storage Reservoir provides the campus with an emergency water supply in the event the City system is incapable of supplying water and ensuring adequate pressure and supply for fire flow. The reservoir is also necessary to provide adequate fire flow to the Crown/Merrill Apartments (UC Santa Cruz 2018:4.13-2).

In addition, as discussed in Section 3.10 (Hydrology and Water Quality), four test wells were installed in the late 1980's in the Jordan Gulch area of Campus to evaluate groundwater resources. A sustainable flow rate equal to approximately 48.6 MGY was produced with no discernible downstream effects. These wells have not been used for water supply since they were installed.

Recycled Water

Recycled water is not currently provided within the LRDP area. As part of the Student Housing West project, currently planned as part of the 2005 LRDP (and considered a cumulative project within the context of this EIR; refer to Chapter 4, "Cumulative Impacts" for further clarification), wastewater generated in new student housing on the Heller site will be collected and treated in a wastewater treatment facility that would be located in the southeastern portion of the Heller site. The facility would be a membrane bioreactor (MBR) plant to treat the wastewater and generate recycled water for irrigation and toilet flushing use on the Heller site and, potentially, at other areas of the main residential campus (West Yost 2020:12). An MBR plant is also planned for new family student housing that would be developed on the Hagar site as part of the Student Housing West project, which would provide recycled water for toilet flushing and irrigation use on that site.

In 2018, the City of Santa Cruz investigated the feasibility of a recycled water program through a regional Recycled Water Facilities Planning Study, funded in part by a grant from the State Water Board Division of Financial Assistance, Water Recycling Funding Program (City of Santa Cruz 2018). The Water Supply Advisory Committee agreed to water conservation measures and water supply reliability studies or non-recycled water elements to be in the Water Supply

Augmentation Plan, which are being further studied. The recommended projects and reuse opportunities include the following (West Yost 2020:26):

- Santa Cruz Public Works Department Title 22 Project: This project will implement a near-term non-potable reuse project to meet in-plant demands, develop a bulk water station and serve the nearby La Barranca Park and Neary Park.
- BayCycle Project: This project will expand Santa Cruz Public Works Department Title 22 Project to increase production and non-potable reuse to serve customers along Bay Street including UC Santa Cruz and other City customers.
- Coordination with Pure Water Soquel: The City will continue to work closely with SqCWD to support the evaluation of the Pure Water Soquel project, a water recycling/reuse to produce safe, high-quality drinking water. The project would replenish the Santa Cruz Mid-County Groundwater Basin with recycled water to increase the sustainability of groundwater supply.
- Groundwater Reuse Replenishment in Santa Cruz Mid County Basin: The City will explore groundwater reuse replenishment in the Santa Cruz Mid County Basin through a collaborative project with Pure Water Soquel or as an independent City-led project to replenish groundwater supplies with recycled water to enhance sustainable groundwater yields.
- Groundwater Reuse Replenishment in Santa Margarita Basin: The City will explore groundwater reuse replenishment with the use of recycled water in the Santa Margarita Basin through a regional project which has the potential to enhance groundwater supplies and make the region more resilient in the long term.

Water Use Trends

Per capita water demand at the main residential campus has dropped dramatically in recent years. Prior to 2009, annual water use on the main residential campus was about 200 MGY. Between 2010 and 2020, total water use peaked in 2013, when water use on the main residential campus was approximately 174 million gallons per year (MGY), and then dropped to 167 MGY in 2018 (see Table 3.17-3). The downward trend in water consumption has resulted from proactive water conservation, improved water use efficiency, and drought response measures on the campus. Much of the water conservation efforts were in response to the statewide drought from 2013 to 2017. During the 2014 and 2015 drought years, the City of Santa Cruz declared a Stage 3 Water Emergency and requested UC Santa Cruz to reduce domestic water use by 20 percent, as metered and billed by the City, compared to a 2013 baseline, which UC Santa Cruz accomplished (West Yost 2020:1).

Table 3.17-3 UC Santa Cruz Annual Water Usage (Main Residential Campus)

Calendar Year	Million Gallons Used	Campus Population	Gallons per Capita
2012	163.7	16,704	9,800.05
2013	173.7	16,752	10,368.91
2014	150.6	16,543	9,103.55
2015	155.9	17,276	9,024.08
2016	161.2	17,335	9,299.11
2017	160.4	18,063	8,880.03
2018	167.1	18,765	8,904.88

Source: City of Santa Cruz 2020a

As discussed above, under Section 3.17.1, "Regulatory Setting," campus-wide efforts to reduce water consumption have been on-going. These efforts include goals and practices under the Sustainable Water Systems section of the UC Sustainable Practices Policy, the Campus Sustainability Plan, and the Water Action Committee. UC Santa Cruz has been proactive in water conservation through infrastructural improvements, technological upgrades including leak detection and monitoring software, advanced evapotranspiration irrigation technology, and user conservation behavior including a successful coordinated campus drought response. As a result, campus potable water usage has followed a downward trend while campus population continues to increase.

In 2014, UC Santa Cruz allocated $374,000 to water-saving projects, including installing time-allocated shower valves at the Recreation and Athletics Facility, retrofitting laboratory autoclaves with a water reuse modification system, adding sub-meters in unmetered irrigation areas, and installing a system to use seawater for marine mammal pool wash downs at the Coastal Science Campus. The Sustainability Office created a five-student Water Action and Drought Response Team to assist with UC Santa Cruz's response to the 2014 drought and meeting the City of Santa Cruz's mandatory water use reduction target of 20 percent. The team conducted a campus-wide audit of all state-funded restroom, kitchen and lab fixtures, posted educational signage to encourage the campus community to report leaks to the Work Order Desk as well as to reduce watering, assisted with the identification of campus sub-metering needs, engaged with users through tabling at campus events, and created tutorials for users to understand the new Beacon leak detection software portal (UC Santa Cruz 2017:21-22).

The University of California Board of Regents Sustainable Practices Policy on Sustainable Water Systems states that: "[campuses] will reduce growth-adjusted potable water consumption 20% by 2020 and 36% by 2025, when compared to a three-year average baseline of FY2005/06, FY2006/07, and FY2007/08." UC Santa Cruz's main residential campus average historical use over the UCOP designated three-year baseline, FY2005/06, 2006/07, and 2007/08, is 13,924 gallons per weighted campus user. In FY2016/17, the campus used 8,856 gallons per weighted campus user, reaching a 36.4 percent reduction from the baseline, surpassing the UC Office of the President's 2020 20 percent reduction and marginally exceeding the 2025 36 percent reduction goals (UC Santa Cruz 2017:5).

WASTEWATER

Wastewater produced on the main residential campus is conveyed via the campus sewer system to the City of Santa Cruz's system. The campus sewer system includes collector lines located in campus roadways and two major trunk lines. The two major trunk sewers on the main residential campus include one on Empire Grade and the second one along Jordan Gulch. Both combine into a single sewer at the Cook House, which discharges into the City's sewer system at Bay and High Streets. The wastewater is then transported through the sewer system to the City of Santa Cruz Wastewater Treatment Plant (WWTP), located near Neary Lagoon and Bay Street, where it is treated before being discharged to Monterey Bay. The City regulates what the campus can discharge to make sure it can properly treat it before discharging it to Monterey Bay. Additionally, campus wastewater is routinely monitored by UC Santa Cruz via an existing meter at the point of discharge to the City's sewer system and by the City to ensure that UC Santa Cruz complies with wastewater discharge limitations (UC Santa Cruz 2018:4.13-4).

The dry-weather flow capacity at the WWTP is 17 mgd. The average daily flow at the WWTP is less than 10 mgd (City of Santa Cruz 2020b). The LRDP area (main residential campus and Westside Research Park) generated a total of approximately 134 million gallons of wastewater in 2019, an average 367,123 gallons per day (UC Santa Cruz 2020).

SOLID WASTE

Waste Management and Disposal

The City of Santa Cruz Resource Recovery Facility (RRF) is approximately 2.5 miles southwest of the UC Santa Cruz main residential campus at 605 Dimeo Lane in Santa Cruz. The RRF is regulated at the federal, state, and local levels and includes the City of Santa Cruz landfill, recycling center, green waste drop-off area, and a Hazardous Waste Drop-off Facility. The RRF has a maximum permitted throughput of 535 tons per day. As of 2017, the landfill had a remaining capacity of 4,806,477 cubic yards (cy) and is not expected to reach capacity until 2058 (Cal Recycle 2020).

Campus Waste Collection and Recycling Services

UC Santa Cruz Grounds Services Department is responsible for overseeing the sorting and disposal of over 90 percent of waste generated on the campus. Trash is collected from mixed container bins, segregated recycling bins for mixed paper and white office paper, and cardboard located throughout the campus. Containers pass through a sorting line on the lower campus and are then hauled by Grounds Services to commercial recycling facilities and the City of Santa Cruz Resource Recovery Facility. Paper is transferred to large box bins and stored on the lower campus, where it is picked up by an outside vendor. Grounds Services collects cardboard and when the truck is full, hauls it to various off-campus

vendors. Trash is sent to the City of Santa Cruz Resource Recovery Facility. Compost from campus dining facilities is transported to Marina Landfill. Hazardous waste from the campus is managed by the Office of Environmental Health and Safety and properly processed off-campus at various facilities. Campus surplus collects electronic waste (E-waste) to be sold at the surplus store or to be disposed of at ECS Refining (UC Santa Cruz 2018:4.13-5; Nelson 2020)

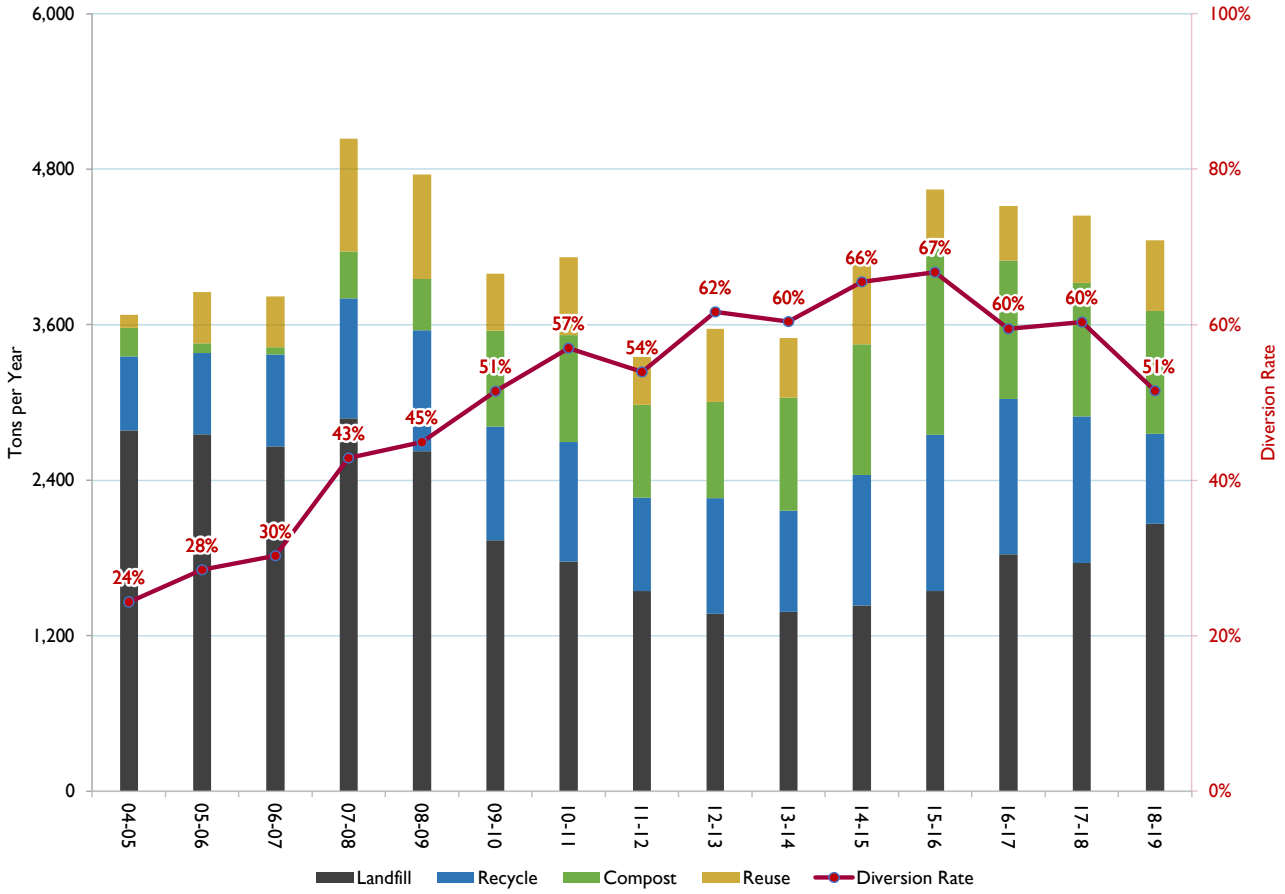
In FY2010/11, UC Santa Cruz hauled 1,722 tons of trash to the landfill, a significant decrease from 2,740-ton annual average of landfill waste from 2005-2009. By FY2015/16, UC Santa Cruz was sending 160 pounds of solid waste per capita per year to the landfill and diverting about 66 percent of solid waste generated (UC Santa Cruz 2018:4.13-5,6). As shown in Figure 3.17-1, in FYs 2016/17 and 2017/18 the diversion rate dropped to 60 percent and in FY2018/19 dropped again to 51 percent. Table 3.17-4 describes existing waste generated at UC Santa Cruz during the 2018/19 fiscal year that was disposed of at the RRF. With a total on-campus population of 22,300 (2018-2019 academic year), this is approximated 185 pounds of solid waste per capita per year to the landfill.

Table 3.17-4 Existing UC Santa Cruz Solid Waste Generation

Waste Type[1]	Existing (tons per year)
Total Municipal Solid Waste Generated	4,251
Municipal Solid Waste Diverted from Landfill	2,189
Municipal Solid Waste Landfilled at City of Santa Cruz Resource Recovery Facility	2,062

[1] Excludes construction and demolition waste, landscape organics, and agricultural waste, which are all considered non-standard municipal solid waste in the UC Sustainable Practices Policy. The campus handles these waste streams through recycling, composting, or other means of landfill diversion.

Source: UC Santa Cruz 2020



Source: Data provided by UC Santa Cruz in 2020.

Figure 3.17-1 Historical Waste Tonnage and Landfill Diversion Rate

ENERGY FACILITIES AND SERVICES

Pacific Gas and Electric (PG&E) provides most of electricity to the UC Santa Cruz campus. The PG&E point of service connection is the Slug Substation, located northeast of the Hagar Court employee housing complex. From there, the electricity at 21 kilovolts (kV) is routed to the Merrill Substation in the northeastern quadrant of the campus, where two transformers reduce the voltage to 12 kV. There are four campus electrical feeders that distribute power from Slugsub along Steinhart to the cogeneration plant. Most of the campus buildings are distributed power via only two feeders. Lower campus buildings, Family Student Housing, and employee housing complexes receive power from a separate PG&E connections. Some of the electricity utilized at UC Santa Cruz is produced on campus by the cogeneration plant, located in the Central Heat Plant area of campus. The plant provides backup for emergency responders, safety systems, and research equipment, as well as supplements the electricity purchased from PG&E. The electric power generated by the turbine is fed into the campus' 12 kV distribution systems. This auxiliary electricity is especially useful when PG&E power failures occur (UC Santa Cruz 2018:4.13-1,2). A solar panel array, located on top of McHenry Library, also generates electricity on the main residential campus. UC Santa Cruz is also in the process of installing the aforementioned, on-site (2.1 MW) solar array above the East Remote parking lot. Refer to Section 3.6, "Energy" for further information regarding future solar facilities within the LRDP area.

UC Santa Cruz currently uses natural gas to run the cogeneration plant and two affiliated natural gas compressors, producing electricity and heating for water and buildings. The two compressors increase the pressure of the fuel gas to maximize combustion efficiency. Natural gas is purchased by UC Santa Cruz from PG&E and delivered via a high-pressure transmission line that runs along the railroad tracks south of Mission Street. A distribution line running along Western Drive delivers the gas to the PG&E point of connection, located at a master gas metering station at High Street. From the point of connection, gas is delivered to the cogeneration plant via an 8-inch line that runs on the west side of the campus to the cogeneration plant (UC Santa Cruz 2018:4.14-3). There are also numerous low-pressure distribution lines that provide natural gas service to various on-campus facilities, including housing, throughout the LRDP area.

With respect to transportation fuels, UC Santa Cruz operates a self-service fueling facility offering unleaded gasoline, biodiesel, and compressed natural gas for the 700 University-owned and operated fleet vehicles (UC Santa Cruz 2018:4.14-3).

3.17.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, the project would result in a potentially significant impact on utilities and service systems if it would:

- require or result in the relocation or construction of new or expanded water, or wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects;
- have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years;
- result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand, in addition to the provider's existing commitments;
- generate solid waste in excess of state or local standards or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals; or
- comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

ANALYSIS METHODOLOGY

Impacts on utilities that would result from implementation of the 2021 LRDP were identified by comparing existing and projected service capacity against future demand associated with project implementation. As noted above and in Chapter 2, "Project Description," UC Santa Cruz is anticipating on-campus improvements for water, wastewater, natural gas, and electricity as part of the 2021 LRDP. These improvements, both in terms of scope and location, were considered in the impact analysis provided below and throughout this EIR. When possible, a quantitative comparison was used to determine impacts of the project on future demands. Details related to methodology are provided below.

Water

Campus Water Demand

Information in this section is based on the *UC Santa Cruz Long Range Development Plan Water Demand Projections Technical Memorandum* prepared by Sherwood Engineers (included as part of Appendix J of this EIR). The following tables depict existing water demand and existing plus project demand, by residential and non-residential uses.

Table 3.17-5 provides demand factors used to forecast domestic (potable) water demands for non-residential buildings. The demand factor (gpd/FTE) was calculated by dividing the total water demand for non-residential buildings by the sum of student and employee full-time equivalents (FTEs). The unit demand factor was then applied to the anticipated development under the 2021 LRDP to estimate the future campus water use based on the growth in the campus population. Water use is conservatively projected linearly with growth (i.e., unit demand factors remain constant), which does not account for reductions that might result from efficiency retrofits to existing buildings or improved efficiency in new buildings.

Table 3.17-5 Non-Residential Buildings, Existing and Existing Plus Project Demand

Category	Annual Demand (MGY) (FY 17/18)	Average Daily Demand (gpd) (FY 17/18)	Existing FTE (FY 17/18)	Demand Factor (gpd/FTE)	Proposed (Existing Plus Project) FTE Projected 2040	Annual Total Demand (MGY) Projected 2040	Average Daily Total Demand (gpd) Projected 2040	Net Increase in Annual Demand (MGY) 2040	Net Increase in Average Daily Demand (gpd) 2040
Main Residential Campus (Non-Residential Uses)[1,2]	28.5	78,195	21,318	3.668[4]	33,000	44.2	121,045	15.7	42,850
2300 Delaware[3]	0.5	1,463	—	—	—	0.5	1,463	—	—
Total	**29.1**	**79,658**	**21,318**	—	**33,000**	**44.7**	**122,508**	**15.7**	**42,850**

Notes: MGY = million gallons per year gpd = gallons per day

[1] Projected water demands are scaled linearly based on increase in student and employee FTEs.

[2] Non-residential includes the following categories from the 2021 LRDP: Classroom, Teaching Lab, Academic Student Support, Research, Offices, Library, Student Support/Health & Wellness, Athletics, Community Amenities, and Miscellaneous.

[3] Demand at existing Westside Research Park research building assumed to remain constant.

[4] Total campus demand, including visitors and non-UC employees, is reflected in the demand factor as it is based on the total average daily demand of UC Santa Cruz.

Source: Sherwood 2020:Table 4

Table 3.17-6 provides demand factors used to forecast domestic (potable) water demands for student and employee residential buildings. Unit demand factors for student and employee housing were derived by dividing daily water use by the number of beds/residents for each category. Employee housing assumes an average 2.43 residents per unit (1.43 dependents for each employee). As with the non-residential category, projections conservatively assume no reduction in unit demand for future conditions.

Table 3.17-6 Residential Existing and Existing Plus Project Demand

Category	Annual Demand (MGY) (FY 17/18)	Average Daily Demand (gpd) (FY 17/18)	Existing Beds/ Residents	Demand Factor (gpd/bed)	(Existing Plus Project) Beds/ Residents	Annual Total Demand (MGY) Projected 2040	Average Daily Total Demand (gpd) Projected 2040	Net Increase in Annual Demand (MGY) 2040	Net Increase in Average Daily Demand (gpd) 2040
Student Housing	68.3	187,241	9,283	20.2	19,958	146.9	402,560	78.5	214,996
Employee Housing Main Residential Campus	6.8	18,672	656	28.5	1,621	16.8	46,145	11.4	31,274
Employee Housing Westside Research Park	-	-	-	28.5	486	5.0	13,831	5.7	15,645
Total	**75.2**	**205,913**	**9,939**	-	**22,065**	**168.8**	**462,535**	**94**	**256,623**

Notes: MGY = million gallons per year; gpd = gallons per day
Source: Sherwood 2020:Table 5

Table 3.17-7 provides irrigation demand projections; Irrigation demand projection methods vary by category:

- Grounds irrigation is assumed to increase by 50 percent to accommodate the planned colleges and academic infill (corresponding roughly to the ratio of future to existing FTE students and employees).
- Employee housing irrigation increases by the percent increase in total employee beds (251 percent increase).
- Farm and garden irrigation are assumed to increase by 25 percent.
- Arboretum irrigation is assumed to increase by 25 percent to allow for increasing post-drought irrigation.
- Athletic Fields (Recreation and Sand Field) are assumed to remain constant.
- Minor categories (Green House and "Non-Grounds" Landscape) are assumed to remain constant.

Table 3.17-7 Irrigation Existing and Existing Plus Project Demand

Category	Annual Demand (MGY) (FY 17/18)	Average Daily Demand (gpd) (FY 17/18)	Increase in Irrigation Demand (%) Projected 2040	Annual Total Demand (MGY) Projected 2040	Average Daily Total Demand (gpd) Projected 2040	Net Increase in Annual Demand (MGY) 2040	Net Increase in Average Daily Demand (gpd) 2040
Grounds							
Grounds Landscape[1]	16.0	43,937	50%	24.1	65,906	8.1	21,969
Recreation Field	8.7	23,905	(None)	8.7	23,905	0	0
Sand Field	4.7	12,798	(None)	4.7	12,798	0	0
Subtotal	29.4	80,640	(None)	37.5	102,609	8.1	21,969
Non-Grounds							
Arboretum[2]	5.0	13,828	25%	6.3	17,285	1.3	3,457
Employee Housing Irrigation	2.4	6,489	251%	7.6	20,839	5.2	14,350
Farm Irrigation[2]	4.6	12,502	25%	5.7	15,627	1.1	3,125
Garden[2]	1.6	4,376	25%	2.0	5,470	0.4	1,094
Greenhouse	0.0	62	(None)	0.0	62	0	0
"Non-grounds" Landscape	0.4	1,226	(None)	0.4	1,226	0	0
Subtotal	14.0	38,483	(None)	22.8	62,468	8.1	22,027
Total	**43.5**	**119,123**	**(None)**	**59.5**	**163,118**	**16**	**43,995**

Notes: MGY = million gallons per year; gpd = gallons per day

[1] Grounds landscape projected increase is 50% based on proposed development of two new colleges.

[2] Arboretum, Farm and Garden demands assumed to increase by 25% to allow for increased irrigation in post-drought years based on conversations with UC Santa Cruz.

Source: Sherwood 2020:Table 6

Table 3.17-8 provides demand projections from mechanical systems. Limited expansion of the existing central cooling system is anticipated, with approximately 10 new buildings within the academic core proposed to connect to the system based on their proximity to the cooling tower loop and amount of excess cooling tower capacity. The anticipated increase in cooling tower make-up water demand is projected by linearly scaling the existing make-up water use by the increase in building area to be served by the centralized cooling systems.

Table 3.17-8 Mechanical Existing and Existing Plus Project Demand

Category	Existing Building Area Served by Cooling Towers (sf) (FY 17/18)	Annual Demand (MGY) (FY 17/18)	Average Daily Demand (gpd) (FY 17/18)	Future Building Area Served by Cooling Towers (sf) Projected 2040	Increase in Area	Annual Total Demand (MGY) Projected 2040	Average Daily Total Demand (gpd) Projected 2040	Net Increase in Annual Demand (MGY) 2040	Net Increase in Average Daily Demand (gpd) 2040
Mechanical	1,005,960	6.8	18,763	2,357,784	234%	16.1	43,977	9.3	25,214

Notes: sf = square feet; MGY = million gallons per year; gpd = gallons per day
Source: Sherwood 2020:Table 7

Table 3.17-9 provides a summary the existing and projected potable water demand by water use category and by campus area.

Table 3.17-9 Existing and Projected Water Demand

Water User Category	Existing (FY 17/18) Annual Demand MGY	Existing (FY 17/18) Average Daily Demand gpd	Projected 2040 Annual Demand MGY	Projected 2040 Average Daily Demand gpd	Net Increase in Annual Demand (MGY) 2040	Net Increase in Average Daily Demand (gpd) 2040
Demand by Water Use Category						
Interior Water Demands						
Non-Residential	29.1	79,658	44.7	122,508	15.6	42,850
Residential	75.2	205,913	168.8	462,535	93.6	256,622
Mechanical	6.8	18,763	16.1	43,977	9.3	25,214
Irrigation						
Grounds	29.4	80,640	37.5	102,609	8.1	21,969
Non-Grounds	14.0	38,483	22.8	62,468	8.8	23,985
Total	**154.5**	**423,457**	**289.1**	**792,121**	**134.6**	**368,664**
Demand by Campus Area						
Main Residential Campus	154.0	421,994	283.5	776,827	129.5	354,833
Westside Research Park	0.5	1,463	5.6	15,294	5.1	13,831
Total	**154.5**	**423,457**	**289.1**	**792,121**	**134.6**	**368,664**

Notes: MGY = million gallons per year; gpd = gallons per day
Source: West Yost 2020:10

Wastewater

To forecast future wastewater generation, annual wastewater generation was projected with consideration of 2040-2041 population levels under the 2021 LRDP, and the projected volume of wastewater was compared to available capacity of the City of Santa Cruz WWTP.

In 2019, the campus generated a total of approximately 134 million gallons of wastewater or 367,123 gpd (UC Santa Cruz 2020). With a 2018-2019 campus population of 22,300, this is equivalent to approximately 6,009 gallons per capita annually and 16.5 gpd. In 2040-2041, the projected campus population of 35,230 persons would generate approximately 212 million gallons annually and 581,295 gpd.

Solid Waste

This analysis considers a reasonable worst-case scenario, which assumes that UC Santa Cruz does not meet the policy goal of reducing waste per capita by 50 percent by 2030 or diverting 90 percent of municipal waste from the landfill. Waste generation rate used to estimate future waste generation at UC Santa Cruz is based on FY2018/19 data (approximately 0.19 tons per campus user per year). This rate is intended to reflect a business-as-usual projection and does not factor in waste reduction achieved through additional campus conservation and waste diversion programs.

ISSUES NOT EVALUATED FURTHER

As stated previously, Impacts related to stormwater collection and disposal are addressed in Section 3.10, "Hydrology and Water Quality." All other issues applicable to utilities and service systems listed under the significance criteria above are addressed in this section.

IMPACTS AND MITIGATION MEASURES

Impact 3.17-1: Impacts on Water Supply

Implementation of the 2021 LRDP would generate an additional demand for water; while there would be adequate water supply from the City's existing water sources in normal water years, during single and multiple dry water year conditions, there would be a substantial gap between demand and available supplies, which would require the City to secure a new water source. This impact would be **significant**.

The analysis below considers several issues. First, the analysis considers whether there is sufficient supply to serve the project during normal and multiple dry years. Because the analysis demonstrates there may be a potential shortage, the analysis explores alternative water supplies if supplies are insufficient, their likelihood of occurrence, and their associated environmental impacts, if procured. Finally, the analysis determines environmental impacts that may occur if development under the 2021 LRDP must be curtailed because sufficient water does not materialize or if water is not supplied by the SCWD to the area outside the current SCWD service area.

The analysis does not consider the use of additional recycled water as part of the 2021 LRDP, which could otherwise reduce total water use as recycled water would replace potable water, as appropriate. Although a wastewater treatment plant is planned as part of the Student Housing West (cumulative), which is a planned-but-not-operational project considered under the 2005 LRDP, these treatment plants are expensive to construct and operate. They also require consideration of several operational issues, such as storage of treated wastewater during non-irrigation seasons or whether this treated effluent will be discharged offsite, the location of such a facility, which can produce odors, and other potential locational constraints due to its size and compatibility of land uses. While it is possible that such a plant could be constructed as part of a housing project under the 2021 LRDP (subject to additional planning and CEQA review), it is not assumed in the analysis of supply.

Sufficiency of Supply

With implementation of the 2021 LRDP, on-campus population (faculty and staff) would increase, which would result in an increase in demand for potable water. In addition, demand for utility water is anticipated to increase with additional landscaping and mechanical needs. The City of Santa Cruz's 2015 UWMP included water demands for UC Santa Cruz based on UC Santa Cruz's previously estimated demand of 308 MGY in 2035, which generally applied an additional 37 MGY per 5-year period after 2020.[2] Based on the analysis in this EIR, the projected potable water demand associated with the development under the proposed 2021 LRDP is approximately 289 MGY (see Table 3.17-9). If the projected water demand under the proposed 2021 LRDP (existing plus project total of 289 MGY) is combined with the projected water demand for the Coastal Science Campus, the total water demand for UC Santa Cruz is estimated at 307 MGY by

[2] 308 MGY is the "primary" projection of UC Santa Cruz water demand in 2035 within the City's 2015 UWMP. It is based on a total UC Santa Cruz projection of 349 MGY (which includes the Coastal Science Campus). Due to the inclusion of the Coastal Science Campus as part of the overall water demand of UC Santa Cruz within the City's UWMP, it is included as part of this discussion.

2040, which is considerably lower (12 percent lower) than an extrapolated 2040 demand of 349 MGY, based on the City's 2015 UWMP. Compared to existing conditions, the 2021 LRDP would increase demand by an estimated 137.5 MGY. As discussed above under Section 3.17.2, "Environmental Setting," the Santa Cruz water system relies predominantly on local surface water supplies, which include the North Coast sources, the San Lorenzo River, and Loch Lomond Reservoir. The system relies entirely on rainfall, surface runoff, and groundwater infiltration occurring within watersheds located in Santa Cruz County. Although the City of Santa Cruz has not previously seen shortages in normal water years, by adding the ecosystem protection conditions under the City's contemplated Habitat Conservation Plan, a small shortage (1 to 3 percent) can be reasonably expected in future normal years. The City predicts the supply and demand volumes to be in balance for 90 percent of all normal water years for 2020-2035.

The City's single-dry water year assessment in their 2015 UWMP was based on the water supply available to the City comparable to water year 2014, which was a recent critically dry year. Based on these supply assumptions, water supply during a single-dry water year is not sufficient to meet the demand in the near-term, although the shortage experienced is projected to decrease over time. During a single-dry water year, annual shortages of 16 to 21 percent are projected.

The 2015 UWMP modeled the estimated water supply that would be available during a multiple-dry water year event using hydrology from a three-year drought sequence of 1976, 1977, and a second 1977 year. In an extreme multi-year drought similar to the 1976-77 event, the estimated water supply available to the City in the first year of that event ranges between 2,430 and 2,377 MGY or an average of 25 percent less water on an annual basis than is available in a normal water year. During the second year, the average shortage over time increases to 39 percent and in the third year modeled, the average shortage compared to a normal year is over 50 percent. Table 3.17-10 shows the City's supply and demand, for normal, single dry, and multiple dry years.

Table 3.17-10 City of Santa Cruz Water Supply and Demand in Normal Years, Single Dry Years and Multiple Dry Years, MGY

	2020	2025	2030	2035
Normal Year				
Supply Totals	3,252	3,164	3,167	3,180
Demand Totals	3,327	3,225	3,205	3,220
Difference	(75)	(61)	(38)	(40)
Demand Served, %	97%	97%	98%	98%
Single Dry Year				
Supply Totals	2,619	2,658	2,692	2,692
Demand Totals	3,327	3,225	3,205	3,220
Difference	(708)	(567)	(513)	(528)
Demand Served, %	79%	82%	84%	84%
Multiple Dry Year				
First Year				
Supply Totals	2,430	2,377	2,377	2,381
Demand Totals	3,327	3,225	3,205	3,220
Difference	(897)	(848)	(828)	(839)
Demand Served, %	73%	74%	74%	74%
Second Year				
Supply Totals	1,918	1,942	1,968	1,969
Demand Totals	3,327	3,225	3,205	3,220
Difference	(1,409)	(1,283)	(1,237)	(1,251)
Demand Served, %	58%	60%	61%	61%

	2020	2025	2030	2035
Third Year				
Supply Totals	1,597	1,567	1,580	1,581
Demand Totals	3,327	3,225	3,205	3,220
Difference	(1,730)	(1,658)	(1,625)	(1,639)
Demand Served, %	48%	48%	49%	49%

Notes: MGY = million gallons per year

Source: West Yost 2020:32

As a City water customer, UC Santa Cruz is subject to these potential water shortages and to the City's water supply allocation system and demand reduction measures. The City's Water Shortage Contingency Plan has a five-stage plan which includes a set of demand reduction measures that become progressively more stringent as the shortage condition escalates. The City's Water Shortage Contingency Plan includes reduction goals for UC Santa Cruz under each shortage scenario. These goals were developed in consultation with UC Santa Cruz. As previously described, UC Santa Cruz has been very successful in reducing water use in recent years through infrastructural improvements, technological upgrades including leak detection and monitoring software, advanced evapotranspiration irrigation technology, and user conservation behavior, including a successful coordinated campus drought response. UC Santa Cruz successfully met the 2014 City's mandatory water reduction goals as a result of this proactive water conservation.

Therefore, while the water demand of the campus under the proposed 2021 LRDP (289 MGY) would be less than demand included in the 2015 UWMP, and there would generally be adequate water supply from the City's existing water sources in normal water years with small shortfalls during normal and single dry years met through conservation. During multiple dry water year conditions, there would be a substantial gap between demand and available supply, up to 1,730 MGY as shown in Table 3.17-10. This gap would not be fully addressed through conservation and would require the City to secure a new water source. UC Santa Cruz's water demand under the 2021 LRDP would contribute to the need for the City to secure a new water supply source to address the shortfall under multiple dry water year conditions. This would be a significant impact.

In addition, as noted in Chapter 2, "Project Description," there is currently a dispute over whether UC Santa Cruz is legally entitled to water service to portions of the 2021 LRDP that are outside the City's current water service area. UC Santa Cruz and the City have existing agreements in place dating back to the inception of the campus that require the City to provide water service to the entire main residential campus, including areas outside the City's designated water service area boundary. Under the 2021 LRDP, some development is planned in the north campus outside of the City's designated service boundary. The main residential campus already includes development above the water service area boundary, including portions of Colleges 9 and 10 (built in 2002) and apartments associated with Crown and Merrill Colleges (built in 1968), as well as water infrastructure that serves the campus. These areas are currently served with City-provided water supplies. However, to date, the City has not affirmed its contractual obligation to provide water service to the portions of the campus outside the boundary, creating uncertainty regarding whether the City will provide water to those areas. Accordingly, UC Santa Cruz initiated litigation in order to obtain a final judicial resolution of the parties' respective rights under the water service agreements. UC Santa Cruz anticipates that the court will affirm the City's legal obligation to serve water to the entire campus, including areas outside the current service boundary. However, to account for the possibility, however remote, that the court finds otherwise, this EIR evaluates what would occur if UC Santa Cruz is deemed not to have a legal right to water service outside the current service boundary, specifically (1) what alternative water sources could serve those areas of campus; (2) the likelihood that such alternative sources could be secured; (3) how 2021 LRDP development would be altered or curtailed if no water source is secured to serve the areas outside the current service boundary; and (4) the environmental impacts of that curtailed LRDP project. This is discussed further, after the evaluation of alternative sources of water supply.

Evaluation of Potential Alternative Water Supplies

As described above in "Water Supply Augmentation Plan," under Section 3.17.2, "Environmental Setting," the City Water Supply Advisory Committee, in response to projected water supply shortages during certain normal year conditions, single-dry year conditions, and multiple-dry year conditions, issued a Water Supply Augmentation Plan that included several measures (Elements 0 through 3) that could be implemented to provide more reliable water supplies to the City and its customers, including UC Santa Cruz. These included the implementation of additional water conservation measures to achieve a 25 percent reduction in potable water demand by 2035, passive recharge of regional aquifers, active recharge of regional aquifers, advanced treatment of stormwater/wastewater, and desalination. Currently, the City is evaluating the feasibility of these three water supply options.

As part of its evaluation of the water supply options, in 2018 the City of Santa Cruz completed a feasibility/planning study of recycled water recycling facilities, including an advanced water treatment facility adjacent to the City's existing wastewater treatment plant. This study, the Regional Recycled Water Facilities Planning Study, was funded in part by a grant from the State Water Board Division of Financial Assistance, Water Recycling Funding Program (City of Santa Cruz 2018). The study identified the following recommended projects and reuse opportunities: 1) the Santa Cruz Public Works Department Title 22 Project; 2) the BayCycle Project; 3) Coordination with Pure Water Soquel; 4) Groundwater Reuse Replenishment in Santa Cruz Mid County Basin; and 5) Groundwater Reuse Replenishment in Santa Margarita Basin.

Potential Environmental Impacts Associated with the Title 22 Project and BayCycle Project

The Title 22 Project would involve construction of treatment and storage facilities at the existing WWTP to treat effluent to Title 22 standards to produce 0.13 mgd of non-potable recycled water. The BayCycle Project would add capacity to the Title 22 treatment facilities at the WWTP to increase production. The efforts identified above are currently in various stages of design and planning by the City, although some initial siting and design has been completed for both the Title 22 Project and BayCycle Project, collectively referred to as the Regional Recycled Water Facilities project. Recycled water projects are common throughout California. The recycled effluent is treated to very high standards, and utilized for landscape and other non-potable uses. Recycled water offsets an equal amount of potable water used for the same purposes. These types of projects have proven feasible. The typical largest constraint is the need to install distribution pipelines throughout their service area. As currently envisioned, the Regional Recycled Water Facilities project would have the following potential impacts:

- Aesthetics: The project would not result in any significant impacts to aesthetics as the upgrades would be within the existing WWTP and distribution pipelines would be located underground within roadways. The location of a storage tank and pump station near the UC Santa Cruz main residential campus entrance is designated as Facilities & Support in the 2021 LRDP. While the storage tank and pump station would be consistent with the designation and the existing support type uses in that area, a water tank at the campus entrance would likely adversely affect the visual character and quality of the entrance area and the impact might be considered significant, requiring mitigation or an evaluation of another site for the tank.
- Agriculture and Forestry Resources: The project would be located within areas that are designated Urban and Built-up Land or Rural Residential Land by the FMMP. There would be no impacts to agriculture or forest lands.
- Air Quality: Other than short term emissions during the construction of the project, due to its nature, the project would not result in substantial emissions of criteria pollutants and toxic air contaminants. Air quality impacts would likely be less than significant.
- Biological Resources: The upgrades within the WWTP would not impact biological resources as the area is already disturbed and developed. The proposed distribution pipelines would be constructed within road rights-of-way. The location of the storage tank and pump station near the campus entrance is within a previously developed area. There are no vegetation communities, sensitive habitats, special status plants and wildlife species in the main residential campus entrance area. Less-than-significant impacts to biological resources would occur.
- Cultural Resources/Tribal Cultural Resources: The location of the storage tank and pump station near the campus entrance is within the Cowell Lime Works Historic District which is NRHP and CRHR listed. Construction of a water tank in the area could adversely affect the historic district. With respect to impacts on previously unknown

cultural resources and tribal cultural resources, and human remains during ground disturbing activities, those would be expected to be reduced to a less-than-significant level with implementation of mitigation measures.

- **Energy:** It is likely that pumps would need to be installed and used to move water from the wastewater treatment plant to the LRDP area, and then up to the colleges. Although this would consume more energy, given the necessity of water, this use of energy would not be wasteful, and energy impacts would likely be less than significant.
- **Geology and Soils:** The pipelines and upgrades within the existing WWTP would have less than significant impacts related to geology and soils. The location of the storage tank and pump station near the campus entrance is underlain by schist which is considered suitable for siting of such a facility. Impacts related to erosion and sedimentation during construction would be avoided by the implementation of a storm water pollution prevention plan (SWPPP) in compliance with NPDES requirements.
- **Greenhouse Gas Emissions:** Due to the nature of the project, which typically uses small amounts of electricity and does not create other notable GHG emissions, its operational emissions of GHG are expected to be minimal.
- **Hazards and Hazardous Materials:** Any hazardous materials used to treat wastewater up to Title 22 standards would be subject to State laws and local regulations related to storage and handling, and similar hazardous materials are currently used at the WWTP. Less-than-significant impacts from hazards and hazardous materials would occur.
- **Hydrology and Water Quality:** The project would not substantially increase the amount of impervious areas. In compliance with the NPDES requirements, implementation of a SWPPP would control discharge of sediment and pollutants into runoff during construction. Less-than-significant impacts to hydrology and water quality would occur.
- **Land Use and Planning:** The upgrades would be within the existing WWTP and all proposed distribution pipelines would be constructed within existing road rights-of-way. The location of the storage tank and pump station near the campus entrance is designated as Facilities & Support in the 2021 LRDP. The storage tank and pump station would be consistent with this designation and no impact would occur.
- **Mineral Resources:** There are no mineral resources in any of the areas where the project would be constructed. There would be no impact.
- **Noise:** Construction noise impacts would be reduced to less than significant levels with mitigation. Project operation could elevate noise levels in the vicinity of the WWTP and pump stations. There are no receptors near the WWTP that would be affected. Regarding pump stations, with acoustical enclosures, the pump station noise would result in a less-than-significant impact.
- **Population and Housing:** There would be no impacts to population and housing as no increases in local or regional population would occur as a result of project implementation.
- **Public Services and Recreation:** There would be no impacts to public services and recreation as no increases in local or regional population would occur as a result of project implementation.
- **Transportation:** No new permanent employees would be expected to be added due to project implementation, so no notable vehicle trips would be generated. During construction of the project, lane closures to install the pipes could be required, which could result in some temporary traffic congestion. The impact would, however, be temporary and less than significant.
- **Utilities and Services Systems:** The project would have no adverse impacts on other utilities including water and solid waste. The project would offset potable water demands, which would be considered beneficial.
- **Wildfire:** The project would not be constructed adjacent to or within wildfire areas. Potential pipelines would be constructed subsurface and within existing road rights-of-way. No impacts are anticipated.

As shown above, the project would largely result in less-than-significant impacts, with the exception of two impacts related to the Cowell Lime Works Historic District that could be reduced to less than significant through relocation of the proposed water storage tank on the main residential campus.

Potential Environmental Impacts Associated with a City Desalination Plant

Desalination plants treat ocean/brackish water and remove the salts so it can be used as potable water or in the same manner as recycled water. Desalination plants are uncommon in California, and typically face regulatory approval and cost challenges. However, locally there is a desalination plant in Sand City on the Monterey Peninsula and some plants have also been constructed in Southern California (such as in Carlsbad), so they are potentially feasible.

The City will consider desalination in the event that the efforts related to the Regional Recycled Water Facilities Planning Study do not achieve the targeted reductions in potable water needs for the City. For the purposes of this analysis, it is assumed that up to a 3.3-mgd (approximately 1,200 MGY) desalination plant may be required, although the formal design and construction timing of such a facility have yet to be determined. Such a facility would require permits from numerous local, state, and federal agencies, including the City, the County, the US Army Corps of Engineers, the US Fish and Wildlife Service, California Coastal Commission, California Department of Fish and Wildlife, the Regional Water Quality Control Board, and others. Due to its inclusion in the City's UWMP and Water Supply Augmentation Plan as a potential future water source, it is evaluated to the extent feasible herein for its environmental impacts.

In order to provide up to 3.3 mgd of desalination capacity through seawater reverse osmosis, the City would likely consider the following primary facilities as part of the project:

- A seawater intake and conveyance system (consisting of an intake structure, intake pipeline, pump station, and transfer piping) or use of subsurface radial collector wells. Three alternatives are under consideration by the City for the seawater intake system or subsurface radial collector wells.
- A seawater desalination plant that would provide for pre-treatment processing, desalination treatment and energy recovery, post-treatment processing and distribution, brine storage and disposal, residuals handling and disposal, chemical systems, and their associated support facilities. Three site alternatives are under consideration for the desalination plant site, which are all located near the intersection of Delaware Avenue and Natural Bridges Drive in an industrial area in the western portion of Santa Cruz.
- A brine disposal and conveyance system consisting of brine storage at the desalination plant, a new pipeline to the City's WWTP outfall, and outfall improvements; and
- Potable water distribution system improvements, consisting of a new connection to the City distribution system and new pipelines and pump station improvements.

A project, which was proposed jointly by the City and SqCWD and evaluated in the 2013 Regional Seawater Desalination Project EIR (State Clearinghouse No. 2010112038), is considered to be of similar scale and, for the purposes of this analysis, an indication of potential impacts associated with a City desalination plant. Based on the analysis presented in the 2013 EIR, the City desalination plant would likely have the following impacts:

- **Aesthetics:** Construction of a new desalination plant would increase light and glare in the area it is constructed. The impact related to light and glare would be reduced to a less than significant level with implementation of a mitigation measure to require lighting to comply with the most recent Leadership in Energy and Environmental Design for New Construction (LEED-NC) guidelines for light pollution reduction. Additionally, there would be less than significant impacts to scenic vistas, scenic resources, and the project would not change the visual character of the area.
- **Agriculture and Forestry Resources:** The project components would be located within areas that are designated Urban and Built-up Land by the FMMP. There would be no impacts to agriculture or forest lands.
- **Air Quality:** Other than short term emissions during the construction of the project which would be mitigated by standard dust control measures, the project would not result in substantial emissions of criteria pollutants and toxic air contaminants. Air quality impacts would likely be less than significant.
- **Biological Resources:** There could be a significant and unavoidable impact associated with conflicts with local policies related to the protection of monarch butterfly overwintering sites, depending on the location selected.

  Offshore construction activities could affect marine life and habitats; however, the impact would be reduced to less than significant with mitigation. Based on design, the operation of the seawater intake system would not

have a substantial adverse effect on special-status or other marine species. Nor would the operation of the seawater intake system substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; or threaten to eliminate a plant or animal community.

Construction-related impacts to special status species, riparian habitat, jurisdictional waters and wetlands, wildlife movement, and conflicts with local plans and policies (except regarding local policies protecting monarch butterfly) would all be reduced to less than significant with mitigation.

- Cultural Resources/Tribal Cultural Resources: Impacts from inadvertent discovery of cultural resources, tribal cultural resources, and human remains would be reduced to a less-than-significant level with implementation of mitigation measures.
- Energy: Other than the short-term energy expenditure during the construction of the project, due to its nature, the project would not result in substantial energy consumption. Energy impacts would likely be less than significant.
- Geology and Soils: With implementation of mitigation measures, impacts related to geologic hazards and soil conditions would be reduced to a less-than-significant level.
- Greenhouse Gas Emissions: Less-than-significant impacts would occur related to GHG emissions as the desalination project would comply with the City's Green Building Program and would be net carbon neutral.
- Hazards and Hazardous Materials: Hazardous exposure to workers due to accidental spills and/or release of chemicals would be mitigated to less-than-significant levels with implementation of proper storage, containment, and emergency controls. Construction impacts related to encountering contaminated soils during construction and the impact from use of hazardous materials near schools would be reduced to a less than significant level with mitigation.
- Hydrology and Water Quality: With implementation of mitigation measures, onshore and offshore construction water quality impacts would be reduced to less than significant. Operation on the proposed desalination plant could increase the rate, amount, or quality of surface runoff in a manner that could result in substantial erosion or siltation on- or off-site, or provide substantial additional sources of polluted runoff. Mitigation measures would be implemented to reduce to a less-than-significant level. The project would dilute the brine from the desalination process by combining it with the City's WWTF effluent prior to discharge through the existing WWTF outfall to avoid potential adverse effects of elevated salinity on the marine environment.
- Land Use and Planning: Construction and operational impacts related to land use and planning would be reduced to a less-than-significant level with mitigation.
- Mineral Resources: There are no mineral resources in any of the areas where the project would be constructed. There would be no impact.
- Noise: Construction and operational impacts related to noise would be reduced to less-than-significant levels with mitigation.
- Population and Housing: The project would not add any people or housing to the project area, nor would it displace any people or homes. No impact would occur.
- Public Services and Recreation: There would be no impacts to public services and recreation as no people would be directly added to the City or other communities due to the project.
- Transportation: As no people would be added due to project implementation, no vehicle trips would be generated. No impacts due to operational traffic would occur. Prior to construction of the project, a traffic control plan would be prepared and implemented which would reduce any temporary construction impacts to a less than significant level.
- Utilities: An operational impact related to wastewater systems could be potentially significant. Implementation of a mitigation measure would reduce the impact to a less-than-significant level.
- Wildfire: The project would not be constructed adjacent to or within wildfire areas. No impacts are anticipated.

As shown above, other than a significant and unavoidable impact related to a conflict with a local policy for the protection of biological resources, all of the impacts of the desalination project would be less than significant with incorporation of appropriate mitigation.

Groundwater Recharge

In-Lieu Transfers (Passive Recharge)

In normal years, the City receives more rainfall than is needed to meet SCWD customer demand, and the additional water can be stored in Loch Lomond Reservoir. The adjacent SqCWD and/or SVWD rely on groundwater to serve their customers. Using in-lieu water exchanges, available winter flows could be delivered to SqCWD and/or SVWD customers, thus allowing reduced pumping by one or both water districts from these regional aquifers and enabling the aquifer to passively rest and recharge. The City's concept for this alternative is to start quickly as a small pilot program, for which a negative declaration was filed in 2015, relying on existing infrastructure to provide potable water to the SqCWD. The program could grow over time, if/as additional infrastructure is developed, additional agreements are reached with SqCWD and SVWD, and any needed changes to water rights are granted by the State of California.

Aquifer Storage and Recovery (Active Recharge)

With aquifer storage and recovery, available winter flows would be injected into aquifers through new and existing wells owned by the SCWD, SVWD and/or SqCWD, thereby actively recharging aquifers. The water would be effectively banked in the aquifers to be extracted and returned to SCWD as a supplemental supply when needed in future dry years. This program could proceed through evaluation and piloting steps and, if successful, can be implemented on a scale sufficient to meet the yield goals of the plan. This alternative could be implemented by using existing infrastructure (wells, pipelines, and treatment capacity) and potential new infrastructure (wells, pipelines and treatment capacity) in the regionally shared Purisima aquifer in the Soquel-Aptos basin and/or in the Santa Margarita/Lompico/Butano aquifers in the Scotts Valley area.

Because both in lieu transfers and ASR options are based on water transfers between water districts and the recharge of the groundwater basin using surface water, both options are generally similar in terms of infrastructure needs. Both options would rely on the use of existing facilities that include water diversions, water treatment facilities, pumps and pipelines and wells, and both options would involve, in varying degrees, improvements to existing diversions, water treatment plant upgrades, additional pump stations, interties, and new wells (for active recharge).

Campus Initiatives to Reduce/Offset Potable Water Supply Demands

Water conservation measures are common throughout California, ranging from use of recycled water (discussed above), repairing leaking infrastructure, replacing older faucets and other plumbing fixtures, using drought-tolerant landscaping, and other measures. Moreover, in drought-prone California, intensive use restrictions (limiting landscape irrigation, reducing toilet flushing, public information campaigns, tiered pricing) have proven successful at substantially reducing water during severe drought periods.

At UC Santa Cruz, the university's WAP, which began implementation in 2013 and was updated in 2017, requires UC Santa Cruz to reduce water use per campus user by 20 percent by 2020 and 36 percent by 2025, which corresponds to Element 0 of the City's Water Supply Augmentation Plan. To date, UC Santa Cruz has already achieved the target reductions provided in the WAP, which are in excess of the City's plan targets. The 2017 WAP also included several additional opportunities that UC Santa Cruz continues to evaluate on a project-by-project basis, as funding is available. These additional measures include:

- developing water reduction targets based on use type for the entire LRDP area to further water conservation practices and usage reduction in non-drought conditions;
- employing, where feasible, the use of non-potable water sources for irrigation purposes;
- continually identify and replace aging infrastructure to reduce leakage and system inefficiencies;
- removing turf or other high-water-demand vegetation to the extent feasible; and
- replacing single-pass cooling systems.

The ability for UC Santa Cruz to consider further on-site water recycling efforts, similar to the City's current undertaking, is subject to funding availability for individual projects. However, UC Santa Cruz has demonstrated a desire to incorporate on-site water recycling, as evidenced by the Student Housing West project, and the impacts of such efforts would be site-specific but typically are restricted to operational noise, construction air quality, and operational odors, all of which can typically be mitigated. Additionally, UC Santa Cruz would comply with any service area wide water restrictions and mandatory use curtailment imposed by the City in response to a declaration of water shortage emergency and/or if the City establishes a service area wide moratorium on new connections because of a water shortage emergency.

In summary, the City of Santa Cruz and UC Santa Cruz are pursuing or can pursue a variety of alternatives to both increase supply and reduce demand for water. Some alternatives, such as recycled water and conservation, are more probable than others, such as desalination, based on permitting challenges and cost.

Potential Impacts if 2021 LRDP Development is Curtailed Due to Insufficient Water Supply

As described above, there is currently insufficient water supply, particularly during multiple dry years, to serve the long-term needs of the City of Santa Cruz, including full implementation of the proposed 2021 LRDP. A number of alternatives are being considered to supplement supply. Because many of them are common supplemental supply sources (such as recycled water and more conservation), there is a reasonably high probability that the City will be able to successfully supplement its water sources. This would not likely eliminate the need to impose stringent conservation measures, as the City already does, during multiple dry years. This is common in California, where occasional drought is an expected part of life in the state.

However, this would not remedy the uncertainty surrounding the water service boundary. While UC Santa Cruz believes the contractual obligations for the City to serve water to the entire campus are clear, the City has taken the position that it is not required to do so, and litigation to resolve this issue is pending as of the date of publication of this Draft EIR.

Approximately 43 percent of housing and 8 percent of academic and support space under the 2021 LRDP is estimated to be located outside the service boundary. The 2021 LRDP would generate an additional demand of 134.6 MGY, so demand in the area outside the service boundary under the 2021 LRDP would be approximately 41.5 MGY.

After evaluating all potential alternatives sources of water, it is apparent that UC Santa Cruz has access to only one potential source of water in the event the City does not provide water beyond the current service boundary, and that is groundwater. As discussed previously and in Section 3.10 (Hydrology and Water Quality), 4 test wells were installed in the late 1980's in the Jordan Gulch area of the main residential campus to evaluate groundwater resources. A sustainable flow rate equal to approximately 48.6 MGY (133,150 gpd) was produced with no discernible downstream effects. None of the springs or streams downstream of the main residential campus showed any signs of reduced flow. These wells have not been used for water supply since they were installed.

Section 3.10-5 of this EIR evaluates the potential of using groundwater to supply water to UC Santa Cruz. The analysis evaluated use of up to 12 MGY (36.9 AFY) and concluded no adverse groundwater effects, including to offsite springs, would result. This is, in part, because the hydrology analysis concluded that the main residential campus is estimated to store approximately 977 MG of groundwater, and that approximately 181 MGY leaves the main residential campus as subsurface flow. The 12 MGY is around one percent of the storage capacity and less than one percent of the total surplus groundwater that flows off campus. While the hydrology analysis did not evaluate using as much as 42.4 MGY, this quantity is only 3 percent of the total subsurface flow that leaves the campus. Further, this is less than the sustainable flow rate tested in wells in the Jordan Gulch area. It is conceivable that sufficient groundwater, if treated, could be used to supply potable water to the area outside the water service boundary.

Assuming a well field, pumps, delivery pipelines, and a water treatment plant (approximately 2 acres assumed) were constructed, the following Impacts of using this groundwater may result:

- Aesthetics: Impacts would primarily be associated with a water treatment plant, as all other infrastructure would be subsurface or low to the ground, and not visible from a distance. However, water treatment plants can be relatively small, with the largest facilities being tanks that are approximately 20-feet high, and it would likely not

be visible off campus due to the fact that most of the campus is shrouded in large trees. Accordingly, aesthetic impacts would be less than significant.

- Agriculture and Forestry Resources: Wells have small footprints, and the water treatment plant would also be on a small site. There would likely be no impacts to agriculture or forest lands.
- Air Quality: Other than short term emissions during the construction of the facilities which would be mitigated by standard dust control measures, the operations would only produce minor emissions as a result of pumps and water treatment plant use, which would be electric powered. Air quality impacts would likely be less than significant.
- Biological Resources: There could be minor impacts to sensitive species as a result of construction noise and vibration and pipeline construction, but these impacts could be reduced or avoided by careful siting and implementation of 2021 LRDP measures related to avoidance and monitoring.
- Cultural Resources/Tribal Cultural Resources: Impacts from inadvertent discovery of cultural resources, tribal cultural resources, and human remains could occur during construction, particularly pipeline trenching, but would be reduced to a less-than-significant level with implementation of 2021 LRDP mitigation measures.
- Energy: Energy would be needed to operate pumps and a water treatment plant, but such energy use would not be considered wasteful and therefore Energy impacts would likely be less-than-significant.
- Geology and Soils: With implementation of mitigation measures, impacts related to geologic hazards and soil conditions would be reduced to a less-than-significant level.
- Greenhouse Gas Emissions: Less-than-significant impacts would occur related to GHG emissions as the energy use would be relatively minimal and would comply with the UC carbon neutrality policies.
- Hazards and Hazardous Materials: Hazardous exposure to workers due to accidental spills and/or release of chemicals would be mitigated to less-than-significant levels with implementation of proper storage, containment, and emergency controls.
- Hydrology and Water Quality: Additional study would be needed to determine how much groundwater could be extracted and still have no effects on downstream springs. In addition, the karst aquifer system is not well understood. Ongoing groundwater level and spring flow monitoring would be needed, but if UC Santa Cruz committed to using groundwater to supply water to this area of the 2021 LRDP, there is a potential for a significant impact. However, the data discussed above suggests there may be sufficient groundwater to serve this area without adversely affecting downstream uses.

  No other impacts would be expected.

  As shown above, there is a potential for a significant impact related to hydrology related to downstream springs. While such an effect is not likely, additional study would be needed to draw a conclusion.

Potential Environmental Impacts Associated with No 2021 LRDP Development Above Water Service Boundary

If service to the area outside the water service boundary is not provided and use of groundwater is infeasible or restricted due to downstream impacts, development under the 2021 LRDP would be curtailed. Academic/administrative or residential uses outside of the current boundary would not be developed and enrollment would be limited to match the number of student beds that would be constructed within the current City-designated water service area boundary. 2021 LRDP development would be curtailed as follows:

- Approximately 4,800 new student beds would be constructed instead of 8,500 student beds under the proposed 2021 LRDP. (About 3,700 student beds that are planned for the north campus under the proposed 2021 LRDP would be eliminated.)
- The projected enrollment level would be reduced to 24,300 FTE, compared to the 28,000 FTE under the 2021 LRDP to align with the reduction in planned student housing, such that all additional students above the 2005 LRDP would be housed on campus.

- The employee housing identified in the 2021 LRDP could be relocated within other envisioned employee housing areas under the 2021 LRDP, resulting in no decrease in future employee housing.
- The projected increase in employees (i.e., faculty/staff) would be reduced to 1,232 FTE, compared to the 2,200 FTE under the 2021 LRDP to align with the reduction in student enrollment.
- Approximately 200,000 assignable square feet (8 percent) of the total academic/administrative and support space envisioned under the 2021 LRDP would not be constructed, as it is also currently envisioned outside of the City's water service boundary.

