

STUDENT HOUSING WEST PROJECT

Draft Environmental Impact Report

Volume I

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1.0 INTRODUCTION

This Draft Environmental Impact Report (EIR) evaluates the potentially significant environmental effects that could result from the implementation of the proposed Student Housing West project (“SHW project” or “proposed project”). As required by the California Environmental Quality Act (CEQA), this Draft EIR (1) assesses the potentially significant environmental effects of the proposed project, including cumulative impacts of the proposed project in conjunction with other past, present and reasonably foreseeable development; (2) identifies feasible means of avoiding or substantially lessening significant adverse impacts; and (3) evaluates a range of reasonable alternatives to the proposed project, including the No Project Alternative.

In addition to the evaluation of the SHW project impacts, the University has completed a new analysis of the impacts of campus growth under the UC Santa Cruz 2005 Long Range Development Plan (LRDP) on water supply, and population and housing. That supplemental analysis is also included in this Draft EIR.

The University is the “lead agency” for the project evaluated in this Draft EIR. The Board of Regents of the University of California (“The Regents”) has the principal responsibility for approving the proposed SHW project.

1.1 PURPOSE OF THE EIR

The University has prepared this EIR for the following purposes:

- To satisfy the requirements of CEQA (Public Resources Code, Sections 21000–21178), the State CEQA Guidelines (California Code of Regulations, Title 4, Chapter 14, Sections 15000–15387), and the University of California Guidelines for the Implementation of CEQA;
- To inform the general public, the local community, responsible and interested public agencies, and The Regents of the nature of the proposed project, its potential environmental effects, measures to mitigate those effects, and alternatives to the proposed project;
- To enable The Regents to consider environmental consequences of approving the proposed project; and
- To supplement the 2005 LRDP EIR’s water supply and population and housing analysis so that the University can complete a streamlined review of subsequent projects proposed for development under the 2005 LRDP, pursuant to State CEQA Guidelines Section 15168.

As described in CEQA and the State CEQA Guidelines, public agencies are charged with the duty to avoid or substantially lessen significant environmental effects, where feasible. In discharging this duty, a public agency has an obligation to balance the project’s significant effects on the environment with its

benefits, including economic, social, technological, legal, and other benefits. This Draft EIR is an informational document, the purpose of which is to identify the potentially significant effects of the proposed project on the environment and to indicate the manner in which those significant effects can be avoided or significantly lessened; to identify any significant and unavoidable adverse impacts that cannot be mitigated; and to identify reasonable and feasible alternatives to the proposed project that would eliminate any significant adverse environmental effects or reduce the impacts to a less than significant level.

The lead agency is required to consider the information in the EIR, along with any other relevant information, in making its decisions on the proposed project. Although the EIR does not determine the ultimate decision that will be made regarding approval of the proposed project, CEQA requires the University to consider the information in the EIR and make findings regarding each significant and unavoidable effect identified in the EIR. The Regents will review and consider certification of the Final EIR prior to any decision on whether to approve the proposed SHW project.

1.2 PROJECT BACKGROUND AND NEED

In September 2006, The Regents certified UC Santa Cruz 2005 LRDP EIR (SCH #2005012113) and approved the UC Santa Cruz 2005 LRDP. The 2005 LRDP provides a comprehensive framework for the physical development of the UC Santa Cruz campus (which includes the 2,030-acre main campus and the 18-acre University-owned property at 2300 Delaware Avenue) to accommodate an on-campus three-quarter-average enrollment of 19,500 full time equivalent (FTE)¹ students by 2020-21, or an increase of approximately 5,100 students from the 2003-04 baseline.

The 2005 LRDP includes a building program to accommodate UC Santa Cruz's academic, research, and public service mission as enrollment grows, and a land use plan that assigns elements of the building program to designated land-use areas and describes general objectives that will guide development within those areas. The building program identifies a total of about 3,175,000 gross square feet of net new building space, including 1,196,000 gross square feet of student and employee housing.

The 2005 LRDP includes a land use plan which identifies areas where development is versus areas that will be preserved, and assigns land use categories/designations to all lands on the campus. The land use

¹ For quarter system campuses, including UC Santa Cruz, a full-time equivalent (FTE) student is defined as (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 credit hours per year; or (3) a graduate doctoral student who has been advanced to candidacy. Since not all students take full course loads, the number of FTE students is generally somewhat lower than the actual total number of students enrolled. However, for UC Santa Cruz, the number of FTE students is very close to the headcount, which is the actual total number of students enrolled. Therefore, the formula 1 FTE= 1 Headcount was utilized.

plan assigns the land use category Colleges and Student Housing (CSH) to 288 acres of land to the east, north, and west of the academic core in the central campus. This land use category is intended to accommodate the construction of new colleges, expansion of existing colleges through infill, new undergraduate and graduate student housing, and family student housing projects.

With respect to student housing, the 2005 LRDP set forth targets to house 50 percent of undergraduate students and 25 percent of graduate students in on-campus housing. However, as part of a 2008 Comprehensive Settlement Agreement (“Settlement Agreement”) that resolved lawsuits by the City and County of Santa Cruz and 11 citizens, the University agreed that UC Santa Cruz will provide housing to accommodate 67 percent of new student enrollment above a baseline of 15,000 three-quarter average FTE within four years of reaching that enrollment level. In addition, the University agreed that housing development in the area west of Porter College will be initiated before new bed spaces are developed in the north campus area.

In January 2016, UC President Janet Napolitano announced the UC system-wide Housing Initiative, the two overarching goals of which are to (1) ensure that each of UC's campuses has sufficient housing for its growing student population; and (2) to keep housing as affordable as possible for UC students. To plan for the needed student housing, address the University's obligation under the Settlement Agreement, and to comply with the Housing Initiative, in 2016, UC Santa Cruz conducted a detailed review of the existing housing on the campus that included: (1) the state of the existing student housing which is aging, (2) current levels of overcrowding, (3) the number of student beds needed to satisfy the terms of the Settlement Agreement as well as to address the projected demand for affordable student housing, and (4) an evaluation of a number of locations on the west campus where additional student housing could be constructed. Based on this review, UC Santa Cruz concluded that it needed to provide approximately 3,000 additional student beds on the campus to relieve overcrowding, to satisfy the requirements of the Settlement Agreement, and address the projected demand for student housing. UC Santa Cruz identified a 50-acre area south of Kresge College and west of Porter College for the construction of this additional student housing.

Given the timeframe in which the housing needed to be completed and based on the experience of other UC campuses with student housing projects, UC Santa Cruz determined that the best method of delivery for the proposed housing project would be via a private-public partnership (P3) agreement. In March 2017, UC Santa Cruz issued a request for proposals (RFP) to solicit proposals from private development teams to design, construct and maintain the proposed SHW project. The P3 developer selection process was undertaken between March and September, and the preferred development team was selected in mid-September.

Implementation of the SHW project will enable UC Santa Cruz to increase its student housing stock, eliminate some overflow bed spaces² in existing housing, replace aging housing, and meet its commitments under the Settlement Agreement.

1.3 TYPE OF CEQA DOCUMENT

The CEQA concept of "tiering" refers to the evaluation of general environmental matters in a broad program level EIR, with subsequent focused environmental documents for individual projects that implement the program. CEQA and the State CEQA Guidelines encourage the use of tiered environmental documents to reduce delays and excessive paperwork in the environmental review process. State CEQA Guidelines Section 15168(d) provides for simplifying the preparation of environmental documents for individual parts of the program by incorporating by reference analyses and discussions that apply to the program as a whole. Where an EIR has been prepared or certified for a program or plan, the environmental review for a later activity consistent with the program or plan should be limited to potentially significant effects on the environment that were not analyzed as significant in the prior EIR, that are susceptible to substantial reduction or avoidance (State CEQA Guidelines Section 15152[d]), or were not adequately addressed in the prior EIR (State CEQA Guidelines Section 15152[f]).

In accordance with CEQA Guidelines Sections 15152 and 15168 and Public Resources Code Section 21094, the environmental analysis in this Draft EIR is tiered from the UC Santa Cruz 2005 LRDP EIR. As noted above, the 2005 LRDP is a comprehensive land use plan for guiding physical development on the campus through 2020 in a way that enhances the quality of the campus environment. The proposed project is within the scope of the growth that was anticipated in the 2005 LRDP and evaluated in the 2005 LRDP EIR.

By tiering from the 2005 LRDP EIR, this Tiered EIR relies on the 2005 LRDP EIR for the following:

- a discussion of general background and setting information for environmental topic areas;
- overall growth-related issues;
- issues that were evaluated in sufficient detail in the 2005 LRDP EIR for which there is no significant new information or change in circumstances that would require further analysis; and
- an assessment of cumulative impacts.