The potential environmental impacts associated with this scenario would be as follows:

- **Aesthetics:** Changes to the visual environment under this scenario would be similar to those under the 2021 LRDP, but the degree of change would be somewhat reduced as less overall development would be constructed. Development on the central and lower campus that is more visible than areas above the City water service area boundary would still occur and would result in similar changes in long-distance views and visual character as the 2021 LRDP. Mitigation identified for the 2021 LRDP would still be required to reduce impacts along designated scenic roadways and to reduce the potential for light spillover and skyglow as a result of campus development. The overall aesthetic impacts would be similar to that of the 2021 LRDP, and the impacts would be reduced to less than significant with incorporation of the same mitigation measures. (*Similar impact*)
- **Agriculture and Forestry Resources:** The small conversion of agricultural land to non-agricultural use would still occur to accommodate anticipated development within the lower portion of the main residential campus. This is a less than significant impact of the 2021 LRDP. Additionally, impacts to forestry resources would also be less than significant with adherence to requirements related to the preparation and implementation of Timber Harvest Plans and Timber Conversion Permits. Nonetheless, due to the lesser level of development that would occur within forested areas of the campus, overall impacts to forestry resources under this scenario would be less than those under the proposed 2021 LRDP. *(Less impact)*
- **Air Quality:** Because there would be no development above the City water service area boundary, this scenario would include less development of residential and academic building space than would occur under the proposed 2021 LRDP, and the campus population increase would be smaller under this scenario. As with the proposed 2021 LRDP, large-scale construction projects or a number of campus projects could occur simultaneously which could result in construction emissions that exceed applicable thresholds; however, any such exceedance would likely be for shorter periods of time due to the reduced amount of new development under this alternative. Thus, construction-related air quality impacts would be reduced compared to those under the 2021 LRDP. Mitigation would still be required, and significant and unavoidable impacts from construction could still occur. Operational air impacts under this scenario would be similar in nature to those described for the 2021 LRDP but reduced in magnitude because of the smaller population and building space increase. As with the 2021 LRDP, it is possible that operational emissions could exceed MBARD operational thresholds. Mitigation of operational emissions would still be required, but it is possible thresholds would still be exceeded. For this reason, operation-related air quality emissions would likely remain significant and unavoidable. *(Similar impact)*
- **Biological Resources:** This scenario would result in an overall reduction in the area of land disturbance as development above the City water service area boundary would be avoided. However, the scenario would result in similar impacts on the central and lower campus. Because habitat for special-status plant and wildlife species, as well as riparian habitat, wetlands, wildlife movement corridors and nursery sites are present in the central and lower campus, implementation of this scenario would result in all of the significant impacts described in Section 3.5, "Biological Resources," and implementation of the same mitigation measures would still be required in order to reduce the significant impacts to less-than-significant levels. However, because of the reduced development footprint, there would be slightly reduced impacts to biological resources compared to the 2021 LRDP. (*Less impact*)
- **Cultural Resources:** While the reduced development footprint and earth-moving/construction activities under this scenario would reduce the potential to encounter and disturb archaeological resources or unknown human remains, significant impacts on archaeological resources and unknown human remains could still occur from

development on the lower and central campus, and the same mitigation would be required to reduce impacts to archaeological resources and compliance with regulations would be required to avoid impacts on human remains. Regarding historic resources, likely impacts under this scenario would be the same as under the proposed 2021 LRDP as no historic resources are present in the portions of the north campus that would be developed under the 2021 LRDP and avoided under this scenario. The same mitigation would still be required to ensure, where feasible, that future projects would not result in damage to or destruction of a building or structure that is a designated historic resource or eligible for listing as a historic resource or a potential historic resource that has not yet been evaluated. As with the proposed 2021 LRDP, redevelopment within the main residential campus under this scenario could result in the loss of historic buildings. Therefore, impacts would still be significant and unavoidable. *(Similar impact)*

- **Energy:** Under this scenario, reduced development would occur, which would result in reduced construction activities and less fuel use during construction, as well as less energy demand associated with the operation of new campus structures. As with the 2021 LRDP, the impacts related to energy would be less than significant. *(Less impact)*
- **Geology and Soils:** Under this scenario, development on the north campus would be avoided although development on the central and lower campus would occur in the same manner as under the proposed 2021 LRDP. Because the development footprint of this alternative would be reduced compared to the proposed 2021 LRDP, impacts related to geology and soils would be slightly reduced compared to the proposed 2021 LRDP. *(Less impact)*
- **Greenhouse Gas Emissions:** Because the amount of development would be reduced under this scenario as compared to the proposed 2021 LRDP, construction and operational GHG emissions would be reduced. The volume of GHG emissions to be mitigated may be less although development under this scenario would also be subject to the UC Sustainable Practices Policy. Therefore, due to less development on campus compared to the proposed 2021 LRDP, impacts would be slightly reduced. *(Less impact)*
- **Hydrology and Water Quality:** Earth-moving activities associated with construction under this scenario would affect hydrology and water quality similar to the construction activities under the proposed 2021 LRDP. The types of impacts include reduced groundwater recharge, alterations to existing drainage systems, and effects on the 100-year floodplain. Mitigation measures are recommended to reduce these impacts to less-than-significant levels. Existing regulations and permitting requirements, such as NPDES permit conditions and a SWPPP, would also be required to reduce water quality impacts to less-than-significant levels. Because this scenario would involve less development within currently undeveloped areas, alterations to existing drainage systems and coverage of groundwater recharge areas may be slightly reduced compared to the proposed 2021 LRDP. Although a lesser level of development would occur, the degree to which these measures would need to be implemented would likely be similar. Therefore, impacts would be less but would remain less than significant with mitigation. *(Less impact)*
- **Mineral Resources:** No known mineral resources occur within the LRDP area. As a result, this scenario would result in no impact, similar to the proposed 2021 LRDP. (*Similar impact*)
- **Noise:** This scenario would result in less overall development, and thus, would generate less construction and operation-related noise, potentially over a shorter period of time. This scenario would avoid development in the northern portion of campus which would likely have limited or no noise impacts on off-campus receptors. Regarding long-term increases in traffic noise, the on-campus population under this alternative would be reduced, which would result in lesser daily vehicle traffic and associated noise on project-affected roadways to the project. However, as noted in Section 3.12, "Noise," roadway noise impacts would be less than significant. Therefore, similar impacts would occur, including a significant and unavoidable impact with respect to construction noise. *(Similar significant and unavoidable construction-related impact; less operation-related impacts but still less than significant)*
- **Population and Housing:** Under this scenario, UC Santa Cruz would still provide a student bed for each new student above 19,500, similar to the proposed 2021 LRDP. Therefore, similar to the proposed 2021 LRDP, no new students would seek off-campus housing under this scenario. This scenario would reduce enrollment and the

amount of new academic/administrative and support space on campus, which would reduce the number of new faculty/staff that would be present at the main residential campus. As a result, the demand for new faculty/staff seeking housing in the area would likely be less than under the proposed 2021 LRDP and would also be less than significant. Implementation of this scenario would similarly not result in unplanned growth in campus population, and impacts would be less than significant. *(Similar impact)*

- Public Services: Although fewer students and employees would be present on the campus under this scenario, impacts to public services would likely be similar in terms of overall demand for public services. For example, modernization/replacement of the existing on-campus fire station would likely still be required. As a result, impacts would be similar to those of the proposed 2021 LRDP and would be less than significant. *(Similar impact)*
- Recreation: Although fewer students and employees would be present on campus under this scenario, fewer recreational facilities associated with those students would be provided. As a result, the impacts related to recreation would be similar to those of the proposed 2021 LRDP and would be less than significant. *(Similar impact)*
- Transportation: The development of less student housing and academic/administrative and support space would reduce on-site population, such that overall VMT would be reduced. However, similar transportation demand reduction measures to reduce VMT associated with faculty/staff commutes would be necessary in order to ensure a less-than-significant impact. Consistency with policies related to alternative transportation (transit, bicycle, and pedestrian) would be similar. *(Similar impact)*
- Utilities and Service Systems: Because this scenario would result in less overall development on campus, demand for utilities and service systems may be somewhat reduced when compared to the proposed 2021 LRDP. Similar to the 2021 LRDP, campus development would increase water consumption needs and wastewater generation. Campus potable water supplies would continue to be derived from the City, though potable water demand would be lower under this scenario due to the smaller increase in campus population, new student housing and new academic and administrative space on campus. Nonetheless, the incremental demand for water on the campus under this scenario may still result in a significant impact on water supply as it would contribute to the need for the City to develop new water supply sources to address the gap between supply and demand under multi-dry water year conditions. With respect to wastewater treatment and conveyance capacity, adequate capacity would be available, although the degree to which additional flows would occur would be less than the proposed 2021 LRDP. As under the proposed 2021 LRDP, impacts on utilities would generally be less than significant; however, water supply impacts would remain significant and unavoidable. *(Less impact)*
- Wildfire: Development under this scenario would still require the continued implementation and adaptation of existing UC Santa Cruz wildfire risk reduction and evacuation procedures. Impacts would be less than significant, similar to the proposed 2021 LRDP. (*Similar impact*)

Nonetheless, as noted above and taking into consideration existing, feasible water demand reduction and alternative water supplies, UC Santa Cruz's remaining water demand with implementation of the 2021 LRDP would contribute to the need for the City to further restrict water deliveries or secure a new water source for multiple dry water year conditions. As set forth above, the development of a new water source would have the potential to result in significant and unavoidable environmental impacts. The 2021 LRDP would therefore result in a significant impact.

Mitigation Measures

Mitigation Measure 3.17-1a: Require Implementation of Measures Consistent with City Drought Measures

If and when the City of Santa Cruz implements drought emergency management measures, UC Santa Cruz shall implement the following measures for the duration of the drought emergency:

- Reduce use of potable water for irrigation of campus landscaping, including the Arboretum, in accordance with reductions required by the City for similar users;
- Utilize water from the existing supply well in Jordan Gulch. UC Santa Cruz shall implement a program of monitoring flow at downgradient springs during the time when the well is being used;

- Require academic/administrative water use on campus be reduced, consistent or in excess of the City's target for business facilities; and
- Require residential water use on campus be reduced, consistent or in excess of the City's target for multifamily residential facilities.

Mitigation Measure 3.17-1b: Evaluation and Implementation of Additional Water Conservation Measures

Within one year following approval of the 2021 LRDP, UC Santa Cruz shall consult with the City of Santa Cruz regarding the appropriate scope of and initiate an engineering audit of campus water use, similar to the previous audit completed in 2007. The audit will assess existing campus water uses, identify additional options for reducing water consumption, prioritize feasible improvements based on the amount of potential water savings and cost effectiveness (and in light of measures already completed by UC Santa Cruz), and recommend top priority measures for implementation within the succeeding five years, and lower priority measures for potential subsequent implementation. The audit will include, but will not be limited to the following:

- An inventory of plumbing fixtures in non-housing facilities on campus, which will identify the number and locations of fixtures and identify those that do not meet current campus standards for water efficiency;
- An inventory of irrigation systems on the campus, including identification of systems that are not metered, the methods used to control the irrigation schedule, and potential for improvement;
- An inventory of locations on campus where buildings and irrigation are on the same meter;
- An analysis of potential water conservation measures for the campus cooling water system; and
- Identification of landscaped areas on campus that have plants that are high water-use.

Following completion of the audit, UC Santa Cruz shall implement measures determined in cooperation with the City of Santa Cruz to address issues identified in the audit. In addition, UC Santa Cruz shall also provide an internal audit every five years with an external audit every ten years on the level of implementation of identified measures, as well as identifying and requiring implementation (where feasible) of potential new technologies or measures from other regional/local studies that could be implemented moving forward. As part of this effort, UC Santa Cruz shall consider necessary updates to the UC Santa Cruz Water Action Plan and coordinate with relevant campus departments.

Significance after Mitigation

No additional mitigation measures are feasible at this stage of plan development. As noted above with respect to project-specific considerations, additional on-site water recycling and water demand reduction measures may be feasible but would be subject to technological demands and funding. As a result, it would be speculative to assume that implementation of additional measures would reduce the campus's water demand sufficiently to avoid or substantially reduce the 2021 LRDP's significant impact on water supply. As a result, if 2021 LRDP development is curtailed to eliminate development outside the City's current water service area boundary, impacts would be **significant and unavoidable**.

Impact 3.17-2: Require Construction of New/Expanded Water Infrastructure

Implementation of the 2021 LRDP could require new water connections or expanded water conveyance systems. However, the construction of new or expanded water infrastructure are comprehensively analyzed in this EIR. This impact is considered **less than significant**.

As noted in Chapter 2, "Project Description," development under the 2021 LRDP could require new water connections or expanded water conveyance systems, and new on-campus infrastructure would be provided as development is proposed and is constructed within the LRDP area. Potential improvements could include new water mains within the main residential campus, connections to new buildings on campus, the installation of purple lines for conveyance of recycled water, or infrastructure for City-related new water sources. As also noted above and in Section 3.10, "Hydrology and Water Quality," UC Santa Cruz, as part of its ongoing sustainability efforts, evaluates the potential for on-site water

recycling on a project-by-project basis, as demonstrated by Student Housing West (refer to Chapter 4, "Cumulative Impacts" for further information regarding this planned-but-not-operational project under the 2005 LRDP). However, no campus-wide plan for water recycling is proposed as part of the LRDP. General construction impacts anticipated to result from implementation of the 2021 LRDP, including the construction of new water-related infrastructure (e.g., connections or expanded water conveyance systems), are comprehensively analyzed in this EIR (e.g., within 3.3, "Air Quality;" 3.4 "Archaeological, Historical, and Tribal Cultural Resources;" 3.5, "Biological Resources;" 3.10, "Hydrology and Water Quality;" 3.12, "Noise;" and 3.16, "Transportation"), Further, as required by law, all connections would be constructed in accordance with all applicable building codes and applicable standards to ensure an adequately sized and properly constructed water conveyance systems. Thus, the potential impacts resulting from the extension of water infrastructure within the UC Santa Cruz main residential campus or improvements at the Westside Research Park are addressed by this EIR's analysis. Regarding infrastructure for City-related new water sources, environmental impacts from the development of new water sources by the City are set forth in Impact 3.17-1 above.

Because the impacts associated with the potential construction of new water connections or expanded water conveyance systems are considered as part of the programmatic development and are addressed in the construction impact discussions in the appropriate technical sections of this EIR, based on the analysis, implementation of the 2021 LRDP would not result in the construction of water infrastructure outside of what is proposed as part of this project, nor construction that would have significant environmental impacts. The impact is considered **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.17-3: Require Construction of New/Expanded Wastewater Infrastructure to Comply with Applicable Wastewater Treatment Requirements

Implementation of the 2021 LRDP would not exceed the available capacity of existing wastewater infrastructure nor would it require the construction or expansion of wastewater treatment facilities or conveyance systems that could cause significant environmental effects. This impact would be **less than significant**.

Under the 2021 LRDP, population increases would result in greater levels of wastewater flows, as shown in Table 3.17-11. Under future conditions, on-campus uses are projected to generate up to 0.58 mgd of wastewater, an increase of 0.21 mgd compared to existing conditions. Similar to existing conditions, projected wastewater flows would remain below the existing design capacity of the City of Santa Cruz WWTP, which can treat an average dry weather flow of 17 mgd. As discussed previously, the WWTP currently receives an average daily flow of less than 10 mgd. The project increase is equal to around 2 percent of the current flow and approximately 3 percent of available capacity. The City does not appear to have any immediate plans to add capacity.

Table 3.17-11 Existing and Projected Wastewater Generation

	Existing	Projected Total Campus Demand
Annual Wastewater Generation (million gallons per year)	134	212
Daily Wastewater Generation - Average (mgd)	0.37	0.58
Wastewater Treatment Plant Capacity - Average (mgd)	17	17
Adequate Capacity	**Yes**	**Yes**

Source: Compiled by Ascent Environmental.

Because adequate capacity remains at the WWTP to accommodate projected flows from the campus, no significant impacts would occur. Additionally, and as stated in Chapter 2, "Project Description," several improvements are anticipated within the LRDP area prior to 2040/2041. Currently up to two additional pump stations and several sewer mains may be constructed as part of 2021 LRDP implementation. The 2021 LRDP also includes the proposed relocation of the east trunk line out of Jordan Gulch beneath Hagar Drive, which would also require construction of a lift station within the gulch. The impacts of these improvements are evaluated as part of the overarching analysis of

2021 LRDP development. Based on the analysis, implementation of the 2021 LRDP would not result in the need for construction of additional wastewater collection/treatment infrastructure that would have significant environmental impacts. The impact is considered **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.17-4: Impacts to Solid Waste Facilities and Compliance with Regulations Related to Solid Waste

Implementation of the 2021 LRDP would increase solid waste generation at the main residential campus and Westside Research Park. However, adequate landfill capacity is available at local landfills to accommodate additional solid waste generated by the project. Compliance with the UC Sustainable Practices Policy would continue to reduce landfill disposal of solid waste, consistent with CIWMA, AB 341, SB 1374, AB 1826, and SB 1383. This impact would therefore be **less than significant**.

Under the proposed 2021 LRDP, the total on-campus population, including dependents and non-UC employees, could grow from about 22,300 persons (2018–2019 academic year) to an estimated total campus population of 35,230 persons in 2040-2041, which is an increase of 12,830 persons. Assuming that waste generation rates remain the same as under 2018-2019 conditions (see "Analysis Methodology," above), this would result in an increase in municipal solid waste produced at UC Santa Cruz. However, because of increased diversion rate requirements, landfilled quantities are anticipated to be substantially decreased by 2040 (refer to "Regulatory Setting" related to solid waste). Existing and projected solid waste generation at UC Santa Cruz, as well as the total anticipated amount to be disposed of at the RFF, are shown in Table 3.17-12. As noted above, the landfill has an anticipated closure date of 2058.

Table 3.17-12 UC Santa Cruz Solid Waste Generation

Waste Type	Existing (2018/2019) (tons per year)	Projected (2040/2041) Campus Solid Waste with 2021 LRDP (tons per year)
Total Municipal Solid Waste Generated	4,251	6,693
Municipal Solid Waste Diverted from Landfill	2,189	3,413[1]
Municipal Solid Waste Landfilled at City of Santa Cruz Resource Recovery Facility	2,062	3,280

[1] Calculated based on 2018/2019 diversion rate of 51 percent.

Source: Compiled by Ascent Environmental

The UC Sustainable Practices Policy goals for solid waste include a reduction of 25 percent per capita from FY2015/16 levels by 2025, 50 percent per capita from FY2015/16 levels by 2030, and a diversion of 90 percent of municipal solid waste from the landfill. Meeting these goals would result in a further reduction in the amount of municipal solid waste generated on-campus beyond that shown in Table 3.17-12. In FY2015/16, UC Santa Cruz generated 4,194.7 tons of solid waste (UC Santa Cruz 2020) with a campus enrollment of 17,012 FTE students (or approximately 0.25 tons per FTE student). With a 50 percent reduction in the per capita rate, the 2030 per capita rate would be approximately 0.12 annual tons per FTE student. If UC Santa Cruz achieves this goal in 2030, upon full implementation of the proposed 2021 LRDP, UC Santa Cruz would generate 3,452 tons per year. Assuming the policy diversion rate of 90 percent, only 345 tons would require disposal at the RFF on an annual basis.

Because quantities of landfilled municipal solid waste are projected to decrease through 2040-2041, and the RFF facility has an expected closure date of 2058 with a maximum permitted throughput of 535 tons per day, the 2021 LRDP would not substantially affect landfill capacity such that additional waste disposal facilities would be required. Therefore, this impact is considered **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 3.17-5: Require Relocation or Construction of New Electricity, Natural Gas, or Telecommunications Facilities, the Construction of which Would Result in Significant Environmental Impacts

New energy facilities may be required as part of 2021 LRDP development. However, the impacts associated with new infrastructure are evaluated as part of the overall 2021 LRDP development. New facilities would be constructed to serve proposed development and any relocated facilities would be coordinated with PG&E in order to ensure no interruption of service. Thus, this impact would be **less than significant**.

PG&E provides both natural gas and electricity distribution infrastructure to customers in Santa Cruz County, including the UC Santa Cruz campus. PG&E owns and operates overhead electric transmission and electric distribution facilities as well as gas transmission facilities within the LRDP area. Implementation of the 2021 LRDP would increase energy usage as noted above. However, PG&E periodically prepares load forecasts to ensure the reliability of its electricity/natural gas distribution system. As implementation of the 2021 LRDP would occur over a multi-year period, the projected energy demands of UC Santa Cruz under the 2021 LRDP would be factored into PG&E's load forecasts now and in the future. Though PG&E's total system demand is expected to continue to increase annually, excluding any unforeseen problems, PG&E's plans for new distribution resources would be adequate to serve all existing and new customer loads during implementation of the 2021 LRDP. Upon updating their load forecasts, PG&E may determine a need to provide additional distribution facilities within the campus to serve UC Santa Cruz. Similarly, telecommunication infrastructure upgrades to both the central facility and the distribution lines are expected over the lifetime of the 2021 LRDP for bandwidth, reliability, and flexibility. Construction of energy, natural gas, or telecommunication transmission and/or distribution lines would occur in conjunction with new development under the 2021 LRDP.

General construction impacts anticipated to result from implementation of the 2021 LRDP, including the construction or undergrounding of electricity, natural gas, or telecommunication transmission and/or distribution lines, are comprehensively analyzed in this EIR (e.g., within 3.3, "Air Quality;" 3.4 "Archaeological, Historical, and Tribal Cultural Resources;" 3.5, "Biological Resources;" 3.10, "Hydrology and Water Quality;" 3.12, "Noise;" and 3.16, "Transportation"). Further, as part of the 2021 LRDP and as shown in Chapter 2, "Project Description," UC Santa Cruz has anticipated future electricity, natural gas, and telecommunications facilities, based on the envisioned development areas of campus. New facilities that may be required as development occurs under the 2021 LRDP include new electrical lines and a substation within the western portion of the main residential campus, as well as a standby generator facility along Heller Drive. Refer to Chapter 2, "Project Description" for further clarification. As required by law, all utility connections would be constructed in accordance with all applicable building codes and applicable standards to ensure an adequately sized and properly constructed transmission and conveyance system. Any necessary connections would be constructed prior to occupancy and in a manner that would minimize the potential for utility service disruption of existing uses. Thus, the potential impacts resulting from the extension of utility infrastructure to serve new/redeveloped land uses within the UC Santa Cruz main residential campus and the Westside Research Park are evaluated within the scope of this EIR's analysis.

Because the impacts associated with the potential construction of on-site transmission and/or electricity, natural gas, or telecommunication distribution lines are considered as part of the programmatic development and construction impact discussions in the appropriate technical sections of this EIR, based on the analysis, implementation of the 2021 LRDP would not result in the construction of additional utility infrastructure beyond what is proposed/anticipated as part of this project that would have significant environmental impacts. The impact is considered **less than significant**.

Mitigation Measures

No mitigation is required.

3.18 WILDFIRE

This section evaluates the effects of UC Santa Cruz development under the 2021 LRDP on wildfire risk and exposure. The following analysis considers drivers of wildfire risk, and the elements of development under the 2021 LRDP that could add to such risks or expose people or structures to it. This section also provides background and context related to wildfires, including the regulatory setting, and concepts such as wildfire regime and wildfire behavior, and wildfire management practices.

Comments received on the NOP (See Appendix B) related to wildfire raised concerns regarding evacuation routes and procedures, concerns regarding emergency response, questions regarding the applicability of Public Resources Code (PRC) Section 4291 requirements related to fire protection, and questions regarding how undeveloped lands would be managed to reduce fire risk.

3.18.1 Regulatory Setting

FEDERAL

There are no federal regulations related to wildfire that apply to the 2021 LRDP.

STATE

California Building Code

The California Building Standards Code (CBC) (California Code of Regulations, Title 24) provides minimum standards for the design and construction of buildings and structures in California. Minimum standards are organized under Part 1 to 12 and include code standards for buildings, mechanical, plumbing, energy, historical buildings, fire safety, and green building standards. State law mandates that local government enforce these regulations, or local ordinances, with qualified reasonably necessary and generally more restrictive building standards than provided in the CBC. Title 24 is applicable to all occupancies, or structures, throughout California, whether or not the local government takes an affirmative action to adopt Title 24.

California Fire Code

The California Fire Code (CFC) provides standards related to construction, maintenance, and use of buildings. Topics addressed in the CFC include fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazard safety, hazardous materials storage and use, provisions intended to protect and assist fire responders, industrial processes, and many other general and specialized fire-safety requirements for new and existing buildings and the surrounding premises. The CFC contains specialized technical regulations related to fire and life safety. It is located in Part 9 of Title 24 of the CCR.

CFC Chapter 49: Requirements for Wildland-Urban Interface Areas

CFC Chapter 49 provides minimum standards to increase building resistance to the intrusion of flame or burning embers projected by a vegetation fire and identifies performance and prescriptive requirements. Section 4906 provides hazardous vegetation fuel management requirements for buildings and structures located on land in a Very High Fire Hazard Severity Zone (VHFHSZ) in Local Responsibility Areas (LRAs) and land in a Moderate Fire Hazard Severity Zone (MFHSZ), High Fire Hazard Severity Zone (HFHSZ), or VHFHSZ in State Responsibility Areas (SRAs). In addition, Section 4907 requires the local entity with jurisdictional authority over areas designated VHFHSZ in LRAs to maintain defensible space near buildings and structures.

Board of Forestry and Fire Protection

The Board of Forestry and Fire Prevention (Board) is a Governor-appointed body within California Department of Forestry and Fire Protection (CAL FIRE). It is responsible for developing the general forest policy of the state, determining the guidance policies of CAL FIRE, and representing the state's interest in federal forestland in California. Together, the Board and CAL FIRE work to carry out the California Legislature's mandate to protect and enhance the state's unique forest and wildland resources.

The Board is charged with developing policy to protect all wildland forest resources in California that are not under federal jurisdiction. These resources include major commercial and non-commercial stands of timber, areas reserved for parks and recreation, woodlands, brush-range watersheds, and all private and state lands that contribute to California's forest resource wealth. In addition, the Board is responsible for identifying VHFHSZs in SRAs and LRAs. Local agencies are required to designate, by ordinance, VHFHSZ, require landowners to reduce fire hazards adjacent to occupied buildings within these zones, and maintain defensible space (Government Code Sections 51179 and 51182). The intent of identifying areas with very high fire hazards is to allow CAL FIRE and local agencies to develop and implement measures that would reduce the loss of life and property from uncontrolled wildfires (Government Code Section 51176).

PRC Sections 4114 and 4130 authorize the Board to establish a fire plan, which, among other things, determines the levels of statewide fire protection services for SRA lands. The primary goals of the 2019 Strategic Plan are focused on fire prevention efforts. Government Code Section 65302.5 gives the Board statutory authority to evaluate General Plan Safety Elements for their land use policies in the SRAs and VHFHSZs, as well as methods and strategies for wildland fire risk reduction and prevention in those areas.

California Department of Forestry and Fire Protection

CAL FIRE is the state agency, established for fire protection and stewardship of over 31 million acres of the state's privately-owned wildlands and to provide emergency services in 36 of California's 58 counties via contracts with local governments. PRC Section 4291 gives CAL FIRE the authority to enforce 100 feet of defensible space around all buildings and structures in mountainous areas, on forest-covered lands, on brush-covered lands, on grass-covered lands, or on any land that is covered with flammable material. PRC Sections 4790 through 4799.04 provide statutory authority for CAL FIRE to administer the California Forest Improvement Program. PRC Sections 4113 and 4125 give CAL FIRE the responsibility for preventing and extinguishing wildland fires in SRAs). The SRAs do not include lands within city boundaries or in federal ownership. The PRC, beginning with Section 4427, includes fire safety statutes that restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors on construction equipment with internal combustion engines; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided on site for various types of work in fire-prone areas.

2019 Strategic Plan for California

The *2019 Strategic Plan* prepared by CAL FIRE and California Natural Resources Agency lays out central goals for reducing and preventing the impacts of fire in the state (CAL FIRE 2019). The goals are meant to establish, through local, state, federal, and private partnerships, a natural environment that is more resilient and human-made assets that are more resistant to the occurrence and effects of wildland fire. The goals of the *2019 Strategic Plan* include the following:

- improve core capabilities;
- enhance internal operations;
- ensure health and safety; and
- build an engaged, motivated, and innovative workforce.

In addition to the *2019 Strategic Plan,* individual CAL FIRE Units develop Fire Plans, which are major strategic documents that establish a set of tools for each CAL FIRE Unit for its local area. Updated yearly, Unit Fire Plans identify wildfire protection areas, initial attack success, assets and infrastructure at risk, pre-fire management strategies, and accountability within their unit's geographical boundaries. The Unit Fire Plan identifies strategic areas

for pre-fire planning and fuel treatment as defined by the people who live and work locally. The plans include contributions from local collaborators and stakeholders and are aligned with other plans for the area. In April 2018, the San Mateo-Santa Cruz Unit of CAL FIRE prepared a community wildfire protection plan for its area, which includes the LRDP area.

California Vegetation Treatment Program

The California Vegetation Treatment Program (CalVTP), developed by the Board, defines the vegetation treatment activities and associated environmental protections to reduce the risk of loss of lives and property, reduce fire suppression costs, restore ecosystems, and protect natural resources as well as other assets at risk from wildfire. The CalVTP supports the use of prescribed burning, mechanical treatments, hand crews, herbicides, and prescribed herbivory as tools to reduce hazardous vegetation around communities in the Wildland-Urban Interface (WUI), to construct fuel breaks, and to restore healthy ecological fire regimes. CAL FIRE has the primary responsibility for implementing proposed CalVTP vegetation treatments, though many local, regional, and state agencies could also employ the CalVTP to implement vegetation treatments if their projects are within the scope of the CalVTP.

The Program Environmental Impact Report (PEIR) for CalVTP (State Clearinghouse No. 2019012052), certified by the Board on December 11, 2019, provides a project-specific implementation approach for streamlining CEQA review of later site-specific, vegetation treatment projects consistent with the CalVTP and this PEIR, in accordance with procedures described in State CEQA Guidelines Section 15168. The streamlined CEQA review approach would document how a project's environmental effects are covered and which feasible mitigation measures from the CalVTP PEIR are incorporated. This would include evaluation of whether later activities and impacts of site-specific vegetation treatment projects are within the scope of the CalVTP and the PEIR. A "within the scope" finding for later activities would facilitate an increase in the pace and scale of project approvals in a manner that includes environmental protections in compliance with CEQA. Where later vegetation treatment projects do not qualify for a "within the scope" finding, additional CEQA documentation would be prepared.

Executive Order B-52-18

On May 10, 2018, in response to the changing environmental conditions and the increased risk to California's citizens, California Governor Brown issued EO B-52-18 to support the state's resilience to wildfire and other climate impacts, to address extensive tree mortality, increase forests' capacity for carbon capture, and to improve forest and forest fire management. The EO requires the California Natural Resources Agency, in coordination with the Board, CAL FIRE, and other agencies, to increase the pace and scale of fire fuel treatments on state and private lands. EO B-52-18 commits additional state funds for these efforts and calls for doubling the land actively managed through vegetation thinning, prescribed burning, and restoration from 250,000 to 500,000 acres per year to reduce wildfire risk.

Senate Bill 1260

In 2018, Governor Brown signed Senate Bill (SB) 1260, which aims to help protect California communities from catastrophic wildfire by improving forest management practices to reduce the risk of wildfires in light of the changing climate. Among other things, it recognizes that prescribed burning is an important tool to help mitigate and prevent the impacts of the wildfire and includes provisions that encourage more frequent use of prescribed fire in managing California's forestlands. SB 1260 authorizes landowners to conduct prescribed burning to abate fire hazards on brush-covered land, forestland, woodland, grassland, and shrubland in an SRA. In addition, SB 1260 includes provisions for the Board's Vegetative Treatment Program EIR to serve as the programmatic environmental document for prescribed burns.

Senate Bill 901

On September 21, 2018, Governor Brown approved SB 901, which boosts government fire protection efforts by $1 billion over the next five years. CAL FIRE will oversee those funds, generally divided into two categories: $165 million per year for fire prevention grants to landowners and for community prevention efforts, and $35 million to continue CAL FIRE's prescribed burning, research, and monitoring. Landowners will have new permission to help reduce overgrowth by cutting down small and mid-sized trees.

Emergency Response and Evacuation Plans

The State of California Emergency Plan, prepared by the Governor's Office of Emergency Services, was adopted on October 1, 2017 and describes how state government mobilizes and responds to emergencies and disasters in coordination with partners in all levels of government, the private sector, non-profits, and community-based organizations. The Plan, which is a requirement of the California Emergency Services Act, outlines a robust program of emergency preparedness, response, recovery, and mitigation for all hazards, both natural and human-caused. Each local government with a certified disaster council is required to develop its own emergency operations plan (EOP) for their jurisdiction that meet state and federal requirements. Local EOPs contain specific emergency planning considerations, such as evacuation and transportation, sheltering, hazard specific planning, regional planning, public-private partnerships, and recovery planning (Cal OES 2017). UC Santa Cruz adopted its current EOP in November 2016 and is continuing to implement it in compliance with state and federal requirements. The UC Santa Cruz EOP is described in further detail below (UC Santa Cruz 2016).

Prescribed Burn Planning and Implementation

Prescribed burning is a tool used for fire fuel management. Implementing a prescribed burn requires extensive planning, including the preparation of prescription burn plans, smoke management plans, site-specific weather forecasting, public notifications, environmental considerations, and ultimately, favorable meteorological conditions which dictate whether a planned burn can move forward on a given day. These planning efforts are required of any agency planning a prescribed burn and are described in more detail below.

Planning a Prescribed Burn

Areas proposed for prescribed burning are typically identified at the beginning of each season. Prescribed burning often occurs in Spring and Fall, and occasionally in Winter, depending on weather conditions. Prior to prescribed burning, fire containment lines are typically established by clearing vegetation surrounding an area proposed for burning to help prevent the accidental escape of fire.

Once areas suitable for prescribed burning are selected, prescriptions (e.g., wind direction, humidity, weather conditions) are developed in conjunction with modeling in a program to provide specific parameters for burning. The goal is to conduct understory burns, which are safer and minimize long-term damage to vegetation. The goal of understory burns is to conduct a low-intensity burn that burns only the targeted fuel types (i.e., ground and litter fuels). Specific treatment details are described in a prescription burn plan, which incorporates input from review agencies such as the California Department of Fish and Wildlife, local air pollution control districts, and regional water quality control boards, if necessary. Contents of a prescription burn plan also include the date, location, and description of the area in detail, prescriptive weather requirements, fire behavior modeling, the ignition plan, a contingency plan, public notification, a go/no go checklist, and contact information for the burn manager and others in charge of the prescription burn.

CAL FIRE Prescribed Burn Procedures

Incident Action Plan

For every prescribed burn, CAL FIRE also requires the preparation of an Incident Action Plan (IAP) that includes communications and emergency protocols, standard best management practices, and emergency procedures. Specifically, an IAP includes the burn dates; burn hours; weather limitations; the specific burn prescription; a communications plan; a medical plan; a traffic plan; and special instructions such as minimizing smoke impacts to specific local roadways. An IAP also assigns responsibilities for coordination with the appropriate air district, such as conducting onsite briefings, posting notifications, weather monitoring during burning, and other burn related preparations. Development and implementation of the IAP establishes clear safety protocols and minimizes risk during prescribed burns.

Public Notification

Prior to implementing a prescribed burn, CAL FIRE also posts burn information such as burn location and the range of dates in which the burn will occur. This information is disseminated to potentially affected communities, typically in

newspapers and on community bulletin boards. Sometimes press releases that include television and radio coverage are used, as well as social media platforms such as Twitter, to notify the public of upcoming prescribed burns. If planned burns are near public roads, signs are posted at both ends of the roadway segment where prescribed burning will occur.

Executing a Prescribed Burn

CAL FIRE staff required to execute a typical prescribed burn includes an Incident Commander and a field crew. Equipment onsite is determined by the Incident Commander on a case-by-case basis, but typically includes fire engines, large water storage containers, drip torches for ignition, and safety equipment deemed necessary by the Incident Commander. If conditions deviate from the burn plan (e.g., winds change direction, humidity decreases), the burn is rescheduled, and crews transition from active burning activities to patrolling and/or extinguishing. In the event a prescribed burn goes beyond the perimeter of its planned area, the crew on-site works to control the escape.

"Mopping up" occurs after the prescribed burn and includes extinguishing any smoldering material along a fires' edge, and this includes ensuring logs and debris cannot roll across the fire line, making sure all burning fuel is burnt out or is spread or buried to avoids sparks traveling, and clearing all sides of the fire containment line of snags, rotten logs, stumps, singed brush, and low hanging limbs of trees. Crews monitor the area until the fire is completely out.

UNIVERSITY OF CALIFORNIA

UC Santa Cruz Office of Emergency Services

The UC Santa Cruz Office of Emergency Services (OES) was formed on July 1, 2014 under the Associate Vice Chancellor of Risk & Safety Services to house the campus fire marshal, emergency management, business continuity, public education, and mass notification (CruzAlert) functions formerly performed by the UC Santa Cruz Fire Department, as well as to manage the fire services contract with Santa Cruz Fire Department (SCFD). The Campus Fire Marshal was transferred from the UC Santa Cruz Fire Department to OES, and a new Deputy Fire Marshal position was created to assist the Campus Fire Marshal and to take over inspection activities. The Campus Emergency Manager was designated as the Director of Emergency Management and also transferred to OES to oversee emergency management, public education, and mass notification programs. The Director of Emergency Management is also responsible for the fire services contract and is the primary campus liaison to the SCFD.

Emergency Operations Plan

As noted above, UC Santa Cruz adopted its EOP in November 2016. The EOP establishes policies, procedures and an organizational structure for the preparedness, response, recovery and mitigation of disasters and events impacting the main campus and its satellite facilities. The plan also provides guidance to departments, units and activities within UC Santa Cruz with a general concept of potential emergency assignments before, during, and following emergency situations. The UC Santa Cruz EOP adopts the Standardized Emergency Management System (SEMS), an emergency management organizational structure used by emergency response agencies statewide to coordinate response to multi-jurisdictional or multi-agency incidents. By incorporated SEMS, UC Santa Cruz implements the same emergency response organization structure and terminology as other city, county, and state agencies. SEMS incorporates:

- The Incident Command System (ICS), a field-level emergency response system based on management by objectives;
- Multi-Agency Coordination, affected agencies working together to coordinate allocations of resources and emergency response activities;
- Mutual Aid, a system for obtaining additional emergency resources from non-affected jurisdictions;
- Operational Area Concept, a system for coordinating damage information, resource requests and emergency response; and
- National Incident Management System (NIMS), a system for coordinating federal resources and response.

The ICS is a foundation part of the SEMS; it provides an organizational structure that can grow rapidly in response to the requirements of an emergency. The structure identifies employee roles, activates certain positions needed to manage a particular incident or level of emergency, promotes unity of command, and establishes a unified command when multiple jurisdictions or agencies have incident response responsibilities. The UC Santa Cruz EOP also outlines evacuation procedures for building emergencies (Stage 1) and campus-wide emergencies (Stage 2). The procedures and actions that students, faculty, and staff should take during an evacuation are communicated by residential staff assigned to a college, building emergency coordinator in academic/administrative buildings, public address announcement from public safety vehicles, and the CruzAlert system. CruzAlert is the UC Santa Cruz emergency notification system used to quickly communicate information to the campus community during emergency situations (UC Santa Cruz 2016).

In May 2019, UC formed the Systemwide Air Quality Protocol Working Group to evaluate operational- and health-related issues and develop recommendations for how UC campuses should respond to various conditions and potential unhealthy air quality due to smoke from wildfire events. The working group compiled an air quality index (AQI) based decision matrix for wildfire smoke events, which was recommended for implementation at all UC campuses. As evidenced by procedures implemented as part of UC Santa Cruz's response to the CZU Lightning Complex fire, UC Santa Cruz implements the decision matrix and stages the level and type of response/requirements, based on AQI values (UC Santa Cruz 2021).

UC Santa Cruz Fire Safety Standards

As detailed in the UC Santa Cruz Annual Campus Security and Fire Safety Report for the campus, UC Santa Cruz OES conducts evacuation drills during the first few weeks of each academic year for student housing facilities and conducts evacuation drills for other buildings throughout the year. UC Santa Cruz OES also maintains an ongoing schedule of inspections for all buildings to ensure that fire hazards are mitigated and also conducts plan reviews and inspections of building construction and renovation activities. The UC Santa Cruz Physical Plant department is charged with testing and maintaining fire protection systems, including fire alarms and fire sprinkler systems, to ensure that all systems function properly.

Fire alarm systems are monitored by the UC Santa Cruz Police Department (PD) Dispatch Center, and SCFD resources are dispatched to all alarm activations or other reports of fire. Students and employees who refuse to evacuate during an alarm may be subject to disciplinary action in accordance with UC Santa Cruz policies and campus implementing regulations. Students and employees are trained to use stairwells instead of elevators during evacuations, and this is reiterated during evacuation drills. All elevators are equipped with emergency phones that connect directly to the UC Santa Cruz PD Dispatch Center for use if an individual is trapped in an elevator, and the SCFD is trained in elevator rescue techniques (UC Santa Cruz 2019).

LOCAL

As noted in Section 3.0.1, "University of California Autonomy," UC Santa Cruz, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UC Santa Cruz that are in furtherance of its educational purposes. However, UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.

County Office of Emergency Services

The Operational Area Emergency Management Plan (EMP) outlines the County's planned response to emergency situations associated with large-scale emergency incidents within or affecting Santa Cruz County. In addition, EMP outlines the emergency management organizational structure for the Santa Cruz County Operational Area. The EMP is reviewed, updated, republished, and redistributed every four years. The County Office of Emergency Services (County OES) is responsible for maintaining records of EMP revisions (County of Santa Cruz 2015).

City of Santa Cruz Local Hazard Mitigation Plan

The City's 2018 Local Hazard Mitigation Plan, adopted by the City Council on October 9, 2018, identifies fire hazard areas within the City of Santa Cruz and identifies several wildfire mitigation actions, including cooperative fire protection agreements, reduction of fire risk through vegetation management and appropriate code enforcement, promotion of built-in fire extinguishing and warning systems, and fire prevention programs in schools and other institutions (City of Santa Cruz 2018). Fire hazard areas within the City of Santa Cruz include Pogonip City Park, DeLaveaga, Moore Creek Preserve, Arana Gulch, Arroyo Seco Canyon, and the main residential campus. Pogonip City Park is located directly east of the main residential campus, and Moore Creek Preserve is located north of the Westside Research Park. The City and UC Santa Cruz currently maintain a cooperative agreement to collaboratively avoid/minimize the threat from wildland-urban interface (WUI) fires.

City of Santa Cruz Requirements for Wildland-Urban Interface Fire Areas

The City of Santa Cruz adopted, by reference, the Building Construction Requirements and Vegetation and Fuel Management Requirements outlined in Chapter 49 of the California Fire Code. The requirements apply to the WUI areas located in the city. The southern portion of the lower campus is included in WUI Map 3 (City of Santa Cruz 2020a). The Building Construction Requirements include fire- or flame-resistant roofing material, roof vent coverings/screens, exterior siding, skylights, windows, doors, and decks. These requirements apply to all new construction, new materials used for remodels and construction, and accessory structures on the same property. The Vegetation and Fuel Management Requirements include clearing vegetation within 100 feet of structures, removing trees and branches that extend within 100 feet of a chimney/stovetop outlet, clearing roofs of vegetative debris, and maintaining vegetation adjacent to overhanging of a building (City of Santa Cruz 2020b).

3.18.2 Environmental Setting

WILDFIRE BEHAVIOR AND CONTROLLING FACTORS

To understand the context of the wildfire regime at UC Santa Cruz and the interplay of the wildland fire setting and development on campus, some basic wildfire concepts and background information are helpful. Wildfire behavior is a product of several variables, primarily weather, vegetation, topography, and human influence, which together combine to produce local and regional fire regimes that affect how, when, and where fires burn. The fire regime, meanwhile, is characterized by several factors, including fire frequency, intensity, severity, and area burned.

Human Influence on Wildfire

Human influence on wildfire is broad and can be substantial. It includes direct influences such as the ignition and suppression of fires, and indirect influence through climate change and alterations in land use patterns that support modified vegetative regimes and increased development in the WUI (refer to the "Climate Change and Wildfire" section, below, for more discussion on the indirect effect of climate change on wildfire).

Human influence on wildfire most substantially controls fire frequency (i.e., number of ignitions) because humans are responsible for most wildfire ignitions. In California specifically, humans account for starting an estimated 95 percent of wildfires (Syphard et al. 2007, Syphard and Keeley 2015). Human ignitions include a multitude of sources, including escapes from debris and brush-clearing fires, electrical equipment malfunctions, campfire escapes, smoking, fire play (e.g., fireworks), vehicles, and arson. Consequently, areas near human development generate fires at a more frequent rate than very remote or urban areas (Syphard et al. 2007, Mann et al. 2016, Balch et al. 2017). Circumstances in California have made the environment particularly vulnerable to human-caused fires with expansion of the WUI and introduction of more people in areas susceptible to wildfire at all times of the year. A 2018 study indicates that the number of houses in the WUI increased nationwide by 41 percent between 1990 and 2010 (Radeloff et al. 2018).

Climate Change and Wildfire

Wildfires are a significant threat throughout California, especially so in recent years as the landscape responds to climate change and decades of fire suppression. It is estimated that since 1985, more than 50 percent of the increase

in the area burned by wildfire in the western United States is attributable to anthropogenic climate change (Abatzoglou and Williams 2016). As climate change persists, it will produce increasing temperatures and drier conditions that will generate abundant dry fuels. The 2020 Lightning Complex fires were the result of lightning storms coupled with dry fuels that ignited a series of fires throughout Northern California, including Santa Cruz County. Wildfires tend to be larger under drier atmospheric conditions and when fed by drier fuel sources (Balch et al. 2017).

WILDFIRE RISK REDUCTION

Wildfire mitigation and prevention requires a complex and multifaceted approach. Wildfire prevention can generally be categorized as some combination of hazardous fuel reduction projects, fire prevention planning, and fire prevention education. Wildfire prevention programs and hazard reduction efforts by multiple participants, including private landowners, homeowners, non-governmental organizations, as well as local, state, and federal agencies are necessary and must work in concert to maximize effectiveness of all treatments and programs.

Vegetation Management

Vegetation management is the primary approach to wildfire management because it can reduce the intensity and severity of wildfire, slowing fire movement and creating favorable conditions for firefighting to protect targeted, high-value resources (Carey and Schuman 2003, Prichard et al. 2010). Fuel reduction has proven successful where it is targeted at protecting specific resources in limited geographic areas, such as in areas of extreme fire danger or in the WUI (Loudermilk et al. 2014). Areas that are treated often exhibit different fire progression characteristics and reduced fire severity from areas that are not treated (Lydersen et al. 2017, Johnson and Kennedy 2019). Firefighting effectiveness has been reportedly increased by vegetation management treatments, due to increased visibility in treated areas, decreased heat and smoke of wildfire, increased penetration of retardant to surface fuels, safe access to the fire, and the ability to quickly suppress spot fires in treated areas (Kalies and Yocom Kent 2016).

Where treatments have occurred, the pattern of wildfire progression may be limited in some areas to low-intensity underbrush and surface burning, which can create safe conditions for firefighters to successfully suppress fires in areas near homes or other structures, or around areas of high resource value. Fuel treatments also promote faster forest recovery post-fire by causing less damage to soils and leaving some live vegetation within burn areas (USFS 2009), increasing seedling regeneration (Tubbesing et al. 2019), protecting resources such as soils, wildlife, riparian function, and wetlands (Kim et al. 2013), and reducing drought-related tree mortality (Restaino et al. 2019).

Certain treatments, such as hand or mechanical thinning followed by prescribed fire, or prescribed fire alone, are very effective at reducing wildfire severity, and related ecological impacts are often neutral to positive (Winford et al. 2015). Quantitative modeling has provided robust empirical support for the basic principles of tree thinning treatments coupled with the reduction of surface fuels through prescribed burning (Martinson and Omi 2013). Prescribed burning as a follow-up treatment to reduce surface ladder fuels and to eliminate slash (i.e., limbs and branches) generated by mechanical thinning has shown to have the greatest benefit in moderating fire behavior (Martinson and Omi 2013).

Community Wildfire Hazard Reduction Programs

Fire-adapted communities are communities located in a fire-prone area that require little assistance from firefighters during a wildfire. The general elements of a fire-adapted community include (University of Nevada 2010):

- Community protection: well-designed fuel breaks and safe areas.
- Defensible space: proper management of vegetation surrounding the home.
- Access: good access helps emergency responders arrive in a timely manner.
- Evacuation: prepared communities can evacuate safely and effectively.
- Built environment: appropriate home construction and maintenance resists ignitions.

Implementing community wildfire hazard reduction practices is an important component of establishing a fire-adapted community; key practices include establishing defensible space and implementing home hardening features. Homes have become one of the most combustible parts of the landscape and are increasingly vulnerable as development extends into the WUI; in certain cases, trees may survive a fire while a home may burn. PRC Section 4291, "Clearance Around Structures," requires individual homeowners to clear and remove vegetation around homes and buildings. Compliance with PRC Section 4291 is required by any person who owns, leases, controls, operates or maintains a building or structure in or adjoining any mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or land that is covered with flammable material and is within the SRA. PRC Section 4291 requires 100 feet of "defensible space" (or to the property line if less than 100 feet) from every building or structure that is used for support or shelter of any use or occupancy. CAL FIRE has developed specific defensible space guidelines for homeowners per PRC 4291, to help individual homeowners implement defensible space, as well as implement home hardening techniques (CAL FIRE 2020a).

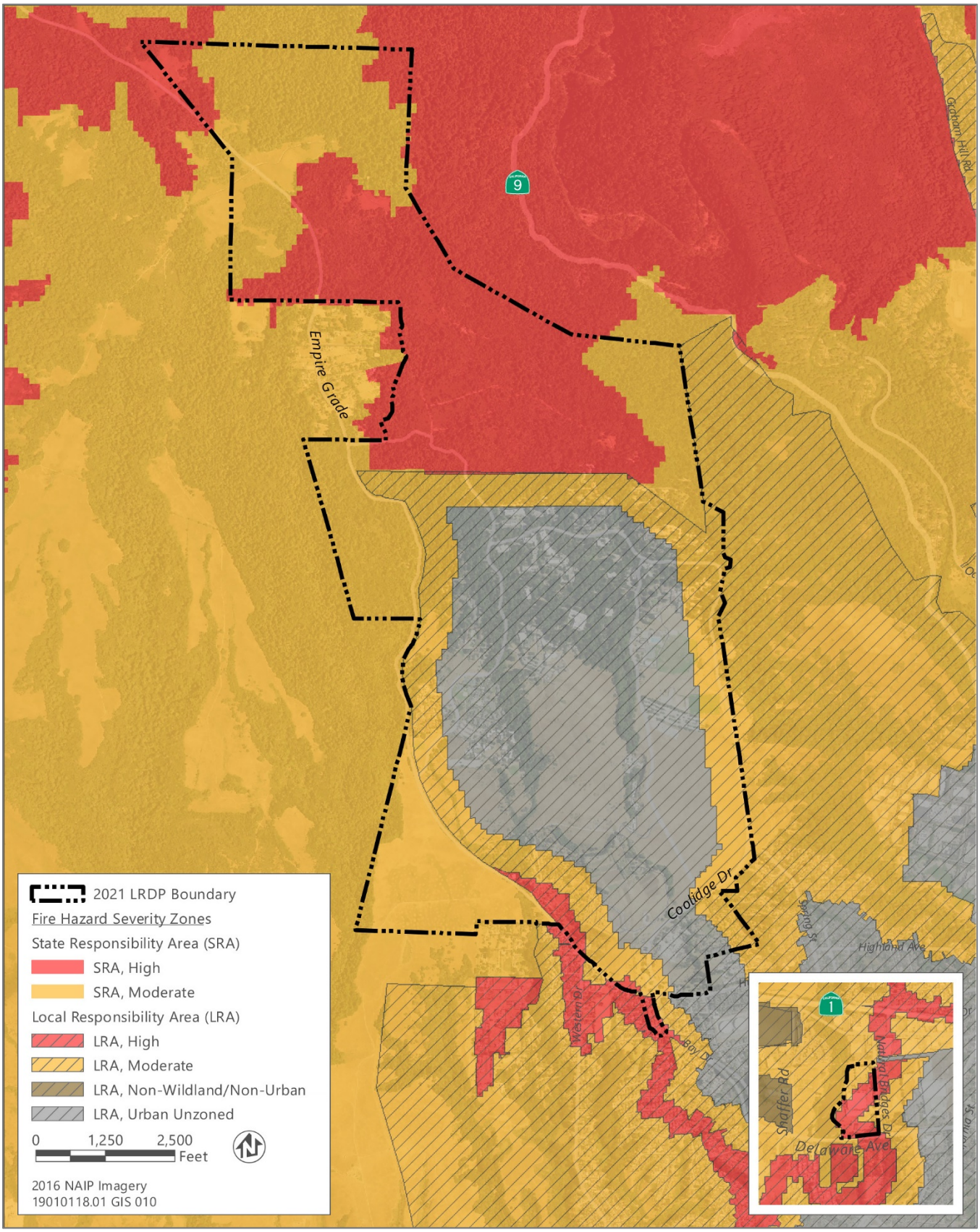
CAMPUS WILDFIRE SETTING

UC Santa Cruz main residential campus represents a diverse land use setting, which is comprised of a moderately dense clusters of academic and research facilities in a central core area, encircled by clusters of development (primarily self-contained colleges and schools) around its periphery, and low-density clusters on the lower campus. This results in a variety of wildfire risk regimes in the various parts of the campus and on adjacent lands.

CAL FIRE identifies Fire Hazard Severity Zones at the local, state, and federal level, which cover all fire-prone areas in the state, regardless of land ownership or responsibility. The main residential campus and surrounding environs represent the combination of a built environment nestled in a region of moderate to high wildfire severity. Developed portions of the central and lower campus have been classified by CAL FIRE as "urban, unzoned," with respect to wildfire hazard; however, as shown in Figure 3.18-1, the northern portion of the campus is largely rated high wildfire severity, and moderate fire severity lands encircle the main residential campus on the west, south, and east. Areas to the southeast of the main residential campus within the city of Santa Cruz are classified urban, unzoned (CAL FIRE 2007). As such, the potential danger exists for wildfire to occur both on and adjacent to the main residential campus. As shown in Figure 3.18-2, there have been several fires recorded by CAL FIRE that have occurred within a distance that could be expected to spread onto the main residential campus lands. The CZU Lightning Complex fire, which burned approximately 86,509 acres in Santa Cruz and San Mateo Counties in August and September 2020, after the NOP for the 2021 LRDP was published, is also identified in Figure 3.18-2 (CAL FIRE 2020b). The regional setting is largely forested lands with ample fuels and rugged, steep terrain that makes firefighting challenging. The fire severity at the Westside Research Park ranges from moderate to high wildfire severity. Land to the north, east, south, and west of the Westside Research Park are also ranges from moderate to high wildfire severity.

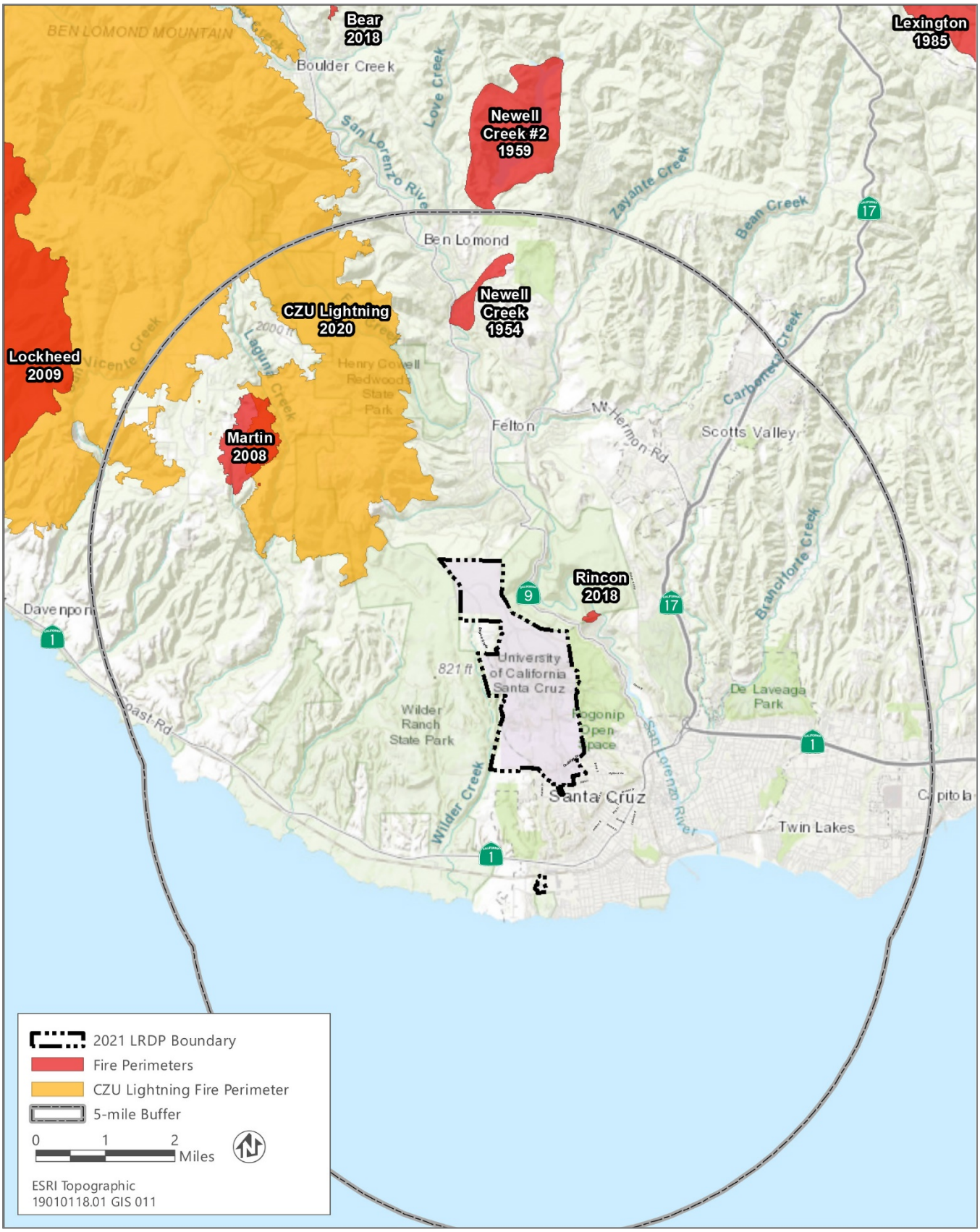
VEGETATION MANAGEMENT

In 2017, UC Santa Cruz entered into a cooperation agreement with CAL FIRE on a project to create a shaded fuel break along 3.6 miles of Empire Grade that included brush cutting and pile burning within approximately 50 feet off both sides of the road. The project also included broadcast and pile burning in a total of approximately 22 acres of coastal prairie and 12.5 acres of chaparral for a total of 34.5 acres to reduce fuel loads and benefit habitat. The project was completed in 2019. In collaboration with CAL FIRE, UC Santa Cruz plans to renew the 2017 Vegetation Management Plan. The renewal would allow CAL FIRE to maintain the shaded fuel break along the section of Empire Grade located adjacent to the main residential campus and would allow for periodic grassland burns. The agreement would last for a period of 10 years.



Source: data downloaded from CAL FIRE (adopted 2007)

Figure 3.18-1 Fire Hazard Severity Zones



Source: data downloaded from CAL FIRE in 2020

Figure 3.18-2 Fire History

UC Santa Cruz evacuated the main residential campus during the CZU Lightning Complex fire, which burned in Santa Cruz and San Mateo Counties during August and September 2020. CAL FIRE cleared vegetation and constructed two fire breaks within the LRDP area to create a physical barrier to slow the fire's progress. One fire break, located in the upper campus and measuring 13,467 linear feet, required the clearing of 9.03 acres within the LRDP area. The other fire break was located east of the main residential campus, measured 2,403 linear feet, and required clearing of 1.61 acres; however, this fire break originates on Empire Grade and extends into state-owned land.

3.18.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Thresholds of significance are based on Appendix G of the State CEQA Guidelines. The 2021 LRDP would result in a significant impact related to wildfire if it would:

- impair an adopted emergency response plan or emergency evacuation plan;
- due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire;
- require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment; or
- expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

ANALYSIS METHODOLOGY

The impact analysis considers the potential for increased wildfire risk from the implementation of the 2021 LRDP in terms of exposure of more people and structures to wildfires, and of the potential for increased wildfire frequency and intensity. It also evaluates the effects of implementing the 2021 LRDP on emergency planning and evacuation in the event of a wildfire, and any conflicts with existing emergency plans and policies. To determine the potential increased risks associated with the 2021 LRDP, the baseline condition representing existing wildfire risk in the plan area was established as of the date of the NOP was published. In doing this, natural conditions and existing features of the campus landscape contributing to wildfire risk, as well as emergency ingress and egress, and other emergency planning features that reduce risks are presented and discussed in the impacts below. These elements have been evaluated in relation to features of the 2021 LRDP that influence wildfire risk and relate to emergency planning, and the net balance in increased or decreased wildfire risk is described.

ISSUES NOT EVALUATED FURTHER

Installation or Maintenance of Associated Infrastructure That May Exacerbate Fire Risk

The effects of the installation or maintenance of wildfire-related infrastructure on other environmental resources are addressed in the applicable resource sections throughout this EIR and are considered as part of the overall development of campus land uses as identified in the proposed land use map and envisioned development areas, as shown in Chapter 2, "Project Description." Wildfire-related infrastructure, under the proposed 2021 LRDP, would continue to include expanded fuel breaks and other vegetation management, and additional wildfire suppression equipment caches and associated storage facilities. Given the amount of development at the Westside Research Park, wildfire-related infrastructure would include vegetation management activities to reduce fuel loads consistent with the City of Santa Cruz Local Hazard Mitigation Plan. The effects associated with installation or maintenance of such wildfire-related infrastructure are varied and may affect numerous resources, and are discussed in reference to those resources, including scenic resources (addressed in Section 3.1, "Aesthetics"), biological resources (addressed in

Section 3.5, "Biological Resources"), hazards (addressed in Section 3.9, "Hazards and Hazardous Materials"), hydrology and water quality (addressed in Section 3.10, "Hydrology and Water Quality"), and emergency access (addressed in Section 3.16, "Transportation"). This section does not address the risk of wildfire that could stem from installation of power transmission or generation facilities such as power lines, because addition or expansion of these facilities is not proposed under the 2021 LRDP.

IMPACTS AND MITIGATION MEASURES

Impact 3.18-1: Compatibility with Adopted Emergency Response and Evacuation Plans

UC Santa Cruz has an adopted EOP, which comprises the entirety of emergency planning activities that govern emergency response and evacuation on the main residential campus and the Westside Research Park and would also encompass new development under the 2021 LRDP. Implementation of the 2021 LRDP would not interfere with an adopted emergency response or evacuation plan, but construction activities for projects under the 2021 LRDP could result in short-term, temporary impacts on street traffic because of roadway improvements and potential extension of construction activities into the right-of-way. This could result in a reduction in the number of lanes or temporary closure of certain street segments. Any such impacts would be limited to the construction period and would affect only adjacent streets or intersection. This would be a **significant** impact.

US Santa Cruz currently has a robust framework for emergency preparedness and response procedures that are outlined in the EOP. The EOP primarily details responsibilities and coordination among responsible parties in the event of various types of emergencies on campus, including wildfire. In addition, the UC Santa Cruz EOP outlines evacuation procedures for building emergencies and campus-wide emergencies. New development on the main residential campus and Westside Research Park would be subject to the EOP; there are no elements in the 2021 LRDP that would interfere with the emergency response and evacuation procedures set forth in the EOP. However, implementation of the 2021 LRDP could interfere with the UC Santa Cruz EOP through construction-related road closures. UC Santa Cruz requires contractors to notify the designated UC representative at least 2 weeks prior to any proposed roadway closure. In addition, when paths, lanes, or roadways are blocked, UC Santa Cruz requires detour signs to be installed that clearly designate an alternate route. The UC Santa Cruz office of Physical Planning, Development, and Operations requires that maintenance and project managers notify UC Santa Cruz PD and SCFD of road closures and alternative routes. However, notification requirements do not ensure that adequate emergency services are available.

Circulation and transportation infrastructure improvements under the 2021 LRDP are intended to enhance alternative transportation opportunities and increase connectivity within UC Santa Cruz and to the city. Several new roads would be added to the transportation network in order to provide better cross-campus transit service, create safer bicycle and pedestrian environments, and fill gaps in the existing roadway system. Existing and proposed roadways would remain accessible to emergency vehicles under the LRDP, no permanent road closures are proposed. Any roadway extensions and new streets would be designed and constructed to include bicycle, pedestrian, and transit facilities, where feasible, and in a manner consistent with UC requirements (e.g., the UC Facilities Manual that requires the UC system, as a whole and inclusive of UC Santa Cruz, to comply with Title 24 California Building Standards Code, Parts 1-12 and all amendments.) UC Santa Cruz would also comply with applicable federal and state regulations related to roadway and transportation facility design, and with local regulations where campus roadways connect to city and county facilities. As discussed in Section 3.16, "Transportation," while adequate emergency access within the LRDP area is already provided, the proposed roadway extensions and new streets would provide improved network connections that could improve emergency vehicle access throughout the LRDP area.

However, implementation of the 2021 LRDP could result in short-term, temporary impacts on emergency vehicle access and evacuation because of roadway improvements and potential extension of construction activities into the right-of-way. This could result in a reduction in the number of lanes or temporary closure of certain street segments. While such impact would be limited to the construction period and would affect only limited streets or intersections, such a blockage could slow down evacuations or emergency access; this impact would be **significant**.

Mitigation Measures

Mitigation Measure 3.9-4: Prepare and Implement Site-Specific Construction Traffic Management Plans

(Refer to Section 3.9, "Hazards and Hazardous Materials")

Significance after Mitigation

Preparation and implementation of a construction traffic management plan, as required by Mitigation Measure 3.9-4, would adequately address any potential conflicts with emergency access or evacuation routes during construction by communicating proposed lane and road closures to first responders and allowing first responders to plan accordingly to ensure that emergency response times and adequate emergency access are maintained. As a result, with mitigation this would be a **less-than-significant** impact.

Impact 3.18-2: Wildfire Risk Associated with New Development and Land Use Patterns

Implementation of the 2021 LRDP would place new development within the north campus, and along the margins of existing development on the central and lower campus. The UC Santa Cruz EOP outlines evacuation procedures for building emergencies and campus-wide emergencies, and the UC Santa Cruz OES also maintains an ongoing schedule of inspections for all buildings to ensure that fire hazards are mitigated and also conducts plan reviews and inspections of building construction and renovation activities. However, in the absence of an adopted Vegetation Management Plan, the wildfire risk associated with placing new development in close proximity to an HFHSZ and proposed changes in land use under the 2021 LRDP would be **significant**.

The 2021 LRDP would accommodate an additional 12,830 individuals on the campus above the existing daily campus population and would allow construction and operation of an additional 5,628,824 assignable square feet of building space to accommodate this additional population. The 2021 LRDP would also create changes in land use designations for some portions of the main residential campus and the Westside Research Park, resulting in both expansion and contraction of certain land uses across the LRDP area, as depicted in Table 3.18-1 and Table 3.18-2, below.

CAL FIRE identifies Fire Hazard Severity Zones at the local, state, and federal level, which cover all fire-prone areas in the state, regardless of land ownership or responsibility. The UC Santa Cruz main residential campus and the surrounding environs represent a combination of a built environment nestled in a region of moderate to high wildfire severity. As shown in Figure 3.18-1, developed portions of the central and lower campus have been classified by CAL FIRE as "urban, unzoned," with respect to wildfire hazard; however, the northern portion of the LRDP area is largely rated HFHSZ, and MFHSZ lands encircle the main campus in the west, south, and east. Areas to the southeast of the main residential campus within the city of Santa Cruz are classified urban, unzoned (CAL FIRE 2007). The fire severity at the Westside Research Park ranges from MFHSZ to HFHSZ. Land to the north, east, south, and west of the Westside Research Park also ranges from moderate to high wildfire severity. The Westside Research Park is largely surrounded by urban development to the north, east, and south, and areas directly to the east are classified urban, unzoned. Given the range in wildfire severity classifications within the LRDP area, potential danger exists for wildfire to occur both on and adjacent to the main residential campus and Westside Research Park. Additionally, as described above, the prevailing trend in California indicates an increase in the severity and frequency of wildfires over time as a result of climate change, modified vegetation regimes, and increasing human influence. Such trends are expected to continue and will pose an increasing threat to wildland areas and nearby urban environments, such as at UC Santa Cruz main residential campus and Westside Research Park, regardless of the actions that UC Santa Cruz takes in terms of the adoption and implementation of the 2021 LRDP.

The increase in the campus population associated with implementation of the 2021 LRDP, and the development of buildings to accommodate population growth, by the sheer probability of adding more people to the area, would increase the risk of wildfire on or near the main residential campus and Westside Research Park. Human-caused wildfires tend to be generated by activities such as debris and brush-clearing fires, electrical equipment malfunctions, campfire escapes, smoking, fire play (e.g., fireworks), vehicles, and arson. As discussed in Chapter 2, "Project Description," the 2021 LRDP supports a compact academic core by concentrating development areas in the already-developed portions of the central campus core, where the risk of wildfire ignitions is very low even when such

activities or risks may occur. For example, while electrical equipment malfunctions would be possible, and vehicles would be present on campus, both would be overwhelmingly likely to be located within the central campus core, which is designated "urban, unzoned," by CAL FIRE.

Table 3.18-1 Summary of Potential Land Use Changes on the Main Residential Campus under 2021 LRDP by Land Use Type

Land Use Designations	Acreage Under the 2005 LRDP, as Amended[1,2]	2021 LRDP Acreage[2]	Net Change
Academic Land Use Designation			
Academic & Support	132	163	**+31**
Residential Land Use Designations			
Colleges and Student Housing	245	277	**+32**
Employee Housing	75	82	**+7**
Open Space Land Use Designations			
Outdoor Research (Site Research and Support in the 2005 LRDP)	152	74	**-78**
Campus Natural Reserve	410	789	**+379**
Natural Space (Protected Landscape in the 2005 LRDP)	503	513	**+10**
Campus Resource Lands	318	—	**-318**
Campus Habitat Reserve[3]	26	26	**0**
Other			
Historic District	—	28	**+28**
Recreation & Athletics	86	67	**-19**
Facilities & Operations	89	21	**-68**

[1] Two minor amendments were made to the 2005 Land Use Map. In 2016, Phase 1 of the Recycling Yard Project amended the 2021 LRDP by converting 1.6 acres of land from Protected Landscape to Campus Support and 2.1 acres of land from Site Research and Support to Campus Support for a total of 3.7 acres converted to Campus Support. In 2019, approximately 17 acres of land were redesignated from Campus Resource Land to Colleges and Student Housing in an LRDP amendment for the Student Housing West Project, which was approved by the Regents in 2019; however, project implementation was delayed due to a legal challenge to the EIR. The Superior Court upheld the adequacy of the EIR but overturned the approval based on issues with the Regents' findings. It is anticipated that the Regents will consider re-approval of the Student Housing West project prior to certification of the 2021 LRDP EIR.

[2] Acreages are approximate, include rounding, and are based on 2005 LRDP, Draft 2021 LRDP, County parcel information, and GIS data.

[3] Campus Habitat Reserve is composed of two mitigation parcels: IAD Preserve, which is 12.5 acres, and IAA, which is 13 acres. Both IAD Preserve and IAA Preserve were preserved under the HCP prepared in support of the Incidental Take Permit (ITP) for the Ranch View Terrace project. The IAA Preserve is preserved in perpetuity, and IAD Preserve is preserved through the ITP term of 60 years. The IAD Preserve has an Employee Housing overlay under the 2021 LRDP, which would require a modification to the HCP if it were be developed in the future.

Source: UC Santa Cruz 2020.

Table 3.18-2 Summary of Potential Land Use Changes on the Westside Research Park under 2021 LRDP by Land Use Type

Land Use Designations	Acreage under the 2005 LRDP[1]	2021 LRDP Acreage[1]	Net Change
Academic & Support (Academic Core in the 2005 LRDP)	18	7	-11
Mixed Use	—	11	11

[1] Acreages are approximate, include rounding, and are based on 2005 LRDP, Draft 2021 LRDP, County parcel information, and GIS data.

Source: UC Santa Cruz 2020.

Construction and operation under the 2021 LRDP would involve the use of hazardous materials including petroleum products, biohazards, radioactive materials, volatile, flammable, and explosive substances (See Section 3.9, "Hazards and Hazardous Materials"). UC Santa Cruz Environmental Health and Safety department is charged with implementing measures, directly and through campus departments, designed to ensure compliance with applicable federal and state laws and regulations related to the proper use, storage, and transport of hazardous materials. Specifically, all individuals who handle hazardous materials are appropriately trained and are provided with Material Safety Data Sheets, which provide chemical safety information about precautions for protecting against known hazards associated with the material and identify protocols proper storage and disposal of chemicals. In addition, the Designated Campus Fire Marshall is responsible for ensuring compliance with the proper storage, handling, and use of explosive, flammable, combustible, toxic, corrosive, and other hazardous materials. Compliance with applicable federal and state laws and regulations related to the proper use, storage, and transport of hazardous materials would reduce the risk of wildfire ignition from the use of hazardous materials.

Implementation of the 2021 LRDP would place new development within the north campus area and along the margins of existing development on the central and lower campus. Specifically, the expansion of administrative and residential areas on campus (see Table 3.18-1) would require clearing of vegetation and elimination of some natural space and encroachment into undeveloped, medium and high-fire risk areas as designated by CAL FIRE. These changes would likely result in reduced wildfire risk on the newly developed lands, as they transition from natural, vegetated landscapes to a more urban environment after development. However, urban encroachment, especially in the northern portion of the campus, could lead to exposure of new development to increased wildfire risks.

Under the 2021 LRDP, future development would result in short-term soil-disturbing activities that could lead to increased erosion including grading, trenching, boring, and removal of trees and other vegetation. As discussed in Section 3.7, "Geology and Soils," UC Santa Cruz has developed erosion control standards that are based substantially on Chapter 16.22 of the Santa Cruz County Code (Erosion Control Ordinance). These standards are included in the Campus Standards Handbook and incorporated by reference. Additionally, projects involving construction sites that are 1 acre or more are required to prepare and implement a storm water pollution prevention plan (SWPPP) to comply with National Pollutant Discharge Elimination System (NPDES) requirements for construction site storm water discharges. Plans include measures such as: design and construction of cut and fill slopes in a manner that minimizes erosion, protection of exposed slope areas, control of surface flows over exposed soils, use of wetting or sealing agents or sedimentation ponds, limiting soil excavation in high winds, construction of beams and runoff diversion ditches, and use of sediment traps, such as hay bales. Compliance with UC Santa Cruz erosion control standards and NPDES requirements would ensure that implementation of the 2021 LRDP would not destabilize soils such that substantial risks related to post fire landslides or debris flow would be created.

As discussed above under Impact 3.18-1, the UC Santa Cruz EOP outlines evacuation procedures for building emergencies (Stage 1) and campus-wide emergencies (Stage 2). The procedures and actions that students, faculty, and staff should take during an evacuation are communicated by residential staff assigned to a college, building emergency coordinator in academic/administrative buildings, public address announcement from public safety vehicles, and the CruzAlert system. CruzAlert is the UC Santa Cruz emergency notification system used to quickly communicate information to the campus community during emergency situations UC Santa Cruz OES also maintains an ongoing schedule of inspections for all buildings to ensure that fire hazards are mitigated and also conducts plan reviews and inspections of building construction and renovation activities. The UC Santa Cruz Physical Plant department is charged with testing and maintaining fire protection systems, including fire alarms and fire sprinkler systems, to ensure that all systems function properly. In addition, UC Santa Cruz plans to partner with CAL FIRE to renew the 2017 Vegetation Management Plan, which included sections of UC Santa Cruz and enabled the shaded fuel break work along Empire Grade and the broadcast burns in coastal prairie and chaparral habitats. The renewal would allow CAL FIRE to maintain the shaded fuel break along the section of Empire Grade and would allow for periodic grassland burns to reduce wildfire risk in the LRDP area. However, the absence of an adopted Vegetation Management Plan, coupled with increased campus population and buildings more proximate to high fire hazard zones, increases the wildfire risk under the 2021 LRDP. This impact would be **significant**.

Mitigation Measures

Mitigation Measure 3.18-2: Prepare Campus-Wide Vegetation Management Plan

Upon approval of the 2021 LRDP and certification of the EIR, UC Santa Cruz shall initiate preparation and, within 2 years, begin implementation of a campus-wide vegetation management plan. The campus-wide vegetation management plan shall identify fire hazard areas consistent with California Government Code Sections 51179 and 51182, and implement a policy framework for managing fuel loads and maintaining defensible space consistent with Public Resources Code Section 4291. Policies and implementation actions that shall be considered as part of the plan will include, but are not limited to:

- vegetation management techniques for fire hazard mitigation, including thinning, pruning, removing or otherwise altering vegetation to reduce the potential for ignitions and to modify potential fire behavior; different vegetation management techniques shall be identified, depending on vegetation type, location, condition, and configuration;
- Treatment actions will be limited to eradication or control of invasive plants, removal of uncharacteristic fuel loads (e.g., removing dead or dying vegetation), trimming of woody species as necessary to reduce ladder fuels, and select thinning of vegetation to restore densities that are characteristic of healthy stands of the vegetation types present in the LRDP area;
- vegetation management and maintenance standards for dominant vegetation types in the LRDP area, specific recommendations for key wildfire risk areas, and the procedures for identifying and planning annual vegetation treatment operations;
- fuel management requirements, including clearing vegetation within 100 feet of structures, removing trees and branches that extend within 100 feet of a chimney/stovetop outlet, clearing roofs of vegetative debris, and maintaining vegetation adjacent to overhanging of a building;
- best management practices implemented to avoid and/or minimize impacts associated with soil erosion, biological resources, and water quality, including the use of fire resistant/drought tolerant landscaping within 100 feet of new/modified structures within high or very high fire hazard zones; and
- building construction requirements for new development located in HFHSZs, including fire- or flame-resistant roofing material, roof vent coverings/screens, exterior siding, skylights, windows, doors, and decks, consistent with California Fire Code Chapter 49.

As part of this effort, UC Santa Cruz shall also consider and incorporate actions/strategies included as part of the CAL FIRE California Vegetation Treatment Program.

Significance after Mitigation

Preparation and implementation of a campus-wide vegetation management plan, as required by Mitigation Measure 3.18-2, would adequately address any potential wildfire risk associated with new development and changes in land use as proposed under the 2021 LRDP. UC Santa Cruz would be required to prepare and implement specific actions to reduce wildfire risk within the LRDP area. As a result, with mitigation this would be a **less-than-significant** impact.

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4 CUMULATIVE IMPACTS

4.1 APPROACH TO THE CUMULATIVE EFFECTS ANALYSIS

The California Environmental Quality Act Guidelines (State CEQA Guidelines) Section 15130 requires that an environmental impact report (EIR) discuss the cumulative impacts of a project. As defined in Section 15355, "a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts."

CEQA provides for an evaluation of the significance of a project's cumulative impact based on whether the project's incremental effect is "cumulatively considerable." The definition of "cumulatively considerable" is provided in Section 15065(a)(3):

> "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

State CEQA Guidelines Section 15130(b) provides two possible approaches for establishing the cumulative environment in which the project is to be considered:

- A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside of the control of the agency (the "list approach").
- A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing (the "plan approach").

This cumulative analysis considers both the list and plan approach. As discussed in more detail below, cumulative projects considered within the LRDP area include development proposals relying on the 2005 LRDP. Cumulative projects considered outside of the LRDP area include those projects located in the City of Santa Cruz and County of Santa Cruz, and California Department of Transportation proximate to the campus.

4.2 SCOPE OF THE CUMULATIVE ANALYSIS

The geographic area that could be affected by 2021 LRDP development in combination with cumulative projects varies depending on the type of environmental resource being considered. The general geographic area associated with various environmental effects of 2021 LRDP construction and operation defines the boundaries of the area used for compiling the list of projects considered in the cumulative impact analysis. Table 4-1 identifies the general geographic areas associated with the different resources addressed in this Draft EIR and evaluated in those sections of this cumulative analysis. The term "local" as used here, generally includes the area within 2 miles of the 2021 LRDP.

Table 4-1 Geographic Scope of Cumulative Impacts

Resource Issue	Geographic Area
Aesthetics	Local (LRDP area and surrounding public viewpoints)
Agriculture and Forestry Resources	Regional (Santa Cruz County)
Air Quality	Regional (North Central Coast Air Basin for pollutant emissions that have regional effects) Local (immediate vicinity for pollutant emissions that are highly localized such as Carbon Monoxide)
Archaeological, Historical, and Tribal Cultural Resources	Historical Resources: Local (LRDP area and City of Santa Cruz) Archaeological and Tribal Cultural Resources: Regional (historic lands of the Uypi people)

Resource Issue	Geographic Area
Biological Resources	Regional (Santa Cruz County) and local (LRDP area and immediately surrounding area)
Energy	Regional (Pacific Gas and Electric Company grid in Santa Cruz County)
Geology and Soils	Local (LRDP area)
Greenhouse Gas Emissions and Climate Change	Global
Hazards and Hazardous Materials	Local (LRDP area)
Hydrology and Water Quality	Regional (Santa Cruz County) and local (LRDP area)
Land Use and Planning	Local (LRDP area and immediately surrounding area)
Noise	Local (immediate project vicinity where project-generated noise could be heard concurrently with noise from other sources)
Population and Housing	Regional (Santa Cruz County) and local (LRDP area and immediately surrounding area)
Public Services	Local service areas of service providers
Recreation	Regional (Santa Cruz County) and local (LRDP area)
Transportation	Regional (Santa Cruz County) and local (LRDP area and immediately surrounding area)
Utilities and Service Systems	Local service areas of utility providers
Wildfire	Regional (Santa Cruz County) and local (LRDP area and immediately surrounding area)

As noted in Table 4-1, the potential geographic scope of some cumulative effects is more localized than others. To account for both regional and localized cumulative impacts, this EIR uses regional growth projections to assess cumulative impacts that would occur on a regional level, and uses a list of projects to assess more localized cumulative impacts.

4.2.1 Timeframe

The timeframe of past, present, and probable future activities was determined as follows:

- **Past/Completed Projects**. Past/Completed projects include those that have been approved and constructed in the past two years prior to February 25, 2020 (the time that the EIR's NOP was published). The influence of past activities is reflected in the baseline, which, pursuant to CEQA, reflects "existing conditions" at the time of the NOP [State CEQA Guidelines Section 15125[a]].
- **Present Projects**. Projects that are either under construction/being implemented, have been approved for construction and operation/implementation, or are ongoing as of February 25, 2020.
- **Reasonably Foreseeable, Probable Future Projects**. Reasonably foreseeable future projects include a summary of reasonably foreseeable activities from planning documents and other projects which, by their nature, would have impacts that could combine with those from the project to create cumulative effects.

4.2.2 Cumulative Projects Considered

As noted above, the State CEQA Guidelines identify two basic methods for establishing the cumulative environment in which the project is to be considered: the use of a list of past, present, and probable future projects (the "list approach") or the use of adopted projections from a general plan, other regional planning document, or certified EIR for such a planning document (the "plan approach"). This analysis utilizes both the list and plan approach, using whichever is more appropriate to accurately evaluate potential cumulative impacts for a particular resource. Relevant projects and planning efforts are discussed in more detail below.

LIST OF PROJECTS WITHIN AND OUTSIDE OF THE LRDP AREA

The past, present, and foreseeable development projects in the vicinity of the LRDP area are listed in Table 4-2 and shown in Figure 4-1. This list is not intended to be an all-inclusive list of projects in the region, but rather an identification of projects constructed, approved, or under review within approximately 2 miles of the LRDP area that have some relation to the environmental impacts of construction and operation of potential uses associated with implementation of the 2021 LRDP. Using a 2-mile radius is appropriate for characterizing potential cumulative impacts within a local context (e.g., with respect to aesthetics, noise, localized air quality, etc.) as these types of impacts are typically localized within less than 2 miles (e.g., siting new sensitive land uses within 500-1,000 feet of existing high-traffic corridors or industrial uses may indicate a potential for localized air quality impacts.) The list of projects used in this cumulative analysis is based on information for approved and pending projects obtained from the City of Santa Cruz (City), Santa Cruz County (County), and the California Department of Transportation (Caltrans). Of note, no County projects were identified within 2 miles of the LRDP area. In addition, approved and pending UC Santa Cruz projects that are considered part of the previous (2005) LRDP are listed in Table 4-2.

Table 4-2 List of Past, Present, and Reasonably Foreseeable Projects in the Vicinity of the LRDP Area

Map Key	Project Name	Land Use	Description	Status
	UC Santa Cruz			
A	Student Housing West[1]	Colleges & Student Housing	Student housing development along Hagar and Heller Drives. Would provide 3,072 beds (a net increase of 1,972 beds) for students on campus.	Planned but not Operational
B	Kresge Housing	Colleges & Student Housing	Redevelopment of existing Kresge College student housing. Would provide 552 beds (a net increase of 187 beds) for students on campus.	Planned but not Operational
C	Environmental Health and Safety (EH&S) Facility	Facilities & Operations	An approximately 7,100 gross square foot EH&S building located on Heller Drive within the central campus.	Completed
D	Crown College Major Maintenance Project	Colleges & Student Housing	Renovation of existing development along Chinquapin Road within the central campus. Provides 16 net new undergraduate student beds.	Completed
E	Rachel Carson Dining Hall Expansion	Colleges & Student Housing	Renovation and expansion of an existing dining hall located along Heller Drive within the west campus. Would provide approximately 2,789 square feet of dining space and 77 new seats.	Anticipated to be completed by 2022.
F	Porter Dining Seating Expansion	Colleges & Student Housing	Expansion of existing dining hall located along Heller Drive within the west campus. Would provide approximately 1,700 square feet of outdoor dining space.	Under construction. Anticipated to be substantially completed by November 2020.
G	Ranch View Terrace Phase 2	Employee Housing	Employee housing development along Ranch View Road within the south campus. Would provide 39 single family homes.	Anticipated to be completed by 2023.

Map Key	Project Name	Land Use	Description	Status
	City of Santa Cruz			
1	160 Jewell	Memory care facility	48-unit memory care facility	Completed
2	1804–1812 Ocean Street (101 Jewell Street)	Residential	11 townhouse units	Completed
3	555 Pacific	Residential and commercial	94 small ownership units/5,000 square feet of commercial space	Completed
4	120 Toledo	Residential	Duplex	Completed
5	225 Meder Street (100–106 Lars Road)	Residential	Four townhouse units	Completed
6	2956 Mission	Hotel	82-room hotel (Fairfield Inn)	Completed
7	2656 Mission	Industrial	11,611-square-foot industrial/warehouse building	Completed
8	630 Water	Hotel	Add 20 single-room occupancy units to existing mixed-use development	Completed
9	413 Laurel	Residential and commercial	Convert office building to two residential units and one commercial space	Completed
10	708–720 Water	Multifamily residential (apartments)	Demolish commercial buildings and residences and construct a 41-unit apartment complex	Completed
11	230 Grandview	Multifamily residential (apartments)	Demolish single-family dwelling and construct 12 apartment units	Completed
12	912 Western Drive	Land division	Three-lot minor land division	Under construction
13	313-321-325 Riverside Avenue (Courtyard Marriott)	Hotel	151-room hotel with meeting room, pool, exercise room; replace three existing motels (64 rooms and manager unit) for net increase in 87 rooms	Under construction
14	301 Beach	Hotel expansion	Add five rooms to an existing hotel	Under construction
15	1547 Pacific (Park Pacific)	Residential and commercial	79 residential units and 5,750 square feet of commercial space	Under construction
16	148 Sunnyside	Residential	Construct two units (demolish single-family dwelling)	Under construction
17	515 Fair	Land division and various types of residential	Lot split, three condominiums, single-family home, and accessory dwelling unit on historic site	Under construction
18	2424 Mission	Hotel	Demolish 32-room hotel and construct 60-room hotel	Under construction
19	530 S. Branciforte	Multifamily residential (condominiums)	Four condominium units	Under construction
20	300 Panetta	Residential and commercial	Mixed-use building: three residential units and 23,195 square feet of commercial space (2120 Delaware Phase 1B)	Under construction
21	769 N. Branciforte	Residential	Three townhouse units	Under construction
22	135 Dubois	Storage facility	Self-storage facility	Under construction
23	550 Second	Hotel	60-room hotel	Under construction
24	200 High Road	Residential and commercial	14,100-square-foot mixed-use building: 11,100 square feet of commercial space and two flex residential units (2120 Delaware Phase 1B)	Under construction

Map Key	Project Name	Land Use	Description	Status
25	350 Ocean	Multifamily residential (apartments) and commercial	63 apartments (with demolition of 20 existing apartments and two single-family homes) and 6,800 square feet of retail	Under construction
26	214 Plymouth	Land division and residential	Lot split and construction of a duplex on each new lot.	Under Construction
27	116 Gharkey	Land division and residential	Lot split with single-family home and accessory dwelling unit on each lot	Under Construction
28	335 Golf Club	Residential	10-unit housing for developmentally disabled	Under Construction
29	215 Beach	Hotel	165-room hotel (La Bahia)	Under Construction
30	1619 Delaware	Land division	Lot split	Under construction
31	189 Beach	Hotel expansion	Add 12 hotel rooms to Casablanca Inn	Under construction
32	1201 Fair	Industrial	10,000-square-foot industrial building for ice cream manufacturing	Under construction
33	430 S. Branciforte	Land division	Lot split	Approved
34	716 Monterey	Land division	Lot split	Approved
35	1013 Pacific	Multifamily residential (condominiums) and commercial	17 condominium units, 4,300 square feet of commercial space	Approved
36	232 River	Multifamily residential (condominiums)	12 condominium units	Approved
37	801 River	Residential	Convert two-story office building to triplex	Approved
38	2120 Delaware	Residential and commercial	Phase 2: Mixed-use development of 161 units and 10,600 square feet of commercial space	Approved
39	1016 West Cliff	Land division	Lot split	Approved
40	1642 Mission	Land division	Lot split	Approved
41	1024 Soquel Avenue	Multifamily residential (apartments) and commercial	13 apartment units, 1,600 square feet of commercial space	Approved
42	1459 High	Land division	Lot split	Approved
43	501 Cedar	Residential and commercial	Mixed-use building: 769 square feet of commercial space addition and building remodel, resulting in 2,885 square feet of commercial space and two new residential units	Approved
44	1930 Ocean Street Extension	Multifamily residential (condominiums)	32 condominium units	Approved
45	501 Golf Club	Not provided	Construct five buildings and parking lot for Homeless Garden Project	Approved
46	301 Beach	Commercial	Convert four hotel rooms to 1,033 square feet of retail space	Approved
47	1129 Soquel Avenue	Mixed-use residential	Construct 5,420 square feet of mixed-use building with two apartment units	Approved
48	2801 Mission	Industrial	460-square-foot addition to industrial building	Approved

Map Key	Project Name	Land Use	Description	Status
49	100 Laurel	Residential and commercial	Six-story mixed-use building with 205 residential apartments and 7,085 square feet of commercial space	Approved
50	2801 Mission	Commercial	New 975-square-foot entry in a commercial building	Approved
51	112 California Street	Water treatment facility	9,600-square-foot tertiary water treatment facility	Approved
52	217 Encinal	Industrial	New 2,000-square-foot metal fabrication building	Approved
53	190 West Cliff	Multifamily residential (condominiums) and commercial	Four-story mixed-use building: 16,188 square feet of commercial space and 89 residential condominium units	Approved
54	801 River	Multifamily residential (apartments)	Convert office building to seven-unit apartment complex	Approved
55	600 Encinal	Land division	Minor land division: one parcel to three	Approved
56	415 Windsor	Residential	Demolish single-family home and build three townhouse units	Approved
57	111 Errett	Multifamily residential (condominiums)	Demolish church and 12-lot subdivision or 10-lot subdivision with six condominiums	Approved
58	122 Benito	Residential and commercial	Mixed-use building: 2,540 square feet of new commercial space and two dwellings	Approved
59	202 Panetta	Multifamily residential (condominiums)	19,800-square-foot building with 14 commercial condominiums	Approved
60	448 May	Multifamily residential (apartments)	Four residential apartments (demolish one dwelling)	Approved
61	No address, APN 001-172-14	Warehouse	Two warehouse buildings, 18,600 square feet total	Approved
62	515 Soquel Avenue	Residential (hotel and duplexes)	Demolish commercial building and construct 51 single-room occupancy units and two duplexes	Pending application
63	902 Third	Multifamily residential (apartments)	Convert hotel to apartments	Pending application
64	508 Front	Residential and commercial	Mixed-use building: 145 dwelling units and 11,511 square feet of commercial space	Pending application
65	135 Campbell	Multifamily residential (apartments)	Demolish garage and construct two apartment units	Pending application
66	2035 N. Pacific	Residential and office	Mixed-use building: 4,300 square feet of office space and 26 apartment dwelling units	Pending application
67	742 N. Branciforte Ave	Residential	Demolish a second unit and construct a duplex	Pending application
68	418 Pennsylvania	Multifamily residential (apartments)	Add three apartment dwelling units	Pending application
69	417 Cedar	Commercial	351-square-foot addition to commercial building	Pending application
70	217 Potrero	Multifamily residential (condominiums)	Add three residential condominiums to site with existing dwelling	Pending application

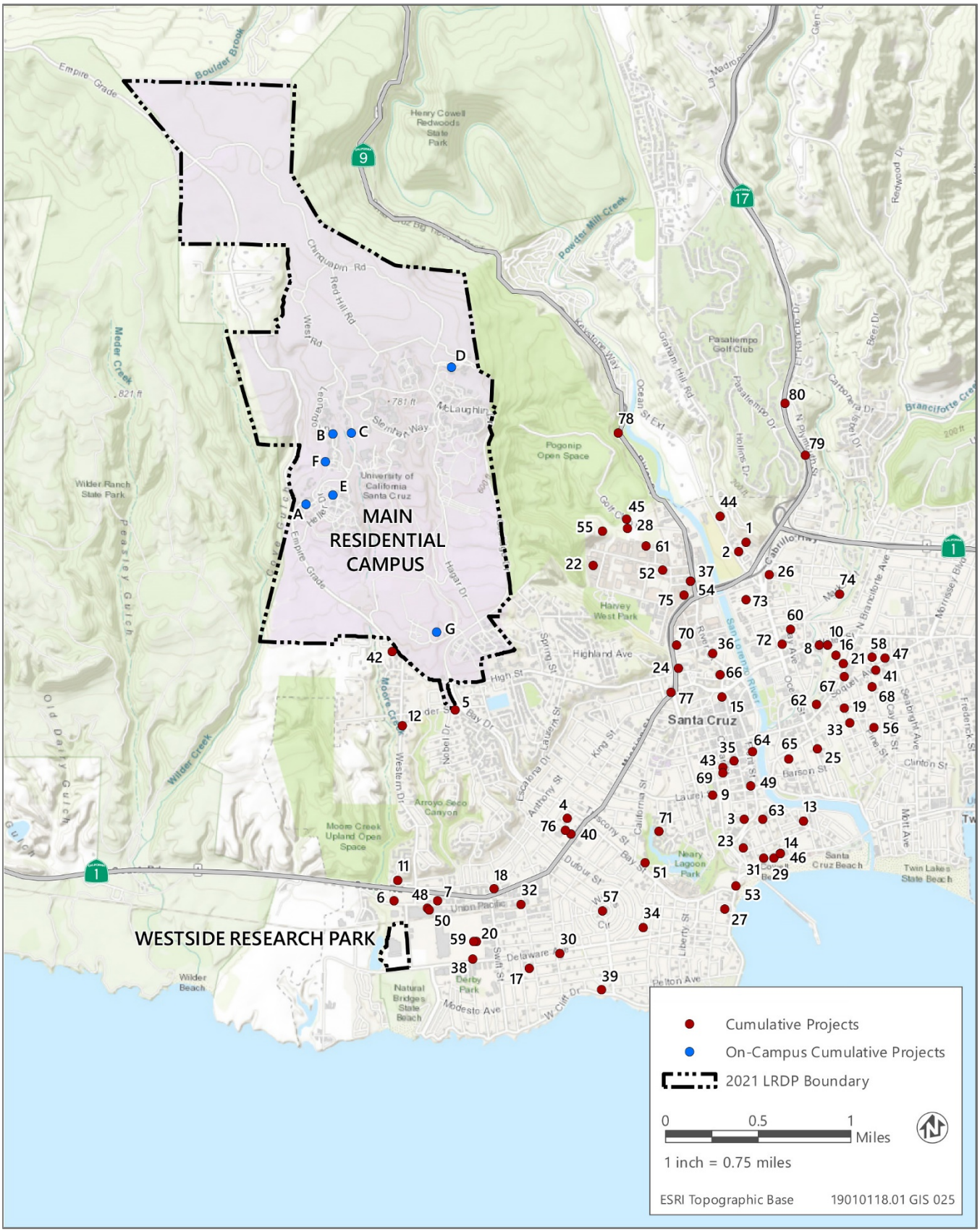
Map Key	Project Name	Land Use	Description	Status
71	101 Felix	Multifamily residential (apartments)	Add 100 apartment dwellings to site with 240 existing dwellings	Pending application
72	908 Ocean	Residential and commercial	408 small ownership units, 7,430 square feet of commercial (demolish 15 dwellings and commercial space)	Pending application
73	137 Pryce	Residential	Three new units	Pending application
74	352 Market	Multifamily residential (apartments)	Seven residential apartments (demolish one dwelling)	Pending application
75	119 Coral	Residential	120 residential supportive housing units (demolish six transitional housing units)	Pending application
76	No address, APN 002-235-26	Multifamily residential (apartments)	Three residential apartments	Pending application
	California Department of Transportation			
77	Santa Cruz Downtown CAP-M (State Route 1)	Transportation	Pave 8.293 LM of Class 2 pavement. Other work will include replacement of 87 Americans with Disabilities Act (ADA) ramps, replacement of Class II bike lanes, and sign panel replacement as needed. 2.7 miles	Approved
78	PM 1.0 and 4.0 Viaduct (State Route 9)	Transportation	In Santa Cruz County near Santa Cruz, 0.5 mile north of Vernon Street, construct side-hill viaduct, restore roadway and facilities; place water pollution control best management practices, erosion control, and required mitigation; and provide temporary traffic control. 0.1 mile	Approved
79	Pasatiempo Shoulder Widening (State Route 17)	Transportation	In Santa Cruz from 0.5 to 0.3 mile south of Pasatiempo overcrossing, shoulder widening and soil nail wall. 0.3 mile	Approved
80	Pasatiempo II (State Routes 1 and 9)	Transportation	In Santa Cruz County in Santa Cruz from 0.1 mile south of State Route 1/17, separation to 0.4 mile south of Pasatiempo overcrossing. Construct ramp safety improvements. 0.2 mile	Approved

[1] The Student Housing West project was approved by the Regents in 2019; however, project implementation was delayed due to a legal challenge to the EIR. The Superior Court upheld the adequacy of the EIR but overturned the approval based on issues with the Regents' findings. It is anticipated that the Regents will consider re-approval of the Student Housing West project prior to certification of the 2021 LRDP EIR.

Source: Compiled by Ascent Environmental in 2020 based on data obtained from UC Santa Cruz, the City of Santa Cruz, Santa Cruz County, and Caltrans.

PLANNING DOCUMENTS OUTSIDE OF THE LRDP AREA

Land use development needed to provide for housing, employment, and other needs of a growing population is primarily guided by general plans and specific plans adopted by city and county governments. The general plan is a comprehensive, long-term, and general document that describes plans for the physical development of a city or county. Local governments are responsible for local land use decisions and planning, including permitting structures to be built within their jurisdictional boundaries. This cumulative analysis considers development projections identified in previously approved planning documents including the City of Santa Cruz 2030 General Plan, County of Santa Cruz General Plan, and Association of Monterey Bay Area Governments 2040 Metropolitan Transportation Plan and Sustainable Communities Strategy.



Source: Figure produced by Ascent Environmental in 2020

Figure 4-1 Cumulative Project Locations

4.3 CUMULATIVE IMPACT ANALYSIS

The following sections contain a discussion of cumulative effects and the contribution of the 2021 LRDP to such effects, taking into consideration related past, present, and reasonably foreseeable future activities, projects, and plans. The analysis conforms with Section 15130(b) of the State CEQA Guidelines, which specifies that the "discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact." When considered in relation to other reasonably foreseeable projects, cumulative impacts to some resources would be significant and more severe than those caused by the proposed project alone.

For purposes of this EIR, the incremental effect of the project would be cumulatively considerable if the cumulative effect of related activities when considered in combination with the effect of the proposed project is significant, and the incremental contribution of the project to these effects is substantial enough to be considered cumulatively considerable.

Such an outcome can occur in one of two ways. First, the cumulative effect of related activities (past, current, and probable future activities) without the project is not significant, but the incremental effect of the project, when added to the cumulative effect of the related projects, is substantial enough to result in a new cumulatively significant impact. Or second, the cumulative effect of related activities (past, current, and probable future activities) is already significant and the addition of the effect of the project is substantial enough to make the project's contribution cumulatively considerable and thus significant in and of itself.

This cumulative analysis employs a multi-step approach: (i) assess whether the project, together with past, present, and probable future projects, will cause significant cumulative impacts, (ii) identify the project's contribution, without mitigation, to existing/anticipated (without the project) cumulative effects, (iii) determine whether, even with mitigation, the project's incremental contribution would be cumulatively considerable, (iv) if the answer is yes, to identify any additional potentially feasible mitigation that may be available, and (v) to identify the impact significance conclusion after implementation of all (project-specific and any additional) potentially feasible mitigation.

4.3.1 Aesthetics

The geographic scope of the aesthetics cumulative impact analysis is local and includes the LRDP area and surrounding areas with public views of the LRDP area.

Development of past, current, and future projects continue to alter the visual environment of the LRDP area and the surrounding areas. With few exceptions, the visual resource impacts of the related projects listed in Table 4-2 above are site-specific and would not necessarily combine with other projects, including the 2021 LRDP, because they are not in the same viewshed. Urban development as guided by city and county general plans (i.e., City of Santa Cruz and County of Santa Cruz) could result in significant cumulative impacts to aesthetics when combined with implementation of the 2021 LRDP. Surrounding areas with public views of the LRDP area that are designated for urban development under the city and county general plans include the area directly to the north and south of the main residential campus which is designated for community facilities, natural areas, and low- to medium-density residential development, and the area to the east of Westside Research Park which is designated for industrial development. Consequently, development guided by city and county general plans and the 2005 LRDP combined with 2021 LRDP implementation could result in a significant cumulative aesthetics impact.

As noted in Section 3.1, "Aesthetics," UC Santa Cruz values views across the campus meadows to its wooded backdrop on central and north campus as viewed from Empire Grade Road. UC Santa Cruz also values views within campus facing east and south towards the coast and Monterey Bay and the visual quality of the Cowell Lime Works Historic District. Construction of the Student Housing West project, which is a planned but not yet operational project under the 2005 LRDP, combined with development under the 2021 LRDP could result in a significant cumulative aesthetics and visual resources impact. The Student Housing West project would include student housing on two distinct sites located on Heller Drive (Heller Site) and the intersection of Glenn Coolidge Drive and Hagar Drive (Hagar Site).

Two visual simulations were prepared to assess the potential cumulative impacts of the Student Housing West and Kresge Housing projects under the 2005 LRDP, as listed in Table 4-2, in combination with the 2021 LRDP. Figure 4-2 identifies the locations of the two additional viewpoints used for this analysis.

Cumulative Viewpoint 1: As shown in Figure 4-3 (Cumulative View 1 – View from Empire Grade), Cumulative Viewpoint 1 offers views of the UC Santa Cruz campus setting from the western edge of the main residential campus, along Empire Grade near the west entrance. From this vantage point, views are largely dominated by open meadow, scattered vegetation, and a few mature trees. In the background, Oakes and Rachel Carson College can be seen. Sensitive viewing groups largely include UC Santa Cruz students, faculty, and staff, but could also include nearby residents or tourists visiting the campus, and passersby traveling on Empire Grade Road. The Heller Site would be redeveloped to provide student housing, parking, and support spaces. As shown in Figure 4-3, new structures on the Heller Site associated with Student Housing West, a cumulative project, would be visible in the foreground and would substantially change the existing view, resulting in a significant impact on this view. With respect to the 2021 LRDP, development under the 2021 LRDP would also be visible from this viewpoint on Empire Grade; however, as discussed in Section 3.1, "Aesthetics," envisioned college and student housing buildings would be clustered together and visually consistent with existing uses in the area. Further, as the visual simulation shows, new structures would be situated within the hillside and would not substantially alter scenic views of the grasslands located along Empire Grade looking east. As a result, the 2021 LRDP's contribution to impacts on scenic vistas along Empire Grade would not be cumulatively considerable.

Cumulative Viewpoint 2: As shown in Figure 4-4 (Cumulative View 2 - View from Glen Coolidge Drive), Cumulative Viewpoint 2 offers views of the UC Santa Cruz campus setting from the Glen Coolidge Drive looking north. From this vantage point, views are largely dominated by open meadow, scattered vegetation, and a few mature trees in the distance. Sensitive viewing groups largely include UC Santa Cruz students, faculty, and staff, but could also include nearby residents or tourists visiting the campus. As part of Student Housing West, which is a cumulative project, the Hagar Site would also be developed with housing, a childcare facility, and parking, and support spaces. As shown in Figure 4-4, new housing on the Hagar Site would be visible in the foreground and would substantially change the existing view, resulting in a significant impact on this view. New development under the 2021 LRDP would be visible against the existing tree line in the background from Glenn Coolidge Drive looking north towards the main residential campus southwest of the Hagar Site. However, as discussed in Section 3.1, "Aesthetics," new development associated with the 2021 LRDP as part of the UC Santa Cruz Design Review Process, Campus Standards Handbook requirements, and Physical Design Framework guidelines, would include landscaping and other features consistent with existing environmental and site conditions, which would soften the visual interface between new development under the 2021 LRDP. In addition, new structures would be largely obscured from public viewpoints due to intervening topography and vegetation. For these reasons, the 2021 LRDP's contribution to impacts on scenic vistas along Glenn Coolidge Drive would not be cumulatively considerable.

Source: Figure produced by Ascent Environmental in 2020

Figure 4-2 Cumulative Viewpoint Locations

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Before

After

190101118.01 GRX 037

Source: Figure produced by Ascent Environmental in 2020

Figure 4-3 Cumulative View 1 - View from Empire Grade

Before

After

190101118.01 GRX 036

Source: Figure produced by Ascent Environmental in 2020

Figure 4-4 Cumulative Viewpoint 2 – View from Glen Coolidge Drive

SUBSTANTIAL ADVERSE EFFECT ON A SCENIC VISTA

Cumulative projects reviewed for this EIR would occur both within and adjacent to the LRDP area. Due to its location, the main residential campus provides views of the city, coast, and the Monterey Bay from various vantage points. Views of the coast and Monterey Bay are not available from the Westside Research Park due to intervening trees and landscaping present within Natural Bridges State Beach and the DeAnza Mobile Home Park located along Delaware Avenue. Cumulative projects within and adjacent to the LRDP area have the potential to impact scenic views; however, the City, County, and UC Santa Cruz have adopted policies (e.g., City of Santa Cruz General Plan policies CD1.1.4, CD1.2.1, CD 1.3.1, and CD1.4.1, as stated in Section 3.1, "Aesthetics") to protect publicly accessible view corridors and designated scenic vistas; it is expected that, with these policies in place, there would be no cumulatively considerable impact without the 2021 LRDP.

As discussed in Section 3.1, "Aesthetics" of this Draft EIR, much of the proposed development under the 2021 LRDP would not be visible from viewpoints outside of the main residential campus due to topography and intervening vegetation. Further, it is not anticipated that views within campus would be damaged or substantially altered because new development would comply with existing design review processes and would be clustered with and complimentary to existing development, such that long distance views towards scenic areas would be maintained. While new development under the 2021 LRDP could alter views throughout campus, changes would not be obtrusive due to the distance between the viewer and the proposed development; the scale of development, and landscaping; and the presence of other existing development and trees throughout the campus. Viewers would still experience the impression of expansive views throughout campus even after development of new structures and buildings. New development resulting from 2021 LRDP implementation would be required to comply with processes, and development standards outlined UC Santa Cruz Design Review Process and Campus Standards Handbook, and generally be consistent with the Physical Design Framework. With respect to potential development at Westside Research Park, the development of mixed-use land use (i.e., additional employee/staff housing with supporting retail) at this location would generally be low-rise (1-3 stories) structures adjacent to the existing academic/administrative space located on site. Therefore, views from the adjacent Antonelli Pond are not anticipated to change considerably. As a result, the 2021 LRDP's cumulative impact on scenic vistas would not be cumulatively considerable.

ADVERSE EFFECT ON THE AESTHETIC QUALITY OF THE COWELL LIME WORKS HISTORIC DISTRICT

The Cowell Lime Works Historic District (historic district) located in the primary entrance area to the main residential campus, is considered a scenic resource. Related on-campus projects that may occur proximate to the Historic District have the potential to damage the aesthetic quality of the scenic resource. However, as the district is largely obscured from view by topography and intervening vegetation (refer to Viewpoint 3 in Section 3.1, "Aesthetics," and since the City, County, and UC Santa Cruz have adopted policies to protect the visual integrity of scenic resources, off-campus projects are not considered cumulatively considerable with respect to impacts to the district.

The 2021 LRDP proposes development to the east and west of the historic district (See Section 2, "Project Description, Figure 2-4). and some limited development could occur within the historic district, in addition to rehabilitation of historic buildings, for academic & support facilities, community-facing programs, and visitor resources. All new development under the 2021 LRDP would be required to comply with the UC Santa Cruz Design Review Process and standards contained in the Campus Standards Handbook, and must be generally consistent with the 2021 LRDP Physical Planning Principles and the UC Santa Cruz Physical Design Framework which include requirements, standards, and guidelines for consideration of and consistency with adjacent development. Further, implementation of Mitigation Measure 3.4-4a would ensure that all new development under the 2021 LRDP would be conducted in a manner consistent with Secretary of the Interior Standards and would not affect the integrity (including visual integrity) of the district. As a result, implementation of the aforementioned mitigation measure would reduce 2021 LRDP-related development to less than cumulatively considerable by preserving the integrity of the district as a historical and visual resource.

DEGRADE EXISTING VISUAL CHARACTER OR QUALITY

Visual character changes are anticipated on campus and in its vicinity as a result of the cumulative projects. The greatest potential for cumulative impacts related to visual character in the LRDP area exists along the perimeter of the main residential campus and in areas adjacent to the Westside Research Park where approved and future projects would interface with development in the local community. Development both on campus and off campus could increase the urban nature of the area and impact the visual character or quality; however, it would not necessarily degrade the visual character. The City, County, and UC Santa Cruz implement adopted policies and review procedures to evaluate visual character and compatibility of proposed projects. As a result, there is not a cumulatively considerable impact without the 2021 LRDP.

Land uses under the 2021 LRDP would modify the existing visual character and quality within the main residential campus and at the Westside Research Park; however, most of the new development would be adjacent to existing development and would comply with the UC Santa Cruz Design Review Process and standards contained in the Campus Standards Handbook, and Physical Design Framework. Additionally, implementation of Mitigation Measures 3.1-3a, 3.1-3b, and 3.1-3c would reduce the 2021 LRDP's contribution to cumulative impacts related to changes to visual character by requiring that the siting, development patterns, and architecture of new development be consistent with the 2021 LRDP Physical Planning Principles and Guidelines, including those related to building height and massing, in order to ensure that the visual character and quality of scenic areas are not substantially degraded. Therefore, the 2021 LRDP's cumulative impact on the degradation of existing visual character would not be cumulatively considerable.

CREATE NEW SOURCE OF LIGHT AND GLARE

The cumulative effects of lighting are visible over a wide area because of the potential for lighting from a number of projects to create skyglow. Under existing conditions, the UC Santa Cruz main residential campus, Westside Research Park, and surrounding areas generate light and glare in the form of reflected building surfaces, streetlights, illumination for paths, interior and exterior lights in buildings, and other noteworthy structures. As described in Impact 3.1-4, implementation of the 2021 LRDP would introduce new sources of light and glare; however, while these fixtures would be similar in nature to existing sources, implementation of Mitigation Measures 3.1-4 would further ensure that the contribution of the 2021 LRDP to light and glare would not be cumulatively considerable.

SUMMARY

In summary, development under the 2021 LRDP would not make a cumulatively considerable contribution to cumulative aesthetic impacts, and impacts would be **less than significant**.

4.3.2 Agriculture and Forestry Resources

CONVERT LANDS DESIGNATED AS IMPORTANT FARMLANDS TO NON-AGRICULTURAL USE

The cumulative setting for agricultural and forest resources is the region which is defined to include Santa Cruz County. As of 2016, Santa Cruz County had approximately 13,437 acres of Prime Farmland, 2,335 acres of Farmland of Statewide Importance, and 3,521 acres of Unique Farmland (DOC 2019). Since 2014, there has been a 2 percent decline in the acreage of farmland, from 19,947 to 19,544 acres (DOC 2019). Local farmland decreased by 19 percent from 300 to 252 acres. Prime Farmland decreased by 2 percent, from 13,688 to 13,437 acres. Farmland of Statewide Importance decreased by 3 percent, from 2,405 to 2,335 acres, and Unique Farmland decreased by 1 percent, from 3,554 to 3,521 acres (DOC 2019). Lands converted from agricultural use to non-agricultural use typically do not return to agricultural use at a later date but become part of a more urban condition.

Although none of the past, current, and future projects identified in Table 4-2 are anticipated to result in a substantial reduction in Important Farmland in the county. further urban development within the county, including development guided by city and county general plans (i.e., City of Santa Cruz and County of Santa Cruz) and shown in the countywide data presented above, could result in significant cumulative impacts to agriculture resources when viewed in combination with implementation of the 2021 LRDP. Therefore, the cumulative impact from the conversion of Important Farmland (which includes Prime, Farmland of Statewide Importance, and Unique Farmland) to non-agricultural uses within Santa Cruz County is considered significant.

As discussed in Section 3.2 of this EIR, the 2021 LRDP would result the conversion of approximately 2 acres of farmland within the main residential campus (lower campus) to nonagricultural uses (employee housing). However, based on the LESA model evaluation the 2-acre area is not considered a significant agricultural resource that contributed to regional agricultural lands/operations in the region due to its limited acreage and water supply, as well as its relative isolation compared to other agricultural lands in the region. Therefore, the 2 acres of farmland under the 2021 LRDP does not represent a cumulatively considerable contribution to agricultural lands in the county, and similarly, its conversion to non-agricultural uses would not be considered cumulatively considerable.

RESULT IN A LOSS OR CONVERSION OF FOREST LAND TO NON-FOREST USE

Forested lands and timberland occupy a substantial portion of Santa Cruz County with large areas of timber production in the Santa Cruz Mountains. The Timber Production (TP) zoning district extends across 71,000 acres of the County, primarily in the North Coast and Mountain Regions (County of Santa Cruz 2017). The total production value of timber resources for Santa Cruz County in 2018 was approximately $10.2 million, an approximately 30 percent increase from 2017 (Santa Cruz County 2018). Development of past, current, and future projects continue to alter land uses in Santa Cruz County. Urban development as guided by city and county general plans (i.e., City of Santa Cruz and County of Santa Cruz), as shown in Table 4-2, has not and would not result in the conversion of substantial forestland within Santa Cruz County. Based on the projects listed, development has and would occur within existing developed areas and not within lands designated as forestland or timberland. Therefore, the cumulative impact from the loss or conversion of forest land to non-forest use is not considered significant.

Further, the 2021 LRDP would not result in the rezoning of timber harvest lands. Development under the 2021 LRDP could impact up to approximately 123 acres of forested land cover, including redwood and coastal mixed hardwood, however UC Santa Cruz would comply with the Forest Practice Rules through THPs and TCPs, as necessary. In addition, UC Santa Cruz would maintain 10 percent or greater tree cover such that development areas would still be considered forested land per Public Resources Code Section 12220(g). Therefore, the 2021 LRDP would not reduce timberland and would maintain forested land cover such that the contribution to the 2021 LRDP would not be cumulatively considerable.

SUMMARY

In summary, development under the 2021 LRDP would not make a cumulatively considerable contribution to cumulative impacts on agriculture and forestry resources, and impacts would be **less than significant**.

4.3.3 Air Quality

The geographic scope for emissions of criteria air pollutants is the North Central Coast Air Basin (NCCAB) and the local area for toxic air contaminants (TAC) and odors. Future levels of emission from cumulative projects would be a function of the type and scale of the projects under construction and operation, including those discussed in Section 4.2.2, "Cumulative Projects Considered." Cumulative development in the region will continue to increase the concentration of pollutants from traffic, natural gas combustion in buildings, area sources, and stationary sources, but would be partially offset by state and federal policies that set emissions standards for mobile and non-mobile sources. The proposed land uses under the 2021 LRDP would result in an increase of air pollutant emissions from on-campus area sources, stationary sources, and mobile sources. The 2021 LRDP would also result in increased traffic and

related emissions throughout the region because of vehicular travel associated with new students and staff. Therefore, cumulative development in the region combined with 2021 LRDP implementation could result in a significant cumulative air quality impact.

CONSTRUCTION GENERATED EMISSIONS

Monterey Bay Air Resources District (MBARD) has established a significance threshold of 82 lb/day for emissions of respirable particulate matter with an aerodynamic diameter of 10 micrometers (PM_{10}), and 137 lb/day for emissions of ROG and NO_X, which are ozone precursors. The NCCAB, which is under the jurisdiction of MBARD, is currently in attainment of all federal and state ambient air quality standards with the exception of ozone and PM_{10} California standards (CARB 2018). MBARD considers emissions of ROG, NO_X, and PM_{10} from an individual project that exceed the applicable mass emissions thresholds to be a substantial contribution to a cumulative impact on regional air quality, and projects that do not exceed the project-level thresholds may conclude that they are not cumulatively considerable. Estimated construction emissions associated with proposed development under the 2021 LRDP would exceed MBARD daily NO_X emissions threshold. Implementation of Mitigation Measure 3.3-1 would reduce the generation of NO_X emissions related to construction under the 2021 LRDP below the MBARD threshold, consistent with the AQMP, by requiring contractors to develop and implement a plan demonstrating that the off-road equipment used on-site to construct 2021 LRDP projects would achieve a fleet-wide average 41 percent reduction in NO_X exhaust emissions. With implementation of Mitigation Measure 3.3-1, the 2021 LRDP would not exceed MBARD's applicable mass emissions thresholds for ROG, NO_X, and PM_{10}; because these are cumulative thresholds, the 2021 LRDP's contribution (after mitigation) would not be cumulatively considerable.

OPERATIONAL EMISSIONS

NCCAB is currently designated as a nonattainment-transitional area for ozone and non-attainment for PM_{10}. As noted above, MBARD considers emissions of ROG and NO_X (ozone precursors), and PM_{10} from an individual project that exceed the applicable mass emissions thresholds to be a substantial contribution to a cumulative impact on regional air quality.

Implementation of individual projects under the 2021 LRDP would result in long-term project-generated emissions of criteria air pollutants, particularly emissions of the ozone precursor ROG and PM_{10}. Implementation of Mitigation Measure 3.3-2 would reduce the generation of ROG and PM_{10} emissions related to implementation of the 2021 LRDP. As a result, ROG emissions would not exceed MBARD significance criteria, however the mitigated PM_{10} emissions would still exceed MBARD significance criteria. As noted in Section 3.3, "Air Quality," with the majority of PM_{10} emissions resulting from roadway fugitive dust, additional mitigation of these emissions from non-university operations (e.g., motor vehicle use), beyond the actions described above in Mitigation Measure 3.3-3 and 3.16-1, is not considered feasible. Because implementation of the 2021 LRDP would exceed the applicable mass emissions thresholds for PM_{10}, the 2021 LRDP's contribution to regional air quality would be cumulatively considerable. It should be noted that according to Appendix A of the CalEEMod User's Guide, daily roadway fugitive dust emissions from paved roads are calculated based on a formula that accounts for roadway particle sizes, road surface silt loading, average vehicle weight, local precipitation levels, and VMT. None of these variables can be feasibly changed except for VMT, which is already mitigated under Mitigation Measure 3.16-1. With respect to the cumulative development that would occur outside of the LRDP area, UC Santa Cruz has little direct control over fugitive PM emissions from roadway dust nor the use of zero-emissions vehicles from non-university mobile sources. Further PM_{10} reductions would require mitigation of these sources of PM_{10} emissions. Therefore, PM_{10} emissions would remain above the established thresholds, and as a result the 2021 LRDP's contribution would remain cumulatively considerable.

CONSISTENCY WITH APPLICABLE AIR QUALITY PLAN

Santa Cruz County is in an area of nonattainment for ozone and PM_{10} under to the California Ambient Air Quality Standards (CAAQS). As a means of reducing regional ambient ozone concentrations in the long term, MBARD sets

daily and annual significance thresholds for emissions of ozone precursors reactive organic gases (ROG) and oxides of nitrogen (NO_X), as specified in the Air Quality Management Plan (AQMP). As discussed in Impact 3.3-3, a consistency analysis with the AQMP is required for a program-level environmental review, such as the 2021 LRDP. Additionally, consistency with regional growth projections, such as those developed by the Association of Monterey Bay Area Governments (AMBAG), is considered as part of the overall AQMP consistency analysis. The evaluation of consistency is based on a comparison of the plan with the land use and transportation control measures and strategies outlined in the AQMP to reach attainment of standards. If the plan is consistent with these measures, the plan is considered consistent with the AQMP. MBARD utilizes AMBAG growth predictions in its AQMP projected emissions estimates, and the growth projected in the 2021 LRDP is commensurate with the growth accounted for in the AQMP. However, the PM_{10} emissions occurring under operation of the 2021 LRDP would exceed the MBARD daily threshold of significance even with implementation of feasible mitigation (Mitigation Measure 3.3-2). For this reason, the project would conflict with MBARD's long-term air quality planning efforts to achieve and maintain attainment with the ozone CAAQS and by exceeding thresholds established for achieving attainment within the region (inclusive of other related development), the 2021 LRDP's contribution would be cumulatively considerable. No additional feasible mitigation would reduce this contribution.

MOBILE SOURCE CO CONCENTRATIONS

MBARD has a project-level carbon monoxide (CO) threshold of 550 pounds per day, which may be indicative of a localized impact when this level of CO is produced by an individual project, but is inappropriate for a 2021 LRDP, where these CO levels would be dispersed throughout the LRDP area. A more accurate threshold at the plan level is tied to congestion at a particular roadway intersection coupled with a high volume of cars; it is only under these circumstances that CO levels are exceeded. Because MBARD does not have CO significance criteria directly related to intersection traffic volumes, MBARD was consulted for approval to use screening criteria for CO emissions at high-volume intersections developed by Sacramento Metropolitan Air Quality Management District (SMAQMD). According to SMAQMD, a project that would result in an affected intersection experiencing more than 31,600 vehicles per hour would result in a significant CO impact.

Intersection volumes in the project vicinity under the 2021 LRDP would not exceed 10,000 vehicles per hour even under Cumulative with Project conditions. As a result, development-generated, operational mobile-source emissions of CO would not violate an air quality standard or contribute substantially to an existing or projected air quality violation or expose sensitive receptors to substantial pollutant concentrations of CO. Therefore, the 2021 LRDP's contribution to mobile source CO concentrations would not be cumulatively considerable.

CONSTRUCTION EMISSIONS OF TOXIC AIR CONTAMINANTS

Toxic air contaminants (TACs) are pollutants of localized concern. The emissions of multiple TACs by sources, including diesel particulate matter exhaust (diesel PM), can result in a cumulative impact to air quality in locations where receptors are exposed to high concentrations of TACs over the long term. Construction-related activities associated with projects under the 2021 LRDP would result in temporary, short-term project-generated emissions of diesel PM from the exhaust of off-road, heavy-duty diesel equipment used during demolition, site preparation, building construction, paving, the exhaust of on-road haul truck travel, and application of architectural coatings. As discussed in Section 3.3, "Air Quality," the non-cancer risks from construction TAC emissions would be below MBARD's thresholds of 10 in one million for cancer risk and an HI of 1.0 for non-cancer risk. In addition, projects under the 2021 LRDP would comply with Rule 424 and unsafe exposure to asbestos would be avoided. The rule requires UC Santa Cruz and its contractors to notify MBARD of any renovation or demolition activity at least 10 working days prior to commencement of demolition/renovation. When removing any Regulated Asbestos Containing Material (RACM), MBARD regulations must be followed. This notification includes a description of structures and methods utilized to determine whether asbestos-containing materials are potentially present. All RACM found on the site must be removed prior to renovation activity and there are specific requirements for surveying, notification, removal, and disposal of material containing asbestos. Cumulative projects would also be required to comply with

MBARD's thresholds for construction TAC emissions and Rule 424. Further, cumulative projects in the LRDP area, whose construction emissions could overlap with those from the project, were included as part of the HRA evaluation. The incremental health risk from TAC emissions associated with on-campus development including development under the 2021 LRDP would be below the applicable MBARD thresholds; therefore, the 2021 LRDP's contribution to cumulative impacts related to construction emissions TACs would not be cumulatively considerable.

OPERTATIONAL EMISSIONS OF TOXIC AIR CONTAMINANTS

With respect to operational TAC emissions, 2021 LRDP implementation would likely include new stationary sources such as additional boilers, emergency generators, laboratories, a new paint booth, increased vehicular traffic, and increased gasoline storage facilities. New facilities with the potential to generate stationary sources of TACs would be required to obtain a permit from MBARD. Facilities with the potential to generate health risks above established risk levels, would be required to distribute public notifications to notify families of children enrolled and all persons within 1,000 feet of the source before approving any permits. The health risk assessment completed for the 2021 LRDP development concluded that the probability of contracting cancer for the maximally exposed individual resident MEIR (i.e., the modeled receptor location at a residential land use that has the highest risk) would not exceed 1.8 in one million and ground-level concentrations of TACs would result in a HI no greater than 0.1 for non-cancer risk. Cumulative projects in the LRDP area were included as part of the HRA evaluation. With respect to cumulative projects outside of the LRDP area, these projects are largely residential in nature and would not be expected to substantially contribute to TAC emissions beyond what was considered in the HRA. The incremental health risk from TAC emissions associated with on-campus development including development under the 2021 LRDP would be below the applicable MBARD thresholds; therefore, the 2021 LRDP's contribution to cumulative health risk impacts would not be cumulatively considerable.