² "Overflow" bed spaces refers to student bed spaces provided by converting lounges into bedrooms and converting double rooms into triple rooms. Currently, the Campus has approximately 9,400 beds of student housing, which include about 900 overflow bed spaces and about 130 in off-campus facilities.

As a project-level EIR tiered from the 2005 LRDP EIR, the Draft EIR relies on the cumulative impact analysis contained in the 2005 LRDP EIR. However, because the Santa Cruz County Superior Court determined the 2005 LRDP EIR's analysis of water supply and population and housing impacts to be inadequate and the Settlement Agreement does not allow the University to rely on the LRDP EIR for these two analyses, the Draft EIR does not rely on the 2005 LRDP EIR for those analyses. Rather, in compliance with the court order,³ the University has completed a new analysis of the impacts of campus growth under the 2005 LRDP on water supply, and population and housing. That supplemental analysis is included in this Draft EIR.

This Draft EIR is therefore a project-level EIR for the proposed SHW project and a Supplement to the 2005 LRDP EIR with respect to 2005 LRDP growth impacts related to water supply and population and housing.

1.4 ENVIRONMENTAL REVIEW PROCESS

1.4.1 Notice of Preparation and Scoping

A Notice of Preparation (NOP) for this project EIR was initially prepared and distributed by UC Santa Cruz to the State Clearinghouse, trustee agencies, responsible agencies, and other interested parties on August 31, 2017.⁴ Distribution of the NOP established a 30-day review period for the public and agencies to identify environmental issues that should be addressed in the Draft EIR. During the scoping period, a public meeting was held on September 28, 2017, at the Loudon Nelson Community Center at 301 Center Street, Santa Cruz to solicit comments on the scope of the EIR from interested agencies, individuals, and organizations. The August 31 NOP, comments on the August 31 NOP, and the scoping meeting transcript are included in **Appendix 1.0** in this Draft EIR.

Following the selection of the P3 developer, who put forth a project that would develop the proposed housing on two sites, with the majority of the housing on a site west of Heller Drive and a small number of student housing units on a second site at the intersection of Coolidge and Hagar Roads, on November

³ The certification of the 2005 LRDP Final EIR was challenged in 2007 by several entities, including the City of Santa Cruz. A ruling by the Santa Cruz County Superior Court in *City of Santa Cruz et. al. v. Regents of the University of California et. al.* (CV155571, consolidated with Case No. CV155583) concluded that additional analyses relating to water supply, housing, and traffic mitigation were required. For more information on the court order, see **Section 7.0**.

⁴ A NOP was issued by the Campus in April 2017 for the preparation of an EIR for an LRDP Amendment to facilitate the development of housing on the west campus. That NOP is no longer pertinent to this EIR as an LRDP amendment is not needed for the implementation of the proposed project on the selected site on the west campus. However the comments received in response to that NOP were reviewed and all applicable comments were considered in the preparation of this Draft EIR.

1, 2017, the Campus issued a revised NOP for the project EIR, and initiated another 30-day scoping period to obtain public and agency comments. The Campus also held another scoping meeting for the EIR on November 29, 2017 at the Oakes College Academic and Administration Building on the UC Santa Cruz campus. The November 1 NOP, comments on the November 1 NOP, and the second scoping meeting transcript are included in **Appendix 1.0** in this Draft EIR.

Issues that were raised during the NOP review periods by the public and agencies are addressed in the analysis in each subsection of **Chapter 4.0, Environmental Setting, Impacts and Mitigation**.

1.4.2 Publication of Draft EIR

This Draft EIR is being circulated for review and comment to the public and other interested parties, agencies, and organizations for a 45-day review period as required by California law. During the review period, copies of the Draft EIR will be available for review at the McHenry Library on UC Santa Cruz campus and the Central Branch of the Santa Cruz City/County Library in downtown Santa Cruz. Copies of this Draft EIR and reference materials used in the preparation of this EIR will be available for review during normal business hours at the UC Santa Cruz Physical Planning, Development and Operations (PPDO), Barn G, UC Santa Cruz.