ODORS

Odors resulting from the construction of new land uses that would be allowed under the 2021 LRDP would be intermittent and temporary and would dissipate rapidly from the source with an increase with distance. Although construction activities would be spread over a relatively long-term period (approximately 18 years), odors resulting from construction activity would occur in different areas of the 2,000-acre main residential campus or the Westside Research Park at different times over the 2021 LRDP period, not exposing any single area or individual receptor to construction-related odors for extended periods of time. Operational uses under the 2021 LRDP would result in in various levels of odorous emissions, ranging from odors associated with motor vehicle operation to food preparation. Diesel-fueled delivery trucks would haul materials to and from the academic and administrative, residential, recreational, and food service areas; however, these types of sources are not different from those that currently deliver materials to existing land uses in the LRDP area and other parts of the City. No odor complaints regarding UC Santa Cruz have been received by MBARD (Searson, pers. comm., 2020), thus it is unlikely similar sources under the 2021 LRDP would result in new complaints. Other potential sources of odors include research activities, such as through general laboratory research, and handling of volatile organic materials. These odor sources would be contained within buildings in the campus core and not likely result in objectionable odors affecting a substantial number of people. Similarly, the cumulative projects listed in Table 4-2 are not typically associated with substantial odors with the possible exception of the wastewater treatment facility at 112 California Street (Cumulative Project ID 51). However, this facility would be constructed adjacent to the existing wastewater treatment facility operated by the City and would be located over a mile from the LRDP area. As a result, development under the 2021 LRDP would not be considered cumulatively considerable with the aforementioned projects such that the combined odors would be substantial and adversely affect substantial number of people. Therefore, the contribution of campus development under the 2021 LRDP to odors would not be cumulatively considerable.

SUMMARY

In summary, development under the 2021 LRDP would result in emissions that would make a considerable contribution to cumulative, operational air quality impacts, and as a result, the 2021 LRDP would conflict with MBARD's long-term air quality planning efforts to achieve and maintain attainment with the ozone CAAQS. Therefore, the project's cumulative air quality impacts would be **significant and unavoidable**.

4.3.4 Archaeological, Historical, and Tribal Cultural Resources

The cumulative context for the cultural resources cumulative analysis considers the broad regional system of which the resources are a part. The cumulative context for archaeological resources, human remains, and tribal cultural resources is the former territory of the Ohlone tribelet, recorded in Mission Santa Cruz records as Uypi. The historic lands of the Uypi people have been affected by development since the arrival of the Portolá expedition in 1769. Division of the land into land grants was soon followed by limestone production and related commercial development through the 1800s. Development of the Uypi lands continued with agricultural growth, residential growth throughout the county and city of Santa Cruz, and the establishment of UC Santa Cruz in 1965. These activities have resulted in an existing significant adverse effect on tribal cultural resources. The cumulative context for historical resources is UC Santa Cruz and the city of Santa Cruz, where common patterns of historic-era settlement have occurred over roughly the past two centuries.

Because all significant cultural resources are unique and nonrenewable members of finite classes, meaning there are a limited number of significant cultural resources, all adverse effects erode a dwindling resource base. The loss of any one archaeological site could affect the scientific value of others in a region because these resources are best understood in the context of the entirety of the cultural system of which they are a part. The cultural system is represented archaeologically by the total inventory of all sites and other cultural remains in the region. As a result, a meaningful approach to preserving and managing cultural resources must focus on the likely distribution of cultural resources, rather than on a single project or parcel boundary.

Proper planning and appropriate mitigation can help to capture and preserve knowledge of such resources and can provide opportunities for increasing our understanding of the past environmental conditions and cultures by recording data about sites discovered and preserving artifacts found. Federal, state, and local laws are also in place that protect these resources in most instances. Even so, it is not always feasible to protect these resources, particularly when preservation in place would make projects infeasible, and for this reason the cumulative effects of past and present projects in the Santa Cruz area could result in a potentially significant cumulative impact on cultural resources.

UNIQUE ARCHAEOLOGICAL RESOURCES

Development under the 2021 LRDP could be located on properties that contain known or unknown archaeological resources and ground-disturbing activities could result in discovery of or damage to yet undiscovered archaeological resources as defined in CEQA Guidelines Section 15064.5. Implementation of Mitigation Measure 3.4-1 would require UC Santa Cruz to develop site-specific actions in coordination with the appropriate federal, state, and/or local agency(ies) and tribes to avoid, move, record, or otherwise treat the archaeological resource appropriately, in accordance with pertinent laws and regulations, such that the resource would not be substantially and adversely affected. With implementation of Mitigation Measure 3.4-1, potential impacts to archaeological resources would be reduced such that 2021 LRDP development would not substantively affect the archaeological context of the area and the 2021 LRDP would not be considered cumulatively considerable with respect to other development in the vicinity of the LRDP area.

TRIBAL CULTURAL RESOURCES

Future development associated with the 2021 LRDP would involve land development activities that could cause a substantial adverse change in the significance of a tribal cultural resource. The Amah Mutsun Tribal Band identified the eight prehistoric archaeological sites on the UC Santa Cruz main residential campus as tribal cultural resources.

Compliance with PRC Section 21080.3.2 and Section 21084.3 (a) would ensure that treatment and disposition of the tribal cultural occurs in a manner consistent with the California Native American Heritage Commission guidance. Further, implementation of Mitigation Measure 3.4-2 would require UC Santa Cruz to provide the culturally affiliated tribe the to monitor construction and by requiring appropriate and respectful treatment (i.e., proper care as determined through preparation and implementation of a treatment plan that is approved by the tribe) of artifacts if they are recovered. With compliance with existing regulations and implementation of Mitigation Measure 3.1-2, development under the 2021 LRDP would not contribute to a cumulative loss of tribal cultural resources in the area, and as a result would not be cumulatively considerable.

HUMAN REMAINS

Construction and excavation activities associated with project development could unearth previously undiscovered or unrecorded human remains if they are present. Compliance with California Health and Safety Code Section 7050.5 and California Public Resources Code (PRC) Section 5097 would provide an opportunity to avoid or minimize the disturbance of human remains, and to appropriately treat any remains that are discovered such that any effects would not be considerable. As a result, the 2021 LRDP would not contribute to a cumulative loss or adverse effect on human remains in the area, and the 2021 LRDP's contribution to cumulative impacts to human remains would not be cumulatively considerable.

HISTORICAL RESOURCES

Historical resources on campus have been identified through historic building surveys and cultural resource studies. The cumulative loss of historic resources at UC Santa Cruz and the Santa Cruz area is considered significant. Known historic resources on the UC Santa Cruz campus include the Cowell Lime Works Historic District and the potential discontiguous Campus Core district. While no modifications to the buildings in these districts are envisioned under the 2021 LRDP, future development under the plan could result in the loss or modification of buildings or structures that have not yet been evaluated for historical significance. Implementation of Mitigation Measure 3.4-4a, 3.4-4b, and 3.4-4c would require a district evaluation of the Campus Core, a historic structure evaluation of resources prior to ground-disturbing activities, and would require all report recommendations be implemented to offset the project's contribution. However, it is possible that a historic building would need to be demolished or altered in such a way that it would no longer convey its historic significance. Therefore, the project's contribution to cumulative historic resource impacts would be potentially cumulatively considerable. No additional mitigation, beyond that identified in Section 3.4, "Archaeological, Historical, and Tribal Cultural Resources," is available to reduce the 2021 LRDP's contribution.

SUMMARY

Due to the cumulatively considerable contribution of 2021 LRDP-related development to potential historic resources impacts, the 2021 LRDP would result in **significant and unavoidable** impacts to cultural resources.

4.3.5 Biological Resources

The context for cumulative impacts on biological resources is the LRDP area, the range of affected special-status species and sensitive habitats, as well as adjacent migration and movement corridors (e.g., natural habitat areas surrounding the LRDP area, the Pacific flyway for migratory birds) that are connected to the LRDP area.

Past, present, and future development projects have and likely will result in impacts on special-status plants, special-status wildlife, sensitive natural communities, riparian habitat, state or federally protected wetlands, wildlife movement corridors, and native wildlife nurseries. Most of the projects in Table 4-2 would be discretionary and subject to environmental review under CEQA or otherwise subject to regulations protective of biological resources (e.g., ESA, CESA, and California Fish and Game Code), and would be required to implement measures to avoid,

reduce or compensate for adverse effects on sensitive natural resources. The existing cumulative impacts of these projects, activities, and disruptions to ecosystem and biophysical processes (e.g., climate change, invasive species invasions) on special-status species, sensitive natural communities, riparian habitat, state and federally protected wetlands, and wildlife movement corridors and nursery sites have been substantial, and are considered significant.

Additionally, as described in Section 3.18, "Wildfire," the CZU Lightning Complex fire burned approximately 86,509 acres in Santa Cruz and San Mateo Counties in August and September 2020, including forested areas at Big Basin, Butano, and Henry Cowell State Parks (Figure 3.18.2; CAL FIRE 2020, Sempervirens Fund 2020). Wildfire is a natural process in ecosystems, including redwood forest ecosystems (Sempervirens Fund 2020). The impacts of high-intensity wildfires, like the CZU Lighting Complex fire, are complex and vary dependent on the species. Some plant species are likely killed during wildfires, while other plant species depend on fire for germination. Some wildlife species were capable of fleeing during the CZU Lighting Complex fire, while others (e.g., immobile young) likely perished. High-intensity wildfires can alter habitats such that they temporarily no longer provide the optimal attributes (e.g., canopy cover, understory complexity) for some wildlife species, while improving habitat for other wildlife species. Although wildfire is a natural process, the CZU Lighting Complex fire contributed to the existing significant cumulative impacts described above.

As analyzed and described in Section 3.5, "Biological Resources," implementation of projects under the 2021 LRDP would result in several direct and indirect impacts related to the disturbance or loss of special-status plants, special-status wildlife and wildlife habitat, riparian habitat, sensitive natural communities, state or federally protected wetlands, wildlife movement corridors, wildlife nurseries, and conflicts with the provisions of the Ranch View Terrace HCP. Implementation of the 2021 LRDP, in combination with other past, present, and reasonably foreseeable projects that have resulted or would result in similar impacts, would contribute to the significant cumulative effects on these biological resources if left unmitigated.

The following discusses residual cumulative impacts for each biological resource addressed in this EIR in consideration of the relevant mitigation measures included in Section 3.5, "Biological Resources."

SPECIAL-STATUS PLANTS

Project activities under the 2021 LRDP would result in ground disturbance, vegetation removal, and conversion of natural habitat, which could result in direct loss of special-status plants or habitat. This would contribute to significant cumulative impacts on special-status plants. However, implementation of Mitigation Measures 3.5-1a, 3.5-1b, and 3.5-1c would reduce the 2021 LRDP's contribution to this impact, because they would require UC Santa Cruz to conduct reconnaissance-level surveys of projects under the 2021 LRDP to determine the likelihood of presence of special-status plants, protocol-level surveys for special-status plants if determined to be likely to occur, implement avoidance measures and compensation for impacts on special-status plants, and avoid the introduction or spread of invasive plants and plant pathogens. With implementation of these mitigation measures, the 2021 LRDP is not expected to substantially reduce the abundance or viability of special-status plant populations. Because the 2021 LRDP would not contribute to potential loss or net loss of habitat within the cumulative context, the 2021 LRDP's contribution to significant cumulative impacts on special-status plants would not be cumulatively considerable.

SPECIAL-STATUS WILDLIFE

Project activities under the 2021 LRDP would result in ground disturbance; vegetation removal; conversion of habitat; and the use of heavy machinery, vehicles, and construction crews, which could result in the disturbance or direct loss of special-status wildlife. Several special-status wildlife species have been adversely affected as a result of historic and ongoing habitat loss across their range, which in some cases has been a contributing factor in their listing under ESA or CESA. Other special-status wildlife species have extremely limited ranges or narrow habitat requirements; thus, loss of habitat within the range of these species could result in the narrowing or exclusion of the species from its range. This would contribute to significant cumulative impacts. Mitigation Measures 3.5-1a, 3.5-2a, 3.5-2b, 3.5-2c, 3.5-2d, 3.5-2e, 3.5-2f, 3.5-2g, 3.5-2h, 3.5-2i, 3.5-2j, 3.5-2k, 3.5-2l, 3.5-2m, 3.5-2n, and 3.10-5a would reduce these direct and indirect impacts on special-status wildlife to less-than-significant levels because protective actions, including

reconnaissance-level surveys, focused or protocol-level surveys, implementation of avoidance measures (e.g., physical avoidance, seasonal avoidance), and compensation for unavoidable loss of special-status wildlife species (potentially through incidental take permitting for listed species) would reduce the potential impacts of injury, mortality, or other disturbance on individual animals and their habitat. Implementation of these mitigation measures would substantially reduce the 2021 LRDP's contribution to the potential loss of special-status wildlife and wildlife habitat, such that the 2021 LRDP would not result in a net loss of sensitive habitat within the cumulative context. Therefore, the 2021 LRDP's contribution would not be cumulatively considerable.

SENSITIVE NATURAL COMMUNITIES AND RIPARIAN HABITAT

Project activities under the 2021 LRDP could adversely affect sensitive natural communities and riparian habitat if these habitats are present within the project sites and are subject to project activities such as vegetation removal or ground disturbance. These activities could result in loss or degradation of these sensitive habitats, which would contribute to significant cumulative impacts. Implementation of Mitigation Measures 3.5-1a, 3.5-1c, 3.5-3a, 3.5-3b, and 3.5-3c would reduce the 2021 LRDP's contribution to this significant cumulative impact on sensitive natural communities and riparian habitat because they would require UC Santa Cruz to identify and avoid sensitive natural communities and riparian habitat or compensate for unavoidable losses of these resources. Implementation of these mitigation measures would reduce the 2021 LRDP's contributions to the potential loss or degradation of sensitive habitats such that no net loss would occur as a result of 2021 LRDP implementation. Therefore, the 2021 LRDP to contribution to significant cumulative impacts on sensitive natural communities and riparian habitat would not be cumulatively considerable.

STATE AND FEDERALLY PROTECTED WETLANDS

Implementation of the 2021 LRDP could adversely affect state or federally protected wetlands if project activities (e.g., vegetation removal, ground disturbance, use of heavy machinery) occur within or adjacent to these habitats, particularly if these features have not been previously identified. This would contribute to significant cumulative impacts. Implementation of Mitigation Measures 3.5-1a and 3.5-4 would substantially reduce the 2021 LRDP's potential contribution to this significant cumulative impact because it would require delineation of the boundaries of state and federally protected wetlands, avoidance of these features, or compensation for unavoidable impacts on the wetlands. Thus, implementation of these mitigation measures would reduce the 2021 LRDP's contribution to significant impacts on state and federally protected wetlands within the cumulative context such that no net loss of wetlands would occur. Therefore, the 2021 LRDP's cumulative impact on state and federally protected wetlands would not be cumulatively considerable.

WILDLIFE MOVEMENT CORRIDORS AND NURSERY SITES

Implementation of the 2021 LRDP could directly and indirectly adversely affect wildlife movement corridors and nursery sites if project activities occur within or adjacent to these areas. This would contribute to significant cumulative impacts. Implementation of Mitigation Measures 3.5-1a, 3.5-3a, 3.5-3b, 3.5-3c, 3.5-4, 3.5-5a, and 3.5-5b would reduce the 2021 LRDP's contribution to the significant cumulative impact on wildlife movement corridors and wildlife nursery sites because it would require identification, avoidance, or compensation for sensitive habitats (e.g., sensitive natural communities, riparian habitat, state or federally protected wetlands, monarch overwintering colonies), utilization of wildlife-friendly building design and fencing to minimize the risk of bird strikes or wildlife entanglements, and identification and retention of important habitat for wildlife nursery sites. Thus, implementation of these mitigation measures would limit the 2021 LRDP's contribution to the combined level of interference on wildlife movement through wildlife corridors and nursery sites within the cumulative context by maintaining established wildlife corridors through campus. Therefore, the 2021 LRDP's cumulative impact on wildlife movement corridors and nursery sites would not be cumulatively considerable.

CONFLICT WITH LOCAL POLICIES AND ORDINANCES

Implementation of the 2021 LRDP could result in a conflict with City of Santa Cruz and County of Santa Cruz General Plan policies adopted to protect biological resources, such as rivers, streams, creeks, wetlands, riparian habitat, special-status plants, special-status wildlife, and sensitive habitats. Pursuant to the UC's constitutional autonomy, development and uses on property under control of the UC that are in furtherance of the university's educational purposes are not subject to local land use regulation, including City of Santa Cruz and County of Santa Cruz General Plan policies regarding protection of biological resources. Although UC Santa Cruz is not subject to City and County policies and regulations, UC Santa Cruz strives to be consistent with local policies, where feasible. As discussed in Section 3.5, "Biological Resources," implementation of mitigation measures would reduce the 2021 LRDP's impact to biological resources, such as rivers, streams, creeks, wetlands, riparian habitat, special-status plants, special-status wildlife, and sensitive habitats, such that no conflicts are anticipated. Nonetheless, due to the UC's constitutional autonomy, development under the 2021 LRDP is not subject to local plans and policies, and as a result, the 2021 LRDP is not cumulatively considerable with respect to potential conflicts with the plans/policies of the City and County General Plans.

CONFLICT WITH THE PROVISIONS OF THE RANCH VIEW TERRACE HCP

Implementation of the 2021 LRDP could result in a conflict with the Ranch View Terrace HCP if the preserve area in Inclusion Area D is developed. This would contribute to significant cumulative impacts. Implementation of Mitigation Measure 3.5-7 would reduce the 2021 LRDP's contribution to the significant cumulative impact resulting from conflict with an adopted HCP because it would require consultation with USFWS, identification and protection of alternative preserves, or amendment of the existing HCP or preparation of a new more comprehensive HCP, or prohibition of development in IAD if the HCP cannot be amended. Therefore, after implementation of Mitigation Measure 3.5-7, the 2021 LRDP's contribution to potential conflicts with the provisions of the Ranch View Terrace HCP would not be cumulatively considerable.

SUMMARY

In summary and for the reasons stated above, development under the 2021 LRDP would not result in a cumulatively considerable contribution with respect to cumulative impacts to significant cumulative impacts on biological resources, and impacts would be **less than significant**.

4.3.6 Energy

The geographic area considered for cumulative impacts related to energy use includes the service area for PG&E. As noted in Section 3.6, "Energy," electric and natural gas services are purchased from PG&E by UC Santa Cruz. A natural gas turbine engine located at the Central Heat Plant, a canopy solar panel array located in the East Remote Parking lot, and a solar panel array located on top of McHenry Library, also generate electricity on the main residential campus. PG&E employs various programs and mechanisms to support provision of these services to new development; various utilities charge connection fees and re-coup costs of new infrastructure through standard billings for services. Campus development under the 2021 LRDP, in combination with other development in the City and County of Santa Cruz, would contribute to the increased demand of energy.

RESULT IN UNNECESSARY, INEFFICIENT, AND WASTEFUL USE OF ENERGY

Energy would be required for the construction and operation of campus development under the proposed 2021 LRDP. Construction-related energy would be used during construction activities and not represent a long-term increase in demand. Further, construction activities conducted on-campus would not result in unusual or unique construction requirements that would result in potential wasteful energy use/consumption. Best available control technology would be used by contractors, as well as conformance to applicable requirements like MBARD requirements related to equipment idling, such that the inefficient or wasteful use of energy during construction

would not occur. Operations-related energy demand would result from building energy use and increases in vehicular traffic. UC Santa Cruz would comply with the most current energy-efficient standard by achieving energy efficiency rates as required under the UC Sustainable Practice Policy Green Building targets. UC Santa Cruz is also committed to achieving LEED Silver status at minimum and is required to meet at the most current Title 24 building energy efficiency standards at minimum. Both the building energy efficiency and LEED targets which are designed to reduce energy waste and increase building energy efficiently. For these reasons, energy consumption under the 2021 LRDP through construction, building and facility operations, and transportation would not contribute to the wasteful, inefficient, or unnecessary use of energy within the cumulative context. Therefore, the project's contribution to cumulative energy demand impacts would not be cumulatively considerable,

CONFLICT, OR CREATE AN INCONSISTENCY, WITH ANY APPLICABLE PLAN, POLICY, OR REGULATION ADOPTED FOR THE PURPOSE OF AVOIDING OR MITIGATING ENVIRONMENTAL EFFECTS RELATED TO ENERGY

Development under the 2021 LRDP would exceed Title 24 Building Energy Efficiency Standards by at least 20 percent to reduce energy use, which establish minimum efficiency standards related to various building features, including appliances, water and space heating and cooling equipment, building installation and roofing, and lighting. However, under the 2021 LRDP design features that reduce energy use, improve energy efficiency, and increase reliance on renewable energy sources would be incorporated into new building projects to meet the goals of the UC Carbon Neutrality Initiative as written into the UC Sustainable Practices Policy, as well as meeting the whole-building energy performance targets listed in Table 1 of Section V.A.3 in the SPP. Thus, the 2021 LRDP would adhere to the stringent building and vehicle efficiency standards as well as 2021 LRDP design features consistent with UC Carbon Neutrality goals and UC Santa Cruz's 2017 Climate & Energy Strategy (CES). Therefore, within the cumulative context, the 2021 LRDP's would not result in conflicts with applicable plans, policies, and regulations adopted for avoiding or mitigating environmental effects related to energy, and the 2021 LRDP would not be cumulatively considerable.

SUMMARY

In summary and for the reasons stated above, development under the 2021 LRDP would not result in a cumulatively considerable contribution with respect to cumulative impacts on energy resources, and impacts would be **less than significant**.

4.3.7 Geology and Soils

The study area for the cumulative impacts on geology and soils is the LRDP area. The geographic context for geotechnical impacts are site-specific, rather than regional in nature, because each development site has unique geologic considerations prevalent within the regions that would be subject to, at minimum, uniform site development and construction and regulatory standards, such as the California Building Code (CBC) standards. All projects located within and outside the LRDP area are subject to regulatory mandates in the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook.

INCREASE THE RISK OF EXPOSURE OF PEOPLE OR BUILDINGS TO SEISMIC GROUND SHAKING

The LRDP area is located in a seismically active region that includes several active earthquake faults of local and regional significance, including the San Andreas fault. High accelerations generated from large magnitude earthquakes on any of the nearby active faults in the region could lead to structural damage of buildings and infrastructure if they are not designed to withstand the forces generated from those accelerations, which in turn would result in exposure of the occupants to those hazards. Development under the LDRP would be designed to comply with CBC, the UC Seismic Safety Policy, and the UC Santa Cruz Campus Standards Handbook which require

the use of the most stringent seismic safety standards, consistent with all applicable regulations. Development outside of the LRDP area would also comply with the CBC as well as other state, city, or county seismic safety regulations. Thus, within the cumulative context, the 2021 LRDP's would not contribute to a cumulative geology and soils impact associated with the risk of exposure to people or buildings to seismic ground shaking. Therefore, the 2021 LRDP's contribution would not be cumulatively considerable.

INCREASE THE RISK OF EXPOSURE OF PEOPLE OR BUILDINGS TO SEISMIC-RELATED GROUND FAILURE, INCLUDING LIQUEFACTION

Development and redevelopment under the 2021 LRDP could occur on a geologic unit or soil that could become unstable. In addition, ground failure could be triggered by seismic shaking and could result in on- or off-site landslides, lateral spreading, or liquefaction, creating potential risks to life or property. All structures proposed to be constructed or redeveloped would be required to comply with the CBC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook which require buildings and infrastructure to be designed to withstand anticipated levels of ground shaking. Further, site-specific geotechnical studies and soil engineering reports would be required before consideration of approval of for all development pursuant to the 2021 LRDP. Development outside of the LRDP area would also comply with the CBC as well as other state, city, or county seismic safety regulations. Thus, within the cumulative context, the 2021 LRDP would not contribute to a cumulative geology and soils impact associated with the risk of exposure to people or buildings to seismic related ground failure, including liquefaction. Therefore, the 2021 LRDP's contribution would not be cumulatively considerable.

RESULT IN SUBSTANTIAL EROSION OR LOSS OF TOPSOIL DURING CONSTRUCTION, OPERATIONS, OR MAINTENANCE

The LRDP area is underlain by soils that range from slightly to very highly erodible, based on U.S. Soil Conservation Service classification. Highly to very highly erodible soils are present in some areas of central and north campus and in small portions of the lower campus. Implementation of the 2021 LRDP would result in erosion and loss of topsoil from vegetation removal, clearing, and grading of soils, during development and redevelopment activities. Compliance with UC Santa Cruz erosion control standards, SWRCB General Permit for Discharges of Stormwater Associated with Construction Activity, and Statewide Phase II MS4 Permit would protect against soil erosion during and as a result of construction, operations, and maintenance activities. In addition, UC Santa Cruz continues to assess the health and functionality of the existing campus storm drain system, natural drainages and karst systems, as well as proposed improvements to those systems and development of non-potable water systems. Thus, within the cumulative context, the 2021 LRDP would not contribute to a cumulative geology and soils impact associated with the erosion or loss of topsoil during construction, operations, or maintenance. Therefore, the 2021 LRDP's contribution would not be cumulatively considerable.

INCREASE THE RISK OF EXPOSURE OF PEOPLE OR BUILDINGS TO EXPANSIVE OR OTHERWISE UNSTABLE SOILS

The LRDP area includes soils with high shrink-swell potential. Development and redevelopment projects within the LRDP area on these soils could result in shrinking and swelling of soils, which can cause damage to foundations. All structures proposed to be constructed or redeveloped would be required to comply with BC, UC Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook, which require site-specific geotechnical studies and soil engineering reports to address potential risk associated with expansive or unstable soils. These site-specific geotechnical studies and soil engineering reports would evaluate potential risk associated with expansive or unstable soils and incorporate project-specific design requirements and conditions of approval for all development pursuant to the 2021 LRDP. As a result, 2021 LRDP-related impacts would be site-specific and would not contribute to a cumulative geology and soils impact associated with exposure of people or buildings to expansive or unstable soils within the cumulative context. The 2021 LRDP's contribution would not be cumulatively considerable.

INCREASE THE RISK OF EXPOSURE OF PEOPLE OR BUILDINGS TO UNSTABLE CONDITIONS DUE TO KARST TOPOGRAPHY, INCLUDING SUBSIDENCE OR COLLAPSE

The LRDP area includes karst topography, which is characterized by irregular surfaces resulting from subsidence or collapse of the bedrock and sediment into subterranean cavities that have developed within the marble bedrock. Future development per the 2021 LRDP could result in construction of facilities on sites underlain by dolines or sinkholes, both of which are a characteristic of karst topography, that are filled with soft soil that lead to settling or collapse beneath facilities. All structures constructed or redeveloped would be required to comply with the CBC, University of California Seismic Safety Policy, and UC Santa Cruz Campus Standards Handbook, which require site-specific geotechnical studies and soil engineering reports to address potential karst hazard risks. Site-specific geotechnical studies and soil engineering reports would be conducted by geotechnical engineers and geologists experienced in karst hazards before consideration of approval of development pursuant to the 2021 LRDP. Consequently, development under the 2021 LRDP would not contribute to a cumulative geology and soils impact associated with exposure of people or buildings to unstable conditions due to karst topography, including subsidence or collapse. Therefore, the 2021 LRDP would not be cumulatively considerable.

DIRECTLY OR INDIRECTLY DESTROY UNIQUE PALEONTOLOGICAL RESOURCES

Development under the 2021 LRDP could result in the disturbance of paleontologically sensitive formations with the potential to contain paleontological resources. Potential fossil-bearing formations in the LRDP area include marine formations (Santa Margarita sandstones, Santa Cruz mudstone, and Quaternary marine terrace deposits) and sedimentary formations (Quaternary non-marine terrace deposits and doline deposits). Implementation of Mitigation Measure 3.7-6 would require paleontological awareness training for construction personnel on projects located within potential fossil-bearing formations. If paleontological resources are discovered during ground-disturbing activities, Mitigation Measure 3.7-6 requires that a qualified paleontologist evaluate the discovery and notify UC Santa Cruz, and that appropriate treatments are implemented to document and protect the resources. With implementation of this mitigation measure, the 2021 LRDP would not contribute to a broader geology and soils impact within the cumulative context associated with disturbance of paleontological resources. Therefore, the 2021 LRDP's contribution would not be cumulatively considerable.

SUMMARY

In summary and for the reasons stated above, the 2021 LRDP would not result in a cumulatively considerable contribution with respect to cumulative impacts on geology and soils, and the impacts would be **less than significant**.

4.3.8 Greenhouse Gas Emissions and Climate Change

As discussed in Section 3.8, "Greenhouse Gas Emissions and Climate Change," the quantity of greenhouse gas (GHG) emissions that has accumulated in the atmosphere is enormous and has resulted in climate change, which is a significant cumulative impact. Because climate change is a global phenomenon, the impacts of GHG emissions are inherently cumulative. Therefore, the analysis under Impact 3.8-1 and Impact 3.8-2 reflects the cumulative impact of the proposed 2021 LRDP on global climate. As described under those impacts, implementation of the 2021 LRDP would not conflict with applicable plans, policy, or regulations for GHG emission reduction, and implementation of Mitigation Measure 3.8-1 would reduce annual GHG emissions generated by the UC Santa Cruz campus under the 2021 LRDP by 6,907 MTCO2e, which is needed to reduce the campus's 2040 emissions to 60 percent below 1990 levels. Therefore, with mitigation, the 2021 LRDP's contribution to GHG emissions would not be cumulatively considerable, and impacts would be **less than significant**.

4.3.9 Hazards and Hazardous Materials

Although some hazardous materials releases can cover a large area and interact with other releases (e.g., atmospheric contamination, contamination of groundwater aquifers), incidents of hazardous materials contamination due to leaking underground storage tank sites or release at individual businesses are more typically confined to a limited area. These relatively limited areas of contamination typically do not interact in a cumulative manner with other sites of hazardous materials contamination. However, if construction would create a new site of contamination, or contribute substantially to a hazardous condition in the LRDP area, it could be considered to contribute to a cumulative impact. Impacts related to emergency vehicle access and response are considered site specific and not cumulatively considerable.

CREATE A SIGNIFICANT HAZARD THROUGH THE ROUTINE TRANSPORT, USE, OR DISPOSAL OF HAZARDOUS MATERIALS

Construction and operation of development under the 2021 LRDP would involve the transport, use, and disposal of hazardous materials to and from the UC Santa Cruz campus. Cumulative projects and associated activities located within and outside the LRDP area would be required to comply with safety procedures mandated by applicable federal and state laws and regulations, and UC Santa Cruz programs and policies related hazardous materials. State, federal, and UC Santa Cruz regulate the transport, use, and disposal of hazardous materials. As a result, there is not a cumulatively considerable impact without the 2021 LRDP.

As discussed in Section 3.9, "Hazards and Hazardous Materials, activities that involve the use of hazardous materials within the LRDP area such as construction and operation would continue to comply with existing safety standards mandated by applicable federal and state laws, UC Santa Cruz programs and policies. Therefore, the 2021 LRDP would not result in significant public hazards as a result of hazardous materials use. While UC Santa Cruz would continue using varying amounts and types of hazardous materials in day-to-day activities and operations, these activities would be closely regulated by UC Santa Cruz EH&S which mandates continued compliance with federal and state regulations to minimize the potential for adverse health effects related to hazardous materials use. Cumulative projects within the City and County would be required to implement similar procedures by the Santa Cruz County EHS, the designated CUPA for the region. With continued regulatory compliance, the 2021 LRDP would not contribute to a significant hazards and hazardous materials impact within the cumulative context associated with the routine transport, use, or disposal of hazardous materials. Therefore, the 2021 LRDP would not be cumulatively considerable.

RELEASE OF HAZARDOUS MATERIALS FROM A SITE OF KNOWN OR POTENTIAL CONTAMINATION

Construction and operation of development under the 2021 LRDP would potentially expose residents and construction workers to contaminated soil, including on or near sites included on a list of locations known to contain hazardous materials compiled pursuant to Government Code Section 65962.5. Cumulative projects and associated activities located within and outside the LRDP area would be required to comply with applicable state laws and regulations that govern hazardous materials. As a result, there is not a cumulatively considerable impact without the 2021 LRDP.

As discussed in Section 3.9, "Hazards and Hazardous Materials, Santa Cruz County EHS approved the site closure report for Westside Research Park in 2004, and the site is considered closed. As of the writing of this EIR, UC Santa Cruz EH&S is in the process of updating the DTSC's records to reflect existing conditions at Westside Research Park, and based on current data, UC Santa Cruz anticipates that the PEA will conclude that there are no contaminated soils on site in areas that could be disturbed during construction. In addition, there are sites known to contain hazardous materials within 1 mile of the LRDP area (see Table 3.9-1). Activities involving the assessment, cleanup, and monitoring of these sites would continue regardless of approval of the 2021 LRDP. Due to the proximity of documented contamination sites, proximity of public roadways, and the potential for undocumented contaminated sites to occur in the LRDP area, there is potential for contamination to be encountered during construction of projects under the

2021 LRDP. With implementation of Mitigation Measure 3.9-2a, the potential for on-site contamination would be evaluated before site-specific investigation is initiated. Mitigation Measure 3.9-2b would confirm on-site soil conditions before development is commenced and any identified contamination would be appropriately remediated. Mitigation Measure 3.9-2c would establish a contingency plan that would describe the necessary actions that would be taken if evidence of contaminated soil or groundwater is encountered during construction, including cessation of work until the potential contamination is characterized and properly contained or remediated. Mitigation Measure 3.9-2d would minimize the potential for release of potentially hazardous construction materials during demolition by requiring that asbestos-containing building materials, lead-based paint, and other hazardous substances in building components are identified, removed, packaged, and disposed of in accordance with applicable state laws and regulations. These impacts are all site-specific.

Cumulative projects within the City and County would be required to adhere to the applicable laws and regulations that govern USTs and pesticide use, as well as requirements applicable to disposal and cleanup of contaminants. The Santa Cruz County EHS, the designated CUPA for the region is responsible for implementing a unified hazardous materials regulatory program throughout Santa Cruz County. Compliance is verified through annual routine inspections of all regulated facilities and investigation of citizen-based complaints or inquiries regarding improper handling and/or disposal of hazardous materials or hazardous wastes.

With implementation of mitigation measures and continued regulatory compliance, the 2021 LRDP would not contribute to a significant hazards and hazardous materials impact within the cumulative context associated with the release of hazardous materials. Therefore, the 2021 LRDP would not result in a cumulatively considerable impact.

HANDLING OF HAZARDOUS OR ACUTELY HAZARDOUS MATERIALS WITHIN 0.25 MILES OF AN EXISTING SCHOOL

Hazardous materials would continue to be handled within 0.25 mile of an existing school as a result of 2021 LRDP implementation, and overall quantities of hazardous materials used within the LRDP area may increase in the future. UC Santa Cruz would continue to comply with applicable hazardous materials and disclosure requirements for the handling, use, storage, and disposal of hazardous materials. Cumulative projects would also be required to comply with applicable laws and regulations pertaining to hazardous wastes, and risks associated with hazardous emissions or materials to existing or proposed schools located within 0.25 mile of future development would be reduced through proper handling, disposal practices, and/or cleanup procedures. Further, hazardous materials in laboratories are typically handled in small quantities. The potential consequences of accidental releases would be limited to a single building and in most cases are limited to the individual laboratory where the spill occurred, and people outside the buildings would not be exposed. With continued regulatory compliance, the 2021 LRDP would not contribute to hazards and hazardous materials impact associated with hazardous emissions or handling of hazardous materials with 0.25 mile of a school. Therefore, the 2021 LRDP would not result in a cumulatively considerable impact.

IMPAIR IMPLEMENTATION OF, OR PHYSICALLY INTERFERE WITH, AND ADOPTED EMERGENCY RESPONSE PLAN OR EMERGENCY EVACUATION PLAN

Implementation of the 2021 LRDP would not interfere with adopted emergency response or evacuation plan but construction activities for projects under the 2021 LRDP could result in short-term, temporary impacts to street traffic because of roadway improvements and potential extension of construction activities into the right-of-way. UC Santa Cruz requires contractors to notify the designated UC representative at least two weeks prior to any proposed roadway closure. In addition, when paths, lanes, or roadways are blocked, UC Santa Cruz requires detour signs to be installed that clearly designate an alternate route. UC Santa Cruz office of Physical Planning, Development, and Operations requires that maintenance and project managers notify UCPD and SCFD of road closures and alternative routes. Further, implementation of Mitigation Measure 3.9-4 would require UC Santa Cruz to prepare and implement site-specific construction traffic management plans for any construction effort that would require work within existing roadways. Cumulative projects would also be required to comply the City of Santa Cruz Emergency Operations Plan and the County Operational Area Emergency Management Plan. With implementation of Mitigation Measure 3.9-4

continued compliance with UC Santa Cruz notification requirements, the 2021 LRDP would not contribute to hazards and hazardous materials impact associated with implementation of an adopted emergency response plan. Therefore, the 2021 LRDP would not result in a cumulatively considerable impact.

SUMMARY

In summary and for the reasons stated above, development under the 2021 LRDP would not result in a cumulatively considerable contribution to cumulative impacts related to hazardous materials, and the impacts would be **less than significant**.

4.3.10 Hydrology and Water Quality

The geographic context for the cumulative impact analysis concerning hydrology and water quality consists of all watersheds that originate on the main residential campus and the Westside Research Park; this includes Wilder Creek, Cave Gulch, Moore Creek, Moore Creek Western Tributary, Jordan Gulch, Arroyo Seco, High Street, Kalkar Quarry, and San Lorenzo River. For cumulative groundwater impacts, the study area includes the LRDP area and portions of the city of Santa Cruz between the LRDP area and the coastline. All projects located within and outside the LRDP area are subject to federal, state, and local standards pertaining to water quality.

VIOLATE ANY WASTE DISCHARGE REQUIREMENTS THAT WOULD SUBSTANTIALLY DEGRADE SURFACE OR GROUNDWATER QUALITY

Development under the 2021 LRDP would increase the volume of wastewater generated on campus by increasing both the UC Santa Cruz population and the number of campus buildings and facilities. In general, the types of activities and uses in the LRDP area would remain unchanged, and therefore the quality of wastewater that is discharged to the sanitary sewer system would remain unchanged. The use of hazardous materials on campus is projected to increase under the 2021 LRDP because of increase laboratory space and campus populations. However, the types of chemicals and biological agents used in the future would likely be similar to those used in existing laboratories on campus. Wastewater generated on the main residential campus and Westside Research Park is discharged to the City of Santa Cruz sewer system and is treated at the City's wastewater treatment plant. As part of ongoing sustainability efforts, UC Santa Cruz evaluates the potential for on-site water recycling on a project-by-project basis, as demonstrated by the on-site water recycling system included as part of Student Housing West, which is a planned-but-not operational project (see Chapter 5, "Cumulative Impacts" of the Student Housing West EIR). However, no campus-wide plan for water recycling is proposed. Wastewater generated by cumulative projects would also be subject to wastewater treatment. With continued compliance with City of Santa Cruz wastewater discharge standards, and UC Santa Cruz safety programs that regulate the handling, storage, and disposal of hazardous materials, the 2021 LRDP would not contribute to a cumulative hydrology and water quality impact associated with a violation of waste discharge requirements within the cumulative context. Therefore, the 2021 LRDP would not be cumulatively considerable.

WATER QUALITY IMPACTS RELATED TO CONSTRUCTION ACTIVITIES

Overall water quality in the region has degraded over time as natural habitat has been converted to urban uses, and these uses have resulted in runoff of various pollutants into local and regional waterways. A variety of programs have been implemented with the goal of halting degradation of water quality and reversing this trend. Several state and federal agencies are involved in these programs, many of which are required by or originate in the federal Clean Water Act. However, a cumulative adverse water quality condition exists.

Construction activities associated with implementation of the 2021 LRDP would expose bare soil to rainfall, which could accelerate erosion and result in sedimentation of stormwater and, eventually, waterbodies. Construction-related projects in the LRDP area would be required to comply with the State Water Resources Control Board 2009-

0009-DWQ Construction General Permit (CGP). Compliance with the CGP requires a) development of a Storm Water Pollution Prevention Plan (SWPPP) for projects disturbing 1 acre or more, of b) preparation of an Erosion and Sediment Control Plan for projects less than 1 acre in accordance with the Campus Standards Handbook and the Storm Water Management Program to minimize erosion and sedimentation during construction. In addition, the design and operation of each new facility would adhere to UC Santa Cruz Post-Construction Stormwater Management Requirements (UC Santa Cruz Post-Construction Requirements). This program exists to ensure compliance with Central Coast Regional Water Quality Control Board Resolution R3-2013-0032. applicable laws and implementation of BMPs on the ground during construction. Cumulative projects would also be required to comply with CGP and SWPPP requirements, in addition to applicable local water quality regulations. With continued compliance with regulatory requirements and the UC Santa Cruz Campus Standards Handbook, the 2021 LRDP would not contribute to a cumulative hydrology and water quality impact associated with water quality within the cumulative context. Therefore, the 2021 LRDP would not be cumulatively considerable.

ALTERATION OF DRAINAGE PATTERNS AND INCREASED RUNOFF

Development under the LRDP area could alter drainage patterns, and increase the rate or amount of surface runoff, which could result in substantial siltation or erosion on or off site, and increase the amount of urban pollutants in storm water runoff, which could affect water quality. The campus SWMP ensures that UC Santa Cruz is legally fulfilling the requirements of its Phase II General Permit for Small Municipal Separate Storm Sewer System (i.e., Non-Traditional MS4 permit). In addition to the SWMP, new campus developments must comply with the UC Santa Cruz Post-Construction Requirements to ensure that UC Santa Cruz is reducing pollutant discharges to the Maximum Extent Practicable and preventing stormwater discharges from causing or contributing to a violation of receiving water quality standards in all applicable development projects. UC Santa Cruz is also considering options for providing a more comprehensive, integrated, and consistent approach to more consistently determine site-specific runoff changes related to individual drainages, as well as cumulative watershed changes that will inform appropriate site design measures (if required) and in conformance with SWRCB Phase II NPDES requirements. Cumulative projects would also be required to comply with SWRCB Phase II NPDES requirements, in addition to applicable local water quality regulations. With continued compliance with regulatory requirements and UC Santa Cruz SWMP, the 2021 LRDP would not contribute to a cumulative hydrology and water quality impact associated with alternation of drainage patterns and increased runoff within the cumulative context. Therefore, the 2021 LRDP would not be cumulatively considerable.

FLOOD RELATED IMPACTS

Development under the 2021 LRDP could alter drainage patterns in the LRDP area and would increase the rate or amount of surface runoff, which could exceed the capacity of storm water drainage systems, resulting in flooding on or off site. UC Santa Cruz Post-Construction Requirements which require compliance with SWRCB Phase II NPDES requirements would manage peak flow rates and reduce sediment flow in the LRDP area. Potential surface runoff on the Westside Research Park would also be conveyed to the existing storm drainage system that serves the existing facility or retained on-site. In addition to UC Santa Cruz Post-Construction Requirements managing peak flow rates, karst features intercept most of the surface flow, even during extreme rainfall events. Cumulative projects would also be required to comply with SWRCB Phase II NPDES requirements, in addition to applicable local water quality regulations. With continued compliance with regulatory requirements and UC Santa Cruz Post-Construction Requirements, the 2021 LRDP would not contribute to a cumulative hydrology and water quality impact associated with flooding within the cumulative context. Therefore, the 2021 LRDP would not be cumulatively considerable.

IMPACTS TO KARST AQUIFER SUPPLY, RECHARGE, AND GROUNDWATER QUALITY

Potential impacts on groundwater under the 2021 LRDP could result from an increase in impervious surfaces, pressure grouting to densify and stabilize soft soils, and groundwater extraction. New impervious areas that would overlie the north campus groundwater system could impact the infiltration of rainfall which is a significant source of

recharge of the shallow aquifer on the north campus. Although this shallow groundwater is not extracted as a water source on the campus, it supplies water to springs and seeps located throughout the north campus and in adjacent drainages such as Cave Gulch and Wilder Creek. Development under the 2021 LRDP could also affect the karst aquifer in the central/lower campus, that the combined effect of new impervious surfaces and pressure grouting to stabilize soft soils could result in the reduction of groundwater levels, which in turn could potentially affect off-site spring flow. However, development in the LRDP area would be required to comply with UC Santa Cruz Post-Construction Requirements which require the on-site retention of stormwater equal to the volume of runoff generated by the 85th or 95th percentile 24-hour storm event; therefore, continued compliance prevent a reduction in flow to springs and recharge the karst aquifer. UC Santa Cruz is also considering options to more consistently evaluate and determine site-specific runoff changes, as well as cumulative watershed changes that will inform appropriate site design measures (if required) and in conformance with SWRCB Phase II NPDES requirements. Further, Implementation of Mitigation Measure 3.10-5a would require UC Santa Cruz to employ alternative building foundation designs in the event that pressure grouting practices have the potential to impact groundwater quality. Implementation of Mitigation Measure 3.10-5b, would require UC Santa Cruz to monitor water levels and define average base water levels to ensure that extraction does not contribute to a net deficit in aquifer volume within the cumulative context. Cumulative projects would also be required to comply with SWRCB Phase II NPDES requirements, in addition to applicable local water quality regulations. Accordingly, with continued compliance with UC Santa Cruz's Post-Construction Requirements, the 2021 LRDP would not contribute to a cumulative hydrology and water quality impact associated with impacts to karts aquifer supply, recharge, and groundwater quality within the cumulative context. Therefore, the 2021 LRDP would not be cumulatively considerable.

SUMMARY

In summary and with inclusion of appropriate mitigation measures (as noted above), development under the 2021 LRDP would not result in a cumulatively considerable to cumulative hydrology impacts and the cumulative impacts would be **less than significant**.

4.3.11 Land Use and Planning

The cumulative context for land use impacts of the 2021 LRDP include the existing and planned land uses surrounding the campus. UC Santa Cruz is the only agency with land use jurisdiction over campus projects, therefore, development occurring consistent with the 2021 LRDP would have no land use impacts within the LRDP area.

Table 4-2, Cumulative Projects List, describes planned or approved projects anticipated for both the City of Santa Cruz and UC Santa Cruz. Generally, the types of uses identified in Table 4-2 represent a continuation of existing land use types and/or redevelopment of similar land use types. With respect to the 2021 LRDP, all future development occurring in the LRDP area, consistent with the 2021 LRDP, would not conflict with adopted plans and policies set forth by UC Santa Cruz. Therefore, the development under the 2021 LRDP would not contribute to any cumulative impacts, and they would be **less than significant**.

4.3.12 Noise

Noise impacts typically occur locally because noise levels dissipate rapidly with increased distance from the source. When discussing increases in noise levels, a doubling of a noise source is necessary to result in a 3-dB (i.e., audible) increase. Thus, for cumulative noise impacts to occur, noise sources must combine to result in increases in noise at the same receptor that otherwise would not experience the increase attributed to the combined (or cumulative) condition.

CONSTRUCTION-GENERATED NOISE

Construction-related noise is typically considered a localized impact, affecting only receptors closest to construction activities. Construction of cumulative projects, including those proposed under the 2021 LRDP, occurring in close proximity to each other and at the same time, could contribute to cumulative noise impacts.

Implementation of individual projects proposed under the 2021 LRDP would necessitate construction activities near existing development, both on- and off-campus. Construction activities generally occur in phases and would be dispersed throughout the campus. However, construction activities could also occur adjacent to existing residential land uses and could, depending on the equipment used and distance to nearby noise-sensitive land uses, exceed the acceptable daytime noise levels of existing on-campus and off-campus sensitive land uses. Implementation of Mitigation Measure 3.12-1 would limit the time periods during which construction activities in the vicinity of nearby noise-sensitive land uses would occur. Additionally, Mitigation Measure 3.12-1 would provide substantial reductions in levels of construction noise exposure at noise-sensitive receptors by requiring the use of properly maintained equipment, alternatively powered equipment, exhaust mufflers, engine shrouds, equipment enclosures, and temporary noise barriers (noise curtains typically can reduce noise by up to 10 dBA [EPA 1971]). Additionally, short-term lodging would be offered to residents if they would be temporarily exposed to nighttime (after 10PM) interior noise levels that exceed the interior noise standard of 45 L_{eq}. However, construction noise associated with some projects under the 2021 LRDP could still potentially exceed applicable noise standards. When combined with cumulative projects listed in Table 4-2 above, especially projects located within 0.25-mile of the LRDP area (e.g., Project Nos. 42, 48, and 50), concurrent construction activities may result in additional/combined construction noise that could disturb nearby receptors. As a result, development under the 2021 LRDP has the potential to contribute to cumulative noise impacts. Therefore, the 2021 LRDP would be cumulatively considerable.

CONSTRUCTION-GENERATED VIBRATION

Construction-related vibration is typically considered localized impacts, affecting only receptors closest to construction activities. Construction of cumulative projects, including those proposed under the 2021 LRDP, occurring in close proximity to each other and at the same time, vibration from individual construction projects could contribute to cumulative impacts related to noise and vibration.

Construction-related ground vibration is normally associated with impact equipment, such as pile drivers and jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. Blasting activities also generate relatively high levels of ground vibration and vibration noise. Construction activities under the 2021 LRDP would occur in proximity to existing on- and off-site sensitive receptors. Although the use of impact or sonic pile driving or blasting is not anticipated, construction within the LRDP area would exceed the significance threshold for building structural damage, human disturbance, and sensitive (i.e., laboratory) equipment. Consistent with Federal Transit Administration (FTA) guidelines for maximum-acceptable vibration criteria, implementation of Mitigation Measures 3.12-2a and 3.12-2b would require the contractor(s) to minimize vibration exposure at nearby receptors by locating equipment far from receptors and phasing operations. Cumulative projects would also be required to comply with FTA guidelines or similar adopted policies adopted to reduce impacts associated with construction generated ground vibration. Further, the projects listed in Table 4-2 that are located within 0.25 mile of the LRDP area generally involve additions to existing structures and would not typically require the types of construction (e.g., pile-driving) that can result in substantial and potentially cumulative vibration levels. Therefore, with implementation of mitigation measures, the 2021 LRDP would not contribute to a cumulative impact related to construction generated ground vibration within the cumulative context. Therefore, the 2021 LRDP would not be cumulatively considerable.

LONG-TERM STATIONARY NOISE

Implementation of the 2021 LRDP may result in increased noise levels as a result of new stationary noise sources and equipment (e.g., HVAC units, backup generators), and other new sources such as gathering spaces, loading docks, corporation yards, and parking lots. As discussed in Section 3.12, "Noise," on-campus gatherings are not anticipated

to expose off-site receptors to noise levels that exceed City standards. Additionally, building mechanical equipment would not generate substantial operational noise levels and their design would be required to follow all UC building regulations. However, depending on the distance to noise-sensitive receptors, intervening shielding, and noise-reduction features incorporated into the loading dock or corporation yard design, noise-generating activity at these land uses could expose nearby noise-sensitive receptors to noise levels that exceed noise thresholds. Implementation of Mitigation Measures 3.12-3a and 3.12-3b minimize noise levels generated by loading docks, delivery activity, and corporation yard activity to levels that do not exceed daytime and nighttime standards. Cumulative projects would also be required to comply with noise standards to reduce operation noise levels. With implementation of mitigation measures, ambient noise levels associated with the operation of on-campus uses would be reduced to within acceptable standards. Further, based on the distance between the LRDP area and nearby development, as well as the type of developments listed in Table 4-2, stationary source noise from these projects is not anticipated to combine or be considered in conjunction with stationary source noise associated with the 2021 LRDP. AS a result, the 2021 LRDP would not contribute to a cumulative noise impact (i.e., exceedance of applicable standards) related to long-term stationary noise within the cumulative context. Therefore, the 2021 LRDP would not be cumulatively considerable.

PERMANENT (TRAFFIC) NOISE LEVELS

Development associated with the 2021 LRDP would result in some increases in traffic volumes along affected roadway segments and potentially generate an increase in traffic source noise levels under cumulative conditions. As discussed in Section 3.12, "Noise," the County's incremental noise increase standards for sensitive receptors (i.e., 5 dB increase in traffic-related noise, where the post-project noise level would remain equal to or lower than 60 dB L_{dn}, and a 3 dB increase in traffic-related noise where the post-project noise level would exceed 60 dB L_{dn}) were used in the absence of other applicable transportation-specific noise standards.

To assess the cumulative traffic-noise impact, traffic noise levels associated with the 2021 LRDP under cumulative and cumulative-plus-project conditions were modeled for select roadway segments. See Appendix H for detailed modeling assumptions. Table 4-3 summarizes the increases in traffic noise on project-affected roadway segments.

Table 4-3 Predicted Increases in Traffic Noise Levels

Roadway[1]	Predicted dBA L_{dn}, 100 Feet from Centerline Existing	Predicted dBA L_{dn}, 100 Feet from Centerline Existing Plus Project	Predicted Change (dBA)	Applicable Incremental Noise Increase Standard (dBA)	Significant Increase?
Bay Street	62.1	63.0	0.9	3	No
Empire Grade	61.2	62.3	1.1	3	No
Glenn Coolidge Drive	60.7	61.9	1.2	3	No
Hagar Drive	62.7	63.5	0.8	3	No
Heller Drive	55.9	59.1	3.2	5	No
High Street[2]	62.4	63.4	1.0	3	No
SR 17	72.4	72.5	0.1	3	No
McLaughlin Drive	52.6	55.8	3.2	5	No
Mission Street/ Highway 1	65.2	65.4	0.2	3	No
Natural Bridges Drive	57.2	57.3	0.1	5	No
Western Drive	54.5	55.7	1.2	5	No

Notes: Traffic noise levels were calculated using methods consistent with the FHWA roadway noise prediction model, based on data obtained from the traffic analysis prepared for this project; dBA=A-weighted decibel; L_{dn} = Day-Night Noise Level.

[1] Based on results from the Regional Transportation Commission modeling, as summarized in Section 3.16, "Transportation," and provided in Appendix I, the segment with the largest ADT volume was modeled and displayed for each applicable roadway to ensure a conservative analysis.

[2] Predicted traffic noise levels modeled at 50 feet from centerline due to noise sensitive receptors being located closer than 100 feet from the roadway centerline.

Source: Modeled by Ascent Environmental, Inc, in 2020

As shown in Table 4-3, campus development under the 2021 LRDP would result in predicted increases in traffic noise levels ranging from approximately 0.1 to 3.2 dBA along affected area roadway segments. The incremental traffic noise increase standards for all roadways would not be exceeded. Therefore, implementation of the project would not result in a substantial increase (i.e., 5 dB increase where the post-project noise level would remain equal to or lower than 60 dB L_{dn}, and 3 dB where the post-project noise level would exceed 60 dB L_{dn}) in traffic noise. As a result, the contribution of the 2021 LRDP to cumulative roadway noise levels would not be considered substantial, and the 2021 LRDP would not be cumulatively considerable.

SUMMARY

In summary, the contribution of campus development under the 2021 LRDP to most cumulative noise impacts would not be cumulatively considerable. However, implementation of the 2021 LRDP would contribute substantially to cumulative construction noise. As a result, the impacts would be **significant and unavoidable**.

4.3.13 Population and Housing

As described in Section 3.13, "Population and Housing," implementation of the 2021 LRDP could create additional demand for housing in the community, including the city of Santa Cruz. However, as noted in Table 4-2 above, several planned-but-not-operational projects associated with the 2005 LRDP would provide additional on-campus student housing under cumulative conditions. More specifically, Kresge Housing, Student Housing West, and the Crown College Major Renovation Project would provide an additional 2,175 student beds within the LRDP area. As a result, under cumulative conditions, the projected increase in student housing demand that would occur with 2021 LRDP implementation would be accommodated on-campus and no additional off-site student housing demand would occur. This is an improved condition compared to the project-only impact analysis. Under existing conditions, 9,283 beds are provided for a total of 18,518 students. The project would provide 8,500 beds, a ratio of one bed for every student (above the 2005 LRDP capacity of 19,500 beds). The addition of 2,175 beds to the project total would increase the bed count by 10,675 above existing conditions. Under the 2021 LRDP, student capacity would be 28,000, which is 9,482 more than under existing conditions. Therefore, the project plus cumulative on-campus housing development would provide 1,193 more beds than additional students, lowering demand for housing in the community compared to existing conditions. Given the tight Santa Cruz housing market, this would be a beneficial effect from cumulative development on campus.

With regard to off-campus employee housing demand, it is conservatively assumed that the 2021 LRDP may result in an off-campus housing demand for 2,190 residential units within Santa Cruz County. This additional demand is anticipated to incrementally increase over the approximately 20-year planning period of the 2021 LRDP in proportion with 2021 LRDP implementation and increases in student enrollment and would not all occur at a single point in time. According to Department of Finance data, there are an estimated 106,135 total dwelling units in Santa Cruz County in 2020. Of that, 97,831 are occupied, resulting in 8,304 unoccupied dwelling units and a vacancy rate of 7.8 percent. This does not account for the 911 homes recently lost in the 2020 CZU Lightning Complex Fire. Further, based on a 2019 U.S. Housing and Urban Development analysis (prior to the fire), this vacancy rate does not appear to translate into truly available housing, and both the for-sale and rental housing markets are extremely tight. Refer to Section 3.13, "Population and Housing" for further clarification.

The demand for additional housing would likely contribute to the housing issues in the county. However, it is important to consider the discussion above with respect to 2021 LRDP plus cumulative on-campus housing development; a supply of 1,193 beds in the Santa Cruz housing market would be opened through the provision of on-campus housing. This does not necessarily translate into an equivalent availability of housing for employees; students tend to live in larger group settings (example: 4 students in a 2-bedroom apartment) than employees, who may have families or be in a position to afford less dense housing settings, but it does take pressure off the local housing market that would have occurred without these projects. On balance, additional demand for housing in the

Santa Cruz housing market would be created by 2021 LRDP employees. While many of the cumulative projects identified in the analysis above could address increased demand associated with 2021 LRDP development, cumulative housing development would also help meet local housing needs. For these reasons, the contribution of campus growth under the 2021 LRDP would be expected to increase housing demand and would contribute considerably to cumulative population and housing impacts. The project's cumulative impacts would be **significant and unavoidable**.

4.3.14 Public Services

The cumulative context for public services includes the service areas of the various public service providers that provide fire, police, and library services to UC Santa Cruz. Under existing conditions, public services are provided in the LRDP plan area and surrounding areas by multiple agencies, including City of Santa Cruz Fire Department, the California Department of Forestry and Fire Protection, UC Santa Cruz Police Department, and City of Santa Cruz Police Department, as needed. School services are primarily provided by Santa Cruz City Schools District (SCCS). Cumulative development in the region continues to increase the concentration of persons and structures within these local public service jurisdictions and the demands for these services.

The increase in population under the 2021 LRDP could continue the trend of increasing the demand for public services and could combine with other proposed development projects within the city to result in a cumulative increase in demand for public services. Other development projects in the region would be required to pay impact fees consistent with local jurisdiction requirements, including the City of Santa Cruz, Santa Cruz County, and SCCS, to ensure the adequate provision of public services, including schools, in the future, thereby offsetting the contribution of each cumulative project. As noted in Section 3.14, "Public Services," it is not anticipated that new off-campus public service facilities would be required to serve campus growth and development under the 2021 LRDP. The City of Santa Cruz Fire Department has indicated that Station 4, located on-campus, is not equipped to accommodate the proposed increase in on-campus population. The existing station would need to be expanded, or a new station would need to be constructed to accommodate population growth under the 2021 LRDP. Implementation of Mitigation Measure 3.14-1 would require UC Santa Cruz to initiate the design and planning of a new on-campus fire station, in coordination with SCFD, if it is determined that proposed development under the 2021 LRDP would exceed the height of existing on-campus response vehicles of the existing fire station. Therefore, the project would not result in a cumulatively considerable contribution such that a significant cumulative public services impact would occur. No mitigation measures are necessary to reduce the 2021 LRDP's contribution to potential cumulative impacts related to public services. Therefore, the contribution of campus growth and development under the 2021 LRDP to cumulative impacts on public services would not be cumulatively considerable, and the cumulative impacts would be **less than significant**.

4.3.15 Recreation

The cumulative context for recreation impacts includes the City of Santa Cruz, Santa Cruz County, and UC Santa Cruz campus. Past and present development has resulted in an increase in demand for recreation resources and a subsequent dedication of parklands and open space consistent with state and local plans and policies. This has increased the number of developed parklands, trails, and recreation facilities, and the amount of preserved open space within the City, County, and UC Santa Cruz campus.

ON-CAMPUS RECREATION FACILITIES

The increase in campus population under the 2021 LRDP would increase demand for on-campus recreation facilities. Recreation facilities at UC Santa Cruz are maintained as needed to prevent deterioration based on the use levels. In accordance with UCOP Facilities Manual, the UC Santa Cruz construction and maintenance policy outlines procedures for preventative maintenance, general replacement and repair, electrical repairs, ventilation, plumbing, painting, and furniture/cabinetry work. The level of management and maintenance of on-campus recreation facilities would increase throughout the implementation of the 2021 LRDP to prevent the accelerated deterioration that could result from increased demand and usage. Further, the on-campus population under the 2021 LRDP would be served by 15

acres of developed recreation and athletic facilities, and 1,419 acres of open space land uses. This equates to approximately 40 acres per 1,000 persons. Although less than the existing parkland ratio, the new ratio would still exceed the Quimby Act parkland dedication standards which are used generally to determine the adequacy of parklands in California development. In addition, the construction of new recreational facilities under the 2021 LRDP would occur when warranted by increased demand and when financially feasible. Therefore, campus growth and development under the 2021 LRDP would not result in a cumulatively considerable contribution to on-campus recreation impact. The 2021 LRDP's contribution would not be cumulatively considerable.

OFF-CAMPUS RECREATION FACILITIES

With respect to off-campus demand for recreation facilities, further development of parklands and trails and preservation of open space would occur as planned development proceeds, consistent with the City of Santa Cruz Municipal Code Chapter 5.72 and Santa Cruz County Code Chapter 15.01. Therefore, the amount of parkland is expected to increase within the city and county over time consistent with their respective parkland dedication standards. In addition, new developments within the City and County would be required to pay fees to mitigate for increased park demands in accordance with the Quimby Act and locally adopted regulation to off-set maintenance and construction of recreation facilities in response to increases in population, thereby reducing the potential contribution of off-campus development to less than cumulatively considerable. Therefore, campus growth and development under the 2021 LRDP would not result in a cumulatively considerable contribution to off-campus recreation impact. The 2021 LRDP's contribution would not be cumulatively considerable.

SUMMARY

The 2021 LRDP would not represent a cumulatively considerable contribution to recreation impacts in the area, and impacts would be **less than significant**.

4.3.16 Transportation

VEHICLE MILES TRAVELED

As noted in Section 3.16, "Transportation," existing region-wide and project-generated VMT estimates were calculated using the SCC Travel Model. The model uses land use data and transportation network inputs, including highway, arterial, and transit systems, across the County to assign trips within the region's transportation network and estimates of daily person trips and associated VMT. The model also estimates the travel that occurs between Santa Cruz County and surrounding counties even though these areas are not included within the model's geographic boundary. The cumulative (year 2040) model also includes land use growth consistent with AMBAG based on adopted plans the municipalities within the county that are used to estimate future (i.e., cumulative) transportation conditions.

Cumulative VMT impacts are analyzed using the "boundary method." The boundary method evaluates VMT that occurs within a selected geographic boundary (e.g., campus, city, county or region) and is a measure of the project's effect on VMT. The selected regional boundary for this analysis includes Santa Cruz County. This captures all on-road vehicle travel on a roadway network for any purpose and includes local trips as well as trips that pass through the area without stopping. The VMT metrics presented in Chapter 3 illustrate VMT generated by the project.

An example of how a project can affect VMT is the addition of housing in a job-rich downtown. Workers in the downtown that has limited housing options must travel a greater distance between their home and work. Adding the housing in downtown will shorten many of the home-to-work trips and reduce the VMT to/from the downtown. While the new housing itself will "generate" more daily trips than existing uses, in that there will be more cars coming in and out of the housing develop, it will generally attract those trips *away* from other residential developments located farther away. If the boundary VMT in the area served by the new residential development were to be assessed, it is likely that the total amount of driving in that area will have decreased rather than increased. For UC Santa Cruz, increasing the ratio of on-campus

housing should reduce VMT within the County, since a lower proportion of students and employees need to commute to the campus.

Cumulative impacts are analyzed according to whether a project would increase or decrease the forecasted regional VMT per capita under cumulative conditions (2040). The contribution of the 2021 LRDP would be cumulatively considerable, as it relates to cumulative VMT, if it meets the following criteria:

- Boundary method countywide VMT per capita increases with implementation of the 2021 LRDP under 2040 conditions.

Table 4-4 below presents the total regional VMT under cumulative conditions in 2040 and the calculated regional VMT per capita, based on the total VMT in Santa Cruz County divided by the total service population (student enrollment, residents, and employees). The table also presents the total VMT related to the 2021 LRDP and 2021 LRDP VMT per capita in 2040.

Table 4-4 Boundary Method Countywide Cumulative VMT Estimates for Santa Cruz County

Metric	Cumulative Conditions (2040)	Cumulative Conditions with 2021 LRDP
Vehicle Miles Traveled	5,750,000	5,830,105
Service Population	469,000	482,000
VMT per Capita[1]	12.3	12.1

[1] Per capita is defined by dividing total VMT by the sum of all employees, residents, and students.

Source: Data compiled and provided by Fehr & Peers 2020.

As shown in Table 4-4, the regional VMT per capita under 2040 cumulative conditions without the 2021 LRDP would be 12.3 VMT per capita. Under 2040 cumulative conditions with the 2021 LRDP the countywide boundary VMT per capita is estimated to be 12.1 miles, which would be less than the countywide VMT per capita without the 2021 LRDP. Accordingly, the 2021 LRDP would not result in a cumulatively considerable contribution to a significant cumulative VMT impact. One major consideration is the Student Housing West and Kresge Housing projects, which are cumulative projects that would provide student housing on campus. These projects serve to help reduce the need for students to travel off campus for housing, thereby further reducing per capita VMT in addition to the 2021 LRDP.

TRANSIT SERVICE AND FACILITIES, BICYCLE FACILITIES, AND PEDESTRIAN FACILITIES

Campus development identified in the 2021 LRDP would occur incrementally over time. Combined with other cumulative development in the area, the need for transit service and facilities, bicycle facilities, and pedestrian facilities is anticipated to increase. The 2021 LRDP supports access and enhancements to existing transit stops, which may include improved lighting, shelter or shade, benches or seating, which may encourage increase transit usage. In addition, the 2021 LRDP includes additional roadways that would increase the circulation network within the LRDP area, which would increase access to existing transit and other alternative transportation facilities. As a result, the 2021 LRDP would not result in conflicts with plans, programs, and policies related to transit, bicycle, and pedestrian facilities, and the impacts from implementation of the 2021 LRDP would be less than cumulatively considerable.

EMERGENCY ACCESS AND GEOMETRIC DESIGN HAZARDS

In general, adequate emergency access and impacts related to geometric design hazards are site-specific and not cumulative in nature. However, as noted in Section 3.16, "Transportation," the 2021 LRDP includes conceptual roadway network changes and has not progressed to the stage of developing detailed designs. Any roadway extensions and new streets would be required to comply with the UC Facilities Manual, which requires UC Santa Cruz to comply with the Title 24 California Building Standards Code, Parts 1-12, and all amendments. To the extent indicated in the UC Facilities Manual, UC Santa Cruz would also comply with state of the practice roadway design guidance such as the Caltrans Highway Design Manual and the California Manual on Uniform Traffic Control Devices. The improvements to the existing roadway network would be anticipated to improve potential emergency access

routes within the campus and would be designed in accordance with applicable requirements so as to prevent geometric design hazards, related to turning movements, etc., to enhance overall network performance. As a result, the contribution of campus development under the 2021 LRDP would not be cumulatively considerable.

In summary, the contribution of campus growth and development to cumulative transportation impacts would not be cumulatively considerable, and the project's cumulative transportation impacts would be **less than significant**.

4.3.17 Utilities and Service Systems

The cumulative context for water treatment/distribution and wastewater collection/treatment impacts is the 2021 LRDP area and the service areas of local utility providers (i.e., the City). The cumulative context for water supply is the Santa Cruz Water Department (SCWD) service area. The cumulative context for solid waste is the City of Santa Cruz, and the cumulative context for utility infrastructure is the service area for each utility.

WATER SUPPLY AND INFRASTRUCTURE

As discussed in Section 3.17, "Utilities and Service Systems," implementation of the 2021 LRDP would result in an increase in demand for potable water due to on-campus population growth and additional landscaping and mechanical needs. The City of Santa Cruz's 2015 UWMP included water demands for UC Santa Cruz based on the university's previously estimated 2035 demand of 308 million gallons per year (MGY). The projected potable water demand associated with the development under the 2021 LRDP is approximately 289 MGY by 2040. The water demand of the campus under the 2021 LRDP (292 MGY) would be less than demand included in the 2015 UWMP, and there would generally be adequate water supply from the City's existing water sources in normal water years, with small shortfalls during normal and single dry years met through conservation. During multiple dry water year conditions, there would be a substantial gap in the service area between demand and available supply, up to 1,730 MGY. This gap would not be fully addressed through conservation and would require the City to secure a new water source. UC Santa Cruz's water demand under the 2021 LRDP would contribute to the need for the City to secure a new water supply source to address the shortfall under multiple dry water year conditions. Implementation of Mitigation Measure 3.17-1a would require UC Santa Cruz to implement drought emergency measures to reduce water consumption during a drought emergency. Mitigation Measure 3.17-1b would require UC Santa Cruz to consult with the City regarding the appropriate scope of and initiate, an engineering audit of campus water use, similar to the previous audit completed in 2007. However, the impact would remain significant and unavoidable. Therefore, the 2021 LRDP's contribution to cumulative water supply impacts would be cumulatively considerable.

With respect to water supply infrastructure and as noted in Section 3.17, "Utilities and Service Systems," the potential impacts associated with water supply infrastructure take into consideration the combined demand for potable water supplies within the LRDP area and City infrastructure that supplies both the LRDP area and land uses within the city. As a result, the analysis provided in Section 3.17 is inherently cumulative. As described, implementation of the 2021 LRDP would not result in inadequate capacity or the need for additional infrastructure that could result in new significant environmental impacts beyond those identified in this EIR. Therefore, the 2021 LRDP's contribution to water supply infrastructure would not be cumulatively considerable.

WASTEWATER TREATMENT

Under the 2021 LRDP, population increases would result in greater levels of wastewater flows from the campus and the Westside Research Park. The City of Santa Cruz wastewater treatment plant has the capacity to treat an average dry weather flow of 17 million gallons per day (mgd), and currently receives an average daily flow of less than 10 mgd. Under the 2021 LRDP, on-campus uses are projected to generate up to 0.57 mgd of wastewater, an increase of 0.20 mgd compared to existing conditions. Therefore, adequate capacity remains at the WWTP to accommodate projected flows from the campus as well as flows from other new development in the City. As part of ongoing sustainability efforts, UC Santa Cruz evaluates the potential for on-site water recycling on a project-by-project basis, as demonstrated by the on-site water recycling system included as part of Student Housing West, which is a planned-

but-not operational project (see Chapter 5, "Cumulative Impacts" of the Student Housing West EIR). However, no campus-wide plan for water recycling is proposed. With respect to wastewater infrastructure (e.g., pipes) and as noted in Section 3.17, "Utilities and Service Systems," the potential impacts associated with wastewater infrastructure take into consideration the combined demand for wastewater pipeline capacity within the LRDP area and City infrastructure that supplies both the LRDP area and land uses within the city. As a result, the analysis provided in Section 3.17 is inherently cumulative. As described, implementation of the 2021 LRDP would not result in inadequate capacity or the need for additional infrastructure that could result in new significant environmental impacts beyond those identified in this EIR. Therefore, the 2021 LRDP would not be cumulatively considerable.

SOLID WASTE

As discussed under Impact 3.17-4, the quantity of municipal solid waste generated at UC Santa Cruz would be expected to increase through 2040-2041. The UC Sustainable Practices Policy goals for solid waste include a reduction of 25 percent per capita from FY2015/16 levels by 2025, 50 percent per capita from FY2015/16 levels by 2030, and a diversion of 90 percent of municipal solid waste from the landfill. Meeting these goals would result in a reduction in the amount of municipal solid waste generated on-campus. Because quantities of landfilled municipal solid waste are projected to decrease through 2040-2041, and the City of Santa Cruz Resource Recovery Facility has an expected closure date of 2058 with a maximum permitted throughput of 535 tons per day, campus growth and development under the 2021 LRDP would not substantially affect landfill capacity such that additional waste disposal facilities would be required for this project or other development in the region. Therefore, the 2021 LRDP's contribution to solid waste impacts would not be cumulatively considerable.

ELECTRICITY, NATURAL GAS, AND TELECOMMUNICATION FACILITIES

PG&E provides both natural gas and electricity distribution infrastructure to customers in Santa Cruz County, including the UC Santa Cruz main residential campus and Westside Research Park. PG&E owns and operates overhead electric transmission and electric distribution facilities as well as gas transmission facilities within the proposed LRDP area. Implementation of the 2021 LRDP would increase energy usage as noted above. As implementation of the 2021 LRDP would occur over a multi-year period, the projected energy demands of UC Santa Cruz under the 2021 LRDP would be factored into PG&E's load forecasts now and in the future. Upon updating their load forecasts, PG&E may determine a need to provide additional distribution facilities within the campus to serve UC Santa Cruz. Similarly, telecommunication infrastructure upgrades to both the central facility and the distribution lines are expected over the lifetime of the 2021 LRDP for bandwidth, reliability, and flexibility. Construction of energy, natural gas, or telecommunication transmission and/or distribution lines would occur in conjunction with new development under the 2021 LRDP. General construction impacts anticipated to result from implementation of the 2021 LRDP, including the construction or undergrounding of electricity, natural gas, or telecommunication transmission and/or distribution lines, are comprehensively analyzed in this EIR (e.g., within 3.3, "Air Quality;" 3.4 "Archaeological, Historical, and Tribal Cultural Resources;" 3.5, "Biological Resources;" 3.10, "Hydrology and Water Quality;" 3.12, "Noise;" and 3.16, "Transportation"). Further, as required by law, all utility connections would be constructed in accordance with all applicable building codes and applicable standards to ensure an adequately sized and properly constructed transmission and conveyance system. With inclusion of relevant mitigation measures, the impacts associated with the potential construction of on-site transmission and/or electricity, natural gas, or telecommunication distribution lines would be reduced and incremental contributions associated with infrastructure improvements would be less than cumulatively considerable.

SUMMARY

In summary, the contribution of campus growth and development under the 2021 LRDP to cumulative impacts on most utility and service systems would not be cumulatively considerable. However, due to the potential lack of adequate water supplies under future drought conditions within the City, campus growth and development under the 2021 LRDP would make a cumulatively considerable contribution to the cumulative impact on water supply, and the

impact would be **significant and unavoidable**, even with inclusion of the feasible mitigation measures identified in Section 3.17, "Utilities and Service Systems."

4.3.18 Wildfire

The cumulative context for wildfire includes the City of Santa Cruz, Santa Cruz County, and UC Santa Cruz campus. As discussed in Section 3.18, "Wildfire," development under the 2021 LRDP would be subject to the UC Santa Cruz Emergency Operations Plan (EOP).

COMPATIBILITY WITH ADOPTED EMERGENCY RESPONSE AND EVACUATION PLANS

Implementation of the 2021 LRDP could result in short-term, temporary impacts to emergency vehicle access and evacuation because of roadway improvements and potential extension of construction activities into the right-of-way. This could result in a reduction in the number of lanes or temporary closure of certain street segments. Implementation of Mitigation Measure 3.9-4 would require UC Santa Cruz to prepare and implement site-specific construction traffic management plans for any construction effort that would require work within existing roadways. Cumulative projects would also be required to comply the City of Santa Cruz Emergency Operations Plan and the County Operational Area Emergency Management Plan. Cumulative projects would also be required to comply the City of Santa Cruz Emergency Operations Plan and the County Operational Area Emergency Management Plan. With implementation of Mitigation Measure 3.9-4, the 2021 LRDP would not contribute to wildfire impact associated with implementation of an adopted emergency response plan. Therefore, the 2021 LRDP would not be cumulatively considerable.

WILDFIRE RISK ASSOCIATED WITH NEW DEVELOPMENT AND LAND USE PATTERNS

Implementation of the 2021 LRDP would place new development within the north campus, and along the margins of existing development on the central and lower campus. The UC Santa Cruz EOP outlines evacuation procedures for building emergencies and campus-wide emergencies, and the UC Santa Cruz OES also maintains an on-going schedule of inspections for all buildings to ensure that fire hazards are mitigated and also conducts plan reviews and inspections of building construction and renovation activities. However, by placing new development in close proximity to HFHSZ, implementation of the 2021 LRDP could contribute to a cumulative wildfire risk. However, implementation of Mitigation Measure 3.19-2 would require UC Santa Cruz to prepare and implement a campus-wide vegetation management plan which would adequately address any potential wildfire risk associated with new development and changes in land use as proposed under the 2021 LRDP. Cumulative projects would also be required to comply the City of Santa Cruz Emergency Operations Plan, City of Santa Cruz Local Hazard Mitigation Plan, City of Santa Cruz requirements for Wildland Urban Interface Areas, and the County Operational Area Emergency Management Plan. With implementation of Mitigation Measure 3.18-2, the 2021 LRDP would not contribute to wildfire impact associated with new development and land use patterns. Therefore, the 2021 LRDP would not be cumulatively considerable.

SUMMARY

The 2021 LRDP's contribution to cumulative impacts related increased risk of wildfire would not be cumulatively considerable, and impacts would be **less than significant**.

5 OTHER CEQA SECTIONS

Section 15126 of the California Environmental Quality Act Guidelines (State CEQA Guidelines) requires that in addition to an evaluation of a project's significant impacts and identification of mitigation measures to mitigate significant impacts as well as an analysis of alternatives (all of which are analyzed in other sections of this EIR), an environmental impact report (EIR) must also identify (1) significant environmental impacts that cannot be avoided if the project is implemented, (2) significant irreversible environmental changes that would result from implementation of the project, and (3) growth-inducing impacts of the project. Although growth inducement itself is not considered an environmental effect, it could potentially lead to foreseeable physical environmental effects, which are discussed under "Growth-Inducing Impacts," below.

5.1 SIGNIFICANT AND UNAVOIDABLE IMPACTS

Section 15126.2(c) of the State CEQA Guidelines states that an EIR shall "[d]escribe any significant impacts, including those which can be mitigated but not reduced to a level of insignificance…." Accordingly, this section provides a summary of significant environmental impacts of the 2021 LRDP that cannot be mitigated to a less-than-significant level. Chapter 3, "Environmental Setting, Impacts, and Mitigation Measures," provides a description of the potential environmental impacts of the project and recommends various mitigation measures to reduce impacts to the extent feasible. Chapter 4, "Cumulative Impacts," determines whether the incremental effects of the project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects. After implementation of the recommended mitigation measures, most of the impacts associated with campus development and growth under the 2021 LRDP would be reduced to a less-than-significant level. The following impacts are considered significant and unavoidable; that is, no feasible mitigation is available, or the mitigation measures available are not enough to reduce the project's impacts to a less-than-significant level. Note, this is only a summary of those impacts; it is important to review the discussions in Chapters 3 and 4 of this EIR to understand the full context of the impact conclusion following mitigation.

Implementation of the 2021 LRDP would result in the following significant and unavoidable environmental impacts following implementation of feasible mitigation measures:

- Impact 3.3-2: Operational Emissions of Criteria Air Pollutants and Precursors
- Impact 3.3-3: Conflict with or Obstruct Implementation of an Applicable Air Quality Plan
- Impact 3.4-4: Impacts to Historical Resources
- Impact 3.12-1: Generate Substantial Temporary Construction Noise
- Impact 3.13-1: Directly or Indirectly Induce Substantial Unplanned Population Growth and Housing Demand
- Impact 3.17-1: Impacts on Water Supply
- Cumulative impacts related to air quality, historical resources, noise, population and housing, and water supply

5.2 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

Section 15126.2(d) of the State CEQA Guidelines requires a discussion of any significant irreversible environmental changes that would be caused by the project. Section 15126.2(d) states:

> "Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also irreversible damage can result

from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified."

Generally, a project would result in significant irreversible environmental changes if:

- the primary and secondary impacts would generally commit future generations to similar uses,
- irreversible damage could result from environmental accidents associated with the project,
- the project would involve a large commitment of nonrenewable resources, or
- the proposed consumption of resources is not justified (e.g., the project involves the wasteful use of energy).

Implementation of the 2021 LRDP would result in the continued commitment of UC Santa Cruz (main residential campus and Westside Research Park) to additional institutional uses (including the development of academic facilities, support space and facilities, and housing for students, faculty, and staff), irreversibly removing portions of the plan area from any other potential uses. The UC's ownership of the main residential campus and Westside Research Park represents a long-term commitment of these lands to an institutional use. Restoration of either site to pre-developed conditions would not be feasible given the degree of disturbance, the urbanization of the area, and the level of capital investment.

Additional irreversible commitments to future use include those related to new housing or academic/administrative and support space development. Development of undeveloped lands would constitute an irreversible change of use on these lands because once buildings or pavement are constructed, prior open space related uses, including in support of biological resources and, to a minor degree, agriculture, would be committed to academic support. Implementation of the 2021 LRDP would result in the loss of approximately 2 acres of existing farmland within the lower portion of the main residential campus that are associated with the UC Santa Cruz Farm. As noted in Section 3.2, "Agriculture and Forestry Resources," this acreage would not represent a significant adverse change in agricultural opportunities. In addition, while implementation of the 2021 LRDP would result in the removal of forested land, some tree cover would be maintained and the potentially affected acreage, which is not designated for forestry purposes, would not represent a significant adverse change in forestry resources in the region. For biological resources, in addition to the loss of the aforementioned agricultural lands, development under the 2021 LRDP could result in the loss of approximately 220 acres of natural vegetation communities/habitat that may be used by wildlife species for foraging. As discussed in Section 3.5, "Biological Resources," UC Santa Cruz would implement mitigation measures to reduce impacts to these sensitive biological communities, as well as to enhance or protect appropriate compensatory habitat elsewhere within the campus lands. As noted in Sections 3.9, "Hazards and Hazardous Materials," and 3.18, "Wildfire," implementation of the 2021 LRDP would not increase the risk of environmental accidents in the area/region. Further, as evidenced by the August 2020 wildfires that occurred in Santa Cruz County and where firebreaks were constructed, the land cover that exists on campus and would be maintained under the 2021 LRDP constitutes a good opportunity for controlling risks to other structures in the County and City.

Resources that would be permanently and continually consumed by project implementation include water, electricity, natural gas, and fossil fuels; however, the amount and rate of consumption of these resources would be minimized as a result of continued and expanded implementation of the UC Sustainable Practices Policy, as well as the UC Santa Cruz energy efficiency and conservation programs (e.g., Carbon Fund, Green Labs Certification Program, Green Office Program, Student Sustainability Advisors, Enviroslug, and the People of Color Sustainability Collective) identified in Sections 3.6, "Energy" and 3.8, "Greenhouse Gas Emissions and Climate Change." As such, implementation of the 2021 LRDP would not result in significant environmental impacts related to the unnecessary, inefficient, or wasteful use of energy resources as stated in Section 3.6, "Energy." As discussed in Section 3.17, "Utilities and Service Systems," UC Santa Cruz, partially through 2021 LRDP implementation, would implement water conservation measures, including water-efficient fixtures, water recycling (where feasible), the use of drought-tolerant landscaping, turf removal, and public information campaigns, which would result in the efficient use of water.

With respect to operational activities, compliance with and exceedance of applicable building codes, as well as continued implementation of UC Santa Cruz energy efficiency and conservation programs (refer to Section 3.8, "Greenhouse Gas Emissions and Climate Change,") along with project-specific mitigation measures or project

requirements, would ensure that natural resources are conserved or recycled to the maximum extent feasible. It is also possible that new technologies or systems would emerge, or would become more cost-effective or user-friendly, which would further reduce the campus's reliance upon nonrenewable natural resources. Nonetheless, even with implementation of conservation measures, consumption of natural resources would generally increase with implementation of the 2021 LRDP as campus enrollment, staffing, and structures are generally expected to increase.

5.3 GROWTH-INDUCING IMPACTS

CEQA specifies that growth-inducing impacts of a project must be addressed in an EIR (Public Resources Code Section 21100[b][5]). Specifically, the State CEQA Guidelines Section 15126.2[e] states that the EIR shall discuss the ways in which the project could foster economic or population growth or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this analysis are projects that would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also, the EIR should discuss the characteristics of the project that may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

Direct growth inducement would result if a project involved construction of new housing. Indirect growth inducement would result, for instance, if implementing a project resulted in:

- substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises);
- substantial short-term employment opportunities (e.g., construction employment) that indirectly stimulates the need for additional housing and services to support the new temporary employment demand; or
- removal of an obstacle to additional growth and development, such as a constraint on a required public utility or service (e.g., construction of a major sewer line with excess capacity through an undeveloped area).

The State CEQA Guidelines do not distinguish between planned and unplanned growth for purposes of considering whether a project would foster additional growth, although recently (2018) the Initial Study checklist questions related to population growth were modified to query whether a project would cause substantial unplanned population growth (the word "unplanned" was added) (see CEQA Guidelines, Appendix G, XIV). This EIR evaluates whether the project would foster (i.e., promote or encourage) growth in economic activity, population, or housing, including whether the growth is already approved by and consistent with local plans. The conclusion does not determine that induced growth is beneficial or detrimental, consistent with the State CEQA Guidelines (Section 15126.2[e]).

Environmental effects resulting from induced growth fit the definition of "indirect" effects in the State CEQA Guidelines (Section 15358[a][2]). These indirect or secondary effects of growth, which although caused by a project, occur later in time or farther removed from the project site and may be significant. CEQA requires analysis of reasonably foreseeable environmental effects, but does not require that the EIR speculate about the precise location and site-specific characteristics of indirect effects caused by induced growth. Potential secondary effects of growth could include environmental impacts that are the result of growth fostered by the project, such as conversion of open space to developed uses, increased demand on community and public services and infrastructure, increased VMT and noise, degradation of air and water quality, or degradation or loss of plant and wildlife habitat.

5.3.1 Growth-Inducing Impacts of the 2021 LRDP

This analysis examines the following potential growth-inducing impacts related to implementation of the 2021 LRDP:

1) foster population growth;

2) foster the construction of new housing in the surrounding environment;

3) foster economic growth; and

4) remove obstacles to growth by expanding facility capacity, or infrastructure.

Forecasts concerning growth in Santa Cruz County provide a wide range of predictions. Per a recent report published by the California Department of Finance (DOF), the county of Santa Cruz (County) is anticipated to experience a minor decrease in population between 2020 and 2040 (117 fewer residents or 0.04 percent compared to DOF's 2020 estimate of 273,999 residents) (DOF 2020), although countywide population would have minor fluctuations during that period, reaching a peak projected population of 276,168 in 2033. Other growth projections identify an increase in countywide population. The Association of Monterey Bay Area Governments (AMBAG) identifies a countywide increase of 25,734 residents or 9 percent over the same period (AMBAG 2018). Per AMBAG's 2018 Regional Growth Forecast, approximately 8,000 of the projected increase in countywide population between 2020 and 2040 is associated with UC Santa Cruz. Based on projected increases in development within the County, including those listed in Table 4-1 of Chapter 4, "Cumulative Impacts," the AMBAG projections may more accurately reflect growth expectations. Further, the AMBAG projections are used to develop various regional planning documents, including the sustainable community strategy required by SB 375 (Chapter 4.2 of CEQA) to provide for more efficient land use patterns that facilitate a reduction in per capita greenhouse gases over time.

As noted in Section 3.13, "Population and Housing," development under the 2021 LRDP would allow for increased campus population, thereby increasing local student population, as well as the number of faculty/staff on-campus on a daily basis. The 2005 LRDP accommodated up to 19,500 students (FTE), with 18,518 FTE students enrolled in the 2018-2019 academic year. The 2021 LRDP would accommodate up to 28,000 students (FTE), an increase of approximately 9,500 students over existing levels and 8,500 students over previously planned totals in the 2005 LRDP. While there would be an increase in enrollment, the 2021 LRDP provides for development of more on-campus student beds (8,500 beds as part of the 2021 LRDP), which would (taking into consideration the planned-but-not-operational student housing projects, which would also provide additional student beds--a net increase of 2,175 student beds, as discussed in Chapter 4, "Cumulative Impacts") reduce the need for students to seek off-campus housing compared with existing conditions. Therefore, the 2021 LRDP would not foster student population growth at off-campus locations and within local jurisdictions.

With respect to employment growth, the 2021 LRDP would provide new employment opportunities for up to 2,200 FTE faculty/staff and 350 Non-UC employees, which would result in additional housing needs at off-campus locations for employees. Although some of the new employees would be housed in new on-campus housing, the majority of new employees (about 1,992 employees) would seek off-campus housing. The combined (students/employees/dependents, etc.) growth associated with the 2021 LRDP would be 12,830 (see Table 2-1 in the Project Description) and would exceed the 8,000-person AMBAG forecast for the university. As evaluated in Section 3.13, "Population and Housing," under Impact 3.13-1, while the projected demand for off-campus housing under the 2021 LRDP is less than the combined level of available housing and housing construction planned in nearby communities, other considerations, including the recent loss of housing within the county as a result of the CZU Lightning Complex Fire and rental/vacation/second homes that may be reflected as unoccupied in housing statistics, and strong evidence of a tight rental and for-sale housing market, additional housing may be induced as a result of on-campus growth under the 2021 LRDP. This demand for off-campus housing would occur incrementally over the 20-year period of the 2021 LRDP, and not instantaneously upon approval of the 2021 LRDP. It is noted that the 2021 LRDP planned growth is consistent with growth projections developed by AMBAG (see Section 3.13, "Population and Housing" of this EIR).

The 2021 LRDP-related population growth may induce economic growth through an increased demand for goods and services, which could create new jobs in the area, including within the downtown area of the city of Santa Cruz. Based on a 2019 study conducted for UC Santa Cruz regarding economic impacts associated with campus, UC Santa Cruz supported 15,627 jobs in the county in 2017. These included direct employment by UC Santa Cruz; jobs created in the community at hotels, restaurants, and retail; and indirect and induced full- and part-time jobs created for supply and equipment vendors, contractors, and construction workers (UC Santa Cruz 2019). The number of indirect and induced jobs generated by a university is commonly calculated by applying a ratio, or job multiplier, to the number of jobs directly provided by the institution. The projected increase in jobs (faculty and staff) is 2,200 FTE or

approximately 2,900 headcount by 2040. With full implementation of the 2021 LRDP and using a job multiplier of 1.23, which is a reflection of the ratio of indirect/induced: direct employment of UC Santa Cruz in 2017 (UC Santa Cruz 2019), an additional 3,567 jobs elsewhere in the region could be indirectly cause by or induced by growth under the 2021 LRDP. As a result, the 2021 LRDP could result in approximately 3,568 additional jobs within the region. While it is likely that a substantial proportion of the 3,567 jobs would be located in the city of Santa Cruz, it is anticipated that some of the new, indirect jobs would be created elsewhere within the region (e.g., Capitola and other communities of Santa Cruz County where people may locate or buy goods and services). This indirect and induced economic growth may result in the development of additional commercial space in the region, which would be subject to local planning and discretionary actions by local jurisdictions, including the City. The potential environmental impacts associated with such development would be identified consistent with CEQA requirements and evaluated through local jurisdictions' General Plans and project-level evaluations of commercial development proposals. As with this 2021 LRDP EIR, the CEQA review for future regional growth may identify significant impacts and mitigation measures and significant and unavoidable impacts. These impacts are generally part of overall regional growth and the 2021 LRDP would contribute to this growth and to the impacts related to the growth. In considering proposals for future developments, these regional entities would evaluate the details, alternatives, and mitigation measures to decide whether potential impacts would be significant and unavoidable.

Growth may result from the removal of physical impediments or restrictions to growth, as well as the removal of planning impediments resulting from land use plans and policies. In this context, physical growth impediments may include nonexistent or inadequate access to an area or the lack of essential public services (e.g., water service), while planning impediments may include restrictive zoning and/or land use designations. The 2021 LRDP would be implemented within existing UC Santa Cruz land holdings (specifically the main residential campus and Westside Research Park) which contain established land uses and supporting infrastructure (roads, water distribution, wastewater and drainage collection, and energy distribution). The 2021 LRDP includes redevelopment of certain portions of the LRDP area, predominantly within the main residential campus, and would intensify the uses over existing conditions some areas. This intensification may require the modification and/or replacement of existing infrastructure (e.g. water and sewer lines) to support the increased land use intensity associated with the 2021 LRDP. However, as noted in Section 3.17, "Utilities and Service Systems," the utility infrastructure (in terms of sizing and need) that is maintained by other jurisdictions is sized according to existing agreements and demands of the campus. In addition, due to the location of the main residential campus along the northwestern boundary of the City, any modifications to existing infrastructure would be made only to accommodate campus-related development and would not serve growth in areas outside of the LRDP area. Finally, and notably, because of limitations in water supply (see Section 3.15, "Utilities and Service Systems"), growth on campus could create competition for this resource that may restrict any additional growth.

In summary, implementation of the 2021 LRDP would foster on-campus student and employee population growth. Environmental impacts of on-campus population growth are accounted for in the 2021 LRDP and analyzed in this EIR (e.g., impacts to agricultural resources, air quality, and traffic; see discussions within the relevant chapters of this EIR). As discussed above, 2021 LRDP population growth may induce some off-campus growth, especially related to development of commercial space and possibly housing. This growth would not exceed growth projections in the region, including areas both within and outside of the County. The potential environmental effects of this off-campus growth cannot be specifically known or analyzed at this time without speculation, and any future development induced by the 2021 LRDP in the region would be subject to the review and approval of regional municipal and regulatory agencies, including environmental review required under CEQA. Therefore, the 2021 LRDP could result in adverse growth-inducing impacts off-campus beyond those inherent to the plan itself which are analyzed in this EIR, but the environmental impacts of that growth are not reasonably foreseeable and will be addressed in future environmental review under CEQA.

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6 ALTERNATIVES

6.1 INTRODUCTION

Section 15126.6(a) of the California Environmental Quality Act Guidelines (State CEQA Guidelines) requires environmental impact reports (EIRs) to describe:

> "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason."

This section of the State CEQA Guidelines also provides guidance regarding what the alternatives analysis should consider. Subsection (b) further states that the purpose of the alternatives analysis is as follows:

> "Because an EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment (Public Resources Code Section 21002.1), the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly."

The guidelines require that an EIR include information about each alternative that is sufficient to allow meaningful evaluation, analysis, and comparison with the project. If an alternative would cause one or more significant effects in addition to those that would be caused by the project, the significant effects of the alternative must be discussed, but in less detail than the significant effects of the project as proposed (Section 15126.6[d]). The guidelines further require that a "no project" alternative be considered (Section 15126.6[e]).

6.2 PROJECT OVERVIEW

The UC Santa Cruz 2021 Long Range Development Plan (2021 LRDP) involves modifications to the campus land use plan, established as part of the 2005 LRDP, to support the academic mission of UC Santa Cruz and potential growth in enrollment through 2040. It would guide the physical development on two of the three UC Santa Cruz campus properties within or near the City of Santa Cruz: the approximately 2,000-acre main residential campus and the 18-acre Westside Research Park. It does not address planning or growth on the Coastal Science Campus, which is subject to its own coastal LRDP, or on other remote campuses (UC Monterey Bay Education Science and Technology Center [MBEST]; Scotts Valley; and Silicon Valley).

The 2005 LRDP accommodated 19,500 full-time equivalent (FTE) students. UC Santa Cruz anticipates that under the 2021 LRDP, the campus population (at both the main residential campus and the Westside Research park combined) could grow to include approximately 28,000 FTE students and 5,000 FTE faculty and staff by the 2040–2041 academic year. Additional on-campus housing (8,500 new student beds) would be developed to accommodate the increase in the number of students (above the 2005 LRDP), and to provide additional housing for UC Santa Cruz faculty and staff. To accommodate the increased population and respond to evolving higher education needs at UC Santa Cruz, the 2021 LRDP proposes development of approximately 3.1 million assignable square feet (asf) of academic and support building space.

In general, the 2021 LRDP embraces a compact academic core with housing around the periphery. Employee housing would be strategically located to allow access to community resources. An enhanced historic district at the entrance

to the main residential campus would provide an improved community interface. Designated reserve areas would be set aside for ecological, cultural, and educational uses, and natural space would protect wildlife corridors and scenic views. To improve circulation, the 2021 LRDP includes an improved and more efficient roadway network and enhanced alternative transportation strategies. Finally, the 2021 LRDP plans for the Westside Research Park to be developed with mixed-use academic, research, and housing on the west side of the City of Santa Cruz.

6.3 METHODOLOGY FOR SELECTION OF ALTERNATIVES

6.3.1 Potential Feasibility

An EIR must "consider a range of potentially feasible alternatives" (CEQA Guidelines section 15126.6(a)). CEQA Guidelines Section 15126.6(f) (1) explains "feasibility" (e.g., "… feasibly attain most of the basic objectives of the project …"), in part, as follows:

> Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives.

Although, as noted above, EIRs must contain a discussion of "potentially feasible" alternatives, the ultimate determination as to whether an alternative is definitively feasible or infeasible is made by the lead agency's decision-making body, here the University of California Board of Regents (Regents) (See PRC Sections 21081.5, 21081[a] [3].) As a result, the EIR only concludes whether an alternative is potentially feasible.

6.3.2 Attainment of Project Objectives

As described above, one factor that must be considered in selection of alternatives is the ability of a specific alternative to attain most of the basic objectives of the project (CEQA State Guidelines Section 15126[a]). The overall objective of the 2021 LRDP is to guide the physical planning and development of the plan area in support of the teaching, research, and public service missions of UC Santa Cruz and the broader UC system. Four key considerations have informed the 2021 LRDP goals: supporting the academic mission, guiding campus evolution and integrity, recognizing and connecting to the local and regional context, and establishing a framework of planning resilience and long-term sustainability. UC Santa Cruz has identified the following 2021 LRDP objectives to guide implementation of the 2021 LRDP:

- Expand campus facilities and infrastructure to allow for projected increases in student enrollment through 2040 based on statewide public educational needs and to support the academic mission, including housing for 100 percent of the additional FTE students (above the 2005 LRDP total of 19,500 FTE students) in both colleges and student housing developments, and commensurate academic and support space.
- Ensure compact and clustered development of academic, administrative, and support facilities in the academic core and student housing and colleges around the periphery to facilitate shared resources, provide convenient access, and promote pedestrian circulation.
- Provide for establishment of two new college pairs at the main residential campus to provide academic services and a close-knit intellectual and social environment.
- Protect, to the extent feasible, existing campus open spaces in the built environment, including areas designated as Natural Space to maintain an interconnectedness between natural resources, wildlife corridors and critical scenic viewsheds, and areas designated as Outdoor Research and Natural Reserve to protect natural features and processes for teaching and learning and to support dedicated outdoor research programs.

- Provide spaces for events and academic facilities to allow the campus to function as a center for public cultural life in the region through public programs, events, and services.
- Increase on-campus housing opportunities for faculty and staff at the main residential campus and the Westside Research Park, to allow up to 25 percent of the increase in faculty and staff, based on demand, to be housed on campus.
- Recognize, to the extent feasible, UC Santa Cruz and regional histories within the campus, including protecting tribal cultural resources and maintaining the integrity of existing historic structures and enhancing the Cowell Lime Works Historic District as a campus gateway.
- Develop an improved, more efficient roadway network to support transit with peripheral parking and mobility hubs.
- Promote Transportation Demand Management (TDM) and provide infrastructure to optimize trip- and vehicle-miles-travelled-reduction benefits and efficiency of transit, bike, and pedestrian access to, from, and within the campus to reduce the use of single-occupancy vehicles.
- Foster long-term physical and social resilience, including a response to climate change through climate resiliency and adaptation strategies and integrating sustainability leadership into campus teaching, learning, research, design, and operations.
- Respect and reinforce the Physical Planning Principles and Guidelines to maintain the unique character of the UC Santa Cruz campus.

6.3.3 Potential to Avoid or Substantially Reduce a Significant Impact

Alternatives considered in an EIR must avoid or substantially lessen any of the significant effects of the proposed project (CEQA Guidelines Section 15126.6(a)). The Executive Summary presents a detailed summary of the potential environmental impacts of implementation of the 2021 LRDP. Please refer to Table ES-1 for a summary of impacts associated with development of the project. Overall, implementation of the 2021 LRDP would result in significant and unavoidable impacts with respect to air quality (operational criteria pollutant emissions), historic resources, noise (construction), population and housing, and utilities and service systems (water supply). All other impacts would either be less than significant or reduced to a less than significant level with mitigation.

6.4 ALTERNATIVES CONSIDERED BUT DISMISSED

The State CEQA Guidelines state that an EIR also should identify any alternatives that were considered by the lead agency but were rejected during the scoping process and briefly explain the reasons underlying the lead agency's determination (Section 15126.6[c]). This section addresses these alternatives.

6.4.1 Main Residential Campus Infill

Under this potential alternative, all of the new development to accommodate the projected enrollment and employment growth would be focused in the central and lower Campus areas of the main residential campus, and new development would not extend beyond the boundary of existing development in the north campus area of the main residential campus. Development of housing and academic space would be focused in and adjacent to areas of campus that have already been developed. Unlike under the 2021 LRDP, some of the meadows, as well as other sensitive habitat areas (e.g., for Ohlone tiger beetle and California red-legged frog) would need to be developed due to land constraints. Because of concerns regarding historic and other sensitive resources in these areas, as well as potential impacts to existing open space, this alternative would not fulfill most of the basic project objectives, including those related to preserving the existing character and diversity (including biological diversity) of the campus. By developing existing meadows, this alternative would also have significant impacts with regard to research, aesthetics and recreation. Thus, because this alternative would not meet most of the basic project objectives and

would not reduce or eliminate an environmental impact, relative to the proposed plan, this alternative is not feasible and is not considered in further detail.

6.4.2 High-Rise Development

This alternative would provide the same capacity as the 2021 LRDP, but would require development of less land because it would be more compact. Under this potential alternative, planned new academic, support, and housing would be constructed in the same development areas as proposed under the 2021 LRDP but would be provided in mid- to high-rise (6+ stories) buildings, whereas most proposed development within the main residential campus is currently 4 or fewer stories, although some 6- and 7-story buildings are present. It would increase the density of planned development and reduce the footprint of new development, and thereby reduce impacts on biological resources. However, significant impacts would still occur, and mitigation similar to the 2021 LRDP's mitigation would still be required. This alternative would expedite and exacerbate the need for additional firefighting equipment and capacity to address the taller buildings, resulting in a significant impact to public services. Further, construction under this alternative would exceed the height of existing structures and potentially surrounding trees, which could alter the overall visual character of the campus, as well as long-distance views of and from the main residential campus. It would be inconsistent with 2021 LRDP objectives related to the preservation of the campus' existing character, including development above the existing tree canopy. Thus, because this alternative would not meet most of the basic project objectives and would not substantially reduce or eliminate an environmental impact, relative to the proposed plan, this alternative is not feasible and is not considered in further detail.

6.4.3 Silicon Valley Campus Off-Site Alternative

Under this potential alternative, all of the planned additional enrollment, academic and support resources, and housing would be located at the Silicon Valley Campus, located at 3175 Bowers Avenue in Santa Clara, California, and no further development (other than some building modernization) would occur on the main residential campus or at the Westside Research Park. The Silicon Valley Campus currently consists of a 90,000-square-foot academic building and has been at its current location since 2016. The campus houses the UC Santa Cruz extension program, and some graduate and research programs associated with the Baskin School of Engineering. To accommodate additional academic programming and student enrollment, including undergraduates, additional property would need to be acquired for the development of the needed facilities; expansion of the existing building to meet the projected demand is not feasible due to the limited area of the existing campus.

The existing campus is surrounded on all sides by existing urban uses and would require the acquisition of approximately 100 acres of currently developed property to accommodate the projected academic, administrative, and housing needs of UC Santa Cruz. Based on the assessed value (2019) of the Silicon Valley Campus, a minimum of $150 million would be required to acquire adequate acreage, with additional costs associated with the design, planning, and the construction of new campus facilities (including removal of existing development). Land acquisition costs would not occur under the 2021 LRDP because UC Santa Cruz already owns the property upon which facilities would be built.

This alternative is considered potentially financially infeasible, and it would not fulfill most of the basic project objectives, including the objective of placing new facilities near existing facilities to enhance synergies between existing and new educational and research programs, facilitate use of shared resources, facilitate faculty-student interaction, and promote an environment conducive to learning. In addition, given the amount of demolition and construction required to demolish existing uses on 100 acres of property and construct entirely new buildings in a densely populated area, this alternative would likely result in additional significant and unavoidable impacts. Accordingly, because this alternative would not meet most of the basic project objectives and is not feasible, it is not considered in further detail.

6.4.4 Scotts Valley Center Off-Site Alternative

Under this potential alternative, all of the planned additional enrollment, academic and support resources, and housing would be located at the Scotts Valley Center, which serves as the professional offices for about 350 UC Santa Cruz staff (primarily Business and Administrative Services, Information Technology Services, and University Relations). Online course curricula would also be expanded under this alternative. No further development (other than some building modernization) would occur on the main residential campus or at Westside Research Park under this alternative. Under this alternative, the existing building could be redeveloped to realize additional usable space for academic/administrative uses. However, the existing property occupies 24 acres, and approximately 45 additional acres would be considered necessary to accommodate the academic programming needs and student enrollment anticipated under the 2021 LRDP. The Scotts Valley Center is located immediately east of State Route 17 and is bounded by residential with some commercial uses to the south, requiring future property acquisition to focus on undeveloped land located to the east or the existing uses to the south that could be redeveloped. Property acquisition would add to the cost of developing the facilities needed to accommodate the enrollment and employment increase at UC Santa Cruz. In addition, this alternative would not fulfill most of the basic project objectives, including the objective of placing new facilities near existing facilities to enhance synergies between existing and new educational and research programs, facilitate use of shared resources, facilitate faculty-student interaction, and promote an environment conducive to learning. Thus, because this alternative would not meet most of the basic project objectives, this alternative is not feasible and is not considered in further detail.

6.4.5 Coastal Science Campus Expansion Off-Site Alternative

Under this potential alternative, all of the planned additional enrollment, academic and support resources, and housing would be located at the Coastal Science Campus, which serves as the marine research and academic campus of UC Santa Cruz. Online course curricula would also be expanded under this alternative. While the Coastal Science Campus is supported by additional ocean research and education facilities and faculty/staff at the main residential campus, its mission since the 1960s has been to strengthen and promote marine science research and instruction. The Coastal Science Campus is also constrained by sensitive habitat and on-site laboratory operations. As a result, this site would not meet the long-term programming needs of the broader UC Santa Cruz academic program. It also would result in development of uses that are not coastal-dependent, within the coastal zone, which could conflict with the California Coastal Act. In addition, this alternative would not fulfill most of the basic project objectives, including the objective of placing new facilities near existing facilities to enhance synergies between existing and new educational and research programs, facilitate use of shared resources, facilitate faculty-student interaction, and promote an environment conducive to learning Thus, because this alternative would not meet most of the basic project objectives, this alternative is not feasible and is not considered in further detail.

6.4.6 Expanded UC Monterey Bay Education, Science, and Technology Center (UC MBEST) Off-Site Alternative

Under this alternative, all of the planned additional enrollment, academic and support resources, and housing would be located at UC MBEST located in the City of Marina in Monterey County. UC Santa Cruz received nearly 1,100 acres of the land from the U.S. Army at the former Fort Ord property as part of the Fort Ord Reuse Plan. Of this total, 500 acres are already planned by the UC potentially accommodate the projected growth of the proposed 2021 LRDP within approximately 100 acres. Limited academic/administrative facility growth (approximately 110,000 asf) would occur on the main residential campus under this alternative to provide additional university-facilities to accommodate 19,500 FTE students.

The Fort Ord area is known for biological sensitivity issues; therefore, future campus development at MBEST could result in similar biological impacts. In addition, potentially greater transportation impacts could also occur because of the need for students to travel to and MBEST to the main residential campus. While it would be intended to support the academic mission of UC Santa Cruz, development at MBEST under this alternative would function as an

autonomous campus. The development of a full university campus at MBEST and the addition of another UC campus to the UC system is not considered feasible at this time, given State fiscal constraints. Moreover, this type of shift would profoundly affect the economy of the city and county of Santa Cruz. This alternative would also not achieve any of the basic project objectives, including the objective of placing new facilities near existing facilities to enhance synergies between existing and new educational and research programs, facilitate use of shared resources, and facilitate faculty-student interaction. Thus, because this alternative would not meet most of the basic project objectives, this alternative is not feasible and is not considered in further detail. Note that Alternative 4, which is analyzed in detail, also involves the UC MBEST property but places only a portion of the planned enrollment and building program at that site.

6.4.7 Remote/Distance Learning Alternative

Under this potential alternative, UC Santa Cruz would serve all future enrollment through expanded online course curricula. This would reduce the need for on-campus facilities, although, certain academic programs (e.g., those that involve scientific laboratory coursework) and tenure track faculty would still require on-campus building space. Because on-campus students would not increase under this alternative, additional student housing would not be constructed. With respect to on-campus employment, up to 800 FTE faculty/staff, based on existing faculty ratios at the main residential campus and the lack of need for non-instructional staff under this alternative, would be needed to support a distance learning program. This alternative is not consistent with the current academic programming needs of the UC or UC Santa Cruz. Further, this alternative would not fulfill most of the basic project objectives, including the objective of placing new facilities near existing facilities to enhance synergies between existing and new educational and research programs, facilitate use of shared resources, facilitate faculty-student interaction, and promote an environment conducive to learning Thus, because this alternative would not meet most of the basic project objectives, relative to the proposed plan, this alternative is not feasible and is not considered in further detail.

6.5 COMPARISON AND ANALYSIS OF ALTERNATIVES

The following alternatives are considered in detail in the analysis below for this project:

- **Alternative 1: No Project.** This alternative involves the continued implementation of the 2005 LRDP. Planned growth as expressed in the 2005 LRDP would continue up to its planned capacity, primarily associated with new academic and administrative space.
- **Alternative 2: Reduced LRDP Enrollment.** This alternative would involve a reduced development intensity and lower enrollment than proposed (26,400 FTE students) within the LRDP area identified in Figure 2-4, "Envisioned Development Areas" of Chapter 2, "Project Description."
- **Alternative 3: Reduced Development Footprint.** This alternative would lower enrollment (26,400 FTE students) and restrict future development to areas within the central and lower campus subareas, and exclude development of areas in the north campus.
- **Alternative 4: Reduced Campus Growth and Use of UC MBEST Off-Site.** This alternative would reallocate some of the projected growth under the 2021 LRDP to the UC MBEST site. In addition, this alternative involves an expanded on-line/remote learning component for UC Santa Cruz students. Total enrollment under this alternative would be 28,000 FTE students, similar to the 2021 LRDP, with enrollment increases of 6,300 FTE students within the LRDP area, up to 1,400 FTE students through expanded online/remote learning programs, and 1,800 FTE graduate students at the UC MBEST site.

6.5.1 Alternative 1: No Project (2005 LRDP)

DESCRIPTION OF ALTERNATIVE

State CEQA Guidelines Section 15126.6(e)(1) requires that the "no project" alternative be described and analyzed "to allow decision makers to compare the impacts of approving the project with the impacts of not approving the project." The no-project analysis is required to discuss "the existing conditions at the time the notice of preparation is published…as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services" (Section 15126.6[e][2]). The guidelines further state (Section 15126[e][3][B]):

> If the project is…a development project on identifiable property, the "no project" alternative is the circumstance under which the project does not proceed. Here the discussion would compare the environmental effects of the property remaining in its existing state against environmental effects which would occur if the project is approved. If disapproval of the project under consideration would result in predictable actions by others, such as the proposal of some other project, this "no project" consequence should be discussed. In certain instances, the no project alternative means "no build" wherein the existing environmental setting is maintained. However, where failure to proceed with the project will not result in preservation of existing environmental conditions, the analysis should identify the practical result of the project's non-approval and not create and analyze a set of artificial assumptions that would be required to preserve the existing physical environment.

As noted in Chapter 2, "Project Description," 2018/19 academic year enrollment is 18,518 students. Based on existing data and forecasts in the 2005 LRDP, implementation of this alternative could result in up to an additional approximately 1,150 people (up to approximately 1,000 students and 150 faculty) and 1,322,000 assignable square feet (asf) of administrative/academic space compared to baseline conditions, as approved under the 2005 LRDP. However, no enrollment growth would occur beyond the 19,500 FTE students, as enrollment growth is limited by the 2008 Comprehensive Settlement Agreement [CSA]) until a new LRDP is approved. Faculty and staff growth would be limited to be commensurate with student and campus growth.

ABILITY TO MEET PROJECT OBJECTIVES

The No Project Alternative would potentially meet some of project objectives (Project Objectives 2, 4, 5, and 7), but not all. With respect to Project Objectives 4 and 7, this alternative would achieve these objectives to a greater extent due to the lesser level of development that would further ensure the maintenance of existing open spaces and historic structures within the LRDP area. With respect to Project Objectives 2 and 5, this alternative would include some development that would expand campus facilities and provide additional social event space; however, this would not occur under this alternative to the extent that is planned in the 2021 LRDP.

The No Project Alternative would not meet any of the project objectives that relate to growth, housing, roadway network improvements, multi-modal efficiency improvement, and implementation of climate resiliency and adaptation strategies (Project Objectives 1, 3, 6, 8, 9, and 10). The transportation improvements described in Chapter 2, "Project Description," would not be implemented within the LRDP area, which would impede UC Santa Cruz from providing a close-knit intellectual and social environment and improving means of active and alternative transportation within the campus. Student enrollment would be limited to 19,500 FTE students approved under the 2005 LRDP, which would be considered counter to the overarching goal of the UC to provide a dynamic learning environment for residents of California. Additionally, because this alternative would provide a lesser amount of new academic/administrative space, it would limit the ability for UC Santa Cruz to continue to create a dynamic environment for learning and discovery through the provision of new academic programs and disciplines. Furthermore, because the 2005 LRDP does not reflect the current planning goals of UC Santa Cruz or the State of California's public education plans and policies, this alternative would not provide the best framework for growth and development within the LRDP area. Thus, the No Project Alternative would not meet most of the basic project objectives.

COMPARISON OF ENVIRONMENTAL IMPACTS

Aesthetics

Changes to existing visual conditions on the UC Santa Cruz campus would be largely limited to development of academic/administrative buildings and support space within the main residential campus. By comparison, the 2021 LRDP would involve greater development along the periphery of the main residential campus and at Westside Research Park. Under Alternative 1, changes in existing visual conditions would be much more limited than the 2021 LRDP and would be less than significant with mitigation set forth in the 2005 LRDP EIR. Under this alternative, no new development would occur proximate to Empire Grade, a designated scenic roadway in the County, such that no impacts to scenic resources/roadways would occur. Therefore, aesthetic impacts associated with Alternative 1 would be less than those associated with the proposed 2021 LRDP. *(Less Impact)*

Agriculture and Forestry Resources

Under Alternative 1, there would be no conversion of lands currently used for agricultural purposes to non-agricultural use. However, as noted in Section 3.2, "Agriculture and Forestry Resources," the two acres that are currently associated with the university farm and that would be converted are not considered a significant agricultural resource based on the LESA model evaluation. With respect to forestry resources, implementation of this alternative would involve less development and less conversion of forested land. However, some development, especially within the central campus portion of the main residential campus, would still occur. Similar to the proposed 2021 LRDP, this alternative would require the preparation of timber harvest plans (THPs) and acquisition of timber conversion permits (TCPs) from the California Department of Forestry and Fire Protection (CAL FIRE). Nonetheless, due to the reduced area of development under this alternative, impacts on forest resources would be less than under the proposed 2021 LRDP, and no impact would occur with respect to agriculture. *(Less Impact)*

Air Quality

Alternative 1 would result in less development than under the proposed 2021 LRDP, and thus, would generate less construction- and operations-related air emissions. This alternative would result in approximately 20 percent of the construction effort anticipated with implementation of the proposed 2021 LRDP, and therefore proportionally reduced total construction emissions. Implementation of Alternative 1 would also result in decreased operational emissions, due to decreased vehicle trips and activities within the LRDP area. Further, campus development under this alternative would be subject to 2005 LRDP EIR mitigation measures which would further reduce operational air emissions. This alternative would avoid the significant and unavoidable impact associated with operational emissions under the 2021 LRDP. Because of the limited amount of new development and campus growth anticipated under this alternative, air quality impacts pertaining to criteria pollutant and ozone precursor emissions would be reduced compared to the proposed 2021 LRDP and likely be less than significant. *(Less Impact)*

Archaeological, Historical, and Tribal Cultural Resources

As with the proposed 2021 LRDP, earth-moving activities within the UC Santa Cruz campus under Alternative 1 have the potential to disturb archaeological, tribal cultural, and/or historic resources or result in accidental discovery of human remains, and result in significant impacts to these resources. However, feasible mitigation measures and regulatory requirements/procedures would reduce these impacts to a less-than-significant level. Additionally, development within or near potentially historic structures on the main residential campus under both this alternative and the 2021 LRDP would result in potentially significant and unavoidable impacts. Because there would be lesser earth-moving activities under Alternative 1, there would be a lower potential to impact cultural resources. *(Less Impact)*

Biological Resources

As less new building space would be constructed under Alternative 1, this alternative would have substantially reduced impacts on sensitive biological resources on the main residential campus, compared to the proposed 2021 LRDP. To the extent development under this alternative is proposed in areas containing special-status species or habitats, mitigation measures from the 2005 LRDP EIR would be implemented to avoid, reduce and/or mitigate significant impacts. Potential impacts related to the existing Ranch View Terrace Habitat Conservation Plan (HCP)

would be avoided under this alternative. Overall, compared to the 2021 LRDP, Alternative 1 would result in reduced severity of impacts to biological resources. *(Less Impact)*

Energy

Under this alternative, less development would occur on the campus, including the development of fewer energy-efficient structures and facilities. Less construction activities would correspond to less fuel consumption during construction. Fewer students on campus would also result in less energy consumption. However, development under the proposed 2021 LRDP would be highly energy efficient, which is the primary basis of impact determination under CEQA, and there would be no significant impacts associated with the wasteful or inefficient use of energy. Both this alternative and the 2021 LRDP would require adherence with the UC Sustainably Practices Policy and the UC Santa Cruz Energy Efficiency Programs, both of which would ensure efficient use of energy in construction and operations. Based on this, impacts to energy would be similar. *(Similar Impact)*

Geology and Soils

Earth-moving activities associated with construction have the potential to affect geology and soils. The types of impacts that could occur from development on campus include: geotechnical issues, increased erosion, and exposure of buildings and people to seismic hazards. Existing regulations and permitting requirements, such as California Building Code (CBC) requirements, National Pollutant Discharge Elimination System (NPDES) permit conditions, UC Santa Cruz Post-Construction Stormwater Management Requirements, and best management practices (BMPs), would minimize potential impacts to a less-than-significant level. While both this alternative and the 2021 LRDP would result in less-than-significant impacts, Alternative 1 would have reduced geology and soils impacts compared to the proposed 2021 LRDP because there would be less new building development. *(Less Impact)*

Greenhouse Gas Emissions and Climate Change

Due to the lesser level of building development under this alternative, there would be less construction-related as well as operational greenhouse gas (GHG) emissions compared to the proposed 2021 LRDP. However, consistent with the UC Sustainable Practices Policy and actions outlined in the UC Santa Cruz Climate Action Plan (CAP), campus-related emissions would be required to be net zero for Scopes 1 and 2 in 2025 and net zero for Scopes 1, 2, and selected Scope 3 sources in 2050 under both this alternative and the 2021 LRDP. While implementation of the 2021 LRDP would involve the placement of new energy-efficient structures within available land and adjusting land use patterns to capture efficiencies related to alternative transportation (transit, bicycle, and pedestrian travel), Alternative 1 would emit lesser GHG emissions overall because it would result in less development. Therefore, the alternative would reduce the project's impact (less than significant with mitigation incorporated) related to GHG emissions. *(Less Impact)*

Hazards and Hazardous Materials

Under the 2021 LRDP, on-campus construction activities would entail the transport, use, and storage of hazardous materials, and potential for a release of hazardous materials from a site of previously known or unknown contamination. In addition, closure of area roadways during construction may hinder traffic flow and affect emergency response. However, feasible mitigation measures are available to reduce these impacts to a less-than-significant level. Due to compliance with applicable regulations and programs, campus operations would have less than significant impacts related to hazardous materials transport, use and storage. Similar types of impacts would occur under Alternative 1 although to a lesser degree as a result of the reduced construction effort. *(Less Impact)*

Hydrology and Water Quality

Earth-moving activities associated with construction under the 2021 LRDP have the potential to affect hydrology and water quality within UC Santa Cruz. The types of impacts that could occur from development under the 2021 LRDP include: adverse effects on water quality, reduced groundwater recharge, alterations to existing drainage systems, and effects on the 100-year floodplain. Existing regulations and permitting requirements, such as NPDES permit conditions, UC Santa Cruz Post-Construction Stormwater Management Requirements, a storm water pollution prevention plan (SWPPP), and a Stormwater Quality Control Plan (SWQCP) would reduce potentially significant

impacts to a less-than-significant level. In addition, development of additional academic/administrative space would be required to comply with existing regulations and to implement similar mitigation measures that would reduce impacts to a less-than-significant level. Because this alternative would require less development compared to the 2021 LRDP, the severity of impacts would be lesser when compared to the 2021 LRDP. *(Less Impact)*

Land Use and Planning

This alternative would result in substantially less new development compared to the 2021 LRDP, and furthermore, this alternative would not include the amendments to the 2005 LRDP land use designations that are proposed under the 2021 LRDP to address the organization of land uses, spacing, and interrelationship of land uses on-campus. As a result, this alternative would result in no additional changes to existing planning efforts, and as such would have no impact, which would be less than the 2021 LRDP's less-than-significant impact associated with conflict with land use plans, policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect, and incompatibility with adjacent land uses. *(Less Impact)*

Noise

Earth-moving activities within campus (e.g., grading, excavation) under the 2021 LRDP would result in noise and vibration impacts. Feasible mitigation measures are available to reduce these impacts; however, construction noise could be substantial due to potential proximity to nearby housing (both on and off campus) and would still be considered significant and unavoidable under the 2021 LRDP. Compared to the 2021 LRDP, there would be less construction-generated noise or vibration under Alternative 1 due to less overall construction-related activities. *(Less Impact)*

Population and Housing

Under Alternative 1, up to 2,159 new student beds would be provided on campus once the planned-but-not-operational student housing (i.e., Kresge Housing and Student Housing West), which are part of the 2005 LRDP, is constructed. This additional approved housing would be greater than the enrollment increase under this alternative, and therefore, new students would not seek off-campus housing. Therefore, population and housing impacts associated with students would be less than the proposed 2021 LRDP which plans for a larger enrollment increase with 8,500 student beds on-campus. It is noted, however, that the project would provide an equal number of student beds as students above the 19,500 student enrollment cap considered in this alternative.