In reviewing the Draft EIR, reviewers should focus on the document's adequacy in identifying and analyzing significant effects on the environment and ways in which the significant effects of the project might be avoided or mitigated. To ensure inclusion in the Final EIR and full consideration by the lead agency, comments on the Draft EIR must be received during the public review period, which ends at 5:00 PM on May 11, 2018. Written comments on the Draft EIR may be emailed to eircomment@UCSC.edu or sent to:

Director of Campus Planning
Physical Planning and Construction
University of California, Santa Cruz
1156 High Street
Santa Cruz, CA 95064
Attn: EIR Comment

1.4.3 Publication of Final EIR

Following the public hearing, and after the close of the written public comment period on the Draft EIR, responses to written and recorded comments will be prepared and published. The Final EIR, which will consist of the Draft EIR, comments on the Draft EIR, written responses to those comments, and the

Mitigation Monitoring and Reporting Program (MMRP), will be forwarded to The Regents for their consideration.

To consider approval of the proposed SHW project, Section 15090 of the State CEQA Guidelines requires The Regents to certify that:

- The Final EIR has been completed in compliance with CEQA;
- The Final EIR was presented to The Regents, and that The Regents reviewed and considered the information contained in the Final EIR prior to approving the project; and
- The Final EIR reflects the lead agency's independent judgment and analysis.

In conjunction with their certification of the Final EIR, The Regents must also adopt written findings that address each significant adverse environmental effect identified in the Final EIR, consistent with Section 15091 of the State CEQA Guidelines. The Regents must also adopt the MMRP to ensure implementation of mitigation measures that have been incorporated into the project to reduce or avoid significant effects during project construction and/or implementation.

If feasible mitigations are not available to reduce significant environmental impacts to a less than significant level, those impacts are considered significant and unavoidable. If The Regents elect to approve the proposed project, and the proposed project would have significant and unavoidable impacts, The Regents will also be required to identify the specific reasons for approving the amendment, based on the Final EIR and any other information in the public record. This "Statement of Overriding Considerations" would be incorporated into the Findings and would provide the specific reasons why the benefits of implementing the proposed project outweigh the significant unavoidable environmental effects that would result from its implementation.

1.5 INTENDED USES OF THE EIR

Three uses are envisioned for this document. The Regents will use this EIR to review and consider the environmental implications of approving the proposed SHW project. Secondly, the LRDP-level Supplemental analysis included in this EIR will be used, along with the 2005 LRDP EIR, to focus environmental review of subsequent campus development projects proposed under the 2005 LRDP. Lastly, this document may be used as a source of information by responsible agencies with permitting or approval authority over the SHW project.

1.6 ORGANIZATION OF THE EIR

This Draft EIR is organized in two volumes (Volumes I and II). Volume I presents the potential project-level environmental impacts of the proposed SHW project and also contains the LRDP-level Supplemental analysis, while Volume II provides technical appendices. The contents of Volume I include the following:

Chapter 1.0, Introduction – provides an overview of the purpose of the EIR, the type of EIR, the EIR review process, the intended uses of the EIR, and an overview of the format and contents of the EIR.

Chapter 2.0, Executive Summary – presents a brief synopsis of the proposed project and project objectives, community/agency issues, and an overview of project alternatives. This chapter also provides a table that summarizes environmental impacts that would result from implementation of the proposed project; LRDP mitigation measures to reduce potentially significant impacts, and the level of significance of impacts both before and after mitigation.

Chapter 3.0, Project Description – provides a detailed description of the proposed project, including its location, background information, objectives, and physical characteristics.

Chapter 4.0, Environmental Setting, Impacts and Mitigation – presents an analysis of environmental impacts for each environmental factor. Each subsection in **Chapter 4.0** contains a description of the environmental setting (or existing conditions); identifies the threshold of significance used to determine whether impacts would be significant or less than significant; discusses the impacts; describes LRDP mitigation measures to reduce significant environmental impacts; and describes cumulative impacts. The “Approach to Project Impact Analysis,” at the beginning of the chapter, provides an overview of the approach to the tiered environmental analysis. Based on a preliminary review of the project by the University, the comments received in response to the NOPs, and the changes in CEQA requirements since 2005, this EIR evaluates the following environmental factors in detail:

Aesthetics	Land Use and Planning
Agriculture and Forest Resources	Noise
Air Quality	Population and Housing
Biological Resources	Public Services
Cultural Resources	Transportation and Traffic
Geology and Soils	Utilities and Service Systems
Greenhouse Gas Emissions	Tribal Cultural Resources
Hydrology and Water Quality	Energy

Because the proposed project would clearly not alter the conclusions of the impact analysis in the 2005 LRDP EIR related to hazards and hazardous materials, mineral resources, and recreation, these environmental factors are not evaluated in detail in this EIR, although substantial evidence is presented in the EIR as to why these are not evaluated in detail.