Under this alternative, on-campus employment could incrementally increase by approximately 150 faculty/staff of which a small number would be housed in on-campus housing, compared to 2,200 new employees under the 2021 LRDP, of which 550 new employees would be housed on campus. Therefore, similar to the 2021 LRDP, Alternative 1 would increase the need for off-campus housing as a result of increased employment. In this case, however, the need for off-campus housing would likely be addressed by available housing stock in the region and less than significant. Therefore, impacts would be less under this alternative. *(Less Impact)*

Public Services

Alternative 1 would result in an incremental increase in demand for public services as a result of increased campus population, although not to the degree of the 2021 LRDP due to the substantially reduced amount of building development. Under the 2021 LRDP, impacts were determined to be less than significant with mitigation because, in large part, campus development under the 2021 LRDP would be adequately served by local public service providers. As noted in Section 3.14, "Public Services," a replacement fire station is anticipated as part of 2021 LRDP development, and mitigation measures provide requirements related to the timing of construction of the new fire station. Beyond the timing of the aforementioned fire station, the project related demand for service would not require new or modified facilities that would result in significant environmental impacts. Alternative 1 would also result in less-than-significant public service impacts similar to the 2021 LRDP, but to a lesser degree due to the lesser acreage of land to be developed and fewer FTE of students and staff under this alternative. *(Less Impact)*

Recreation

Alternative 1 would not substantially increase on-campus population such that additional recreational facilities would be necessary. As noted for the 2021 LRDP, adequate land area for the development of new recreational facilities would be provided, as necessary and as part of new on-campus housing development. As no new on-campus housing or enrollment beyond 19,500 FTE students would be accommodated on campus under this alternative, impacts would be less than significant under this alternative because existing recreational facilities (in addition to those included as part of Kresge Housing and Student Housing West) would adequately accommodate any incremental increase in demand associated with the campus population. Thus, recreation impacts under Alternative 1 would be similar to those discussed for the 2021 LRDP. (*Similar Impact*)

Transportation

Under the proposed 2021 LRDP, on-site housing would be provided sufficient to accommodate the increased enrollment (8,500 beds) above the No Project's 19,500 students, and 550 of the 2,200 new faculty and staff. Therefore, new vehicle trips and an increase in vehicle miles traveled (VMT) would occur due to the commuting of the approximately 1,650 new employees who would live off campus. Under Alternative 1, new on-campus housing (refer to the cumulative projects that are part of the 2005 LRDP within the LRDP area and identified in Chapter 4, "Cumulative Impacts") would exceed the projected increase in student population (approximately 1,000 new students), as well as a small number of the 150 new employees would live on campus. Therefore, the alternative would result in a much smaller increase in the number of daily vehicle trips and VMT compared to the proposed 2021 LRDP. Overall impacts related to transportation would be less under this alternative than the 2021 LRDP as a result of fewer vehicle trips. Of note, implementation of this alternative would not encourage alternative transportation nor improve inter-campus connections to the degree of the 2021 LRDP. *(Less Impact)*

Utilities and Service Systems

Under Alternative 1, there would be less additional demand on utilities or requirements to alter or expand infrastructure compared to the 2021 LRDP because campus population levels would be substantially lower. In general, impacts would be less under this alternative and would be less than significant with the exception of the impact related to water supply. Based on the supplemental analysis of water supply impacts of the 2005 LRDP, presented in the Student Housing West EIR, campus growth and development under the 2005 LRDP would result in a significant impact on water supply as it would contribute to the need for the development of new water supplies by the City. Additional development in the 2021 LRDP would further contribute to this need. *(Less Impact)*

Wildfire

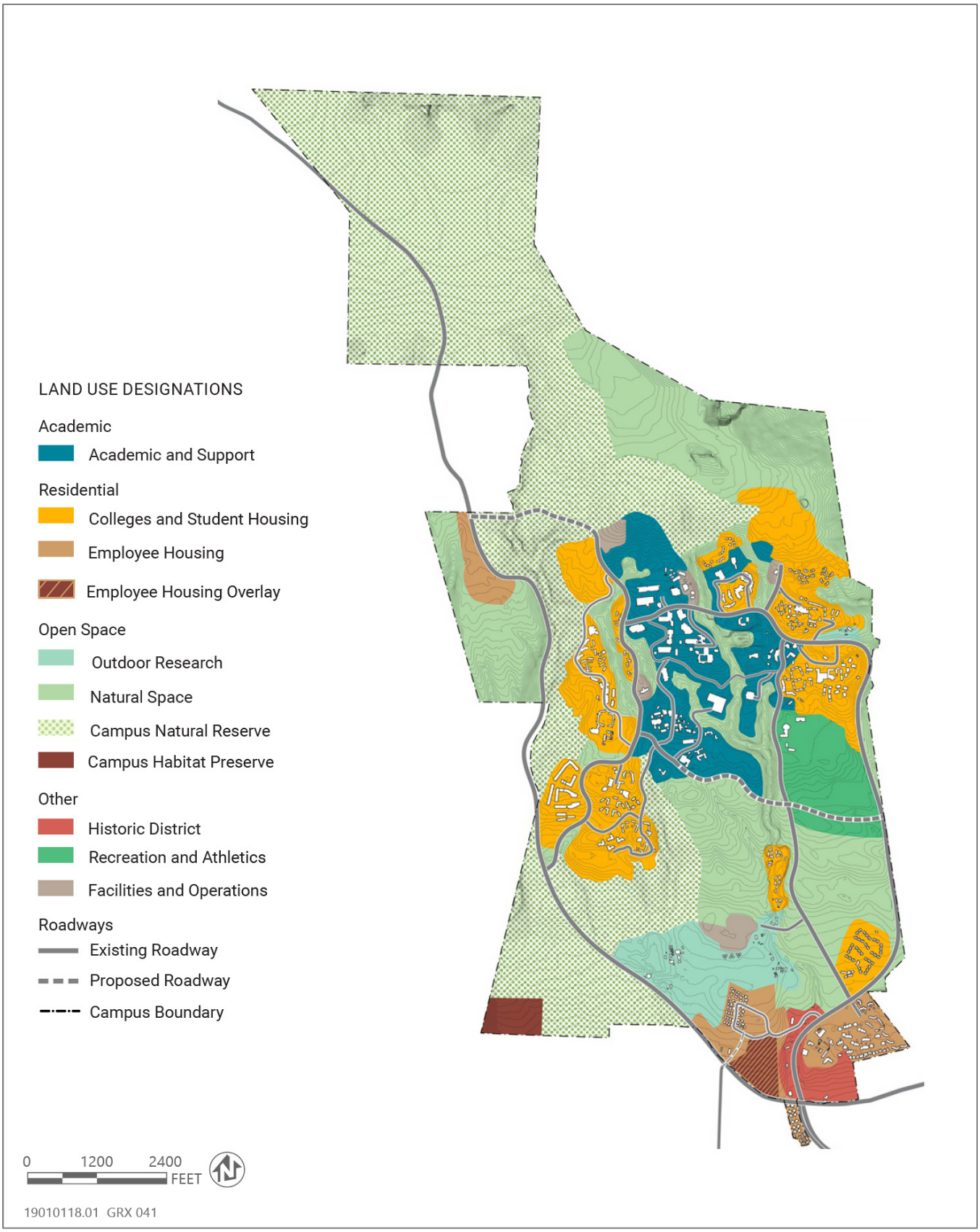
Under this alternative, there would be less overall development, however, the development areas would substantially the same as under the proposed 2021 LRDP. UC Santa Cruz would continue to manage wildfire risk and implement existing campus plans related to campus evacuation and wildfire prevention, similar to the 2021 LRDP. As a result, impacts would be similar to those under the 2021 LRDP and less than significant. *(Similar Impact)*

6.5.2 Alternative 2: Reduced LRDP Enrollment

This alternative is being considered to avoid environmental impacts associated with development on some areas of campus as well as those associated with the total increase in enrollment.

DESCRIPTION OF ALTERNATIVE

Under this alternative, UC Santa Cruz would implement a long-range development plan with a smaller increase in campus enrollment and associated development compared to the proposed 2021 LRDP. However, the land use plan would remain the same, as shown in Figure 6-1. Overall, this alternative would involve a 20 percent reduction in new students above the 2005 LRDP for a future total enrollment level that would be approximately 6 percent lower than the proposed 2021 LRDP, which would lower the number of students, faculty, and staff located on campus and travelling to and from the campus each day. Implementation of this alternative would result in a future on-campus



Source: UC Santa Cruz 2020

Figure 6-1 Alternative 2 (Reduced LRDP Enrollment) Conceptual Land Use Plan

enrollment of 26,400 FTE students in 2040 compared to 28,000 FTE students in 2040 under the proposed 2021 LRDP, and increase 6,900 students (compared to 8,500 under the 2021 LRDP) over the 2005 LRDP totals. This alternative would also result in a commensurate reduction in new faculty/staff to 1,190, compared to 2,200 new faculty/staff under the 2021 LRDP. Up to 6,900 new student beds, 300 new faculty/staff housing units, and 2,467,000 asf of new academic/administrative space would be provided under this alternative. Accordingly, this alternative would not be able to accommodate sufficient academic/administrative space to support the projected growth in student enrollment through 2040. The proposed land use designations under the alternative would remain the same as under the proposed 2021 LRDP. Figure 6-1 includes the potential land use plan for this alternative.

ABILITY TO MEET PROJECT OBJECTIVES

Alternative 2 would increase on-campus housing opportunities to accommodate 100 percent of new student enrollment (above the 2005 LRDP cap of 19,500 students) and 25 percent of new faculty/staff. This alternative would also accommodate development of academic/administrative and support facilities to match the projected increased enrollment totals. For this reason, Alternative 2 would meet most of the 2021 LRDP objectives (Project Objectives 2 through 10). However, because this alternative would provide less academic/administrative space, it would limit the ability for UC Santa Cruz to continue to create a dynamic environment for learning and discovery through the provision of new academic programs and disciplines. In addition, this alternative would not provide the full additional capacity for 28,000 students, which is based on the state's 2040 college enrollment projections; therefore, Alternative 2 would only partially meet Project Objective 1 which involves the accommodation of projected increases in student enrollment through 2040 based on statewide public educational needs. The primary mission of the UC is to provide teaching, research, and public service for the higher education needs of California. Alternative 2, which would provide less academic building space and student capacity, would impair the ability of the UC to achieve this mission and would conflict with Project Objective 1.

COMPARISON OF ENVIRONMENTAL IMPACTS

Aesthetics

The changes from existing visual conditions that would occur within the LRDP area would be similar under this alternative to the 2021 LRDP, as development would be placed in the same areas that are planned for development under the proposed 2021 LRDP. While the degree of change would be less as the amount of development that would be constructed would be less, the same mitigation measures would be required to mitigate significant impacts. In general, the overall height and bulk of structures may be slightly reduced, however not to the extent that potential changes in visual character and views of and through the campus would be substantially different when compared to the 2021 LRDP. Land use changes under this alternative would involve the development of additional university-related uses within a university campus, such that the overall aesthetic condition of the campus would be similar to that of the 2021 LRDP and would be less than significant. *(Similar Impact)*

Agriculture and Forestry Resources

Under Alternative 2, the conversion of some agricultural lands to non-agricultural use would likely be necessary to accommodate additional employee housing under this alternative, similar to the 2021 LRDP. However, as noted in Section 3.2, "Agriculture and Forestry Resources," the two acres that are currently associated with the university farm and that would be converted are not considered a significant agricultural resource due to its limited acreage and water supply, as well as its relative isolation compared to other agricultural lands in the region. With respect to forestry resources, implementation of this alternative would involve lesser development but similar conversion of forested land due to similar land area to the 2021 LRDP that would be associated with development. Similar to the 2021 LRDP, this alternative would require the preparation of THPs and acquisition of TCPs from the CAL FIRE. As a result, impacts would be similar to the 2021 LRDP. *(Similar Impact)*

Air Quality

Alternative 2 would include less development (approximately 600,000 asf less) than the 2021 LRDP, and thus, would emit less overall air emissions during construction. Similarly, during operations, this alternative would result in less operational emissions due to the lesser level of development, compared to the 2021 LRDP. However, the decrease in overall emissions would not preclude the potential for construction emissions in a given year to exceed Monterey Bay Air Resources District thresholds. As such, mitigation of construction emissions (both criteria pollutant and toxic air contaminant [TAC]) would be still be necessary under this alternative. Operational emissions would be lower than under the proposed 2021 LRDP, and assuming a proportional reduction in vehicle emissions as a result of the reduction in new students, this alternative could, with implementation of similar mitigation to the 2021 LRDP, avoid the significant and unavoidable under the 2021 LRDP that is primarily associated with increased vehicle emissions and use of consumer products. Therefore, due to the lesser level of development and associated air quality impacts under this alternative, impacts would be less, but construction and operational phase impacts would still be significant and require mitigation. *(Less Impact)*

Archaeological, Historical, and Tribal Cultural Resources

Earth-moving activities within the LRDP area have the potential to disturb archaeological, tribal cultural, and/or historic resources or result in accidental discovery of human remains. Under the 2021 LRDP, ground-disturbing activities (e.g., grading, excavation) could result in the discovery of archaeological resources, tribal cultural resources, or human remains; however, feasible mitigation measures and regulatory requirements/procedures would reduce these impacts to a less-than-significant level. Additionally, on-campus development within or near potentially historic structures under the 2021 LRDP would result in potentially significant and unavoidable impacts. Although the areas of the campus affected by new development would be substantially the same as under the 2021 LRDP, the overall level of campus development and thereby the footprint of development would be less under this alternative. Therefore this alternative would result in similar to slightly reduced potential impacts to archaeological, historical, and tribal cultural resources. *(Similar Impact)*

Biological Resources

Under Alternative 2, the same areas of the campus would be developed in a manner similar to but with less overall development than under the 2021 LRDP, including within the central portion of the main residential campus adjacent to existing academic/administrative development. Due to the presence of habitat for special-status plant and animal species, as well as riparian habitat, within the areas of development, physical changes associated with implementation of this alternative could result in significant impacts; however, mitigation measures described for the 2021 LRDP would reduce these impacts to a less-than-significant level. Impacts of this alternative would be similar to or slightly reduced compared to those under the proposed 2021 LRDP. *(Similar Impact)*

Energy

Under this alternative, less development would occur on the campus, including the development of fewer energy-efficient structures and facilities. Less construction would correspond to less fuel consumption during construction. Fewer students on campus would also result in less energy consumption. However, development under the proposed 2021 LRDP would be highly energy efficient, which is the primary basis of impact determination under CEQA, and there would be no significant impacts associated with the wasteful or inefficient use of energy. Both this alternative and the 2021 LRDP would require adherence with the UC Sustainably Practices Policy and the UC Santa Cruz Energy Efficiency Programs, both of which would ensure efficient use of energy in construction and operations. Based on this, impacts to energy would be similar. *(Similar Impact)*

Geology and Soils

Earth-moving activities associated with construction have the potential to affect geology and soils. The types of impacts that could occur from development on campus include: geotechnical issues, increased erosion, and exposure of buildings and people to seismic hazards. Existing regulations and permitting requirements, such as CBC requirements, NPDES permit conditions, UC Santa Cruz Post-Construction Stormwater Management Requirements, and BMPs, would minimize potential impacts to a less-than-significant level. As with the proposed 2021 LRDP, this

alternative would result in less than significant impacts related to geology and soils. Even though this alternative involves a lesser overall level of development, the general areas where development would occur would be subject to similar geologic impacts. Thus, the impacts would be of similar type and magnitude. *(Similar Impact)*

Greenhouse Gas Emissions and Climate Change

Due to the lesser level of development on-campus under this alternative, GHG emissions associated with new development during construction would be lower than under the proposed 2021 LRDP. With respect to operation, this alternative, similar to the 2021 LRDP, involves the placement of new energy-efficient structures within available land and adjusting land use patterns to capture efficiencies related to alternative transportation. As a result, the 2021 LRDP represents a relatively small carbon footprint for a project of its size, with very low building energy use, particularly with respect to fossil fuels. Similarly, although to a lesser degree, this alternative would involve the operation of more efficient land uses to serve an increased campus population. Overall operational GHG emissions would be less under this alternative than the 2021 LRDP. However, consistent with the UC Sustainable Practices Policy and actions outlined in the UC Santa Cruz CAP, UC Santa Cruz emissions would be required to be net zero for Scopes 1 and 2 in 2025 and net zero for Scopes 1, 2, and Scope 3 from selected sources in 2050 under this alternative, similar to the 2021 LRDP. Further, to achieve any remaining GHG emissions reductions, the purchase of voluntary carbon offsets, consistent with Mitigation Measures MM3.8-1a and MM3.8-1b, would be necessary. Thus, this alternative would also result in impacts that would be less than significant with mitigation, similar to the 2021 LRDP, but impacts would be less due to the overall lesser level of emissions. *(Less Impact)*

Hazards and Hazardous Materials

Under the 2021 LRDP, on-campus construction activities would entail the transport, use, and storage of hazardous materials; and release of hazardous materials from a site of known or potential contamination. In addition, closure of area roadways during construction may hinder traffic flow and affect emergency response. However, feasible mitigation measures are available to reduce these impacts to a less-than-significant level. Due to compliance with applicable regulations and programs, campus operations would have less than significant impacts related to hazardous materials transport, use and storage. Similar types of hazards and hazardous materials impacts would occur with implementation of Alternative 2 although to a lesser degree as a result of the reduced construction effort. *(Less Impact)*

Hydrology and Water Quality

Earth-moving activities associated with construction under the 2021 LRDP have the potential to affect hydrology and water quality within UC Santa Cruz. The types of impacts that could occur from development under the 2021 LRDP include: adverse effects on water quality, reduced groundwater recharge, alterations to existing drainage systems, and effects on the 100-year floodplain. Existing regulations and permitting requirements, such as NPDES permit conditions, UC Santa Cruz Post-Construction Stormwater Management Requirements, a SWPPP, and the Regional Water Quality Control Plan, would reduce potentially significant impacts to a less-than-significant level. Similarly, under this alternative, development of additional on-campus structures and facilities would be required to comply with existing regulations and similar mitigation measures as to the 2021 LRDP would be available to reduce potentially significant impacts to a less-than-significant level. Impacts under this alternative would, therefore, be less than significant with mitigation and similar to the 2021 LRDP. *(Similar Impact)*

Land Use and Planning

This alternative would result in less new development compared to the 2021 LRDP, however, this alternative would include the amendments to the 2005 LRDP land use designations that are proposed under the 2021 LRDP to address the organization of land uses, spacing, and interrelationship of land uses on-campus. As a result, this alternative would result in a similar and less-than-significant impact associated with conflict with land use plans, policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect, and incompatibility with adjacent land uses. (*Similar Impact*)

Noise

Earth-moving activities within campus (e.g., grading, excavation) under the 2021 LRDP would result in noise and vibration impacts. Feasible mitigation measures are available to reduce most of these impacts to a less-than-significant level, as described in Section 3.12, "Noise." However, construction noise could be substantial due to potential proximity to nearby housing (both on and off campus) and would still be considered significant and unavoidable under the 2021 LRDP. Compared to the 2021 LRDP, there would be less construction-generated noise or vibration under Alternative 2 due to less overall construction-related activities. Although the overall level of development would be less under this alternative, the land area required for plan implementation and development locations would likely be similar and result in similar impacts compared to the 2021 LRDP. *(Similar Impact)*

Population and Housing

Under Alternative 2, there would be 6,900 new student beds provided on-campus, which would provide a new student bed for each student above 19,500 FTE. This would accommodate this alternative's projected increase in student enrollment above them 2005 LRDP. Similar to the project, the new beds above the enrollment of 19,500 students would not address the demands for beds between 2018/2019 enrollment of 18,518 students and the 19,500 2005 LRDP enrollment cap (although this would be addressed by the Student Housing West and Kresge Housing projects, previously discussed). While Alternative 2 would provide less faculty/staff housing than the 2021 LRDP, it would also result in fewer new faculty/staff. Nonetheless and similar to the 2021 LRDP, additional demand for off-campus housing would occur under this alternative and due to the already tight housing market, worsened by the loss of houses from the CZU Lightning Complex fire, adequate housing opportunities may not be available in surrounding communities for new faculty/staff and students. Impacts would be less under this alternative due to a smaller increase in faculty/staff, but the difference would be relatively small. Impacts would remain significant and unavoidable. *(Similar Impact)*

Public Services

Alternative 2 would result in an increase in demand for public services similar to the 2021 LRDP. Under the 2021 LRDP, impacts were determined to be less than significant because campus development under the 2021 LRDP would be adequately served by local public service providers and the project-related demand for service would not require new or modified facilities (except a possible fire station on campus, which is included as part of the 2021 LRDP and addressed in this EIR), the development of which could result in significant environmental impacts. Alternative 2 would also result in less-than-significant public service impacts as this alternative would also not require new or modified public service facilities, the development of which could result in significant environmental effects. *(Similar Impact)*

Recreation

Alternative 2 would increase on-campus population and recreational needs but would, similar to the 2021 LRDP, provide additional on-site recreational opportunities proximate to new student and faculty/staff housing such that additional recreational facilities beyond those already intended as part of new housing would not be necessary. Because the campus would develop new recreational facilities as needed, impacts under Alternative 2 would be of similar type and magnitude as the 2021 LRDP. (*Similar Impact*)

Transportation

Under Alternative 2, development of new on-campus housing and academic/administrative space would increase the level of on-campus activity such that new vehicle commute trips would occur on a daily basis, similar to the 2021 LRDP. Under this alternative, overall campus VMT would be less than the proposed 2021 LRDP due to the lesser level of development and on-campus activities, however, the overall efficiency (i.e., VMT per capita) would be similar as all new students above the 19,500 2005 LRDP enrollment cap would be housed on campus, as well as 25 percent of new faculty/staff. *(Similar Impact)*

Utilities and Service Systems

Under Alternative 2, development of the LRDP area with additional housing, academic/administrative space, and supporting uses would occur, placing greater demand on utilities and service system than under existing conditions.

The overall demand for utilities would be incrementally less than the 2021 LRDP's demand due to the smaller amount of development and on-campus population under this alternative. As with the proposed 2021 LRDP, with the exception of water supply, the existing utilities and service systems would generally be sufficient to meet the additional demands associated with this alternative. Although the demand for water under this alternative would be lower, the impact of this incremental water demand would still be significant as it would contribute to the need for the City to develop new water supplies. In general, impacts would be of similar type (i.e., significant and unavoidable related to water supplies) but reduced in magnitude under Alternative 2, compared to the 2021 LRDP. *(Less Impact)*

Wildfire

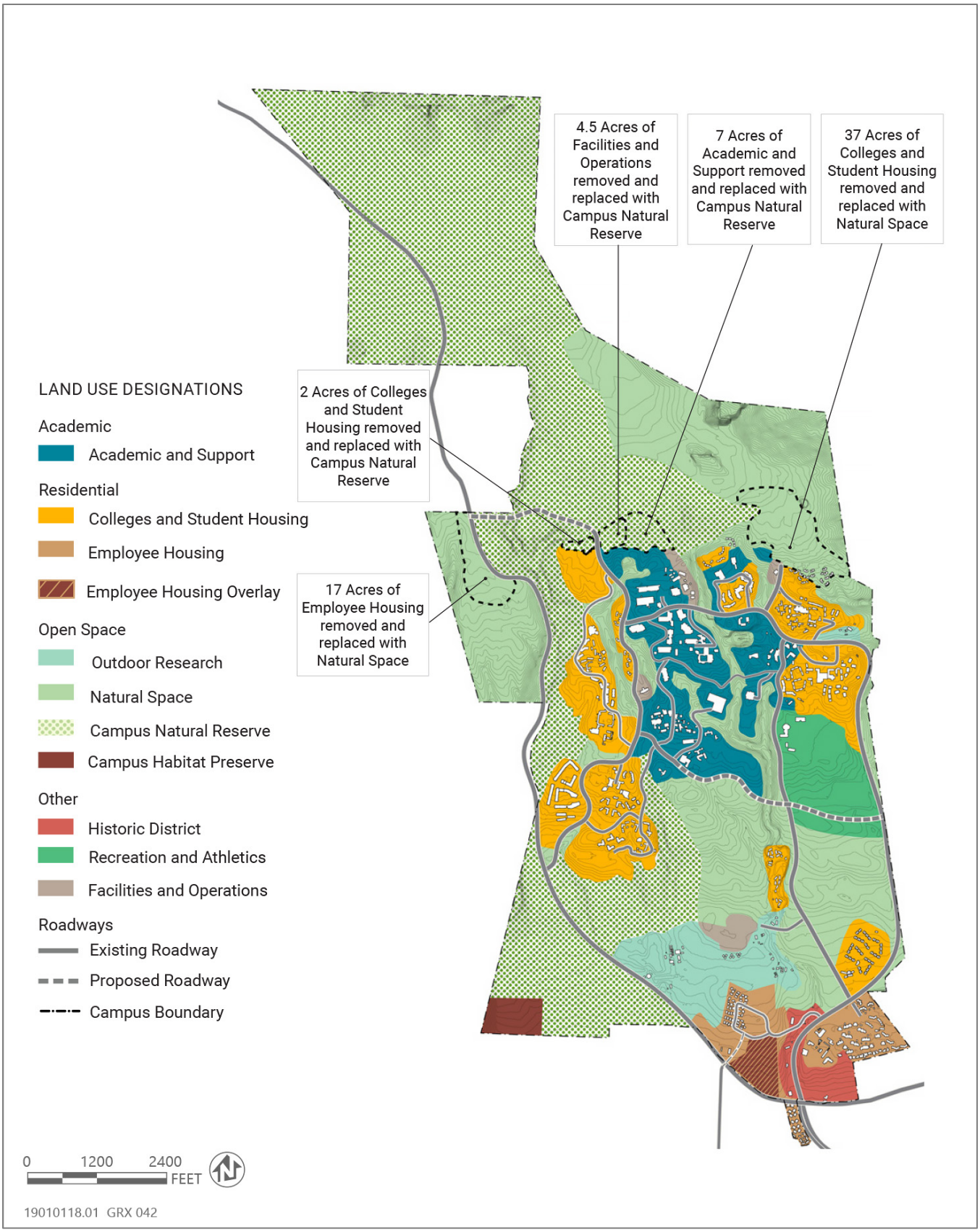
Under this alternative, there would be less overall development, however, the LRDP area (i.e., areas of potential development) would remain the same. UC Santa Cruz would continue to manage wildfire risk and implement existing campus plans related to campus evacuation and wildfire prevention, similar to the 2021 LRDP, and the mitigation measure identified for the 2021 LRDP and related to the need for a campus-wide vegetation management plan would still be required. As a result, impacts would be similar to the 2021 LRDP and less than significant with mitigation. *(Similar Impact)*

6.5.3 Alternative 3: Reduced **Development Footprint**

Similar to Alternative 2, this alternative is being considered to avoid environmental impacts associated with development on some areas of campus, as well as those associated with the total increase in enrollment. The primary difference is this alternative avoids development in the areas currently outside the City of Santa Cruz water service boundary (see Section 3.17, "Utilities and Service Systems").

DESCRIPTION OF ALTERNATIVE

Under this alternative and similar to Alternative 2, UC Santa Cruz would propose a reduction in projected campus enrollment and associated development compared to the 2021 LRDP. However, under this alternative and as shown in Figure 6-2, UC Santa Cruz would restrict future development to areas within the central and lower campus subareas, exclude development of areas in the north campus and to the west of Empire Grade. The revised land use map would reduce the amount of development proposed in critical habitat areas in an effort to reduce potential impacts biological resources. With the exclusion of the northern and western development areas, some of the planned student housing and faculty housing would be eliminated, along with some academic and support space. The land use plan under this alternative would only include one pair of colleges, not two as proposed under the 2021 LRDP. Both of these changes would reduce the ability for the campus to enroll the number of students that are planned under the proposed 2021 LRDP, which is required to meet projected state-wide demand for public university capacity in 2040. Therefore, this alternative would involve a future campus enrollment level of 26,400 FTE students by 2040 (which is approximately 1,600 FTE students fewer than under the proposed 2021 LRDP). This alternative would also result in a commensurate reduction in additional faculty/staff; there would be up to 1,190 new faculty/staff under this alternative, compared to 2,200 new faculty/staff under the 2021 LRDP. Up to 6,900 new student beds, 300 new faculty/staff housing units, and 2,467,000 asf of new academic/administrative space would be provided under this alternative. The alternative would also include densification of uses on the central and lower campus, compared to the proposed 2021 LRDP. Figure 6-2 includes the potential land use plan for this alternative.



Source: UC Santa Cruz 2020

Figure 6-2 Alternative 3 (Reduced Development Footprint) Conceptual Land Use Plan

ABILITY TO MEET PROJECT OBJECTIVES

Alternative 3, similar to Alternative 2, would increase on-campus housing opportunities to accommodate 100 percent of new student enrollment above the 2005 LRDP cap and 25 percent of new faculty/staff. This alternative would also accommodate development of academic/administrative and support facilities to match the projected increased enrollment totals. In addition, this alternative would reduce the amount of development and help to minimize impacts to biological resources. For this reason, Alternative 3 would meet most of the 2021 LRDP objectives (Project Objectives 2, and 4 through 10). However, because this alternative would provide less academic/administrative space, it would limit the ability for UC Santa Cruz to continue to create a dynamic environment for learning and discovery through the provision of new academic programs and disciplines. In addition, this alternative would not provide additional capacity for 28,000 students, which is based on the state's 2040 college enrollment projections and is therefore necessary to meet the State of California's need for additional public university capacity. Therefore, Alternative 3 would only partially meet Project Objective 1 which requires UC Santa Cruz to accommodate projected increases in student enrollment through 2040 based on statewide public educational needs. In addition, Alternative 3 would only include one pair of colleges, not two as proposed under the 2021 LRDP; therefore, Project Objective 3 would not be met under this alternative. Thus, Alternative 3, which would provide less academic building space and student capacity, would not meet Project Objectives 1 and 3.

COMPARISON OF ENVIRONMENTAL IMPACTS

Aesthetics

The changes from existing visual conditions that would occur within the LRDP area under this alternative would be similar to those under the 2021 LRDP, but the degree of change would be greater. Alternative 3 would result in less overall development within the LRDP area, however development would be more intensive within visible areas of the main residential campus and Westside Research Park. Under Alternative 3, while some of campus growth that would otherwise have occurred within the north campus subarea would eliminated, some of it would be redistributed within the central and lower portions of campus. As existing development within the northern portions of campus is not visible from long distances, the visual effects of LRDP-related development in those areas is minimal. With the intensification of uses further south within the main residential campus, higher buildings and greater massing would occur, which would result in further visual changes compared to the 2021 LRDP. However, as noted in Section 3.1, "Aesthetics," views of the campus from off-campus locations are either too distant or are largely precluded by existing vegetation and topography. With the additional development, which may involve increase massing and the addition of a floor or two of development, especially with respect to housing, views of the potential development would also be largely precluded. Therefore, the impacts associated with this alternative would be similar to the LRDP. *(Similar Impact)*

Agriculture and Forestry Resources

Under Alternative 3, the conversion of some agricultural lands to non-agricultural use would occur to accommodate additional employee housing under this alternative, similar to the 2021 LRDP. However, as noted in Section 3.2, "Agriculture and Forestry Resources," the two acres that are currently associated with the university farm and that would be converted are not considered a significant agricultural resource due to its limited acreage and water supply, as well as its relative isolation compared to other agricultural lands in the region. With respect to forestry resources, implementation of this alternative would result in less conversion of forest land as a result of the lack of development within the northern portions of the main residential campus. However, some forest land would be removed within the central and lower portions of the main residential campus. For this reason and similar to the 2021 LRDP, this alternative would require the preparation of THPs and acquisition of TCPs from the CAL FIRE. Therefore, impacts would be less than the 2021 LRDP due to the lesser level of development within forest land, and would less than significant. *(Less Impact)*

Air Quality

Alternative 3 would include less development (approximately 600,000 asf less) than the 2021 LRDP, and thus, would emit less overall air emissions during construction. The decrease in overall emissions would not preclude the potential for construction emissions in a given year to exceed Monterey Bay Air Resources District thresholds. As such,

mitigation of construction emissions (both criteria pollutant and TAC emissions) would still be necessary under this alternative. With respect to operation, emissions would be lower than under the proposed 2021 LRDP, and assuming a proportional reduction in vehicle emissions as a result of the reduction in new students, this alternative could, with implementation of similar mitigation to the 2021 LRDP, avoid the significant and unavoidable under the 2021 LRDP that is primarily associated with increased vehicle emissions and use of consumer products. Therefore, due to the lesser level of development and associated air quality impacts under this alternative, impacts would be less, but construction and operational phase impacts would still be significant and require mitigation. *(Less Impact)*

Archaeological, Historical, and Tribal Cultural Resources

Earth-moving activities within the LRDP area have the potential to disturb archaeological, tribal cultural, and/or historic resources or result in accidental discovery of human remains. Under the 2021 LRDP, ground-disturbing activities (e.g., grading, excavation) could result in the discovery of archaeological resources, tribal cultural resources, or human remains; however, feasible mitigation measures and regulatory requirements/procedures would reduce these impacts to a less-than-significant level. Additionally, on-campus development within or near potentially historic structures under the 2021 LRDP would result in potentially significant and unavoidable impacts, especially within the main residential campus. Although this alternative would result in a lesser overall development area, which would reduce potential impacts to archaeological and tribal cultural resources, the increase in potential development intensity could result in greater potential for a significant impact to historic structures, especially within the central campus subarea (as shown in Figure 2-3 of Chapter 2, "Project Description.") Implementation of mitigation measures similar to those identified for the 2021 LRDP would be required, and potential impacts to historic structures would remain significant and unavoidable. *(Less Impact for archaeological and tribal cultural resources, Greater Impact for historic resources)*

Biological Resources

Under Alternative 3, the LRDP area would be developed in a manner similar to but with less overall development and in a smaller area than under the 2021 LRDP. As a result, the potential for impacts to sensitive species/habitat would be less due to the lesser land area affected by implementation of this alternative. Nonetheless, due to the presence of habitat for special-status plant and wildlife species, as well as riparian and other sensitive habitats, within certain portions of the LRDP area, physical changes associated with implementation of this alternative could result in significant impacts; however, mitigation measures, described for the 2021 LRDP would reduce these impacts to a less-than-significant level. Thus, due to the smaller development area associated with the envisioned development under this alternative, the potential for impacts to biological resources would be reduced, although the impacts would still be potentially significant and require the same mitigation. *(Less Impact)*

Energy

Under this alternative, less development would occur on the campus, including the development of fewer energy-efficient structures and facilities. Less construction would correspond to less fuel consumption during construction. Fewer students on campus would also result in less energy consumption. However, development under the proposed 2021 LRDP would be highly energy efficient, which is the primary basis of impact determination under CEQA, and there would be no significant impacts associated with the wasteful or inefficient use of energy. Both this alternative and the 2021 LRDP would require adherence with the UC Sustainable Practices Policy and the UC Santa Cruz Energy Efficiency Programs, both of which would ensure efficient use of energy in construction and operations. Based on this, impacts to energy would be similar. *(Similar Impact)*

Geology and Soils

Earth-moving activities associated with construction have the potential to affect geology and soils. The types of impacts that could occur from development on campus include: geotechnical issues, increased erosion, and exposure of buildings and people to seismic hazards. Existing regulations and permitting requirements, such as CBC requirements, NPDES permit conditions, UC Santa Cruz Post-Construction Stormwater Management Requirements, and BMPs, would minimize potential impacts to a less-than-significant level. As with the proposed 2021 LRDP, this alternative would result in less than significant impacts related to geology and soils. Although the general areas where

development would occur would be subject to similar geologic impacts, this alternative would involve a smaller area of development and for that reason, impacts would be less than under the proposed 2021 LRDP. *(Less Impact)*

Greenhouse Gas Emissions and Climate Change

Due to the lesser level of development on-campus under this alternative, there would be lower GHG emissions associated with new development during construction. With respect to operation, this alternative, similar to the 2021 LRDP, involves the placement of new energy-efficient structures within available land and adjusting land use patterns to capture efficiencies related to alternative transportation. As a result, the 2021 LRDP represents a relatively small carbon footprint for a project of its size, with very low building energy use, particularly with respect to fossil fuels. Similarly, although to a lesser degree, this alternative would involve the operation of more efficient land uses to serve an increased campus population. The operational GHG emissions would be less under this alternative than the 2021 LRDP. Consistent with the UC Sustainable Practices Policy and actions outlined in the UC Santa Cruz CAP, UC Santa Cruz emissions would be required to be net zero for Scopes 1 and 2 in 2025 and net zero for Scopes 1, 2, and from selected Scope 3 sources in 2050 under this alternative, similar to the 2021 LRDP. Further, to achieve any remaining GHG emissions reductions, the purchase of voluntary carbon offsets, consistent with Mitigation Measures MM3.8-1a and MM3.8-1b, would be necessary. Thus, this alternative would also result in impacts that would be less than significant with mitigation, similar to the 2021 LRDP. *(Less Impact)*

Hazards and Hazardous Materials

Under the 2021 LRDP, on-campus construction activities would entail the transport, use, and storage of hazardous materials; and release of hazardous materials from a site of known or potential contamination. In addition, closure of area roadways during construction may hinder traffic flow and affect emergency response. However, feasible mitigation measures are available to reduce these impacts to a less-than-significant level. Due to compliance with applicable regulations and programs, campus operations would have less than significant impacts related to hazardous materials transport, use and storage. Similar types of hazards and hazardous materials impacts would occur with implementation of Alternative 3 although to a lesser degree as a result of the reduced construction effort. *(Less Impact)*

Hydrology and Water Quality

Earth-moving activities associated with construction under the 2021 LRDP have the potential to affect hydrology and water quality within UC Santa Cruz. The types of impacts that could occur from development under the 2021 LRDP include: adverse effects on water quality, reduced groundwater recharge, alterations to existing drainage systems, and effects on the 100-year floodplain. Existing regulations and permitting requirements, such as NPDES permit conditions, UC Santa Cruz Post-Construction Stormwater Management Requirements, a SWPPP, and the Regional Water Quality Control Plan, would reduce potentially significant impacts to a less-than-significant level. Similarly, under this alternative, development of additional on-campus structures and facilities would be required to comply with existing regulations, and mitigation measures similar to the 2021 LRDP would be available to reduce potentially significant impacts to a less-than-significant level. However, due to the smaller land area and scale of development associated with this alternative, impacts would be less. *(Less Impact)*

Land Use and Planning

This alternative would result in less new development compared to the 2021 LRDP, however, this alternative would include the amendments to the 2005 LRDP land use designations that are proposed under the 2021 LRDP to address the organization of land uses, spacing, and interrelationship of land uses on-campus. As a result, this alternative would result in a similar and less-than-significant impact associated with conflict with land use plans, policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect, and incompatibility with adjacent land uses. (*Similar Impact*)

Noise

Earth-moving activities within campus (e.g., grading, excavation) under the 2021 LRDP would result in noise and vibration impacts. Feasible mitigation measures are available to reduce most of these impacts to a less-than-significant level, as described in Section 3.12, "Noise." However, potential construction noise associated with this

alternative would occur over a smaller area with this alternative, including potential construction noise impacts to nearby existing residences (both on and off campus). Nonetheless, due to the location of construction activities in locations proximate to sensitive uses, this alternative would also result in significant and unavoidable noise impacts during construction. Further, as development would be more intensive within certain areas of the campus, potential construction noise levels at certain existing receptors may incrementally increase in terms of periodic noise and the general time period (i.e., months of construction) over which noise levels would be perceptible. Similar to the 2021 LRDP, noise levels would potentially exceed standards and, even with mitigation, and construction-related noise impacts would remain significant and unavoidable. Operational noise impacts would be similar to that under the proposed 2021 LRDP although incrementally less due to the lesser roadway volumes attributable to lower enrollment. Because this alternative would not construction noise impacts to sensitive receptors, impacts are considered to be similar to the 2021 LRDP. *(Similar Impact)*

Population and Housing

Under Alternative 3 and similar to Alternative 2, there would be 6,900 new student beds provided on-campus, which would provide a new student bed for each student above 19,500 FTE. This would accommodate this alternative's projected increase in student enrollment above the 2005 LRDP. Similar to the project, the new beds above the enrollment of 19,500 students would not address the demands for beds between 2018/2019 enrollment of 18,518 students and the 19,500 2005 LRDP enrollment cap (although this would be addressed by Student Housing West/Kresge Housing projects, previously discussed). While Alternative 3 would provide less faculty/staff housing than the 2021 LRDP, it would also result in fewer new faculty/staff. Nonetheless and similar to the 2021 LRDP, additional demand for off-campus housing would occur under this alternative and due to the already tight housing market, worsened by the loss of houses from the CZU Lightning Complex fire, adequate housing opportunities may not be available in surrounding communities for new faculty/staff and students. Impacts would be less under this alternative due to a smaller increase in faculty/staff, but the difference would be relatively small. Impacts would remain significant and unavoidable. *(Similar Impact)*

Public Services

Alternative 3 would result in an increase in demand for public services similar to the 2021 LRDP. Under the 2021 LRDP, impacts were determined to be less than significant because campus development under the 2021 LRDP would be adequately served by local public service providers and the project-related demand for service would not require new or modified facilities (except a possible fire station on campus, which is included as part of the 2021 LRDP and addressed in this EIR). Alternative 3 would also result in less-than-significant public service impacts as it would also not require the construction of new or modified public service facilities, the development of which would result in significant environmental impacts. *(Similar Impact)*

Recreation

Alternative 3 would increase on-campus population and recreational needs but would, similar to the 2021 LRDP, provide additional on-site recreational opportunities proximate to new student and faculty/staff housing such that additional recreational facilities beyond those already intended as part of new housing would not be necessary. Because the campus would develop new recreational facilities as needed and as part of new housing development, impacts under Alternative 3 would be of similar type and magnitude as the 2021 LRDP. (*Similar Impact*)

Transportation

Under Alternative 3, both enrollment and employment on the campus would increase compared to existing conditions but both increases would be less than those under the proposed 2021 LRDP. As with the proposed 2021 LRDP, under this alternative all of the new students would be housed on campus and would not live off campus, and of the new faculty and staff, 25 percent would be housed on campus and the rest would live off campus in surrounding communities. Therefore, as with the 2021 LRDP, under Alternative 3, the increase in commute trips over existing conditions would be associated only with the new employees who would live off campus. As the number of these off-campus employees would be smaller than that under the 2021 LRDP, this alternative would result in fewer new daily vehicle trips to the campus. Consequently, the increase in total VMT under this alternative would be

smaller. However, when the total VMT is divided by the service population, the resulting VMT per capita service population be comparable to the proposed 2021 LRDP. Similarly, both the VMT per resident and the VMT per worker would be comparable to the corresponding results for the proposed 2021 LRDP. As a result, impacts would be less than significant with mitigation and similar to the 2021 LRDP under this alternative. *(Similar Impact)*

Utilities and Service Systems

Under Alternative 3, development of additional housing, academic/administrative space, and supporting uses within the LRDP area would still occur, placing greater demand on utilities and service systems than under existing conditions. The overall demand for utilities would be incrementally less than the 2021 LRDP's demand due to the smaller amount of development and on-campus population under this alternative. As with the proposed 2021 LRDP, with the exception of water supply, the existing utilities and service systems would generally be sufficient to meet the additional demands associated with this alternative. Although the demand for water under this alternative would be lower, the impact of this incremental water demand would still be significant as it would contribute to the need for the City to develop new water supplies. In general, utility impacts would be of similar type but reduced in magnitude under Alternative 3 as the 2021 LRDP. Accordingly, the impact conclusion related to water supply would be the same (significant and unavoidable) as under Alternative 2. *(Less Impact)*

Wildfire

Under this alternative, the area of development would be less than under the 2021 LRDP as new development on the north campus and to the west of Empire Grade would not occur. However, wildfire risk would still be a concern with respect to new development on the central and lower campus. UC Santa Cruz would continue to manage wildfire risk and implement existing campus plans related to campus evacuation and wildfire prevention, similar to the 2021 LRDP, and the mitigation measure identified for the 2021 LRDP and related to the need for a campus-wide vegetation management plan would still be required. As a result, impacts under Alternative 3 would be less when compared to the 2021 LRDP would remain less than significant. *(Less Impact)*

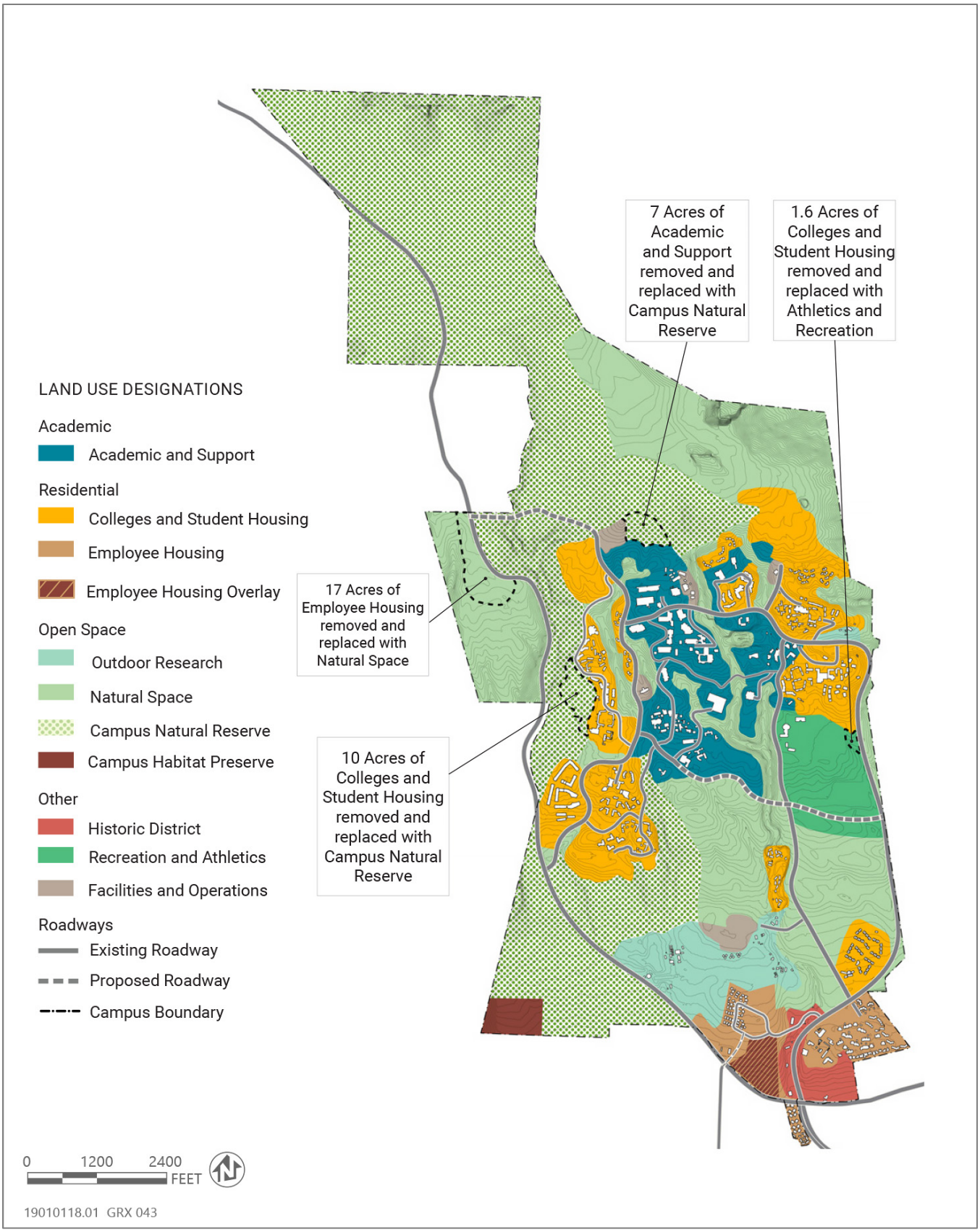
6.5.4 Alternative 4: Reduced Campus Growth and Use of UC MBEST Off-site

This alternative is being considered to avoid environmental impacts associated with development of some areas of campus, as well as those associated with the total increase in enrollment in Santa Cruz, while still meeting the enrollment objections of the 2021 LRDP.

DESCRIPTION OF ALTERNATIVE

Under Alternative 4, the academic support and instruction would occur within the LRDP area and at UC MBEST in Monterey County. Online/remote learning programs would also be expanded under this alternative. Similar to the proposed 2021 LRDP, this alternative would provide for 28,000 FTE students to be enrolled by 2040.

Within the LRDP area, enrollment would increase by approximately 6,300 FTE students to about 25,800 FTE students at the main residential campus and Westside Research Park. In addition, up to 1,400 FTE new students would be accommodated through expanded online/remote learning programs. Faculty/staff are projected to increase by approximately 1,100 employees for on-campus teaching and research programs at the main residential campus and 250 for remote learning programs (some of whom would be located at UC Santa Cruz's main residential campus). To accommodate the academic programming needs of both the remote and on-campus teaching programs and as shown in Figure 6-3, an additional 1,000,000 asf of academic/administrative and support space would be developed at the main residential campus and Westside Research Park. Further, all new students enrolled at the main residential campus, above the 2005 LRDP enrollment cap of 19,500 students, would be housed in on-campus housing (~6,300 FTE) and 280 new faculty/staff housing units would be provided under this alternative.



Source: UC Santa Cruz 2020

Figure 6-3 Alternative 4 (Reduced Campus Growth and Use of UC MBEST Off-Site) Conceptual Land Plan

A portion of the enrollment growth projected under the proposed 2021 LRDP would also be allocated to UC MBEST. As noted earlier in this chapter, UC Santa Cruz received nearly 1,100 acres of the land in the northern portion of the former Fort Ord (Monterey County) from the U.S. Army. Of this total, 500 acres are planned for development, and 600 acres are identified as a habitat reserve for the UC Natural Reserve System. For the purposes of this assessment, it is assumed that out of the 500 acres planned for development, a portion of the "Central North" campus, which is approximately 70 acres in size, could be used to develop facilities that would accommodate the enrollment growth allocated to UC MBEST. It is assumed that the remainder of the developable lands at UC MBEST would continue to be designated for light industrial uses, but primarily research and development.

Under this alternative, the focus of development at MBEST would be on graduate research across all divisions, including Physical and Biological Sciences, School of Engineering, Arts, Humanities and Social Sciences. Potential programs could include innovative research partnerships highlighting interdisciplinary possibilities and entrepreneurial collaborations with regional partners. Approximately 1,800 FTE graduate students would be enrolled at UC MBEST, with an associated faculty and staff of approximately 320 employees (based on the projected faculty/staff-to-student ratio for UC Santa Cruz under the 2021 LRDP). Approximately 250,000 asf of academic/administrative space would be constructed at UC MBEST under this alternative. Due to siting constraints, it is anticipated that no student housing would be provided, at least initially, at UC MBEST. Based on a 2011 visioning study conducted for UC MBEST, the site is considered to be best suited for a "university-related research park" (UC Santa Cruz 2011). Figure 6-3 identifies the potential land plan at UC MBEST for this alternative.

In summary, this alternative provides for the same increase in enrollment as the proposed 2021 LRDP, although the increase at the main campus would be smaller and the balance of the enrollment increase would be accommodated via expanded online learning programs and at UC MBEST. The alternative provides on-campus housing for all new enrolled students on the main residential campus and Westside Research Park but not for those enrolled at the UC MBEST. Similarly, this alternative provides on-campus housing for about 25 percent of the new employees on the main residential campus and Westside Research Park, but not for employees at UC MBEST.

The impact analysis below is focused on the environmental impacts of these levels of population growth and development at the main residential campus (including the Westside Research Park) and at UC MBEST. With regard to the impacts associated with the expanded online/remote learning programs, those are expected to be limited to the environmental impacts from the development of the academic and administrative space on the main residential campus necessary for the administration of the online classes, and are analyzed below.

ABILITY TO MEET THE PROJECT OBJECTIVES

Alternative 4 would provide campus facilities and infrastructure to accommodate projected increases in student enrollment up to a projected 28,000 FTE, consistent with the University of California's forecasted need for additional public university capacity. Development on the main residential campus would be reduced compared to the proposed 2021 LRDP which would maintain existing open space within the LRDP area. Similar to the 2021 LRDP, this alternative would also maintain existing historic structures, and support a more efficient roadway network. Therefore, this alternative would meet some of the project objectives (Project Objectives 4, 5, 7, and 8). However, under this alternative on-campus student housing would only be provided for students enrolled on the main residential campus and Westside Research Park, but not for students at UC MBEST. Similarly, the alternative provides on-campus housing for about 25 percent of the new employees on the main residential campus and Westside Research Park, but not for employees at UC MBEST. The reduction in on-campus housing opportunities would contribute to off-campus housing demands, although these demands would likely be closer to the UC MBEST campus, but would not fully meet the UC Santa Cruz objective of accommodating 100 percent new student enrollment above 19,500 and up to 25 percent of new faculty/staff (Project Objectives 1 and 6).

This alternative would also require students and employees to travel to an off-site location to for academic support and instruction which conflicts with the land use goal of supporting compact and clustered development, and convenient access (Project Objective 2). Due to the increase travel demand between the LRDP area and UC MBEST, this alternative would increase commuter trips and conflict with the UC Santa Cruz objective to optimize trip- and

vehicle-miles-travelled-reduction benefits and efficiency of transit, bike, and pedestrian access to, from, and within the campus to reduce the use of single-occupancy vehicles (Objective 9). The increased in commuter trips would also conflict with UC Santa Cruz's objective to foster climate adaptation strategies and sustainable design (Project Objective 10). Therefore, Alternative 4, would not meet or would only partially meet a number of proposed 2021 LRDP objectives.

COMPARISON OF ENVIRONMENTAL IMPACTS

Aesthetics

The changes from existing visual conditions that would occur within the LRDP area would be similar under this alternative to the 2021 LRDP, but the degree of change would likely be less. This alternative would result in less development within the LRDP area (approximately one-third of the total development under the 2021 LRDP). Due to the lesser level of development throughout the LRDP area, changes in visual character and the visibility of new structures on campus would be reduced, when compared to the proposed 2021 LRDP.

At UC MBEST, development within the Central North campus would replace largely undeveloped lands and low-lying vegetation. In addition, Monterey County has designated the area as having visual sensitivity and Reservation Road is a proposed scenic route (Monterey County 2006). As a result, development under this alternative would be more visible and would likely be considered to result in more substantial changes in visual character and scenic vistas than the 2021 LRDP. Similar to the 2021 LRDP, compliance with UC Santa Cruz Design Review Process and Campus Standards Handbook, and mitigation would be required. Therefore, while this alternative would result in lesser impacts within the LRDP area, it would result in greater impacts at the UC MBEST site. Further, because the impact is spread over two locations, it would be greater overall than the 2021 LRDP. (*Greater Impact*)

Agriculture and Forestry Resources

Under this alternative, the conversion of some agricultural lands to non-agricultural use would not occur within the LRDP area. However, as noted in Section 3.2, "Agriculture and Forestry Resources," the two acres that are currently associated with the university farm and that would be converted are not considered a significant agricultural resource due to its limited acreage and water supply, as well as its relative isolation compared to other agricultural lands in the region. At UC MBEST, none of the Central North campus is considered Important Farmland. As a result, no impact would occur and impacts would be less under this alternative with respect to agriculture.

With respect to forestry resources, implementation of this alternative would result in the conversion of forest land, although it would be reduced compared to the proposed 2021 LRDP as less development would occur on the main residential campus. As with the 2021 LRDP, this alternative would still require the preparation of THPs and acquisition of TCPs from CAL FIRE. At UC MBEST, none of the Central North campus would be considered forest land, and as a result no impact to forest land would occur. Therefore, Alternative 4 would result in no impact to agriculture and a less-than-significant impact to forestry resources. In addition, impacts under this alternative would be less than those under the 2021 LRDP. *(Less Impact)*

Air Quality

Overall, Alternative 4 would involve less total development than the 2021 LRDP and would spread that development over two sites within different counties. Due to the lesser level of development and on-campus learning, this alternative would emit less overall air emissions during operation, in general. However, due to the limited academic program at UC MBEST, UC Santa Cruz students enrolled at UC MBEST would likely need to take classes at the main residential campus, in addition to classes at MBEST. By contrast under the 2021 LRDP, the majority of students would live on campus and walk to academic and support spaces. Accordingly, this alternative would result in substantial additional mobile source criteria pollutant emissions. This would be offset somewhat by reductions in mobile source operational emissions as a result of the online/remote learning component of this alternative; however due to the distance between UC MBEST and the LRDP area, it is expected that overall operational air emissions would likely be greater than the 2021 LRDP.

Construction emissions would be lower compared to the proposed 2021 LRDP as less total building space would be constructed. However, the decrease in overall construction emissions would not preclude the potential for construction emissions in a given year to exceed Monterey Bay Air Resources District thresholds. As such, mitigation of construction emissions (both criteria pollutant and TAC emissions) would still be necessary under this alternative. Therefore, although the overall level of development and associated air quality impacts would be less, air quality impacts would be significant and potentially unavoidable under this alternative. *(Less Impact during construction; Greater Impact during operation)*

Archaeological, Historical, and Tribal Cultural Resources

As with the 2021 LRDP, under this alternative, ground-disturbing activities (e.g., grading, excavation) within the LRDP area could result in the discovery of archaeological resources, tribal cultural resources, or human remains; however, feasible mitigation measures and regulatory requirements/procedures would reduce these impacts to a less-than-significant level.

Archaeological surveys conducted on the UC MBEST property found cultural resources indicated human occupation dating back 10,000 years (Fort Ord Reuse Authority 2001). Therefore, the potential exists for the discovery of subsurface cultural and tribal cultural resources at UC MBEST, and impacts would be considered similar. Additionally, development within or near potentially historic structures at the main residential campus under both this alternative and the 2021 LRDP would result in potentially significant and unavoidable impacts. With respect to UC MBEST, no historic structures are located within the Central North campus. Due to the lack of historic structures at UC MBEST and the smaller area of development at the main residential campus under this alternative, the potential cultural resource impacts of this alternative would be less than those under the 2021 LRDP. *(Similar Impact to cultural and tribal cultural resources; Less Impact to historic resources)*

Biological Resources

Under Alternative 4, the LRDP area would be developed in a manner similar to but with less overall development and potentially a smaller area than under the 2021 LRDP. Due to the presence of habitat for special-status plant and wildlife species, as well as riparian habitat and other sensitive habitats within certain portions of the LRDP area, physical changes associated with implementation of this alternative could result in significant impacts; however, mitigation measures, described for the 2021 LRDP would reduce these impacts to a less-than-significant level.

With respect to UC MBEST, the North Central Campus and surrounding areas, including the Fort Ord Natural Reserve that is located south of the North Central campus, provide habitat for numerous listed plant species and numerous listed wildlife species that also occur on the anticipated development area. As a result, and due to the greater number of biological species that could be affected by the development at UC MBEST, the impacts of this alternative are considered greater than the 2021 LRDP. Of note, a multi-species habitat conservation plan (MSHCP) is currently under consideration by the Fort Ord Reuse Authority and the U.S. Fish and Wildlife Service for the former Fort Ord area, including the North Central campus. Should the MSHCP be developed and adopted, any development of the North Central campus would be subject to the MSHCP. (*Greater Impact*)

Energy

Under this alternative, less overall development would occur than under the 2021 LRDP, including the additional off-site development at MBEST. Less construction activities would correspond to less fuel consumption during construction. Fewer students on campus would also result in less associated energy consumption. Development under the proposed 2021 LRDP would be highly energy efficient, which is the primary basis of impact determination under CEQA, and there would be no significant impacts associated with the wasteful or inefficient use of energy.

Due to the increase travel demand between the LRDP area and UC MBEST, this alternative would increase commuter trips and would increase energy usage. It could reasonably be argued that this increased need for commuting is a wasteful use of energy. However, with the operational emissions that would be avoided as a result of the online/remote learning component of this alternative, operational energy consumption would likely be similar to the 2021 LRDP, albeit slightly greater due to the level of increase in UC MBEST student travel (see below). Both this alternative and the 2021 LRDP would require adherence with the UC Sustainably Practices Policy and the UC Santa

Cruz Energy Efficiency Programs, both of which would ensure efficient use of energy in construction and operations. Based on this, impacts to energy would be similar. *(Similar Impact)*

Geology and Soils

Earth-moving activities associated with construction have the potential to affect geology and soils. The types of impacts that could occur from development within the LRDP area and at UC MBEST include: geotechnical issues, increased erosion, and exposure of buildings and people to seismic hazards. Existing regulations and permitting requirements, such as CBC requirements, NPDES permit conditions, and BMPs, would minimize potential impacts to a less-than-significant level. Similarly, this alternative would result in less than significant impacts. Although the general areas where development would occur involve a smaller area of development, development would be subject to similar geologic impacts, and for that reason, impacts would be similar to the 2021 LRDP. *(Similar Impact)*

Greenhouse Gas Emissions and Climate Change

Due to the lesser level of campus development under this alternative, there would be lower GHG emissions associated with new development during construction. With respect to operational emissions, this alternative, similar to the 2021 LRDP, involves the placement of new energy-efficient structures within available land, including at UC MBEST, and adjusting land use patterns within the main residential campus to capture efficiencies related to alternative transportation. As a result, the 2021 LRDP represents a relatively small carbon footprint for a project of its size, with very low building energy use, particularly with respect to fossil fuels. Similarly, although to a lesser degree, this alternative would involve the operation of efficient land uses to serve an increased campus population, compared to existing conditions. Due to the increased travel between the LRDP area and UC MBEST, this alternative would increase commuter trips and would result in a significant increase in mobile source GHG emissions. However, with overall operational emissions would be offset to some extent by the online/remote learning component of this alternative. However, emissions would be greater than the 2021 LRDP under this alternative due to the level of increase in per capita VMT associated with student travel at MBEST (see below). Consistent with the UC Sustainable Practices Policy and actions outlined in the UC Santa Cruz CAP, UC Santa Cruz emissions would be required to be net zero for Scopes 1 and 2 in 2025 and net zero for Scopes 1, 2, and Scope 3 from selected sources in 2050 under this alternative, similar to the 2021 LRDP. Further, to achieve any remaining GHG emissions reductions, the purchase of voluntary carbon offsets, consistent with Mitigation Measures MM3.8-1a and MM3.8-1b, would be necessary. Thus, this alternative would also result in impacts that would be less than significant with mitigation, similar to the 2021 LRDP. *(Greater Impact)*

Hazards and Hazardous Materials

Under Alternative 4 and the 2021 LRDP, university-related construction activities would entail the transport, use, and storage of hazardous materials; and release of hazardous materials from a site of known or potential contamination. In addition, closure of area roadways during construction may hinder traffic flow and affect emergency response. As noted above, UC MBEST is located within the former Fort Ord area, and on-site soils have the potential to contain unexploded ordnance items including pyrotechnics and explosives, a potential hazard that would not occur with implementation of the 2021 LRDP (U.S. Army Corps of Engineers 2002). In 1998, the Army began a comprehensive evaluation of past investigations and removal actions to develop remedial actions that will support long-term reuse of Fort Ord (Fort Ord Cleanup 2020). However, the types of hazards and hazardous materials impacts of Alternative 4 would generally be of greater type and magnitude compared to the 2021 LRDP due to the potential impact associated with the presence of unexploded ordnance at UC MBEST. Therefore, impacts would be considered greater. *(Greater Impact)*

Hydrology and Water Quality

Earth-moving activities associated with construction under this alternative have the potential to affect hydrology and water quality within the LRDP area and at UC MBEST. The types of impacts that could occur from new development include adverse effects on water quality, reduced groundwater recharge, alterations to existing drainage systems, and effects on the 100-year floodplain.