Chapter 5.0, Alternatives – describes potentially feasible alternatives to the proposed project that may be capable of attaining most of the basic objectives of the project while avoiding or substantially lessening any of its significant effects. The analysis evaluates the environmental effects that would result from implementation of each of the alternatives, compares these effects to the effects that would result from implementation of the proposed project, and describes the relationship of each alternative to the project objectives.

Chapter 6.0, Other CEQA Considerations – summarizes impacts that would result from the proposed project, including significant environmental effects, significant and unavoidable environmental effects, irreversible changes to the environment, and growth-inducing impacts.

Chapter 7.0, Supplement to the 2005 LRDP EIR – presents the LRDP-level analyses of the impacts of campus growth under the 2005 LRDP on water supply, and population and housing.

Chapter 8.0, List of Preparers/Consultation – identifies lead agency staff and consultants who prepared the EIR under contract to the University. It also identifies all federal, state, or local agencies, and individuals consulted during the preparation of the Draft EIR.

The contents of Volume II include the following:

Appendix 1.0 – Notice of Preparation and Scoping Comments

Appendix 4.2 – Air Quality and Greenhouse Gas Emissions Technical Memorandum and CalEEMod Output

Appendix 4.3 – Lists of Special-Status Species with Potential to Occur on or in the Vicinity of the Project Sites

Appendix 4.9 – Noise Technical Memorandum

Appendix 4.11 – Trip Generation Estimates and Intersection Operations and Multimodal Site Access Evaluation Memorandum

Appendix 4.14 – Construction Diesel and Petroleum Fuel Consumption Tables

Appendix 7.1 – Water Supply Evaluation

2.0 EXECUTIVE SUMMARY

2.1 PURPOSE

This EIR provides an assessment of the potentially significant environmental effects from implementation of the proposed UC Santa Cruz Student Housing West project (“SHW project” or “proposed project”). This EIR also includes a Supplement to the 2005 LRDP EIR that addresses previously noted deficiencies in the 2005 LRDP EIR’s analysis of water supply impacts and the impacts of campus growth under the 2005 LRDP on population and housing.

This Executive Summary is intended to provide the decision makers, responsible agencies, and the public with a clear, simple, and concise description of the proposed project and the potential significant environmental impacts that could result from its implementation.

CEQA Guidelines (Section 15123) require that a summary be included in an EIR that identifies all major conclusions, each significant effect, recommended mitigation measure(s), and alternatives that would minimize or avoid potential significant impacts of the proposed project. The summary is also required to identify areas of controversy known to the lead agency, including issues raised by agencies and the public and issues to be resolved. These issues can include the choice among alternatives and whether or how to mitigate significant effects. All of these requirements of an EIR summary are addressed in the sections below. This summary focuses on the major areas of importance in the environmental analysis for the proposed SHW project and utilizes non-technical language to promote understanding. This summary also reports the findings of the Supplement to the 2005 LRDP EIR.

The University of California (the University) is the CEQA lead agency for the proposed project. The Board of Regents of the University of California (“The Regents”) has the principal responsibility for approving the proposed SHW project.

2.2 STUDENT HOUSING WEST PROJECT

2.2.1 Project Location

The proposed project would be constructed on two sites on the UC Santa Cruz campus: the first, 13-acre site is in the western portion of the campus, west of Heller Drive (“Heller site”) and the second, 15-acre site, is in the southeastern portion of the campus on Glenn Coolidge and Hagar Drives (“Hagar site”). The UC Santa Cruz campus is located Santa Cruz County. Most existing campus development is within the City of Santa Cruz; the remainder of the campus is within unincorporated Santa Cruz County.

2.2.2 Project Description

The SHW project is an approximately 3,000-student bed project, which is planned for completion by UC Santa Cruz by 2022, via a public-private partnership (P3) delivery method. This Draft EIR evaluates the environmental impacts from the construction of approximately 2,852 student beds on the Heller site, and 148 beds to house student families and a childcare center on the Hagar site.

The Heller site is currently developed with the Family Student Housing (FSH) complex, which includes a childcare center. The proposed project includes the demolition of the existing FSH complex and the construction of new housing, parking, and other support spaces. The proposed project would construct five apartment buildings that would provide approximately 2,652 undergraduate student beds. Buildings 1 and 3 in the northern and western portion of the site would be seven to ten stories tall. Buildings 2, 4, and 5, which would be in the central and eastern portion of the site, would vary in height from five to seven stories, with the lower portions of those buildings closer to Heller Drive and the taller sections away from Heller Drive. Graduate student housing would be provided in two buildings (Buildings 6 and 7) located in the southeastern portion of the Heller site. Each building would be four stories high and would provide approximately 100 beds, for a total of approximately 200 beds for graduate students.

The project would also include support spaces, such as laundry facilities, mail facilities, custodial space, storage, etc. In addition, student hubs would be included in Buildings 4 and 5, which would be located centrally within the site and would include retail amenities, a fitness center, administrative and student services, music practice rooms, multi-purpose rooms, study areas, convenience store, and social spaces for residents and neighboring student communities to the east and north. The project would also provide necessary parking and landscaping, and would include sustainable design features, including but not limited to an on-site wastewater treatment facility to generate recycled water for toilet flushing and irrigation, and roof-top solar panels for electricity generation.

The proposed project also includes the construction of a new family student housing complex on the Hagar site to provide approximately 148 student beds. The complex would comprise approximately 37 two-story pre-fabricated townhouses, with each building housing a two-bedroom apartment unit on the first floor and another two-bedroom apartment unit on the second floor. Each apartment would include approximately 950 square feet of interior space. Other elements of the housing complex would include community open spaces; playgrounds located centrally on the site; a 2,000-square-foot community building; and a 2,500-square-foot service and maintenance building. A new childcare center would be constructed on the southwestern portion of the Hagar site. The approximately 13,500-square-foot facility would serve up to 140 children of both employees and students and would employ 30 staff. The development of student housing on the Hagar site would require an amendment of the 2005 LRDP to

change the land use designation of the site from Campus Resource Land to Colleges and Student Housing.

The project would be constructed in two phases, with the first phase (Hagar site housing and childcare facility) available for occupancy by Fall 2019 and the remainder of the project (Heller site housing) completed by Fall 2022.

2.2.3 Project Objectives

The University has developed the following primary objectives to satisfy the requirements of *State CEQA Guidelines* Section 15124 (b).

- Comply with the University's commitment under the 2008 Comprehensive Settlement Agreement ("Settlement Agreement") to initiate housing development in the area west of Porter College before development of new beds in the North Campus Area;
- Support the development of sufficient and affordable, on-campus student housing under the UC President's Housing Initiative;
- Develop additional housing in a timely manner in order to meet the stipulation in the Settlement Agreement;
- Develop new housing while minimizing displacement impacts on students with families;
- Locate undergraduate, graduate, and family student housing on campus in order to facilitate convenient access to classrooms and other learning environments; student services; and campus amenities such as retail, restaurants and fitness facilities;
- Incorporate adequate support space needed for students and residential life staff (i.e., social space, recreational space, laundry facilities);
- Provide a childcare facility to serve both students and employees in a location that maximizes its accessibility to families living on and off campus.
- Incorporate design, massing, density, siting, and building footprint strategies to minimize removal of sensitive habitats and environmental impact;
- Develop housing at the highest level of sustainability that the project can afford, with Leadership in Energy and Environmental Design (LEED) Silver certification at a minimum; and
- Provide a reasonable amount of on-site parking to meet basic parking needs of the project while minimizing traffic impacts on campus.

2.2.4 Porter and Rachel Carson Dining Facilities Expansion Project

The Campus intends to replace and expand the existing dining facilities at Porter and Rachel Carson Colleges, close to the Heller site, by 2023. The dining expansion project is a separate project with its own separate source of funding and timeline for completion, and is not proposed as part of the SHW project. However, the dining facilities expansion project has been sized to serve the students who would live in the new housing on the Heller site and the opening of the expanded dining facilities is expected to be coordinated with the completion of the SHW project on the Heller site. The dining facility expansion project is, therefore, considered a related project, and is evaluated in this Draft EIR for its environmental impacts based on the information available at this time. The environmental impacts of the project are presented in this Draft EIR for purposes of disclosure as they are considered a foreseeable indirect consequence of the SHW project. Once the dining facilities expansion project is more completely defined, the Campus will conduct additional environmental review of that project to the extent required to form the basis of its approval or denial by the decision makers.

2.2.5 Alternatives

Consistent with CEQA requirements, the EIR evaluates a reasonable range of alternatives that could feasibly avoid or lessen any significant environmental impacts and which would feasibly attain most of the basic objectives of the proposed project. The alternatives analyzed in detail in this Draft EIR are presented below.