As noted above, there is a potential for on-site soils at UC MBEST to contain unexploded ordnance. As noted above for hazards and hazardous materials, construction-related ground disturbing activities have the potential to unearth

contaminated soils which could lead to additional water quality impacts. However, compliance with existing regulations and permitting requirements, such as NPDES permit conditions, a SWPPP, and the Regional Water Quality Control Plan, would reduce potentially significant impacts. Similarly, under this alternative, development of additional university-related structures and facilities would be required to comply with existing regulations, and mitigation measures at both locations would be available to reduce potentially significant impacts to a less-than-significant level. Therefore, impacts under this alternative would be similar. *(Similar Impact)*

Land Use and Planning

Under Alternative 4, there would be changes to the existing campus land use pattern, similar to the 2021 LRDP, and substantive changes to the land use plan at UC MBEST. Additional academic/administrative space would be developed within both the main residential campus and the Central North campus portion of UC MBEST. Within the LRDP area, this alternative would replace the 2005 LRDP land use designations insofar as necessary to address the organization of land uses, spacing, and interrelationship of land uses on-campus, and as a result, similar less-than-significant impacts would occur within the LRDP area. At UC MBEST, any development would be required to comply with applicable plans, policies, and regulations intended to reduce environmental impacts, including the MSHCP for the area that is currently under consideration. As a result, the potential for conflicts with plans, programs, and policies intended to reduce significant environmental effects would be similar to the 2021 LRDP and less than significant. (*Similar Impact*)

Noise

Earth-moving activities within the LRDP area (e.g., grading, excavation) under this alternative would result in noise and vibration impacts. Feasible mitigation measures are available to reduce most of these impacts to a less-than-significant level, as described in Section 3.12, "Noise." However, potential construction noise would occur over a smaller area overall with this alternative as less academic building space would be constructed, compared to the 2021 LRDP. Nonetheless, due to the location of construction activities in proximity of sensitive uses, this alternative would also result in significant and unavoidable noise impacts during construction at UC Santa Cruz.

With respect to potential development at UC MBEST, no sensitive receptors are located within approximately 2,000 feet of the North Central campus, and noise and vibration impacts associated with construction would be less than significant. As a result, and due to the allocation of some of the planned growth and development to UC MBEST under this alternative, construction noise impacts would be less than those under the 2021 LRDP. The less than significant operational noise impacts of the 2021 LRDP would also be reduced under this alternative because some of the planned growth would be assigned to UC MBEST and there are no sensitive receptors on or near UC BEST that could be affected by operational noise, including traffic noise. In addition, traffic noise would be reduced due to the expanded online learning programs included in this alternative. *(Less Impact)*

Population and Housing

Under Alternative 4, approximately 6,300 new student beds would be provided within the LRDP area, which would provide a new student bed for each student above 19,500 FTE that would be enrolled at the main residential campus. As with the 2021 LRDP, this alternative would provide on-campus housing for 25 percent of the new 1,100 employees at the main residential campus, and approximately 800 new employees would seek housing off campus. As this number is lower than the number under the 2021 LRDP, the impact on off-campus housing in Santa Cruz area would be reduced under this alternative.

However, this alternative would not provide student or employee housing at UC MBEST, which would increase the overall proportion of students and employees living off-campus and would result in approximately 2,100 students and faculty/staff seeking housing in the Monterey area. Based on housing vacancy rates published by the California Department of Finance (DOF), this is equal to the number of vacant housing units in the cities of Marina, Seaside, and Monterey (DOF 2019) and would be considered substantial. For that reason, sufficient housing is likely not available in surrounding communities near MBEST for the potential housing demand associated with this alternative. Impacts on housing would be greater under this alternative and would be significant and unavoidable. *(Greater Impact)*

Public Services

Alternative 4 would result in an increase in demand for public services similar to the 2021 LRDP. Under the 2021 LRDP, impacts were determined to be less than significant because campus development under the 2021 LRDP would be adequately served by local public service providers and the project-related demand for service would not require new or modified facilities, the development of which would result in significant environmental impacts.

Under Alternative 4, development at UC MBEST would be served by the City of Marina Public Safety Department which provides both police and fire services. UC MEST is located within the City of Marina service boundary and development under Alternative 4 would continue to be served by public service providers. The increase in on-site population may require the service provide to hire new personnel but would not require the construction of new or modified public service facilities in Santa Cruz or in the UC MBEST area, the development of which would result in significant environmental impacts. *(Similar Impact)*

Recreation

Alternative 4 would increase campus-related population and recreational needs similar to the proposed 2021 LRDP; however, a portion of the need would be shifted to UC MBEST. With respect to impacts within the LRDP area, UC Santa Cruz would provide additional on-campus recreational opportunities proximate to new student and faculty/staff housing and elsewhere on the campus as needed.

However, with respect to the proposed development on UC MBEST, no on-campus housing or recreational facilities would be provided, and the new students and employees at UC MBEST under this alternative would place a demand on regional recreational facilities. Given the vast recreational resources in the Monterey Bay area coupled with continued maintenance of existing facilities, it is unlikely that the recreational demand associated with these new students and employees would be substantial enough to require new or modified recreational facilities or cause the physical deterioration of existing recreational facilities in the area. Monterey County provides is expected to provide more than 12,000 acres of parkland (based on current estimates of available parkland within the county) for approximately 500,000 residents in 2040 (Monterey County 2008; AMBAG 2018), which exceeds the typically acceptable ratio of 3 acres of parkland per 1,000 residents. For this reason, although the impacts on recreational facilities under Alternative 4 would be considered greater compared to the 2021 LRDP, the impacts would not be significant. (*Greater Impact*)

Transportation

Under Alternative 4, development of new on-campus housing and academic/administrative space within the LRDP area would increase the level of on-campus activity and vehicle commute trips, similar to the 2021 LRDP. Under this alternative, overall campus VMT would be less than the proposed 2021 LRDP due to a smaller on-campus population.

With respect to UC MBEST, additional vehicle trips and VMT would be associated with the development and operation of additional academic/administrative and support spaces, as well as the lack of on-campus housing at that site. This would be expected to result in a higher total VMT at UC MBEST and higher VMT per capita. Even with the inclusion of expanded online/remote learning as part of this alternative, the total VMT associated with UC MBEST when combined with the total VMT of the main residential campus (including the Westside Research Park) under this alternative would exceed the anticipated VMT per capita calculated for the 2021 LRDP. This conclusion is based on the assumption that graduate students would travel to the LRDP area from UC MBEST once per week, on average. Based on the driving distance between UC MBEST and the main residential campus, which is approximately 37 miles, UC MBEST graduate students would travel 74 miles per week for this single commute. Assuming these students would travel on other days no more than 10.4 miles per day, the same as the residential per capita VMT for Santa Cruz County, UC MBEST graduate students would achieve 19.6 VMT per capita. If remote/online students generate no project-related VMT per capita, the average VMT of UC MBEST and remote/online students would be 11 VMT per capita, which would exceed the average VMT per capita of the 2021 LRDP by 1 VMT per capita (see Table 3.16-6 of Section 3.16, "Transportation.")

Therefore, total VMT per capita (based on total VMT and the total service population) would likely exceed that estimated for the 2021 LRDP and would increase existing VMT per capita associated with UC Santa Cruz operations. Similarly, VMT per resident, which is based on the travel behavior of students and employees who live on- and off-campus, would exceed that estimated for the 2021 LRDP. With regard to VMT per employee, employment VMT per

capita is anticipated to be greater under this alternative compared to the 2021 LRDP due to the lack of campus housing for new employees compared to the 2021 LRDP (approximately 270 fewer residential units.) As a result, the significant impact related to VMT would be greater under this alternative. *(Greater Impact)*

Utilities and Service Systems

Under Alternative 4, development of the LRDP area with additional housing, academic/administrative space, and supporting uses would occur, placing greater demand on utilities and service system than under existing conditions. The overall demand for utilities at the main residential campus and the Westside Research Park would be incrementally less than the 2021 LRDP's demand due to the smaller amount of development and on-campus population under this alternative. As with the proposed 2021 LRDP, with the exception of water supply, the existing utilities and service systems in Santa Cruz would generally be sufficient to meet the additional demands associated with this alternative.

Although the demand for water under this alternative would be lower, the impact of this incremental water demand would still be significant as it would contribute to the need for the City to develop new water supplies. In addition, water supplies at UC MBEST are similarly constrained (MCWD n.d.), and additional water-supply-related impacts may occur at that location under this alternative. Therefore, impacts on utilities under this alternative would be considered greater than that under the 2021 LRDP. *(Greater Impact)*

Wildfire

Under this alternative, the area of development within the main residential campus would be less than the 2021 LRDP although it is likely that development would still occur in the same areas of the campus (i.e., primarily the central campus subarea) that would be developed under the 2021 LRDP. UC Santa Cruz would continue to manage wildfire risk and implement existing campus plans and mitigation related to campus evacuation and wildfire prevention, similar to the 2021 LRDP, throughout the LRDP area. With respect to UC MBEST, the North Central Campus is not located within a high or very high fire hazard zone. As a result, overall less new development would be located within or near areas of high or very high fire hazard under this alternative, however, due to considerations related to wildfire hazards and in light of the recent CZU Lightning Complex fire, mitigation would be required for future development within the LRDP area, consistent with the 2021 LRDP. Therefore, with mitigation, impacts would be less than significant. *(Similar Impact)*

6.6 COMPARISON OF ALTERNATIVES

6.6.1 Comparison of Ability to Meet Project Objectives

A textual description of how each alternative would achieve the project objectives is provided above as part of the discussion of each alternative. For ease of comparison, Table 6-1 summarizes the degree to which the project objectives are met by each 2021 LRDP alternative.

Table 6-1 Comparison of Ability to Meet Project Objectives

2021 LRDP Project Objectives	Alternative 1: No Project	Alternative 2: Reduced LRDP Enrollment	Alternative 3: Reduced Development Footprint	Alternative 4: Reduced Campus Growth and Use of UC MBEST Off-Site Alternative
1. Expand campus facilities and infrastructure to allow for projected increases in student enrollment through 2040 based on statewide public educational needs and to support the academic mission, including housing for 100 percent of the additional FTE students (above the 2005 LRDP total of 19,500 FTE students) in both colleges and student housing developments, and commensurate academic and support space.	No	Partial	Partial	No
2. Ensure compact and clustered development of academic, administrative, and support facilities in the academic core and student housing and colleges around the periphery to facilitate shared resources, provide convenient access, and promote pedestrian circulation.	Partial	Yes	Yes	No
3. Provide for establishment of two new college pairs at the main residential campus to provide academic services and a close-knit intellectual and social environment.	No	Yes	No	No
4. Protect, to the extent feasible, existing campus open spaces in the built environment, including areas designated as Natural Space to maintain an interconnectedness between natural resources, wildlife corridors and critical scenic viewsheds, and areas designated as Outdoor Research and Natural Reserve to protect natural features and processes for teaching and learning and to support dedicated outdoor research programs.	Yes	Yes	Yes	Yes
5. Provide spaces for events and academic facilities to allow the campus to function as a center for public cultural life in the region through public programs, events, and services.	Partial	Yes	Yes	Yes
6. Increase on-campus housing opportunities for faculty and staff at the main residential campus and the Westside Research Park, to allow up to 25 percent of the increase in faculty and staff, based on demand, to be housed on campus.	No	Yes	Yes	No
7. Recognize, to the extent feasible, UC Santa Cruz and regional histories within the campus, including protecting the integrity of existing historic structures and enhancing the Cowell Lime Works Historic District as a campus gateway.	Yes	Yes	Yes	Yes
8. Develop an improved, more efficient roadway network to support transit with peripheral parking and mobility hubs.	No	Yes	Yes	Yes
9. Promote Transportation Demand Management (TDM) and provide infrastructure to optimize trip- and vehicle-miles-travelled-reduction benefits and efficiency of transit, bike, and pedestrian access to, from, and within the campus to reduce the use of single-occupancy vehicles.	No	Yes	Yes	No
10. Foster long-term physical and social resilience, including a response to climate change through climate resiliency and adaptation strategies and integrating sustainability leadership into campus teaching, learning, research, design, and operations.	No	Yes	Yes	No
11. Respect and reinforce the Physical Planning Principles and Guidelines to maintain the unique character of the UC Santa Cruz campus.	No	Yes	Yes	No

6.6.2 Comparison of Environmental Impacts

Table 6-2 summarizes the environmental analyses provided above for the 2021 LRDP alternatives.

Table 6-2 Comparison of the Environmental Impacts of the Alternatives in Relation to the Proposed 2021 LRDP

Environmental Topic	2021 LRDP	Alternative 1: No Project	Alternative 2: Reduced LRDP Enrollment	Alternative 3: Reduced Development Footprint	Alternative 4: Reduced Campus Growth and Use of UC MBEST Off-Site Alternative
Aesthetics	LTS/M	<	=	=	>
Agriculture and Forestry Resources	LTS	<	=	<	<
Air Quality	S&U	<	<	<	< (Construction); > (Operation)
Archaeological, Historical, and Tribal Cultural Resources	S&U	<	=	< (Archaeological and Tribal); > (Historic)	= (Archaeological and Tribal); < (Historic)
Biological Resources	LTS/M	<	=	<	>
Energy	LTS	=	=	=	=
Geology and Soils	LTS/M	<	=	<	=
Greenhouse Gas Emissions and Climate Change	LTS/M	<	<	<	>
Hazards and Hazardous Materials	LTS/M	<	<	<	>
Hydrology and Water Quality	LTS/M	<	=	<	=
Land Use and Planning	LTS	<	=	=	=
Noise	S&U	<	=	=	<
Population and Housing	S&U	<	=	=	>
Public Services	LTS	<	=	=	=
Recreation	LTS	=	=	=	>
Transportation	LTS/M	<	=	=	>
Utilities and Service Systems	S&U	<	<	<	>
Wildfire	LTS/M	=	=	<	=

Impact Status:
LTS = less-than-significant impact.

LTS/M = LTS with mitigation.

S&U = significant and unavoidable.

= - Impacts would be similar to those of the project.

< - Impacts would be less than those of the project.

> - Impacts would be greater than those of the project.

Source: Data compiled by Ascent Environmental in 2020

6.7 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The State CEQA Guidelines Section 15126.6 states that an EIR should identify the "environmentally superior" alternative. "If the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives." As shown in the Executive Summary Chapter of this EIR, there would be significant and unavoidable impacts associated with the proposed 2021 LRDP. These impacts are related to air quality, historic resources, noise, population and housing, and utilities. Each of the evaluated alternatives would result in lesser environmental impacts than the 2021 LRDP to some environmental resources and greater impacts to others with the exception of the No Project Alternative (Alternative 1) and the Reduced LRDP Enrollment Alternative (Alternative 2).

When considering objectives, the 2021 LRDP would best meet the purpose and need. In contrast, Alternative 1 would not provide additional housing (the two planned-but-not-operational projects identified above, Student Housing West and Kresge Housing are part of the 2005 LRDP) to accommodate any growth in student enrollment, and Alternatives 2 and 3 would fall short of meeting projected enrollment needs based on current UC forecasts through 2040 (i.e., up to 28,000 FTE students). While Alternative 4 would achieve a lesser level of development within the main residential campus than the 2021 LRDP, it would likely increase certain off-site impacts at UC MBEST and would not be consistent with the project objective related to compact and clustered development, as well as those objectives related to GHG and VMT efficiency. Alternative 1 (No Project), which would represent the least amount of overall development compared to existing conditions and thus, least potential physical environmental impacts, would be considered the environmentally superior alternative.

As required by State CEQA Guidelines (California Code of Regulations Section 15126.6 [e][2]), because the environmentally superior alternative was identified as the No Project Alternative, another environmentally superior alternative must be identified among the other alternatives considered. Alternative 2 would result in lesser impacts compared to the 2021 LRDP, especially with respect to the overall level of development, but it would not altogether avoid the significant and unavoidable impacts associated with historic resources, noise, population and housing, and water supply that were identified for the 2021 LRDP. Similarly, Alternative 3 would result in generally lesser environmental effect than the 2021 LRDP, however, Alternative 3 would have potentially greater historic resources impacts related to denser and potentially larger/higher structures within the central campus subarea. Thus, when the impact reductions afforded by Alternative 2 are compared to those provided by Alternative 3, Alternative 2 would result in greater impact reductions and is thus considered superior to Alternative 3.

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8 REFERENCES

Executive Summary

No references cited.

Chapter 1, "Introduction"

UC. *See* University of California.

UC Santa Cruz. *See* University of California, Santa Cruz.

University of California. 2019. University of California Capital Financial Plan. Available: https://www.ucop.edu/capital-planning/_files/capital/201925/2019-25-cfp.pdf. Accessed August 4, 2020.

University of California, Santa Cruz. 2010. *University of California, Santa Cruz Physical Design Framework*. Available: https://ppc.ucsc.edu/design/images/sc_pdffinal,3-10-10.pdf. Accessed August 4, 2020.

———. 2017. *Capital Financial Plan*. Available: https://cpsm.ucsc.edu/capital-planning/cfp.html. Accessed August 4, 2020.

———. 2018. *Strategic Academic Plan – A Vision for the Next Decade*. Available: https://sap.ucsc.edu/about-sap/. Accessed August 4, 2020.

———. 2019. *Campus Sustainability Plan – 2019 Update*. Available: https://sustainabilityplan.ucsc.edu/campus-sustainability-plan/. Accessed August 4, 2020.

Chapter 2, "Project Description"

California Department of Finance. 2019. Report E-5: Population and Housing Estimates for Cities, Counties, and the State, January 1, 2011-2019, with 2010 Benchmark. Available: http://dof.ca.gov/Forecasting/Demographics/Estimates/E-5/. Accessed January 11, 2020.

UC Santa Cruz. *See* University of California, Santa Cruz.

University of California, Santa Cruz. 1963 (September). *Long Range Development Plan*. Available: https://lrdp.ucsc.edu/2040/files/1963lrdp.pdf. Accessed August 27, 2020.

———. 2020. Long Range Development Plan - Draft.

Chapter 3, "Environmental Setting, Impacts, and Mitigation"

No references cited.

Section 3.1, "Aesthetics"

Bacon, Warren R. 1979. Visual Management System and Timber Management Application.

California Coastal Commission. 2019. California Coastal Commission, Laws and Regulations, The Coastal Act. Available at: https://www.coastal.ca.gov/laws/. Accessed July 28, 2020.

California Department of Transportation. 2008 (October). *Scenic Highway Guidelines*.

———. 2011. California Scenic Highway Mapping System, Santa Cruz County. Available at: http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/index.htm. Accessed June 18, 2020.

———. 2020. Scenic Highways. Available: https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways. Accessed November 2020.

Caltrans. *See* California Department of Transportation.

CCC. *See* California Coastal Commission.

City of Santa Cruz. 2012 (June). *City of Santa Cruz 2030 General Plan*. Available: https://www.cityofsantacruz.com/government/about-us/general-plan. Accessed June 1, 2020.

———. No Date. City of Santa Cruz Municipal Code.

County of Santa Cruz. 1994 (February). *County of Santa Cruz General Plan*. Available: https://www.sccoplanning.com/PlanningHome/SustainabilityPlanning/GeneralPlan.aspx. Accessed June 1, 2020.

FHWA. *See* U.S. Department of Transportation, Federal Highway Administration.

University of California, Santa Cruz. 2006 (March). *Cultural Resources Management Plan for the Cowell Ranch and Lime Manufacturing Historic District*.

———. 2010 (March). *Physical Design Framework*.

———.2020. Design Advisory Board. Available: https://chancellor.ucsc.edu/assets/pdfs/dab.pdf. Accessed December 2020.

USDA-FS. *See* U.S. Department of Agriculture U.S. Forest Service.

U.S. Department of Agriculture U.S. Forest Service. 1995. *Landscape Aesthetics. A Handbook for Scenery Management*. Agricultural Handbook Number 701. Washington D.C.

U.S. Department of Transportation, Federal Highways Administration, Office of Environmental Policy. 1981. *Visual Impact Assessment for Highway Projects*. Publication No. FHWA-HI-88-054.

UC Santa Cruz. *See* University of California, Santa Cruz.

Section 3.2, "Agriculture and Forestry Resources"

Bay Area Open Space Council. 2019. *The Conservation Lands Network 2.0 Report.* Berkeley, CA.

California Department of Conservation. 2016. California Important Farmland Finder. Available: https://maps.conservation.ca.gov/DLRP/CIFF/. Accessed December 18, 2020.

———. 1997. Land Evaluation and Site Assessment Model. Available: https://www.conservation.ca.gov/dlrp/Documents/lesamodl.pdf. Accessed in August 2020.

City of Santa Cruz. 2011 (September). *General Plan 2030 Draft EIR*. Forest Resources. Page 4.15-5.

DOC. *See* California Department of Conservation.

Santa Cruz County. 2017 (August). *Draft Environmental Impact Report*. Commercial Cannabis Cultivation and Manufacturing Regulations and Licensing Program. Section 3.2, Agricultural and Timber Resources.

———. 2018. *2018 Crop Report*. Prepared by the Office of the Agricultural Commissioner.

———. 2020. GIS Web for Santa Cruz County. Available: https://gis.santacruzcounty.us/gisweb/. Accessed December 18, 2020.

Section 3.3, "Air Quality"

AMBAG. *See* Association of Monterey Bay Area Governments.

Association of Monterey Bay Area Governments. 2018. 2018 Regional Growth Forecast. Available: https://ambag.org/sites/default/files/2020-01/08-AMBAG_MTP-SCS_AppendixA_PDFA.pdf. Accessed August 25, 2020.

BAAQMD. *See* Bay Area Air Quality Management District.

Bay Area Air Quality Management District. 2012. California Environmental Quality Act Air Quality Guidelines. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/baaqmd-ceqa-guidelines_final_may-2012.pdf. Accessed August 30, 2020.

Benbrahim-Tallaa, L., Baan, R. A., Grosse, Y., Lauby-Secretan, B., El Ghissassi, F., Bouvard, V., Guha, N., Loomis, D., and Straif, K. 2012. Carcinogenicity of diesel-engine and gasoline-engine exhausts and some nitroarenes. World Health Organization International Agency for Research on Cancer (IARC) Monograph Working Group. Available: https://publications.iarc.fr/_publications/media/download/3181/e6bd0692f1a9bb46589d3ca2d8178fa8dcd05ba5.pdf. Accessed May 19, 2020.

CalEPA. *See* California Environmental Protection Agency.

California Air Pollution Control Officers Association. 2016a. California Emissions Estimator Model Version 2016.3.2. Available: http://www.caleemod.com/. Accessed May 18, 2020.

———. 2016b. CalEEMod User's Guide. v. 2016.3.2. Available: http://www.aqmd.gov/caleemod/user's-guide. Accessed May 18, 2020.

California Air Resources Board. 2001 (July). Lead Fact Sheet. Available: https://ww3.arb.ca.gov/toxics/lead/factsheet.pdf. Accessed March 20, 2020.

———. 2010 (May). Preliminary Discussion Paper – Proposed Amendments to California's Low-emission Vehicle Regulations – Particulate Matter Mass, Ultrafine Solid Particle Number, and Black Carbon Emissions. Available: https://ww2.arb.ca.gov/sites/default/files/2020-02/pm_disc_paper_v6_ac.pdf. Accessed May 14, 2020.

———. 2014. The California Almanac of Emissions and Air Quality – 2013 Edition. Available: https://ww2.arb.ca.gov/our-work/programs/resource-center/technical-assistance/air-quality-and-emissions-data/almanac. Accessed May 22, 2020.

———. 2015. Facility Search Engine: 2015 Criteria & Toxic plus Risk Data, Zip Code: 95616. Available: http://www.arb.ca.gov/app/emsinv/facinfo/facinfo.php. Accessed August 2017.

———. 2016a (May). California Ambient Air Quality Standards. Available: https://www.arb.ca.gov/research/aaqs/aaqs2.pdf. Accessed July 2017.

———. 2016b (October). In-Use Off-Road Diesel-Fueled Fleets Regulation. Available: https://ww3.arb.ca.gov/msprog/offroadzone/landing/offroad.htm. Accessed May 21, 2020.

———. 2016c. 2016 SIP Emission Projection Data. 2020 Estimated Annual Average Emissions for Santa Cruz County. Available: https://www.arb.ca.gov/app/emsinv/2017/emssumcat.php. Accessed May 18, 2020.

———. 2017a. iADAM: Air Quality Data Statistics by Pollutant, Years, & Area. Available: https://www.arb.ca.gov/adam/select8/sc8start.php. Accessed May 21, 2020.

———. 2017b. Naturally Occurring Asbestos. Available: https://www.arb.ca.gov/toxics/asbestos/asbestos.htm. Accessed February 7, 2018.

———. 2018. Maps of State and Federal Area Designations. Available: https://ww2.arb.ca.gov/resources/documents/maps-state-and-federal-area-designations. Accessed May 18, 2020.

———. 2019a (April 29). Association between long-term ultrafine particulate matter exposure and premature death. Available: https://ww3.arb.ca.gov/research/single-project.php?row_id=65238. Accessed June 5, 2020.

———. 2019b (June). Truck and Bus Regulation Compliance Requirement Overview. Available: https://ww3.arb.ca.gov/msprog/onrdiesel/documents/fsregsum.pdf. Accessed May 21, 2020.

———. 2020a (August). Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values. Available: https://ww3.arb.ca.gov/toxics/healthval/contable.pdf. Accessed August 22, 2020.

———. 2020b (November). Air Quality Trend Summaries. Available: https://www.arb.ca.gov/adam/trends/trends1.php. Accessed November 13, 2020.

California Environmental Protection Agency. 2015 (May). *Staff Report: Multimedia Evaluation of Renewable Diesel*. Available: https://web.archive.org/web/20170123233930/http://www.calepa.ca.gov/cepc/2015/RenDieselRpt.pdf. Accessed August 31, 2020.

CAPCOA. *See* California Air Pollution Control Officers Association.

CARB. *See* California Air Resources Board.

Carpenter, E. 2020 (April 28). Personal communication with Erika Carpenter, Senior Environmental Planner at UC Santa Cruz, to Chris Mundhenk of Ascent Environmental. Regarding chemical inventory data request.

CDC. *See* Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention. 1978 (September). Occupational Health Guideline for Sulfur Dioxide. Available: https://www.cdc.gov/niosh/docs/81-123/pdfs/0575.pdf. Accessed March 23, 2017.

De Jesus, A. L., Rahman, M. M., Mazaheri, M., Thompson, H., Knibbs, L. D., Jeong, C., & Li, L. 2019. Ultrafine particles and PM2. 5 in the air of cities around the world: Are they representative of each other? *Environment international*, 129: 118-135. Available: https://doi.org/10.1016/j.envint.2019.05.021. Accessed June 30, 2020.

Delfino, R. J. Sioutas, C., Malik, S. 2005. Potential role of ultrafine particles in associations between airborne particle mass and cardiovascular health. *Environmental Health Perspectives*, 113(8): 934. Available: https://ehp.niehs.nih.gov/doi/pdf/10.1289/ehp.7938. Accessed May 22, 2020.

Dominici, F., Peng, R. D., Bell, M. L., Pham, L., McDermott, A., Zeger, S. L., & Samet, J. M. 2006. Fine particulate air pollution and hospital admission for cardiovascular and respiratory diseases. *JAMA*, 295(10): 1127-1134. Available: https://jamanetwork.com/journals/jama/article-abstract/202503. Accessed May 22, 2020.

Donaldson, K., Stone, V., Seaton, A., and MacNee, W. 2001. Ambient particle inhalation and the cardiovascular system: potential mechanisms. *Environmental Health Perspectives*, 109, Supplement 4: 523–527. Available: https://ehp.niehs.nih.gov/doi/pdf/10.1289/ehp.01109s4523. Accessed May 4, 2020.

Eckerle, T., & Jones, T. (2015). *Zero-Emission Vehicles in California: Hydrogen Station Permitting Guidebook*. Governor's Office of Business and Economic Development, Sacramento, CA. Available: https://businessportal.ca.gov/wp-content/Documents/ZEV/Hydrogen-Permitting-Guidebook.pdf. Accessed May 3, 2020.

EPA. *See* U.S. Environmental Protection Agency.

Frisbey, D. 2020 (August 26). Personal communication with David Frisbey, Planning and Air Monitoring Manager, Monterey Bay Air Resources District, to Christopher Lovett of Ascent Environmental. Regarding CO thresholds for traffic.

Froines, J. R. 2006. Ultrafine Particle Health Effects. Southern California Particle Center. A presentation at a conference held by the South Coast Air Quality Management District titled Ultrafine Particles: The Science, Technology, & Policy Issues Conference, April 30 to May 2, 2006.

Governor's Interagency Working Group on Zero-Emission Vehicles. 2016 (October). 2016 ZEV Action Plan. Available: https://www.gov.ca.gov/wp-content/uploads/2018/01/2016_ZEV_Action_Plan-1.pdf

———. 2018 (September). *2018 ZEV Action Plan Priorities Update*. Available: https://static.business.ca.gov/wp-content/uploads/2019/12/2018-ZEV-Action-Plan-Priorities-Update.pdf. Accessed: April 26, 2020.

Health Effects Institute. 2013 (January). Understanding the Health Effects of Ambient Ultrafine Particles. HEI Review Panel of Ultrafine Particles. Boston, MA. Available: https://www.healtheffects.org/publication/understanding-health-effects-ambient-ultrafine-particles. Accessed June 16, 2020.

HEI. *See* Health Effects Institute.

Kim, K. H., Jahan, S. A., & Kabir, E. 2013. A review on human health perspective of air pollution with respect to allergies and asthma. *Environment International*, 59: 41-52. Available: https://doi.org/10.1016/j.envint.2013.05.007. Accessed May 23, 2020.

Kim, S. 2020 (July 6). Personal communication with Seong Kim, Air Quality Engineer, Monterey Bay Air Resources District, to Brenda Hom of Ascent Environmental. Regarding the UC Santa Cruz Prioritization Score Assessment.

———. 2020b (October 6). Personal communication with Seong Kim, Air Quality Engineer, Monterey Bay Air Resources District, to Brenda Hom of Ascent Environmental. Regarding the use SMAQMD's Roadway Construction Emissions Model to estimate roadway construction emissions.

Kleeman, M. J., M. A. Robert, S. G. Riddle, and C. A. Jakober. 2007 (August). Source apportionment of fine and ultrafine particles in California. Report to the California Air Resources Board, Report #01-36.

Landrigan, P. J., Fuller, R., Acosta, N. J., Adeyi, O., Arnold, R., Baldé, A. B., Bertollini, R., Bose-O'Reilly, S., Boufford, J. I., Breysse, P. N., & Chiles, T. 2018. The Lancet Commission on pollution and health. *The Lancet*, 391(10119): 462-512. Available: https://doi.org/10.1016/S0140-6736(17)32345-0. Accessed May 20, 2020.

Levesque, S., Taetzsch, T., Lull, M. E., Kodavanti, U., Stadler, K., Wagner, A., Johnson, J. O., Duke, L., Kodavanti, P., Surace, M. J., & Block, M. L. 2011. Diesel exhaust activates and primes microglia: Air pollution, neuroinflammation, and regulation of dopaminergic neurotoxicity. *Environmental Health Perspectives*, 119(8): 1149-1155. Available: https://doi.org/10.1289/ehp.1002986. Accessed May 2, 2020.

Li, N., C. Sioutas, A. Cho, D. Schmitz, C. Misra, J. Sempf, M. Wang, T. Oberley, J. Froines, and A. Nel. 2003 (April). Ultrafine particulate pollutants induce oxidative stress and mitochondrial damage. *Environmental Health Perspectives*, 111(4): 455-460. Available: https://ehp.niehs.nih.gov/doi/pdf/10.1289/ehp.6000. Accessed May 30, 2020.

MBARD. *See* Monterey Bay Air Resources District.

Monterey Bay Air Resources District. 2008. *CEQA Air Quality Guidelines* – Monterey Bay Unified Air Pollution Control District. Available: https://www.mbard.org/files/f665829d1/CEQA_full+%281%29.pdf. Accessed May 22, 2020.

———. 2017. *2012-2015 Air Quality Management Plan*. Available: https://www.mbard.org/files/6632732f5/2012-2015-AQMP_FINAL.pdf. Accessed May 8, 2020.

Nemmar, A., P. H. M. Hoet, V. Vanquickenborne, D. Dinsdale, M. Thommer, M. F. Hoylaerts, H. Vanboilen, L. Mortelmans, and B. Nemery. 2002. Passage of intratracheally instilled ultrafine particles from the lung into the systemic circulation in hamster. *American Journal of Respiratory and Critical Care Medicine*, 164(9): 1665-1668. Available: https://www.atsjournals.org/doi/pdf/10.1164/ajrccm.164.9.2101036. Accessed May 14, 2020.

Oberdörster, G. 2001. Pulmonary effects of inhaled ultrafine particles. *International Archives of Occupational and Environmental Health*, 74: 1-8. Available: https://doi.org/10.1007/s004200000185. Accessed May 13, 2020.

OEHHA. *See* Office of Environmental Health Hazard Assessment.

Office of Environmental Health Hazard Assessment. 2003 (August). The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. Available: https://oehha.ca.gov/media/downloads/crnr/hrafinalnoapp.pdf. Accessed August 1, 2020.

———. 2009. Appendix A of Technical Support Document for Cancer Potency Factors: Methodologies for derivation, listing of available values, and adjustments to allow for early life stage exposures. California Environmental Protection Agency. Office of Environmental Health Hazard Assessment. Air Toxicology and Epidemiology Branch. May 2009. Available: https://oehha.ca.gov/air/crnr/technical-support-document-cancer-potency-factors-2009. Accessed February 5, 2018.

———. 2015. (February). *Air Toxics Hot Spots Program Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments*. Available: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf. Accessed March 22, 2018.

———. 2019. OEHHA Acute, 8-hour and Chronic Reference Exposure Level (REL) Summary. Available: https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary. Accessed May 14, 2020.

Sacramento Metropolitan Air Quality Management District. 2016 (August). Sacramento Metropolitan Air Quality Management District CEQA Guide, Chapter 4: Operational Criteria Air Pollutant and Precursor Emissions.

Available: http://www.airquality.org/LandUseTransportation/Documents/Ch4OperationalFINAL8-2016.pdf. Last updated August 2016. Accessed June 28, 2020.

———. 2018. SMAQMD Road Construction Emissions Model (RCEM), Version 9.0.0 Available: http://www.airquality.org/LandUseTransportation/Documents/RoadConstructionEmissionsModelVer9_0_0_locked.zip. Accessed July 31, 2020.

Sahai, R. and Brown, K. 2014. Benchmark-based, Whole-Building Energy Performance Targets for UC Buildings. Available: https://www.ucop.edu/sustainability/_files/whole-building-energy-performance-targets-for-uc-buildings-study.pdf. Accessed July 31, 2020.

SCAQMD. *See* South Coast Air Quality Management District.

Searson, C. 2020 (August 11). Personal communication with Cynthia Searson, Engineering and Compliance Specialist, Monterey Bay Air Resources District, to Christopher Lovett of Ascent Environmental. Regarding odor complaints.

Second Nature. 2018. *Annual Progress Evaluation for University of California, Santa Cruz, 2018*. Available: https://reporting.secondnature.org/ape/ape-public!337. Accessed July 31, 2020.

Shah, A. S., Langrish, J. P., Nair, H., McAllister, D. A., Hunter, A. L., Donaldson, K., Newby, E., & Mills, N. L. (2013). Global association of air pollution and heart failure: a systematic review and meta-analysis. *The Lancet*, 382(9897), 1039-1048. Available: https://doi.org/10.1016/S0140-6736(13)60898-3. Accessed May 1, 2020.

Sioutas, C., R. J. Delfino, and M. Singh. 2005. Exposure assessment for atmospheric ultrafine particles (UFP) and implications in epidemiologic research. *Environmental Health Perspectives*, 113(8): 947-955. Available: https://ehp.niehs.nih.gov/doi/pdf/10.1289/ehp.7939. Accessed May 28, 2020.

SMAQMD. *See* Sacramento Metropolitan Air Quality Management District.

South Coast Air Quality Management District. 2017 (October). CalEEMod Appendix E Technical Source Documentation. Prepared for California Air Pollution Control Officers Association. Prepared by BREEZE Software, A Division of Trinity Consultants Dallas, Texas in collaboration with South Coast Air Quality Management District and the California Air Districts.

———. 2020. Air Quality Modeling for CEQA. Available: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-modeling. Accessed August 30, 2020.

Stölzel, M., S. Breitner, J. Cyrys, M. Pitz, G. Wölke, W. Kreyling, J. Heinrich, H. E. Wichmann, and A. Peters. 2007. Daily mortality and particulate matter in different size classes in Erfurt, Germany. *Journal of Exposure Science & Environmental Epidemiology*, 17(5): 458-67. Available: https://www.nature.com/articles/7500538.pdf. Accessed May 26, 2020.

UCOP. *See* University of California Office of the President.

University of California Office of the President. 2020 (July 24). *Sustainable Practices Policy*. University of California – Policy. July 24, 2020. Available: http://policy.ucop.edu/doc/3100155/Sustainable%20Practices. Accessed July 31, 2020.

University of California, Santa Cruz. 2005. *Air Toxics Health Risk Assessment in Support of the University of California, Santa Cruz 2005 Long Range Development Plan.* Prepared by URS Corporation.

U.S. Environmental Protection Agency. 2011. AP-42 Emission Factors. 13.2.1. Paved Roads. Available: https://www.epa.gov/sites/production/files/2020-10/documents/13.2.1_paved_roads.pdf. Accessed December 9, 2020.

———. 2017. *Nonattainment Areas for Criteria Pollutants (Green Book)*. Available: https://www.epa.gov/green-book. Accessed May 18, 2020.

———. 2019a (August). Environments and Contaminants: Criteria Air Pollutants. In America's Children and the Environment. Updated Third Edition. Available: https://www.epa.gov/sites/production/files/2019-07/documents/ace3-criteria-air-pollutants-report-section.pdf. Accessed: April 1, 2020.

———. 2019b. American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee modeling system (AERMOD), Version 19191. Available: https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models. Accessed June 11, 2020.

———. 2020a (June). Lead (Pb) Air Pollution. Available: https://www.epa.gov/lead-air-pollution. Last updated June 3, 2020. Accessed June 19, 2020.

———. 2020b (April). Health and Environmental Effects of Particulate Matter (PM). Available: https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm. Accessed June 19, 2020.

Van Gosen, B. S. and Clinkenbeard J. P. 2011. Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California. U. S. Geological Survey Open-File Report 2011-1188. California Geological Survey Map Sheet 59. Available: https://pubs.usgs.gov/of/2011/1188/. Accessed April 28, 2020.

Western Regional Climate Center. 2016. Period of Record Monthly Climate Summary for Santa Cruz, California (047916). Available: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7916. Accessed May 18, 2020.

———. 2017. Prevailing Wind Direction, Monterey Airport (KMRY). Available: https://wrcc.dri.edu/Climate/comp_table_show.php?stype=wind_dir_avg. Accessed May 18, 2020.

WRCC. *See* Western Regional Climate Center.

Zhu, Y., W. C. Hinds, S. Kim, S. Shen, and C. Sioutas. 2002. Study of ultrafine particles near a major highway with heavy-duty diesel traffic. *Atmospheric Environment*, 36: 4323–4335. Available: https://doi.org/10.1016/S1352-2310(02)00354-0. Accessed April 29, 2020.

Section 3.4, "Archaeological, Historical, and Tribal Cultural Resources"

architecture + history. 2020 *UC Santa Cruz 2020 Long Range Development Plan Historic Resources Technical Memorandum*.

Architectural Resources Group. 2006 (February). *Campus Core Historic Context University of California, Santa Cruz*. Prepared for University of California, Santa Cruz Physical Planning and Construction.

Birnbaum, Charles A. 1994. National Park Service Preservation Brief 36. Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes. Available: https://www.nps.gov/tps/how-to-preserve/briefs/36-cultural-landscapes.htm.

Office of Historic Preservation. 1995 (March). *Instructions for Recording Historical Resources*.

Pacific Legacy. 2020. *Technical Memo for Cultural Resource Studies, UC Santa Cruz, Long Range Development Plan*.

Weeks, KD and AE Grimmer. 1995. *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings*. U.S. Department of the Interior National Park Service Cultural Resource Stewardship and Partnerships Heritage Preservation Services Washington, D.C.

Section 3.5, "Biological Resources"

Allen, M. L., L. M. Elbroch, D. S. Casady, and H. U. Wittmer. 2015. Feeding and Spatial Ecology of Mountain Lions in the Mendocino National Forest, California. *California Fish and Game*. 101:51-65.

American Bird Conservancy. 2015. *Bird-Friendly Building Design.* Available: https://abcbirds.org/wp-content/uploads/2015/05/Bird-friendly-Building-Guide_20151.pdf. Accessed December 19, 2019.

AmphibiaWeb. 2020. *California Red-Legged Frog Species Account.* Available: https://amphibiaweb.org/cgi/amphib_query?where-genus=Rana&where-species=draytonii. Accessed July 7, 2020.

Arnold, R. A. 2020. *University of California Santa Cruz Campus – Long Range Development Plan EIR Habitat Assessment Report for the Endangered Ohlone Tiger Beetle.* Pleasant Hill, CA.

Bay Area Open Space Council. 2019. *The Conservation Lands Network 2.0 Report.* Berkeley, CA.

Biosearch Environmental Consulting. 2020. *California Red-Legged Frog Site Assessment University of California, Santa Cruz Santa Cruz County, California.* Santa Cruz, CA.

Bulger, J. B., N. J. Scott Jr., and R. B. Seymour. 2003. Terrestrial Activity and Conservation of Adult California Red-legged Frogs *Rana aurora draytonii* in Coastal Forests and Grasslands. *Biological Conservation* 110:85-95.

California Department of Fish and Wildlife. 2008. *Life History Account for California Red-Legged Frog*. Available: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=7103. Accessed July 7, 2020.

———. 2012. *Staff Report on Burrowing Owl Mitigation.* Available: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843. Accessed June 26, 2020.

———. 2018. *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities.* Available: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18959&inline. Accessed June 26, 2020.

———. 2020. California Wildlife Habitat Relationships. Sacramento, CA. Available: https://www.wildlife.ca.gov/Data/CWHR. Accessed August 31, 2020.

Calflora. 2020. Calflora database. Available: http://www.calflora.org/. Accessed July 3, 2020.

California Department of Parks. 2017. *Marbled Murrelet Landscape Management Plan for Zone 6.* Available: https://www.parks.ca.gov/pages/29882/files/Z6-Plan_FINAL_MASTER_V14_07-17.pdf. Accessed June 17, 2020.

California Native Plant Society. 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Available: http://www.rareplants.cnps.org. Accessed June 8, 2020.

California Natural Diversity Database. 2020. Results of electronic records search. Sacramento: California Department of Fish and Wildlife, Biogeographic Data Branch. Accessed June 8, 2020.

California Oak Mortality Task Force. 2019. *Sudden Oak Death Map*. Available: http://www.suddenoakdeath.org/maps-media/maps/. Accessed July 3, 2020.

Center for Ecosystem Management and Restoration. 2020. *Steelhead/Rainbow Trout Resources of Santa Cruz County*. Available: http://www.cemar.org/SSRP/pdfs/SSRP_SantaCruz.pdf. Accessed June 29, 2020.

CNDDB. *See* California Natural Diversity Database.

CNPS. *See* California Native Plant Society.

County of Santa Cruz. 2020. Santa Cruz County Geospatial Data. Available: https://gis.santacruzcounty.us/. Accessed August 27, 2020.

Cramer, M. D. and N. N. Barger. 2014. Are mima-like mounds the consequence of long-term stability of vegetation spatial patterning? *Palaeogeography, Palaeoclimatology, Palaeoecology*. 409:72-83.

Department of the Interior. 2009. *Adaptive Management the U.S. Department of the Interior Technical Guide.* Available: https://www.doi.gov/sites/doi.gov/files/migrated/ppa/upload/TechGuide.pdf. Accessed December 2, 2020.

eBird. 2020. *eBird*. Ithaca, NY. Available: https://ebird.org/home. Accessed June 16–18, 2020.

Environmental Laboratory. 1987. U.S. Army Corps of Engineers Wetlands Delineation Manual. (Technical Report Y-87-1.) U.S. Army Corps of Engineers Waterways Experiment Station. Vicksburg, MS.

Fellers, G. M. and P. M. Kleeman. 2007. California Red-Legged Frog (*Rana draytonii*) Movement and Habitat Use: Implications for Conservation. *Journal of Herpetology*. 41:276-286.

Gabet, E. J., J. T. Perron, and D. L. Johnson. 2014. Biotic Origin for Mima Mounds Supported by Numerical Modeling. *Geomorphology*. 206:58-66.

Jones, Alex. Campus Natural Reserve Manager, UC Santa Cruz, Santa Cruz, CA. October 7, 2020–phone call with Ascent Environmental staff regarding biological resource occurrence data.

Kauffmann, M., T. Parker, and M. Vasey. 2015. *Field Guide to Manzanitas California, North America, and Mexico*. Backcountry Press. Kneeland, CA.

Krohn A. R. and A. S. Jones. 2020. *Meta dolloff* Levi, 1980 (Araneae: Tetragnathidae) in cave-like environments. *The Pan-Pacific Entomologist*. 96:185-187.

Matocq, M. D. 2002. Morphological and Molecular Analysis of a Contact Zone in the *Neotoma fuscipes* Species Complex. *Journal of Mammalogy*. 83:866-883.

Neubauer, D. 2013. *Annotated Checklist of the Vascular Plants of Santa Cruz County, California*. California Native Plant Society, Santa Cruz County Chapter, Santa Cruz, CA.

Reese, D. A. and H. H. Welsh. 1997. Use of Terrestrial Habitat by Western Pond Turtles, *Clemmys marmorata*: Implications for Management. *Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles*. An International Conference held by the New York Turtle and Tortoise Society, pp. 352-357.

Remsen, J. V. 1978. *Bird Species of Special Concern in California*. Available: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=169067&inline. Accessed June 29, 2020.

Santa Cruz Puma Project. 2015. *Three New Puma Kittens Take on the World!* Available: http://www.santacruzpumas.org/2015/06/three-new-puma-kittens-take-on-the-world/. Accessed June 30, 2020.

———. 2020. *Santa Cruz Puma Project Puma Tracker*. Available: http://www.santacruzpumas.org/puma-tracker/. Accessed June 30, 2020.

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. *A Manual of California Vegetation*. Second edition. California Native Plant Society Press, Sacramento, California, USA.

Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. *California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California*. Available: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18366. Accessed April 20, 2020.

State Water Resources Control Board. 2019. *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State*. Available: https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/procedures_conformed.pdf. Accessed July 10, 2020.

SWRCB. *See* State Water Resources Control Board.

Thomson, R. C., A. N. Wright, and H. B. Shaffer. 2016. *California Amphibian and Reptile Species of Special Concern*. University of California Press, Oakland, CA.

UC Santa Cruz. 1971. *Long Range Development Plan*. Prepared by UC Santa Cruz, Santa Cruz CA.

———. 2005a. *UC Santa Cruz 2005 Long Range Development Plan Environmental Impact Report*. Biological Resources. Prepared by Jones & Stokes Associates, Inc. San Jose, CA.

———. 2005b. *Habitat Conservation Plan Ranch View Terrace, University of California, Santa Cruz*. Prepared by Jones & Stokes Associates, Inc. San Jose, CA.

———. 2016a. *UC Santa Cruz Campus Natural Reserve Amphibian and Reptile List.* Available: https://ucsccampusreserve.ucsc.edu/maps-habitats-organisms-stewardship/amphibians-and-reptiles-of-ucsc.html. Accessed July 10, 2020.

———. 2016b. *UC Santa Cruz Campus Natural Reserve Mammal List.* Available: https://ucsccampusreserve.ucsc.edu/documents/ucsc-mammals.pdf. Accessed July 2, 2020.

———. 2017. *UC Santa Cruz Arboretum and Botanic Garden, Gardens and Collections*. Available: https://arboretum.ucsc.edu/visit/garden/index.html. Accessed June 21, 2020.

———. 2019. *UC Santa Cruz Ranch View Terrace Habitat Conservation Plan Annual Report 2019*.

USACE. *See* U.S. Army Corps of Engineers.

U.S. Army Corps of Engineers. 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0).* Available: https://usace.contentdm.oclc.org/utils/getfile/collection/p266001coll1/id/7627. Accessed May 8, 2020.

U.S. Fish and Wildlife Service. 2002b. *Recovery Plan for the California Red-legged Frog (Rana aurora draytonii).* Available: https://www.fws.gov/arcata/es/amphibians/crlf/documents/020528.pdf. Accessed April 20, 2020.

———. 2020a. Information for Planning and Consultation electronic records search. Available: https://ecos.fws.gov/ipac/. Accessed June 9, 2020.

———. 2020b. National Wetlands Inventory. Available: https://www.fws.gov/wetlands/data/mapper.html. Accessed August 27, 2020.

USFWS. *See* U.S. Fish and Wildlife Service.

Xerces Society for Invertebrate Conservation. 2016. *State of the Monarch Butterfly Overwintering Sites in California.* Available: https://www.xerces.org/sites/default/files/2018-05/16-015_01_XercesSoc_State-of-Monarch-Overwintering-Sites-in-California_web.pdf. Accessed June 29, 2020.

———. 2017. *Protecting California's Butterfly Groves. Management Guidelines for Monarch Butterfly Overwintering Habitat.* Available: https://xerces.org/sites/default/files/2018-05/17-040_01_ProtectingCaliforniaButterflyGroves.pdf. Accessed June 29, 2020.

———. 2018. *A Petition to the State of California Fish and Game Commission to List the Crotch Bumble Bee (Bombus crotchii), Franklin's Bumble Bee (Bombus franklini), Suckley Cuckoo Bumble Bee (Bombus suckleyi), and Western Bumble Bee (Bombus occidentalis occidentalis) as Endangered Under the California Endangered Species Act.* Available: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=161902&inline. Accessed June 29, 2020.

Section 3.6, "Energy"

AFDC. *See* Alternative Fuels Data Center.

Alternative Fuels Data Center. 2020. Alternative Fueling Station Counts by State. Data Last Updated July 2, 2020. Available: https://afdc.energy.gov/stations/states. Accessed July 2, 2020.

California Air Resources Board. 2014. *First Update to the Climate Change Scoping Plan*. Available: https://ww2.arb.ca.gov/sites/default/files/classic//cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf. Accessed May 13, 2020.

———. 2017 (November). *California's 2017 Climate Change Scoping Plan*. Available: https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed May 12, 2020.

California Energy Commission. 2018 (September). *Frequently Asked Questions 2019 Building Energy Efficiency Standards*. Available: https://ww2.energy.ca.gov/title24/2019standards/documents/Title24_2019_Standards_detailed_faq.pdf. Accessed June 29, 2020.

———. 2019a. Total System Electric Generation. Available: http://www.energy.ca.gov/almanac/electricity_data/total_system_power.html. Accessed May 19, 2020.

———. 2019b (November). 2019 California Energy Efficiency Action Plan. California Energy Commission. Publication Number: CEC400-2019-010-SF. Available: https://ww2.energy.ca.gov/business_meetings/2019_packets/2019-12-11/Item_06_2019%20California%20Energy%20Efficiency%20Action%20Plan%20(19-IEPR-06).pdf. Accessed May 20, 2020.

California Energy Commission and California Air Resources Board. 2003 (August). *Reducing California's Petroleum Dependence. Joint Agency Report by California Energy Commission and California Air Resources Board*. Available: https://ww3.arb.ca.gov/fuels/carefinery/ab2076final.pdf. Accessed July 1, 2020.

CARB. *See* California Air Resources Board.

CEC. *See* California Energy Commission.

CEC and CARB. *See* California Energy Commission and California Air Resources Board.

The Climate Registry. 2020 (April). The Climate Registry Default Emission Factors. Available: https://www.theclimateregistry.org/wp-content/uploads/2020/04/The-Climate-Registry-2020-Default-Emission-Factor-Document.pdf. Accessed December 9, 2020.

Diamantopoulos, T. 2020 (December 4). Personal communication with Theo Diamontopoulos, Fleet Manager, UC Santa Cruz, to Erika Carpenter of UC Santa Cruz. Regarding UC Santa Cruz campus alternative fleet characteristics.

Eckerle, T., & Jones, T. (2015). *Zero-Emission Vehicles in California: Hydrogen Station Permitting Guidebook*. Governor's Office of Business and Economic Development, Sacramento, CA. Available: https://businessportal.ca.gov/wp-content/Documents/ZEV/Hydrogen-Permitting-Guidebook.pdf. Accessed May 3, 2020.

Governor's Interagency Working Group on Zero-Emission Vehicles. 2016 (October). 2016 ZEV Action Plan. Available: https://www.gov.ca.gov/wp-content/uploads/2018/01/2016_ZEV_Action_Plan-1.pdf

———. 2018 (September). *2018 ZEV Action Plan Priorities Update*. Available: https://static.business.ca.gov/wp-content/uploads/2019/12/2018-ZEV-Action-Plan-Priorities-Update.pdf. Accessed: April 26, 2020.

OPR. See Governor's Office of Planning and Research.

Governor's Office of Planning and Research. 2017 (November). *Technical Advisory on Evaluating Transportation Impacts in CEQA*. Available: http://www.opr.ca.gov/docs/20171127_Transportation_Analysis_TA_Nov_2017.pdf. Accessed April 18, 2019.

Sahai, R., Kniazewycz, C., and Brown, K. 2014. Benchmark-based, Whole-Building Energy Performance Targets for UC Buildings. Available: https://www.ucop.edu/sustainability/_files/whole-building-energy-performance-targets-for-uc-buildings-study.pdf. Accessed July 31, 2020.

SCAQMD. *See* South Coast Air Quality Management District.

South Coast Air Quality Management District (April). 1993. *Air Quality Handbook*.

———. 2017. California Emissions Estimator Model (CalEEMod). Available: http://www.caleemod.com/. Accessed July 13, 2020.

UCOP. *See* University of California Office of the President.

UCSC. *See* University of California, Santa Cruz.

University of California Office of the President. 2020. *Sustainable Practices.* University of California – Policy. Available: https://policy.ucop.edu/doc/3100155/SustainablePractices. Accessed July 26, 2020.

University of California, Santa Cruz. 2011 (November). UC Santa Cruz Cogeneration Plant Replacement Phase 1 Final Tiered IS/MND. Office of Physical Planning & Construction. Available: https://mediafiles.ucsc.edu/ppc/OtherEnvdocs/Cogen/cogenfinalis.pdf. Accessed July 5, 2020.

———. 2017 (January). *University of California – Santa Cruz Climate & Energy Strategy* (CES). Available: http://reporting.secondnature.org/media/uploads/cap/597-capfile_lWeaR6l.pdf. Accessed June 29, 2020.

———. 2019. Campus Standards. Available: https://ppc.ucsc.edu/consultants/standards.html. Accessed December 9, 2020.

———. 2020. Physical Plant Live Data. Available: https://physicalplant.ucsc.edu/energy-work-management/energy-management/live-data.html. Accessed August 4, 2020.

Section 3.7, "Geology, Soils, and Mineral Resources"

American Society of Civil Engineers. 2016. *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*, ASCE/SEI 7-16.

ASCE. *See* American Society of Civil Engineers.

Bryant, William. A., and Hart, Earl. W. 2007. *Fault-Rupture Hazard Zones in California*. California Department of Conservation, Sacramento, CA.

California Geological Survey. 2018. Earthquake Fault Zones a Guide for Government Agencies, Property Owners / Developers, and Geoscience Practitioners for Assessing Fault Rupture Hazards in California, Special Publication 42 https://www.conservation.ca.gov/cgs/Documents/Publications/Special-Publications/SP_042.pdf.

Cao, T., Bryant, W.A., Rowshandel, B., Branum, D. And Wills, C.J., 2003. The Revised 2002 California Probabilistic Seismic Hazards Maps. Available: https://www.conservation.ca.gov/cgs/Documents/PSHA/2002%20California%20Hazard%20Maps.pdf. Accessed September 10, 2020.

Clark, J.C. 1981. Stratigraphy, Paleontology, and Geology of the Central Santa Cruz Mountains, California Coast Ranges. *U.S. Geological Survey, Prof Paper 1168*:1-51.

Dupré, W.R., 1975c, Geology and liquefaction potential of Quaternary deposits in Santa Cruz County, California, U. S. Geological Survey Miscellaneous Field Studies Map MF-648, 2 sheets, scale 1:62,500.

Lawson, A.C. et al. 1908. The California Earthquake of April 18, 1906, Report of the State Earthquake Investigation Commission, Carnegie Institute of Washington, Publication 87, 2 v., 600 p.

NCEP. *See* Working Group on Northern California Earthquake Potential.

Nolan, Zinn and Associates. 2005. Revised Geology and Geologic Hazards, Santa Cruz Campus University of California, unpublished consultant report.

Rosenberg, L.I., and Clark, J.C., 1994, Quaternary faulting of the greater Monterey area, California: Technical report to U.S. Geological Survey, under Contract 1434-94-G-2443, 27 p., scale 1:24,000.

Santa Cruz County. 2020. Mineral Classifications. Available: https://www.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=5d7a3abda0ee48599d5f977de12a7f17. Accessed on August 18, 2020.

SCS. *See* Soil Conservation Service.

Soil Conservation Service. 1980. *Soil Survey of Santa Cruz County, California*. U.S. Department of Agriculture. Available: https://websoilsurvey.nrcs.usda.gov/app/. Accessed August 28, 2020.

Stanford Libraries. 2020. *Soils Survey: Santa Cruz County, California*. Available: https://earthworks.stanford.edu/catalog/stanford-kf833hv3826. Accessed August 28, 2020.

Steven Raas and Associates. 2000. Preliminary geotechnical investigation for North Campus Planning Study, University of California, Santa Cruz, California, unpublished consultant report, 95 p.

Sykes, L.R. and S.P. Nishenko. 1984. Probabilities of occurrence of large plate-rupturing earthquakes for the San Andreas, San Jacinto, and Imperial faults, California, 1983-2003. *Journal of Geophysical Research*, v. 89, p. 5905-5927.

UCMP. *See* UC Museum of Paleontology

UC Museum of Paleontology. 2010 (May). *Marine vertebrate paleontology in Half Moon Bay*. Available: https://ucmp.berkeley.edu/2010/05/marine-vertebrate-paleontology-in-half-moon-bay/. Accessed December 30, 2020.

UC Santa Cruz. *See* University of California, Santa Cruz.

University of California, Santa Cruz. 2014 (June). *Storm Water Program Guidance Document*. Available: https://cleanwater.ucsc.edu/Background/SWMPGuidanceDocs06_2014%20.pdf. Accessed December 2020.

———. 2017 (June). *UCSC - Campus Standards Handbook*.

U.S. Geological Survey. Ongoing. Quaternary Faults database. Available: https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=5a6038b3a1684561a9b0aadf88412fcf. Accessed September 10, 2020.

———. 2003. *Earthquake Probabilities in the San Francisco Bay Region: 2002-2031*. Prepared by Working Group on California Earthquake Probabilities. Open-File Report 03-214. Available https://pubs.usgs.gov/of/2003/of03-214/OFR-03-214_FullText.pdf. Accessed on September 8, 2020.

USGS. *See* U.S. Geological Survey.

WG. *See* Working Group on California Earthquake Probabilities.

Working Group on California Earthquake Probabilities. 1988. Probabilities of large earthquakes occurring in California on the San Andreas fault, U. S. Geological Survey Open-File Report 88-398, 62 p.

———. 1990. Probabilities of large earthquakes in the San Francisco Bay region, California, U. S. Geological Survey Circular 1053, 51 p.

———. 2003. Earthquake probabilities in the San Francisco Bay region: 2002-2031: U.S. Geological Survey Open-File Report 03-214.

Working Group on Northern California Earthquake Potential. 1996. Database of potential sources for earthquakes larger than magnitude 6 in northern California, U. S. Geological Survey Open-File Report 96-705, 53 p.

Youd, T.L. and S.N. Hoose. 1978. Historic ground failures in northern California triggered by earthquakes, U. S. Geological Survey Professional Paper 993, 177 p.

Section 3.8, "Greenhouse Gas Emissions and Climate Change"

AMBAG. *See* Association of Monterey Bay Area Governments.

Association of Monterey Bay Area Governments. 2018. *Moving Forward Monterey Bay 2040, Metropolitan Transportation Plan /Sustainable Communities Strategy*. Available: http://ambag.org/sites/default/files/2020-05/0-AMBAG_MTP-SCS_ExecutiveSummary_PDFA.pdf. Accessed July 15, 2020.

California Air Pollution Control Officers Association. 2016. California Emissions Estimator Model (CalEEMod) Version 2016.3.2. Available: http://www.caleemod.com/. Accessed March 30, 2020.

California Air Resources Board. 2010. Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories. Available: https://ww2.arb.ca.gov/local-government-operations-protocol-greenhouse-gas-assessments. Accessed May 10, 2020.

———. 2017a (November). California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target. Adopted by the California Air Resources Board on December 14, 2017. Available: https://ww3.arb.ca.gov/cc/scopingplan/scopingplan.htm. Accessed: May 12, 2020.

———. 2017b (March). Short-Lived Climate Pollutant Reduction Strategy. Available: https://ww2.arb.ca.gov/our-work/programs/slcp. Accessed: May 12, 2020.

———. 2019. California Greenhouse Gas Emissions for 2000 to 2017. Available: http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed July 3, 2020.

———. 2020a. Low Carbon Fuel Standard. About. Available: https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/about. Accessed May 12, 2020.

———. 2020b. Advanced Clean Cars Program. About. Available: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/about. Accessed May 12, 2020.

California Department of Resources Recycling and Recovery. 2020. Mandatory Commercial Organics Recycling. Available: https://www.calrecycle.ca.gov/recycle/commercial/organics. Accessed May 12, 2020.

California Energy Commission. 2018 (December). 2019 Building Energy Efficiency Standards for Residential and Nonresidential Buildings. CEC-400-2015-037-CMF. Available: https://ww2.energy.ca.gov/publications/displayOneReport_cms.php?pubNum=CEC-400-2018-020-CMF. Accessed May 12, 2020.

———. 2020. Cal-Adapt Annual Averages Tool. Available: https://cal-adapt.org/tools/annual-averages/#climatevar=tasmax&scenario=rcp45&lat=36.96875&lng=-122.03125&boundary=locagrid&units=fahrenheit. Accessed July 3, 2020.

California Natural Resources Agency. 2018. *Safeguarding California Plan: 2018 Update*. Available: http://resources.ca.gov/docs/climate/safeguarding/update2018/safeguarding-california-plan-2018-update.pdf. Accessed July 7, 2020.

CalRecycle. *See* California Department of Resources Recycling and Recovery.

CAPCOA. *See* California Air Pollution Control Officers Association.

CEC. *See* California Energy Commission.

City of Santa Cruz. 2007. *City of Santa Cruz Climate Action Compact*. Available: https://www.cityofsantacruz.com/Home/ShowDocument?id=9309. Accessed October 12, 2020.