Alternative 1: No Project Alternative

The State CEQA Guidelines require the analysis of a No Project Alternative (Section 15126.6(e)). The analysis must discuss existing conditions, as well as what would be reasonably expected to occur in the foreseeable future if the proposed project were not to be approved, based on current plans, site zoning, and consistent with available infrastructure and community services. If a project is a development project on an identifiable site, CEQA Guideline Section 15126.6(e)(3)(B) provides that the discussion of the No Project alternative should compare the environmental effects of the site remaining in its existing state against environmental effects which would occur if the project is approved.

However, in light of the Settlement Agreement, the No Project Alternative for this EIR consists of reasonably foreseeable actions that could be taken by the University in the absence of the project to provide as many as possible of the number of beds that are required for the campus population projected under the 2005 LRDP. With respect to providing the needed student housing beds in the absence of the project, as is discussed in **Chapter 3.0, Project Description**, the Campus has already implemented a number of projects to increase the density of occupancy of existing housing and has added beds where

feasible by reconfiguring existing space as part of major maintenance/capital renewal projects (as at Crown College, where an additional 22 beds are being added). More beds cannot be added to the existing colleges on the campus without new construction, as is being planned for Kresge College, and therefore are not considered reasonably foreseeable. With regard to adding student beds at other locations on the campus, the Campus did complete an environmental review of constructing 600 student beds on the ECI site. Although the project was approved, the Campus determined that provision of the planned housing at the ECI site was infeasible. A project to redevelop the Heller site with 400 student beds and a new childcare center was evaluated in 2006 as part of the 2005 LRDP EIR and the EIR was certified. However, that redevelopment project was not approved and is not anticipated to be approved. Therefore, the No Project Alternative in this EIR is a no development alternative, under which no development would occur on either project site and no housing would be added to the campus inventory.

Under the No Project Alternative, the Heller site would remain in its current condition and would continue to provide 196 student beds and would continue to be occupied by student families, and the childcare center would remain in place. The Hagar site would remain undeveloped at least in the near term because it is designated Campus Resource Land in the 2005 LRDP, a land use designation given to land that is not planned for development under the 2005 LRDP but may be developed in the future. Until a new LRDP is adopted that redesignates the site for development or another development project is put forth under the existing LRDP that requests an LRDP amendment, the Hagar site would remain undeveloped.

Alternative 2: Reduced Project Alternative

Under the Reduced Project Alternative, only the 13-acre Heller site would be used to provide additional housing and the Hagar site would not be used. The Heller site would be developed with 148 apartment units for students with families, an expanded childcare facility and the proposed 200 graduate student beds. However, the number of undergraduate student beds would be reduced by about 900 beds, with approximately 1,752 undergraduate student beds provided under this alternative. Therefore, the alternative would provide a total of 2,100 student beds.

As undergraduates, graduates, students with families, and the childcare center would all be accommodated on the project site, it will be necessary to provide adequate separation between the three population groups. The site plan for this alternative would place the student family apartments in two four-story buildings in the southern portion of the site, with the childcare center at the eastern end of the first building near Heller Drive. Undergraduate student beds would be provided in four apartment buildings (Buildings 1 through 4), with half of Building 4 developed to provide 200 graduate student

beds. Buildings 1 and 2 in the western portion of the site would be six to seven stories high, Building 3 would be six stories high, and Building 4 would be five to six stories high.

Because the Heller site is highly constrained in terms of development area, it would not be possible to construct the housing under this alternative without first relocating at least some of the student families living in the existing FSH complex to another location. This location would likely be off campus in University-leased housing, because housing that would be suitable for student families is not available elsewhere on the campus.

Similar to the proposed project, this alternative would require the expansion of the Rachel Carson and Porter College dining facilities.

As this alternative would provide 2,100 beds compared to 3,000 beds under the proposed project, the amount of building space constructed under this alternative would be about 30 percent less than the space constructed under the proposed project. Due to the reduced size of this alternative, the construction period would be slightly shorter than the 3-year construction period associated with the Heller site development under the proposed project.

Alternative 3: Heller Site Development Only Alternative

This alternative would construct the entire proposed project on the Heller site, including the 3,000 student beds, the childcare facility, other needed student facilities, parking, and the wastewater treatment and recycled water plant and the Hagar site would not be developed as part of the alternative.