———. 2012 (June). *City of Santa Cruz Climate Action Plan*. Available: https://www.cityofsantacruz.com/home/showdocument?id=27824. Accessed October 8, 2020.

CNRA. *See* California Natural Resources Agency.

Eckerle, T., & Jones, T. (2015). *Zero-Emission Vehicles in California: Hydrogen Station Permitting Guidebook*. Governor's Office of Business and Economic Development, Sacramento, CA. Available: https://businessportal.ca.gov/wp-content/Documents/ZEV/Hydrogen-Permitting-Guidebook.pdf. Accessed May 3, 2020.

EPA. *See* US Environmental Protection Agency.

Governor's Interagency Working Group on Zero-Emission Vehicles. 2016. *2016 ZEV Action Plan*. Available: https://dot.ca.gov/-/media/dot-media/programs/sustainability/documents/2016-zev-action-plan-a11y.pdf. Accessed August 30, 2020.

Governor's Office of Planning and Research, California Energy Commission, and California Natural Resources Agency. 2018 (August 27). California's Changing Climate: A Summary of Key Findings from California's Fourth Climate Change Assessment. Available: https://www.energy.ca.gov/sites/default/files/2019-08/20180827_Summary_Brochure.pdf. Accessed June 30, 2020.

Intergovernmental Panel on Climate Change. 2007. *Climate Change 2007: The Physical Science Basis*. Available: https://www.ipcc.ch/report/ar4/wg1. Accessed August 15, 2020.

———. 2013. Chapter 6, Carbon and Other Biogeochemical Cycles. Pages 465–570 in *Climate Change 2013: The Physical Science Basis*. Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Available: http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf. Accessed June 27, 2020.

———. 2014. *Climate Change 2014 Synthesis Report: Summary for Policymakers*. Available: https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf. Accessed June 25, 2020.

IPCC. *See* Intergovernmental Panel on Climate Change.

MBARD. *See* Monterey Bay Air Resources District.

Monterey Bay Air Resources District. 2008. *CEQA Air Quality Guidelines*. Monterey Bay Unified Air Pollution Control District. Available: https://www.mbard.org/files/f665829d1/CEQA_full+%281%29.pdf. Accessed May 22, 2020.

———. 2016 (February). *Guidelines for Implementing the California Environmental Quality Act*. Monterey Bay Unified Air Pollution Control District. Available: https://www.mbard.org/files/50d38962a/Attachment_Guidelines-for-Implementing-CEQA.pdf. Accessed July 3, 2020.

OPR. *See* Governor's Office of Planning and Research.

Sahai, R., Kniazewycz, C., and Brown, K. 2014. Benchmark-based, Whole-Building Energy Performance Targets for UC Buildings. Available: https://www.ucop.edu/sustainability/_files/whole-building-energy-performance-targets-for-uc-buildings-study.pdf. Accessed July 31, 2020.

Second Nature. 2018. Annual Progress Evaluation for University of California, Santa Cruz, 2018. Available: https://reporting.secondnature.org/ape/ape-public!337. Accessed July 31, 2020.

———. 2020. Measuring Progress. From Reporting to Dynamic Assessment. Available: https://secondnature.org/signatory-handbook/measuring-progress/. Accessed December 9, 2020.

The Climate Registry. 2018 (December). *TCR's Voluntary Reporting Program. Frequently Asked Questions.* Available: https://www.theclimateregistry.org/wp-content/uploads/2019/02/Reporting-FAQs.pdf. Accessed December 9, 2020.

UCOP. *See* University of California Office of the President.

UC Santa Cruz. *See* University of California, Santa Cruz.

University of California Office of the President. 2018. Carbon Neutrality Initiative. Available: http://www.ucop.edu/carbon-neutrality-initiative/. Accessed May 12, 2020.

———. 2020. *Sustainable Practices Policy.* University of California – Policy. Available: https://policy.ucop.edu/doc/3100155/SustainablePractices. Accessed July 26, 2020.

University of California, Santa Cruz. 2017 (January). *University of California – Santa Cruz. Climate & Energy Strategy (CES).* Version 1.1. January 13, 2017. Available: http://reporting.secondnature.org/media/uploads/cap/597-capfile_lWeaR6l.pdf. Accessed May 12, 2020.

———. 2019. UCSC Campus Sustainability Plan – Progress Report 2017-2019. Available: https://sustainabilityplan.ucsc.edu/implementation/progress-report-2018-2019-update-in-progress/. Accessed May 12, 2020.

US Environmental Protection Agency. 2011 (March). *PSD and Title V Permitting Guidance for Greenhouse Gases.* Available: https://www.epa.gov/sites/production/files/2015-07/documents/ghgguid.pdf. Accessed June 7, 2020.

———. 2014. eGRID2014 GHG Annual Output Emissions Rates. Available: https://www.epa.gov/sites/production/files/2015-10/documents/egrid2012_ghgoutputrates_0.pdf. Accessed: July 2, 2020.

———. 2017 (January). Carbon Dioxide Emissions Associated with Bioenergy and Other Biogenic Sources. Available: https://19january2017snapshot.epa.gov/climatechange/carbon-dioxide-emissions-associated-bioenergy-and-other-biogenic-sources_.html. Last updated January 6, 2017. Accessed March 23, 2020.

———. 2019a (December 10). *Clean Air Act Permitting for Greenhouse Gases*. Available: https://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases. Last updated December 10, 2019. Accessed May 12, 2020.

———. 2019b (September). *FACT SHEET. Repeal of the Clean Power Plan*. Available: https://www.epa.gov/sites/production/files/2019-06/documents/cpp_repeal_fact_sheet_6.18.19_final.pdf. Accessed May 12, 2020.

———. 2020. Emissions & Generation Resource Integrated Database. Available: https://www.epa.gov/egrid/emissions-generation-resource-integrated-database-egrid. Last updated March 9, 2020.

Wade, Samuel. Branch Chief, Transportation Fuels Branch, Industrial Strategies Division, California Air Resources Board. Sacramento, CA. June 30, 2017—e-mail to Austin Kerr of Ascent Environmental regarding whether the Low-Carbon Fuel Standard applies to fuels used by off-road construction equipment.

Section 3.9, "Hazards and Hazardous Materials"

AirNav. 2020 (August 13). Watsonville Municipal Airport. Available: https://www.airnav.com/airport/KWVI. Accessed August 21, 2020.

California Department of Toxic Substances Control. 2020a. Silicon Systems, Inc. (71003553). Available: https://www.envirostor.dtsc.ca.gov/public/profile_report?global_id=71003553. Accessed August 2020.

———. 2020b. Department of Toxic Substances Control EnviroStor – Glossay of Terms. Available: https://www.envirostor.dtsc.ca.gov/public/EnviroStor%20Glossary.pdf. Accessed October 2020.

———. 2020c. Site Mitigation and Restoration Program. Available: https://dtsc.ca.gov/brownfields/preliminary-endangerment-assessment-pea-process-quick-reference-guide/. Accessed October 13, 2020.

———. 2020d. EnviroStore Database. Available: https://www.envirostor.dtsc.ca.gov/public/map/?myaddress=1156+High+Street+Santa+Cruz. Accessed August 2020.

CDC. *See* Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention. 2009 (December). Biosafety in Microbiological and Biomedical Laboratories. Available: https://www.cdc.gov/labs/pdf/CDC-BiosafetyMicrobiologicalBiomedicalLaboratories-2009-P.PDF. Accessed August 2020.

City of Santa Cruz. 2018. Emergency Operations Plan. Available: https://www.cityofsantacruz.com/home/showdocument?id=76144. Accessed August 2020.

County of Santa Cruz. 2015a (October). Operational Area Emergency Management Plan. Available: http://www.co.santa-cruz.ca.us/Portals/0/County/OES/pdfs/DRAFTOPERATIONAL%20AREA%20EMERGENCY%20MANAGEMENT%20PLAN%20%28EMP%29%202015pdf.pdf. Accessed August 2020.

———. 2015b (September). Local Hazard Mitigation Plan. Available: http://www.co.santa-cruz.ca.us/Portals/0/Local%20Hazard%20Mitigation%20Plan%202015-2020.pdf. Accessed December 2020.

DTSC. *See*. California Department of Toxic Substances Control.

Ninyo and Moore. 2004 (March 5). *Environmental Due Diligence Study*. Prepared for UC Santa Cruz, Santa Cruz, CA. Prepared by Ninyo and Moore, Oakland, CA.

State Water Resources Control Board. 2020a. University of California SC (T0608700178). Available: https://geotracker.waterboards.ca.gov/profile_report?global_id=T0608700178. Accessed August 2020.

———. 2020b. GeoTracker. Available: https://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=71003553. Accessed August 2020.

SWRCB. *See* State Water Resources Control Board.

UCOP. *See* University of California Office of the President.

University of California Office of the President. 2019. Facilities Manual. Available: https://www.ucop.edu/construction-services/facilities-manual/. Accessed September 2, 2020.

UC Santa Cruz. 2005. *UC Santa Cruz 2005 Long Range Development Plan Environmental Impact Report*. State Clearinghouse No. 2005012113. Prepared by Jones & Stokes Associates, Inc. San Jose, CA.

———. 2009 (July). *Lead Compliance Plan*. Available: https://ehs.ucsc.edu/programs/safety-ih/documents/lead-compliance-plan.pdf. Accessed on August 2020.

———. 2016a (September). Underground Storage Tanks. Available: https://ehs.ucsc.edu/programs/environmental/underground-storage.html. Accessed August 18, 2020.

———. 2016b. Laser Safety Manual. Available: https://ehs.ucsc.edu/programs/research-safety/laser-safety/LaserSafetyManual.pdf. August 2020.

———. 2016c (September 27). Laboratory Safety Fundamentals. Available: https://ehs.ucsc.edu/lab-safety-manual/lab-safety-fundamentals.html. Accessed August 2020.

———. 2016d. Emergency Operations Plan. Available: https://oes.ucsc.edu/emergency-preparedness/eop-11-2016.pdf. Accessed August 2020.

———. 2016e. Bloodborne Pathogens Program. Available: https://ehs.ucsc.edu/programs/research-safety/biosafety/bloodborne-pathogens.html. Accessed August 2020.

———. 2017a (January 12). Radiation Safety. Available: https://ehs.ucsc.edu/programs/research-safety/radiation/index.html. Accessed August 2020.

———. 2017b. Safety Data Sheets. Available: https://ehs.ucsc.edu/programs/research-safety/sds.html. Accessed August 2020.

———. 2019 (April 11). Waste Water Discharge. Available: https://ehs.ucsc.edu/programs/environmental/waste-water.html. Accessed August 2020.

———. 2020a. Injury and Illness Prevention Program. Available https://ehs.ucsc.edu/programs/IIPP/index.html. Accessed August 18, 2020.

———. 2020b (February 11). Biosafety. Available: https://ehs.ucsc.edu/programs/research-safety/biosafety/index.html. Accessed August 2020.

———. 2020c (March 23). Lab Inspections. Available: https://ehs.ucsc.edu/lab-safety-manual/labinspections.html. Accessed August 2020.

———. 2020d. Asbestos Containing Construction Materials on Campus. Available: https://ehs.ucsc.edu/programs/safety-ih/documents/ucsc-asbestos.pdf. Accessed August 2020.

———. 2020e. Hazardous Waste Storage and Disposal Guidelines. Available: https://ehs.ucsc.edu/programs/waste-management/documents/non-sci-hazwaste.pdf. Accessed August 2020.

———. 2020f. Hazardous Waste Satellite Accumulation Area. Available: https://ehs.ucsc.edu/programs/waste-management/hazwaste.html. Accessed August 2020.

———. 2020g (February 20). Biohazard and Medical Waste. Available: https://ehs.ucsc.edu/programs/waste-management/biohazard.html. Accessed August 2020.

Section 3.10, "Hydrology and Water Quality"

2NDNATURE. 2020 (September 21). *Hydrologic Modeling Results for UC Santa Cruz Campus*.

Aley, T., and Weber & Associates. 1994 (January 21). *Results of a Groundwater Tracing Study – UC Santa Cruz*.

Beck et al. 2017 (February 5). Research article: An urban runoff model designed to inform stormwater management decisions. *Journal of Environmental Management*.

California Department of Water Resources (DWR). 2019 (February 11). Groundwater Basin Assessment Tool – DWR GIS.

———. 2020. SGMA Data Viewer. Available: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#boundaries. Accessed October 20, 2020.

City of Santa Cruz. 2012 (June). *City of Santa Cruz 2030 General Plan*. Available: https://www.cityofsantacruz.com/government/about-us/general-plan. Accessed June 1, 2020.

———. n.d. *Where Does Our Water Come From?* Available: https://www.cityofsantacruz.com/government/city-departments/water/where-does-our-water-come-from. Accessed October 26, 2020.

County of Santa Cruz. 1994 (February). *County of Santa Cruz General Plan*. Accessed June 1, 2020. Available: https://www.sccoplanning.com/PlanningHome/SustainabilityPlanning/GeneralPlan.aspx

Federal Emergency Management Agency. 2017. FEMA Flood Map Service Center. September 29, 2020.

FEMA. *See* Federal Emergency Management Agency.

Gilchrist & Associates. 1990 (June). *Expanded Initial Study – Farm and Arboretum Irrigation Well*.

Huffman-Broadway Group, LLC. 2018 (October 22). *Year 4 Post-Restoration California Rapid Assessment Method Letter Report for the Stormwater Infrastructure Improvement Project, Santa Cruz, California* (Corps File # 2000-25309S).

———. 2019 (September 18). *Year 5 Post-Restoration California Rapid Assessment Method Report for the Stormwater Infrastructure Improvement Project, University of California, Santa Cruz, Santa Cruz County, California*.

Johnson, N.M. 1988 (June). *Evaluation of Drainage Conditions at the University of California Santa Cruz Under Existing and Proposed Campus Development*. Impervious-surface and development areas, revised March 1989.

———. 2003 (June). *Evaluation of Drainage and Erosion Issues, Southeast UCSC Campus*.

Johnson, N.M., Weber & Associates. 1989 (March). *Evaluation of Groundwater Resources at UCSC, Parts I and II*.

Kennedy/Jenks Consultants. 2004 (September). *Stormwater & Drainage Master Plan*.

Land Trust of Santa Cruz County. 2020. Antonelli Pond. Available: https://www.landtrustsantacruz.org/category/protected-lands/antonelli-pond/. Accessed October 22, 2020.

Nolan Associates. 2000 (July). *Geologic, Hydrologic and Groundwater Resource Assessment for the North Campus Planning Area – Santa Cruz Campus*.

Nolan, Zinn and Associates. 2004 (February). *Final Report – Biotic (Seep) Area Hydrogeologic Investigation Inclusion Area D*. UC Santa Cruz.

PRISM Climate Group. 2004 (February 4). PRISM Climate Data. Available: http://prism.oregonstate.edu. Accessed January 2021.

Rogers E. Johnson & Associates. 1985 (February). *Groundwater Hydrology Study, Phase I Report*.

———. 1987 (March 17). *Geologic Report for the UC Santa Cruz Campus*.

Rutherford & Chekene Consulting Engineers. 1992 (December 4) *Campus Drainage and Erosion Project – Lower Moore Creek, UC Santa Cruz*. Cited in UC Santa Cruz 2005.

Sherwood Design Engineers. 2020 (November). UC Santa Cruz Long Range Development Plan Water Demand Calculations Technical Memorandum.

Trinity Source Group, Inc. 2018 (May 25). *Source Area Data Gaps Investigation Report and Remedial Action Plan, Former Santa Cruz Industries, 411 Swift Street, Santa Cruz, California*.

UC Santa Cruz. 2005. *UC Santa Cruz 2005 Long Range Development Plan Final Environmental Impact Report*, SCH No. 2005012113.

———. 2016. *UC Santa Cruz Post-Construction Stormwater Management Requirements*.

Weber, Hayes & Associates. 2000 (February 15). *Dye Tracing Study in Limestone Karst – UC Santa Cruz Physical Science and College 9 and 10 Residence and Dining Hall Proposed Building Sites*.

———. 2001a (March 9). *Dye Tracing Study in Limestone Karst – Cowell College Housing Proposed Building Sites*.

———. 2001b (August 30). *Dye Tracing Study in Limestone Karst – Proposed Engineering Building Site*.

———. 2007 (December 7). *72-Hour Constant Rate Well Pumping and Aquifer Recovery Test and Pumping Impact Assessment for UCSC Water Supply Well#1 (WSW#1).*

———. 2019a (November 15). *UCSC Spring and Stream Flow Monitoring, 2019 Water Year*.

———. 2019b (June). *2018-2019 Annual Water Quality Monitoring Results, UCSC Campus Storm Water Management Program*.

Section 3.11, "Land Use and Planning"

AMBAG. *See* Association of Monterey Bay Area Governments.

Association of Monterey Bay Area Governments. 2018 (June 3). 2018 Regional Growth Forecast. Available: https://www.ambag.org/sites/default/files/2020-01/08-AMBAG_MTP-SCS_AppendixA_PDFA.pdf. Accessed June 3, 2020.

———. 2020. Regional Coordination. Available: https://ambag.org/about-us/regional-coordination. Accessed May 17, 2020.

California Department of Finance. 2007. *Report E-4: Historical City, County, and State Population Estimates, 1991-2000, with 1990 and 2000 Census Counts*. Available: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-4/1991-2000/. Accessed June 1, 2020.

———. 2020a. *Report E-1: Population Estimates for Cities, Counties, and the State*. Available: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/. Accessed May 19, 2020.

———. 2020b. *Report E-4: Population Estimates for Cities, Counties, and the State, 2011-2020, with 2010 Benchmark*. Available: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-4/2010-20/. Accessed May 19, 2020.

———. 2020c. *Report E-5: Population Estimates for Cities, Counties, and the State*. Available: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-5/. Accessed May 19, 2020.

California Employment Development Department. 2020. *Santa Cruz County Employment by Industry*. Available: https://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/localAreaProfileQSResults.asp?selectedarea=&selectedindex=&menuChoice=localAreaPro&state=true&geogArea=0604000087&submit1=View+the+Local+Area+Profile. Accessed June 2, 2020.

City of Santa Cruz. 2011 (September). *City of Santa Cruz General Plan 2030 Draft EIR*. Available: https://www.cityofsantacruz.com/government/city-departments/planning-and-community-development/long-range-policy-planning/general-plan/draft-eir-for-the-draft-general-plan-2030. Accessed August 18, 2020

———. 2012 (June). *City of Santa Cruz 2030 General Plan*.

———. 2016 (March). *2015-2023 Housing Element of the General Plan*.

DOF. *See* California Department of Finance.

EDD. *See* California Employment Development Department.

HUD. *See* U.S. Department of Housing and Urban Development.

Santa Cruz County. 2016 (April). *2015 Santa Cruz County Housing Element*. Available: http://sccoplanning.com/PlanningHome/Housing/HousingElement.aspx. Accessed July 1, 2020.

UC. *See* University of California.

UCOP. *See* University of California Office of the President.

UC Santa Cruz. *See* University of California, Santa Cruz.

University of California. No date. *Budget for Current Operations 2020-21*. Available: https://www.ucop.edu/operating-budget/_files/rbudget/2020-21-budget-detail.pdf. Accessed August 18, 2020.

University of California Office of the President. 2018 (November 14). Update on the President's Student Housing Initiative. Available: https://regents.universityofcalifornia.edu/regmeet/nov18/b1.pdf. Accessed August 2020.

University of California, Santa Cruz. 2020. Long Range Development Plan - Draft.

U.S. Department of Housing and Urban Development. 2019. Comprehensive Housing Market Analysis, Santa Cruz-Watsonville, California. Available: https://www.huduser.gov/portal/publications/pdf/SantaCruzCA-CHMA-19.pdf. Accessed November 2, 2020.

Section 3.12, "Noise"

California Department of Transportation. 2013a. (September). *Transportation and Construction Vibration Guidance Manual*. Sacramento, CA: Noise, Division of Environmental Analysis. Available: http://website.dot.ca.gov/env/noise/docs/tcvgm-sep2013.pdf. Accessed April 7, 2020.

———. 2013b (September). *Technical Noise Supplement*. California Department of Transportation Division of Environmental Analysis. Sacramento, CA. Prepared by ICF Jones & Stokes, Sacramento, CA.

Caltrans. *See* California Department of Transportation.

City of Merced. 2009. *Merced Wal-Mart Distribution Center DEIR*. Available: https://www.cityofmerced.org/departments/development-services/planning-division/wal-mart-environmental-impact-report/-folder-1222. Accessed August 28, 2020.

City of Santa Cruz. 2012. *City of Santa Cruz 2030 General Plan*. Available: https://www.cityofsantacruz.com/government/about-us/general-plan. Accessed May 20, 2020.

County of Santa Cruz. 2020a. *Santa Cruz County Code Chapter 8.30: Noise*. Available: https://www.codepublishing.com/CA/SantaCruzCounty/#!/SantaCruzCounty08/SantaCruzCounty08.html. Accessed July 8, 2020.

———. 2020b. *Santa Cruz County Code Chapter 13.15: Noise Planning*. Available: https://www.codepublishing.com/CA/SantaCruzCounty/#!/SantaCruzCounty13/SantaCruzCounty1315.html#13.15. Accessed October 20, 2020

———. 2020c. *County of Santa Cruz General Plan – Noise Element*. Available: https://www.sccoplanning.com/PlanningHome/SustainabilityPlanning/GeneralPlan.aspx. Accessed May 20, 2020.

EPA. *See* U.S. Environmental Protection Agency.

Federal Highway Administration. 2004. Traffic Noise Model, Version 2.5. Available: https://www.fhwa.dot.gov/environment/noise/traffic_noise_model/purchasing_tnm/. Accessed August 20, 2020.

———. 2006 (January). *Roadway Construction Noise Model User's Guide*. Washington, DC. Prepared by Research and Innovative Technology Administration, Cambridge, MA.

Federal Transit Administration. 2018. *Transit Noise and Vibration Impact Assessment Manual*. Washington, DC. Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed January 23, 2020.

FHWA. *See* Federal Highway Administration.

FTA. *See* Federal Transit Administration.

Governor's Office of Planning and Research. 2017 (October). *State of California General Plan Guidelines*. Sacramento, CA. Available: http://opr.ca.gov/docs/OPR_COMPLETE_7.31.17.pdf. Accessed February 21, 2020.

Lennox. 2019 (March). *716ACX MERIT Series R-410A Two-Stage Compressor Product Specifications*. Available: https://www.lennoxpros.com/docs/Technical/210873.pdf. Accessed February 21, 2020.

OPR. *See* Governor's Office of Planning and Research.

UC Santa Cruz. 2010. *General Building Requirements*. Available: https://ppc.ucsc.edu/consultants/standards.html. Accessed July 15, 2020.

———. 2017. *Major Events Policy*. Available: https://policy.ucsc.edu/policies/index.html. Accessed July 15, 2020.

U.S. Environmental Protection Agency. 1971 (December). *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*. Washington, DC. Prepared by Bolt Baranek and Newman.

WHO. See World Health Organization.

World Health Organization. 1999 (April). Guidelines for Community Noise. Available: https://www.who.int/docstore/peh/noise/Comnoise-1.pdf. Accessed August 2020.

Section 3.13, "Population and Housing"

AMBAG. *See* Association of Monterey Bay Area Governments.

Association of Monterey Bay Area Governments. 2018 (June 3). 2018 Regional Growth Forecast. Available: https://ambag.org/sites/default/files/documents/2018_Regional_Growth_Forecast_PDFA.pdf. Accessed June 3, 2020.

———. 2020. Regional Coordination. Available: https://ambag.org/about-us/regional-coordination. Accessed May 17, 2020.

California Department of Finance. 2007. Report E-4: Historical City, County, and State Population Estimates, 1991-2000, with 1990 and 2000 Census Counts. Available: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-4/1991-2000/. Accessed June 1, 2020.

———. 2019. Report E-5: Population and Housing Estimates for Cities, Counties, and the State, January 1, 2011-2019, with 2010 Benchmark. Available: http://dof.ca.gov/Forecasting/Demographics/Estimates/E-5/. Accessed January 11, 2020.

———. 2020a. Report E-1: Population Estimates for Cities, Counties, and the State. Available: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/. Accessed May 19, 2020.

———. 2020b. Report E-4: Population Estimates for Cities, Counties, and the State, 2011-2020, with 2010 Benchmark. Available: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-4/2010-20/. Accessed May 19, 2020.

———. 2020c. Report E-5: Population Estimates for Cities, Counties, and the State. Available: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-5/. Accessed May 19, 2020.

California Employment Development Department. 2020. Santa Cruz County Employment by Industry. Available: https://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/localAreaProfileQSResults.asp?selectedarea=&selectedindex=&menuChoice=localAreaPro&state=true&geogArea=0604000087&submit1=View+the+Local+Area+Profile. Accessed June 2, 2020.

City of Santa Cruz. 2011 (September). *City of Santa Cruz General Plan 2030 Draft EIR*. Available: https://www.cityofsantacruz.com/government/city-departments/planning-and-community-development/long-range-policy-planning/general-plan/draft-eir-for-the-draft-general-plan-2030. Accessed August 18, 2020

———. 2012 (June). *City of Santa Cruz 2030 General Plan*.

———. 2016 (March). *2015-2023 Housing Element of the General Plan*

———. n.d. Housing Strategy. Available: https://www.cityofsantacruz.com/government/city-departments/housing-engagement. Accessed October 27, 2020.

DOF. *See* California Department of Finance.

EDD. *See* California Employment Development Department.

HUD. *See* U.S. Department of Housing and Urban Development.

San Francisco Chronicle. 2020a. 'Heartbreaking': Sonoma County homes rebuilt after fires could be just as vulnerable to flames. Available: https://www.sfchronicle.com/california-wildfires/article/Heartbreaking-Sonoma-County-homes-rebuilt-15538947.php. Accessed October 21, 2020.

———. 2020b. Santa Cruz County lose almost 1,000 homes to CZU fire. Its housing crisis is now worse than ever. Available: https://www.sfchronicle.com/california-wildfires/article/Santa-Cruz-County-lost-almost-1-000-homes-to-the-15611152.php. Accessed October 21, 2020.

Santa Cruz County. 2020a (September 2). *CZU Lighting Incident Damage Inspection Report CA-CZU-005205*.

———. 2020b. Vacation Rentals Map. Available: http://sccounty01.co.santa-cruz.ca.us/PlanningVacationRentals/Home/Map. Accessed October 21, 2020.

Santa Cruz Sentinel. 2020. As hotel funds dry for fire survivors, a new housing crisis emerges. Available: https://www.santacruzsentinel.com/2020/10/24/as-hotel-funds-dry-for-fire-survivors-a-new-housing-crisis-emerges/. Accessed October 29, 2020.

UC. *See* University of California.

UCOP. *See* University of California Office of the President.

UC Santa Cruz. *See* University of California, Santa Cruz.

University of California. No date. *Budget for Current Operations 2020-21*. Available: https://www.ucop.edu/operating-budget/_files/rbudget/2020-21-budget-detail.pdf. Accessed August 18, 2020.

University of California Office of the President. 2018 (November 14). Update on the President's Student Housing Initiative. Available: https://regents.universityofcalifornia.edu/regmeet/nov18/b1.pdf. Accessed August 2020.

University of California, Santa Cruz. 2020a. Long Range Development Plan - Draft.

———. 2020b. *A World of Opportunities at UC Santa Cruz*. Available: https://shr.ucsc.edu/applicant_resources/world_of_opportunities.html#:~:text=As%20the%20largest%20employer%20in,in%20non%2Dacademic%20positions%20alone. Accessed December 2, 2020.

U.S. Department of Housing and Urban Development. 2019. Comprehensive Housing Market Analysis, Santa Cruz-Watsonville, California. Available: https://www.huduser.gov/portal/publications/pdf/SantaCruzCA-CHMA-19.pdf. Accessed November 2, 2020.

Section 3.14, "Public Services"

City of Santa Cruz. 2011 (September). *General Plan 2030*. State Clearinghouse No. 2009032007. Santa Cruz, CA. Prepared by Strelow Consulting. CA.

———. 2012 (June). *City of Santa Cruz General Plan 2030.* Adopted June 2012. Santa Cruz, CA.

City of Santa Cruz Police Department. 2020. Recruitment. Available: https://www.cityofsantacruz.com/government/city-departments/police/employment-new. Accessed August 12, 2020.

Donovan, Katherine. Senior Planner. City of Santa Cruz, Advance Planning Division, Santa Cruz, CA. July 15, 2020 and August 12, 2020 emails to Erika Carpenter of UC Santa Cruz regarding police protection services to UC Santa Cruz.

Ed-Data. 2020. Live Oak Elementary School. Available: https://www.ed-data.org/district/Santa-Cruz/Live-Oak-Elementary. Accessed August 2020.

Live Oak School District. 2020a. Our schools. Available: https://www.losd.ca/apps/pages/index.jsp?uREC_ID=1551551&type=d&pREC_ID=1678985.Accessed August 2020.

LOSD. *See* Live Oak School District.

Mosher, Matthew. Environmental Scientist. California Department of Forestry and Fire Protection, Felton, CA. June 17, 2020—email to Erika Carpenter of UC Santa Cruz regarding fire protection services to UC Santa Cruz.

Oatey, Rob. Division Chief. Santa Cruz Fire Department, Santa Cruz, CA. July 16, 2020—email to Erika Carpenter of UC Santa Cruz regarding fire protection services to UC Santa Cruz.

Oweis, Nader. Chief of Police. University of California, Santa Cruz Police Department, Santa Cruz, CA. June 16, 2020 and August 4, 2020—email to Erika Carpenter of UC Santa Cruz regarding police protection services to UC Santa Cruz.

Kyle, Stacey. Director of Special Projects, Research, and Evaluation. Live Oak School District, Santa Cruz, CA. August 27, 2020—email to Claudia Garcia of Ascent Environmental regarding student enrollment.

Santa Cruz City Schools. 2016. Santa Cruz City Schools Secondary Capacities and Enrollment – Current and Projected. Available: http://sccs.net/UserFiles/Servers/Server_222705/File/Facilities/Ad%20Hoc%20Facilities%20Committee%202016/2016%20DecisionInsite%20Enrollment%20Projections%20.pdf. Accessed August 2020.

———. 2020a. Schools. Available: http://sccs.net/schools. Accessed August 2020.

———. 2020b. 2019-2020 California Basic Education Data System Enrollment Report. Available: http://sccs.net/workspaces/one.aspx?objectid=91696333&contextId=93629609. Accessed August 2020.

———. 2020c (February 19) 2020-21 Enrollment Projections. Available: http://sccs.net/workspaces/one.aspx?objectid=92513720&contextId=1005998. Accessed August 2020.

———. 2020d. Developer Fees. Available: http://sccs.net/community/developer_fees. Accessed August 2020.

Santa Cruz County Sheriff's Office. 2018. Santa Cruz County Sheriff Annual Report. Available: https://www.scsheriff.com/Portals/1/County/sheriff/SCSO_Report_2018.pdf. Accessed August 2020.

SCCS. *See* Santa Cruz City Schools.

Scotts Valley Unified School District. 2020a. School Directory. Available: https://scottsvalley-ca.schoolloop.com/schools. Accessed August 2020.

———. 2020b. Developer Fees. Available: https://scottsvalley-ca.schoolloop.com/bs-dev_fees. Accessed August 2020.

SCPD. *See* City of Santa Cruz Police Department.

Simonovich, Cathie. Administrative Assistant to the Superintendent. Scotts Valley Unified School District, Scotts Valley, CA. August 26, 2020—email to Claudia Garcia of Ascent Environmental regarding school enrollment and capacity.

Soquel Union Elementary School District. 2020. Our Schools. Available: https://www.suesd.org/our-schools. Accessed August 2020.

SUESD. *See* Soquel Union Elementary School District.

SVUSD. *See* Scotts Valley Unified School District.

UC Santa Cruz. *See* University of California, Santa Cruz.

University of California, Santa Cruz. 2005. *2005 Long Range Development Plan EIR*. State Clearinghouse No. 2005012113. Santa Cruz, CA, Prepared by Impact Sciences, Inc., Oakland, CA.

———. 2018a (June 27). *Agreement for Fire Protection and Emergency Response Services*. Available: https://oes.ucsc.edu/fire-agreement/index.html. Accessed August 2020.

———. 2018b (September). *Student Housing West Revised Draft Environmental Impact Report*. State Clearinghouse No. 2017092007. Santa Cruz, CA. Prepared by Impact Sciences, Inc., Oakland, CA.

———. 2019 (November 24). About the Office of Emergency Services. Available: https://oes.ucsc.edu/about/index.html. Accessed August 2020.

———. 2020a (January 27). History of the UCSC Fire Department. Available: https://oes.ucsc.edu/fire-agreement/fire-department-history.html. Accessed August 2020.

———. 2020b. About Libraries. Available: https://library.ucsc.edu/about/about-the-libraries. Accessed August 2020.

U.S. Census. *See* U.S. Census Bureau.

U.S. Census Bureau. 2020. Annual Estimates of the Resident Population for Incorporated Places in California: April 1, 2010 to July 1, 2019. Available: https://www.census.gov/data/datasets/time-series/demo/popest/2010s-total-cities-and-towns.html#tables. Accessed August 2020.

Section 3.15, "Recreation"

California State Parks. 2020. Park System Web Map. Available: https://csparks.maps.arcgis.com/apps/Styler/index.html?appid=68b5ca1957c243ee85f4143f97d36f08. Accessed December 28, 2020.

City of Santa Cruz. 2012 (June). *City of Santa Cruz General Plan 2030.* Adopted June 2012. City of Santa Cruz, CA.

———. 2018 (January). Draft Parks Master Plan 2030. Available: https://www.cityofsantacruz.com/home/showdocument?id=75052. Accessed August 2020.———. 2020a (June 8). City of Santa Cruz Parks and Recreation System Status. Available https://www.cityofsantacruz.com/home/showdocument?id=80014. Accessed August 7, 2020.

———. 2020a (June 8). City of Santa Cruz Parks and Recreation System Status. Available https://www.cityofsantacruz.com/home/showdocument?id=80014. Accessed August 7, 2020.

———. 2020b. Parks. Available: https://www.cityofsantacruz.com/government/city-departments/parks-recreation/parks-beaches-open-spaces/parks. Accessed August 7, 2020.

UC Santa Cruz. 2005. Construction and Maintenance Policy. Available: https://physicalplant.ucsc.edu/PDFs/CandM.Policy2005.pdf. Accessed August 2020.

———. 2016 (April 11). Measure 65. Available: https://opers.ucsc.edu/archived%20pages/referenda2016/measure-65.html. Accessed August 7, 2020.

———. 2019. Recreation General Facility Policies. Available: https://recreation.ucsc.edu/facilities/policies.html. Accessed December 2020.

———. 2020a (June 12). Arboretum and Botanic Garden. Available: https://arboretum.ucsc.edu/. Accessed August 2020.

———. 2020b (March 16). UCSC Farm, Chadwick Garden, and Cowell Ranch Hay Barn. Available: https://casfs.ucsc.edu/about/facilities.html. Accessed August 2020.

UCOP. See University of California Office of the President.

University of California Office of the President. 2019 (December). BFB-BUS-29: Management and Control of University Equipment. Available: https://policy.ucop.edu/doc/3220477/BFB-BUS-29. Accessed December 2020.

———. 2020a. University of California Policy Process. Available: https://www.ucop.edu/ethics-compliance-audit-services/_files/policy-toolkit/policy-or-procedure.pdf. Accessed December 2020.

———. 2020b. Operation and Maintenance. Available: https://www.ucop.edu/construction-services/facilities-manual/volume-6/vol-6-chapter-1.html#1-3. Accessed August 2020.

Section 3.16, "Transportation, Circulation, and Parking"

AMBAG. *See* Association of Monterey Bay Area Governments.

Association of Monterey Bay Area Governments. 2018. 2040 Metropolitan Transportation Plan and the Sustainable Communities Strategy. Available: https://ambag.org/plans/2040-metropolitan-transportation-plan-sustainable-communities-strategy. Accessed September 2, 2020.

California Department of Transportation. May 20, 2020a. Vehicle Miles Traveled-Focused Transportation Impact Study Guide. Available: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/sb-743/2020-05-20-approved-vmt-focused-tisg-a11y.pdf. Accessed September 2, 2020.

———. July 2020b. Interim Land Development and Intergovernmental Review (LDIGR) Safety Review Practitioners Guidance. Available: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/sb-743/2020-07-01-interim-ldigr-safety-guidance-a11y.pdf. Accessed September 2, 2020.

California Transportation Commission. 2017. *2017 Regional Transportation Plan Guidelines for Metropolitan Transportation Planning Organizations*. Available: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/f0009312-2017rtpguidelinesformpos-a11y.pdf. Accessed November 12, 2020.

Caltrans. *See* California Department of Transportation.

City of Santa Cruz. 2012 (June). *City of Santa Cruz 2030 General Plan*. Available: https://www.cityofsantacruz.com/home/showdocument?id=71130. Accessed September 2, 2020.

———. 2017 (February 28). *City of Santa Cruz Active Transportation Plan*. Available: https://www.cityofsantacruz.com/home/showdocument?id=60966. Accessed September 2, 2020.

RTC. *See* Santa Cruz County Regional Transportation Commission.

Santa Cruz County. 1994. General Plan. Available: http://www.sccoplanning.com/PlanningHome/SustainabilityPlanning/GeneralPlan.aspx. Accessed November 12, 2020.

———. 2020. February 18, 2020. *Santa Cruz County General Plan* Circulation Element. Available: https://www.sccoplanning.com/Portals/2/County/userfiles/106/GP_Chapter%203_Circulation.pdf. Accessed September 2, 2020.

Santa Cruz County Regional Transportation Commission. 2018 (June). *2040 Santa Cruz County Regional Transportation Plan*. Available: https://sccrtc.org/wp-content/uploads/2018/04/2040RTP/FinalDraft2040RTP.pdf. Accessed September 2, 2020.

UCOP. *See* University of California Office of the President.

University of California Office of the President. 2019. *Facilities Manual*. Available: https://www.ucop.edu/construction-services/facilities-manual/. Accessed September 2, 2020.

———. 2020. Sustainable Practices Policy. Available: https://policy.ucop.edu/doc/3100155/SustainablePractices. Accessed September 2, 2020.

UCSC. *See* University of California, Santa Cruz.

University of California, Santa Cruz. 2008 (November). *University of California, Santa Cruz 2008 Bicycle Plan*. Available: https://www.cityofsantacruz.com/home/showdocument?id=42113. Accessed September 2, 2020.

———. 2019. *2017 – 2022 Campus Sustainability Plan*. Available: https://sustainabilityplan.ucsc.edu/campus-sustainability-plan/. Accessed September 2, 2020.

University of California, Santa Cruz Police Department. 2013. *Traffic and Parking Regulations*. Available: https://police.ucsc.edu/services/parking/parkreg.html. Accessed September 2, 2020.

Section 3.17, "Utilities and Service Systems"

California Department of Resources Recycling and Recovery. 2020. SWIS Facility/Site Activity Details – City of Santa Cruz Resource Recovery Facility (44-AA-0001). Available: https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1394?siteID=3417. Accessed August 23, 2020.

CalRecycle. *See* California Department of Resources Recycling and Recovery.

City of Santa Cruz. 2015. *2015 Urban Water Management Plan*. Prepared by City of Santa Cruz Water Department. Santa Cruz, CA.

———. 2018 (June). *Santa Cruz Regional Recycled Water Facilities Planning Study*. Prepared by Kennedy/Jenks Consultants. San Francisco, CA.

———. 2020a. City of Santa Cruz Water Department. Annual Water Consumption University of California Santa Cruz 1986-2018.

———. 2020b. Public Works Department. Wastewater System. Available: https://www.cityofsantacruz.com/government/city-departments/public-works/wastewater-treatment-facility. Accessed August 17, 2020.

Nelson, Bob. City of Santa Cruz Resource Recovery Facility, Resource Recovery Operations Manager. July 15, 2020—email to Katherine Donovan, Senior Planner Advance Planning Division City of Santa Cruz.

Santa Cruz Mid-County Groundwater Agency. 2019. *Santa Cruz Mid-County Groundwater Basin Groundwater Sustainability Plan*. Available: https://www.midcountygroundwater.org/sites/default/files/uploads/MGA_GSP_2019.pdf.

Santa Margarita Groundwater Agency. 2020. Available: https://smgwa.org/background/sgma/.

Sherwood Engineers. 2020 (November). UC Santa Cruz Long Range Development Plan Water Demand Projections Technical Memorandum.

UC Santa Cruz. 2017 (December). *Water Action Plan*.

———. 2018. *Student Housing West Project Revised Draft Environmental Impact Report*. State Clearinghouse No. 2017092007. Santa Cruz, CA. Prepared by Impact Sciences, Inc., Oakland, CA.

———. 2020. UCOP Waste Data 2018-2019.

West Yost. 2020 (December). *UC Santa Cruz 2020 Long Range Development Plan Water Supply Evaluation*. Prepared for UC Santa Cruz.

Section 3.18, "Wildfire"

Abatzoglou, J.T. and A.P. Williams. 2016 (October 16). Impact of anthropogenic climate change on wildfire across western U.S. forests. *Proceedings of the National Academy of Sciences* 113(42):11770-11775.

Balch, J. K., B. A. Bradley, J. T. Abatzoglou, R. C. Nagy, E. J. Fusco, and A. L. Mahood. 2017 (March 14). Human-started wildfires expand the fire nice across the United States. *Proceedings of the National Academy of Sciences* 114(11):2946-2951.

Board and CAL FIRE. *See* State Board of Forestry and Fire Protection and California Department of Forestry and Fire Protection.

CAL FIRE. *See* California Department of Forestry and Fire Protection.

California Department of Forestry and Fire Protection. 2007 (November 7). Santa Cruz County Fire Hazard Severity Zones in SRA. 1:100,000. Available: https://osfm.fire.ca.gov/media/6768/fhszs_map44.pdf. Accessed December 28, 2020.

———. 2019 (January). *Strategic Plan*. Available: https://www.fire.ca.gov/media/5504/strategicplan2019-final.pdf. Accessed August 2020.

———. 2020a. Homeowners Checklist How to Make Your Home Safe. Available: https://www.lakeshastina.com/Docs_PDFs/Checklist.pdf. Accessed October 15, 2020.

———. 2020b. *CAL FIRE Stats and Events* Available: https://www.fire.ca.gov/stats-events/. Accessed: October 15, 2020.

California Governor's Office of Emergency Services. 2017 (October 1). *State of California Emergency Plan.*

Cal OES. *See* California Governor's Office of Emergency Services.

Carey, H. and M. Schumann. 2003 (April). Modifying wildfire behavior – the effectiveness of fuel treatments. National Community Forestry Center. Southwest Region Working Paper.

City of Santa Cruz. 2018 (October 9). *Local Hazard Mitigation Plan*. Available: https://www.cityofsantacruz.com/home/showdocument?id=77162. Accessed October 15, 2020.

———. 2020a. Santa Cruz City CWPP. Available https://www.cityofsantacruz.com/home/showdocument?id=78236. Accessed October 15, 2020.

———. 2020b. Reducing Wildfire Risk. Available: https://www.cityofsantacruz.com/government/city-departments/fire-department/fire-prevention/residents-reducing-wildfire-risks. Accessed October 15, 2020.

County of Santa Cruz. 2015 (October). Operational Area Emergency Management Plan. Available: http://www.co.santa-cruz.ca.us/Portals/0/County/OES/pdfs/DRAFTOPERATIONAL%20AREA%20EMERGENCY%20MANAGEMENT%20PLAN%20%28EMP%29%202015pdf.pdf. Accessed August 2020.

Johnson, M. C. and M.C. Kennedy. 2019. Altered vegetation structure from mechanical thinning treatments changed wildfire behaviour in the wildland–urban interface on the 2011 Wallow Fire, Arizona, USA. *International Journal of Wildland Fire* 28(3): 216-229.

Kalies, E. and Yocom Kent, L. 2016. Tamm Review: Are fuel treatments effective at achieving ecological and social objectives? A systematic review. *Forest Ecology and Management*, 375, 84-95.

Kim, Y., W. Covington, P. Ervin, R. Fitch, E. L. Kalies, D. Rideout, K. Rollins, A. Sanchez-Meador, M. Taylor, D. Vosick, T. Wu, J. Yoder. 2013 (May). *The Efficacy of Hazardous Fuel Treatments: A Rapid Assessment of the Economic and Ecologic Consequences of Alternative Hazardous Fuel Treatments. Northern Arizona University*.

Loudermilk, E. L., Stanton, A., Scheller, R. M., Dilts, T. E., Weisberg, P. J., Skinner, C., & Yang, J. 2014. Effectiveness of fuel treatments for mitigating wildfire risk and sequestering forest carbon: A case study in the Lake Tahoe Basin. *Forest Ecology and Management*, 323, 114–125.

Lydersen, J. M., B.M. Collins, M.L. Brooks, J.R. Matchett, K.L. Shive, N.A. Povak, V.R. Kane, and D.F. Smith. 2017. Evidence of fuels management and fire weather influencing fire severity in an extreme fire event. *Ecological Applications* 27(7): 2013-2030.

Mann, M.L. E. Batllori, M. A. Moritz, E. K. Waller, P. Berck, A. L. Flint, L. E. Flint, E. Dolfi. 2016 (April 28). Incorporating anthropogenic influences into fire probability models: effects of human activity and climate change on fire activity in California. PLoS One 11(4): e0153589.

Martinson, E. J., and P.N. Omi. 2013. Fuel treatments and fire severity: a meta-analysis. Res. Pap. RMRS-RP-103WWW. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station. 38 p., 103.

Prichard, S.J., D.L. Peterson, and K. Jacobson. 2010 (July 24). Fuel treatments reduce the severity of wildfire effects in dry mixed conifer forest, Washington, USA. *Canadian Journal of Forest Research* 40(8):1615-1626.

Radeloff, Volker C. et al. 2018. Rapid Growth of the US Wildland-Urban Interface Raises Wildfire Risk. *Proceedings of the National Academy of Sciences* 115(13): 3314-3319.

Restaino, C., D. Young, B. Estes, S. Gross, A. Wuenschel, M. Meyer, and H. Safford. 2019. Forest structure and climate mediate drought-induced tree mortality in forests of the Sierra Nevada, USA. *Ecological Applications* 29(4): e01902.

Syphard, A. D., V. C. Radeloff, J. E. Keeley, T. J. Hawbaker, M. K. Clayton, S. I. Stewart, and R. B. Hammer. 2007. Human influence on California fire regimes. *Ecological Applications* 17(5):1388-1402.

Syphard, A.D. and J.E. Keeley. 2015. Location, timing, and extent of wildfire vary by cause of ignition. *International Journal of Wildland* Fire 24(1): 37-47.

Tubbesing, C. L., D.L. Fry, G.B. Roller, B.M. Collins, V.A. Fedorova, S.L. Stephens, and J.J. Battles. 2019. Strategically placed landscape fuel treatments decrease fire severity and promote recovery in the northern Sierra Nevada. Forest Ecology and Management 436, 45-55.

UC Santa Cruz. *See* University of California, Santa Cruz.

U.S. Forest Service. 2009 (July). *Fuel Treatments, Fire Suppression, and their Interactions with Wildfire and its Effects: The Warm Lake Experience During the Cascade Complex of Wildfires in Central Idaho, 2007*. General Technical Report RMRS-GTR-229. Fort Collins, CO.

University of California, Santa Cruz. 2016. *Emergency Operations Plan*. Available: https://oes.ucsc.edu/emergency-preparedness/eop-11-2016.pdf. Accessed August 2020.

———. 2019. *Campus Security and Fire Safety Report*. Available: https://police.ucsc.edu/crime-prevention/fire-clery-2019.pdf. Accessed October 2020.

———. 2020. Long Range Development Plan – Draft.

University of Nevada. 2010 (October). *Fire Adapted Communities: The Next Step in Wildfire Preparedness*.

Winford, E.M., J. T. Stevens, and H. D. Safford. 2015. Effects of fuel treatments on California mixed-conifer forests. California Agriculture 69: 75-81. http://dx.doi.org/10.3733/ca.v069n03p150.

Chapter 4, "Cumulative Impacts"

California Air Resources Board. 2018. Maps of State and Federal Area Designations. Available: https://ww2.arb.ca.gov/resources/documents/maps-state-and-federal-area-designations. Accessed December 28, 2020.

California Department of Conservation. 2019. Santa Cruz County 1984-2018 Land Use Summary. Available: https://www.conservation.ca.gov/dlrp/fmmp/Pages/SantaCruz.aspx. Accessed December 28, 2020.

CARB. *See* California Air Resources Board.

DOC. See California Department of Conservation.

Santa Cruz County. 2017 (August). *Draft Environmental Impact Report Commercial Cannabis Cultivation and Manufacturing Regulations and Licensing Program*. Section 3.2, Agricultural and Timber Resources.

———. 2018. *2018 Crop Report*. Prepared by the Office of the Agricultural Commissioner.

Santa Cruz County Regional Transportation Commission. 2018. *2040 Regional Transportation Plan* – Chapter 7 (System Performance). Available: https://sccrtc.org/wp-content/uploads/2018/04/2040RTP/Chpt7.pdf. Accessed September 2, 2020.

Santa Cruz County RTC. *See* Santa Cruz County Regional Transportation Commission.

Searson, C. 2020 (August 11). Personal communication with Cynthia Searson, Engineering and Compliance Specialist, Monterey Bay Air Resources District, to Christopher Lovett of Ascent Environmental. Regarding odor complaints.

Sempervirens Fund. 2020 (August). *What Recovery Means for Big Basin and Santa Cruz Redwoods*. Available: https://sempervirens.org/news/what-recovery-means-for-big-basin-and-santa-cruz-redwoods/. Accessed April 15, 2021.

Chapter 5, "Other CEQA Sections"

AMBAG. *See* Association of Monterey Bay Area Governments.

Association of Monterey Bay Area Governments. 2018. 2018 Regional Growth Forecast. Available: https://ambag.org/sites/default/files/2020-01/08-AMBAG_MTP-SCS_AppendixA_PDFA.pdf. Accessed August 25, 2020.

California Department of Finance. 2020. P-1. Total Estimated and Projected Population for California and Counties: July 1, 2010 to July 1, 2060 in 1-year Increments. Available: http://www.dof.ca.gov/Forecasting/Demographics/Projections/. Accessed August 25, 2020.

DOF. *See* California Department of Finance.

UC Santa Cruz. *See* University of California, Santa Cruz.

University of California, Santa Cruz. 2019. The Annual Impacts of University of California Santa Cruz in 2017 and Over the Last 50 Years. Available: https://planning.ucsc.edu/budget/reports-overviews/ucsc_economic_impact_2019.pdf. Accessed August 30, 2020.

Chapter 6, "Alternatives"

AMBAG. *See* Association of Monterey Bay Area Governments.

Association of Monterey Bay Area Governments. 2018. 2018 Regional Growth Forecast. Available: https://ambag.org/sites/default/files/2020-01/08-AMBAG_MTP-SCS_AppendixA_PDFA.pdf. Accessed August 25, 2020.

California Department of Finance. 2019. Report E-5: Population and Housing Estimates for Cities, Counties, and the State, January 1, 2011-2019, with 2010 Benchmark. Available: http://dof.ca.gov/Forecasting/Demographics/Estimates/E-5/. Accessed January 11, 2020.

DOF. *See* California Department of Finance.

Fort Ord Cleanup. 2020. Munitions. Available: https://fortordcleanup.com/programs/munitions/. Accessed November 2020.

Fort Ord Reuse Authority. 2001 (November). *For Ord Reuse Plan Final Environmental Impact Report* (State Clearinghouse No. 96013022). Available: https://www.fora.org/Reports/BRP/BRP_v4_FinalEIR_1997.pdf. Accessed November 2020.

Marina Coast Water District. n.d. *Urban Water Management Plan – Planning for the Future*. Available: https://www.mcwd.org/docs/conservation/18556-06%20MCWD16%20UWMP%20Infographic-06.pdf. Accessed November 12, 2020.

Monterey County. 2006. Scenic Highway Corridors and Visual Sensitivity Map. Available: https://www.co.monterey.ca.us/Home/ShowDocument?id=45072. Accessed September 1, 2020.

———. 2008. *Monterey County 2007 General Plan Environmental Impact Report*. Available: https://www.co.monterey.ca.us/home/showdocument?id=43978. Accessed November 13, 2020.

UC Santa Cruz. *See* University of California, Santa Cruz.

University of California, Santa Cruz. 2011. UC Monterey Bay Education, Science, and Technology Center Visioning Process. Available: http://www.fora.org/Reports/FinalVisionRpt12-05-11.pdf. Accessed September 1, 2020.

US Army Corps of Engineers. 2002. Final Interim Action Ordnance and Explosives Remedial Investigation/Feasibility Study for Ranges 43-48, Range 30A, Site OE-16 Former Fort Ord California. Available: https://docs.fortordcleanup.com/ar_pdfs/AR-OE-0332JJ/f_ia_oe_rifs_complete.pdf. Accessed November 2020.

9 LIST OF ABBREVIATIONS

°F	degrees Fahrenheit
2040 RTP	2040 Regional Transportation Plan
AB	Assembly Bill
AC	Academic Core
ADT	Average daily traffic
AEM	Anderson Environmental Management
AERMOD	Agency Regulatory Model Improvement Committee modeling system
AFV	alternative fuel vehicles
ALARA	As Low As Reasonably Achievable
Alquist-Priolo Act	Alquist-Priolo Earthquake Fault Zoning Act of 1972"
AMBAG	Association of Monterey Bay Area Governments
AQAP	air quality attainment plans
AQMP	Air Quality Management Plan
asf	assignable square feet
AST	aboveground storage tanks
ATCM	Airborne Toxic Control Measures
BAAQMD	Bay Area Air Quality Management District
BACT	best available control technology
bgs	below the ground surface
BIOS	Biogeographic Information and Observation System
BL	Biosafety Levels
BMP	best management practices
BP	before present
BUA	biological use authorizations
CA	Commercial Agricultural
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy
CAL FIRE	California Department of Forestry and Fire Protection
Cal/OSHA	California OSHA
CalARP	California Accidental Release Prevention Program
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGreen Code	California Green Building Standards Code
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association

CARB	California Air Resources Board
CASFS	Center for Agroecology and Sustainable Food Systems
CASGEM	California Statewide Groundwater Elevation Monitoring
CBC	California Building Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDC	Center for Disease Control
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFC	California Fire Code
CFR	Code of Federal Regulations
CGP	Construction General Permit
CHES	Colleges, Housing and Educational Services
City	City of Santa Cruz
CIWMA	California Integrated Waste Management Act
CLUMAC	Campus Land Use and Management Action Committee
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CNR	Campus Natural Reserve
CNRA	California Natural Resources Agency
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COC	constituents of concern
County OES	County Office of Emergency Services
County	Santa Cruz County
CRAM	California Rapid Assessment Method
CRHD	Cowell Ranch Historic District
CRHR	California Register of Historical Resources
CRL	Campus Resource Land
CRPR	California Rare Plant Rank
CS	Campus Support
CSA	Comprehensive Settlement Agreement
CSFM	California State Fire Marshal's
CSH	Colleges and Student Housing
CSP	California State Parks
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
CWC	California Water Code
CWHR	California Wildlife Habitat Relationship
cy	cubic yards

dB	decibels
DCFM	Designated Campus Fire Marshal
diesel PM	diesel particulate matter exhaust
DNA	deoxyribonucleic acid
DOC	California Department of Conservation's
DOF	California Department of Finance
DOT	U.S. Department of Transportation
DPR	California Department of Pesticide Regulation
DTSC	California Department of Toxic Substances Control
ECA	Essential Connectivity Areas
EH	Employee Housing
EH&S	Environmental Health and Safety department
EHS	Environmental Health and Safety
EIR	environmental impact report
EMP	Emergency Management Plan
EOP	Emergency Operations Plan
EPA	U.S. Environmental Protection Agency
EPC	Environmental Performance Criteria
EPCRA	Emergency Planning Community Right-to-Know Act
EPS	expanded polystyrene
ERC	emission reduction credits
ESA	Endangered Species Act
ESA	Environmental Site Assessment
ESU	Evolutionarily Significant Unit
EV	electric vehicle
FMMP	Farmland Mapping and Monitoring Program
FPA	Forest Practice Act
FSH	Family Student Housing
FTA	Federal Transit Administration
FTE	Full-Time Equivalent
GHG	greenhouse gas
gsf	gross square feet
GWh	gigawatt-hours
HAB	Campus Habitat Reserve
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HBG	Huffman-Broadway Group, Inc.
HCP	Habitat Conservation Plan
HMMP	Hazardous Materials Management Plan

HRA	health risk assessment
Hz	hertz
IAP	Incident Action Plan
ICS	Incident Command System
IEPR	Integrated Energy Policy Report
IIPP	Illness Prevention Program
in/sec	inches per second
IPaC	Information for Planning and Consultation
ITS	UC Santa Cruz Information Technology Services
Kresge project	Kresge College Renewal and Expansion Project
kV	kilovolts
Labs21	Laboratories for the 21st Century
LAFCO	Local Agency Formation Commission
LCP	Local Coastal Program
L_{dn}	Day-Night Level
LEED	Leadership in Energy and Environmental Design
L_{eq}	Equivalent Continuous Sound Level
LESA	land evaluation and site assessment
LEV	low-emission vehicle
LHAT	Laboratory Hazard Assessment Tool
LIDI	Low Impact Development Initiative
L_{max}	Maximum Sound Level
LOSD	Live Oak School District
LRA	Local Responsibility Areas
LRDP	Long Range Development Plan
LSM	Laboratory Safety Manual
LSO	Laser Safety Officer
LUST	leaking underground storage tank
MACT	maximum achievable control technology
MBARD	Monterey Bay Air Resources District
MBEST	Monterey Bay Education, Science and Technology
MBR	membrane bioreactor
MBSST	Monterey Bay Sanctuary Scenic Trail
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant levels
MCM	Minimum Control Measures"
MEIR	maximally exposed individual resident
METRO	Santa Cruz Metropolitan Transit District
mgd	million gallons per day
MGY	million gallons per year

MICR	maximum individual cancer risk
MLD	most likely to be descended
MMT	million metric tons
mPa	micro-Pascals
mpg	miles per gallon
mph	miles per hour
MPO	metropolitan planning organization
MRZ	Mineral Resource Zone
MS4s	municipal separate storm sewer systems
MTP/SCS	metropolitan transportation plan/sustainable communities strategy
MW	megawatts
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCCAB	North Central Coast Air Basin
NEHRP	National Earthquake Hazards Reduction Program
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act of 1966
NHTSA	National Highway Traffic Safety Administration
NIH	National Institutes of Health
NIMS	National Incident Management System
NO	nitric oxide
NO_2	nitrogen dioxide
NOI	Notice of Intent
NOP	Notice of Preparation
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPPA	The Native Plant Protection Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NWIC	Northwest Information Center
OEHHA	Office of Environmental Health Hazard Assessment
OES	Office of Emergency Services
OPR	Governor's Office of Planning and Research
OSFM	California Office of the State Fire Marshal
OSHA	Occupational Safety and Health Act
ozone	photochemical smog
PCB	polychlorinated biphenyls
PE	Physical Education and Recreation
PEA	Preliminary Endangerment Assessment
PG&E	Pacific Gas and Electric

PICA	Program in Community and Agroecology
PL	Protected Landscape
PM_{10}	respirable particulate matter
$PM_{2.5}$	fine particulate matter
PNC	particle number concentration
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
PPE	personal protective equipment
PPV	peak particle velocity
PRC	Public Resources Code
RACM	Regulated Asbestos Containing Material
RCEM	Road Construction Emissions Model
RCRA	Resource Conservation and Recovery Act
rDNA	recombinant DNA
REL	reference exposure level
RMS	root-mean-square
ROG	reactive organic gases
RPS	Renewables Portfolio Standard
RRF	Resource Recovery Facility
RTC	Regional Transportation Commission
RTPA	regional transportation planning agency
RWQCB	regional water quality control board
SAFE Rule	Safer Affordable Fuel-Efficient Vehicle Rule
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District's
SCCS	Santa Cruz City Schools
SCFD	Santa Cruz Fire Department
SCMTD	Santa Cruz Metropolitan Transit District
SCPD	Santa Cruz Police Department
SCS	Soil Conservation Service
SCWD	Santa Cruz Water Department
SEMS	Standardized Emergency Management System
SFBAAB	San Francisco Bay Area Air Basin
SFHA	special flood hazard areas
SGMA	Sustainable Groundwater Management Act of 2014
SHW	Student Housing West
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	sulfur dioxide
	Soil Survey Geographic Database [SSURGO
SOV	single-occupant vehicle
SPCC	Spill Prevention Control and Countermeasure
SPL	sound pressure level

SPP	Sustainable Practices Policy
SR	State Route
SRA	State Responsibility Area
SRS	Site Research and Support
SUESD	Soquel Union Elementary School District
SVUSD	Scotts Valley Unified School District
SVWD	Scotts Valley Water District
SWPPP	Storm Water Pollution Prevention Plan
SWQCP	Stormwater Quality Control Plan
SWRCB	State Water Resources Control Board
TAC	Toxic air contaminants
T-BACT	best available control technology for toxics
TCP	Timberland Conversion Permit
TDM	transportation demand management
TELR	tool to estimate load reductions
the Regents	Board of Regents of the University of California
THP	Timber Harvest Plan
TISG	Transportation Impact Study Guide
TMDL	total maximum daily load
TP	Timber Production
TPZ	Timberland Production Zones
TSM/TDM	transportation systems and demand management
UC	University of California
UC Santa Cruz	University of California, Santa Cruz
UC Santa Cruz EOP	Emergency Operations Plan
UC Santa Cruz or Campus	University of California, Santa Cruz
UC Santa Cruz PD	UC Santa Cruz Police Department
UC Santa Cruz SWMP	UC Santa Cruz Storm Water Management Plan
UCOP	UC Office of the President
UFP	Ultrafine particulate matter
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USDOT	United States Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGBC	U.S. Green Building Council
USGS	U.S. Geological Survey
UST	underground storage tank
UWMP	urban water management plan
VdB	vibration decibels
VHFHSZ	Very High Fire Hazard Severity Zones

VMT	vehicle miles traveled
VOC	volatile organic compound
WAP	Water Action Plan
WDR	Waste Discharge Requirements
WG	Working Group on California Earthquake Probabilities
WHO	World Health Organization
WQO	water quality objectives
WRCC	Western Regional Climate Center
WUI	Wildland-Urban Interface
WWTP	Wastewater Treatment Plant
ZEV	Zero Emission Vehicles
ZNE	Zero Net Energy