As undergraduates, graduates, students with families, and the childcare center would all be accommodated on the Heller site, the site plan for this alternative would provide all of the undergraduate beds in three quadrangles on the western portion of the site. Family student housing and the childcare center would be located in the southeastern portion of the site and the graduate housing in two buildings in the central-eastern portion of the site. Under this alternative, the family student housing would be four stories, while the undergraduate and graduate student apartment buildings would range from six to nine stories in height.

Because the Heller site is highly constrained, it would not be possible to construct the proposed housing without first relocating at least some of the student families in the existing FSH complex and the childcare facility to another location. This location would likely be existing off-campus housing that would be leased by the University, because housing that would be suitable for student families is not available elsewhere on the campus.

Similar to the proposed project, this alternative would require the expansion of the Rachel Carson and Porter College dining facilities.

Alternative 4: Heller Site and North Remote Development Alternative

Under this alternative, the Heller site would be redeveloped to provide 148 apartments for students with families, about 200 beds for graduate students, and about 1,150 undergraduate student beds. An expanded childcare facility would also be constructed. About 1,500 undergraduate beds would be provided in apartment buildings constructed on the North Remote site, such that, similar to the proposed project, this alternative would provide a total of 3,000 beds. The Hagar site would not be used for the proposed housing.

The 148 beds for student families would be provided in two four-story apartment buildings and would include the childcare center, similar to those described above for the Reduced Program Alternative. Undergraduate housing would be provided in three apartment buildings (Buildings 1 through 3). The graduate student housing would be provided in a portion of Building 3. Buildings 1 and 2 would be six stories high and located along the western side of the Heller site near the forest edge, and Building 3 would be located in the center of the site and would be five stories high.

Under this alternative, the 9.6-acre North Remote site located near the Camper Park in the northwestern portion of the campus would be used to construct student apartments to provide about 1,500 undergraduate beds. The undergraduate student beds would be accommodated within five buildings that would be five to six stories in height. The buildings at the North Remote site would be sited in a manner that would be appropriate for the site, likely alongside a loop road off of the North Remote parking lot. Development on the North Remote site would include a café, support spaces, such as laundry facilities, mail facilities, custodial space, storage, etc. Student hubs would be also included, which would be located centrally within the site and would include retail amenities, a fitness center, administrative and student services, music practice rooms, multi-purpose rooms, study areas, convenience store, and social spaces for residents. This alternative would also include a wastewater treatment and recycling facility at the North Remote site to serve the proposed residence halls.

This alternative would also require the expansion of the dining facilities at Rachel Carson and Porter Colleges to serve the approximately 1,500 students who would live on the Heller site. Due to the distance of the North Remote site from the existing colleges, students living in the housing at that site would not have convenient access to existing dining facilities at any of the colleges, and dining facilities would need to be developed as part of the project on this site.

Although this alternative would be comparable to the proposed project in terms of the number of beds, more building space would be constructed under this alternative because the development at the North Remote site would include dining facilities. Therefore, the construction duration of this alternative would be longer than that of the proposed project and is estimated to take about 4.5 to 5 years.

2.3 ISSUES TO BE RESOLVED/AREAS OF CONTROVERSY

The University issued a Notice of Preparation (NOP) for this EIR on August 31, 2017 and circulated it for 30 days.¹ The University also conducted a Scoping meeting on September 28, 2017 at the Loudon Nelson Community Center at 301 Center Street, Santa Cruz to solicit comments on the scope of the EIR from interested agencies, individuals, and organizations. Following the selection of the P3 developer who put forth a project that would develop the proposed housing on two sites, on November 1, 2017, the Campus issued a revised NOP for the project EIR, and initiated another 30-day review period to obtain public and agency comments. The Campus also held another scoping meeting for the EIR on November 29, 2017 at the Oakes College Academic and Administration Building on the UC Santa Cruz campus. Both NOPs, comments on the NOPs, and the scoping meeting transcripts are included in **Appendix 1.0** in this Draft EIR.

Based on the scoping comments received on the NOP, the University notes that the issues to be resolved and areas of controversy relate to the following:

- Visual impacts from the development of housing on the Hagar site;
- Concerns about downgradient water quality impacts from discharge of Hagar site storm water into the underlying karst formation;
- Concerns about potential impacts on special status species from Heller site development;
- Concerns about downstream erosion from discharge of Heller site runoff into the west fork of Moore Creek; and
- Concern that the proposed housing will not address the effects of campus growth on the housing supply in the City.

¹ A NOP was issued by the Campus in April 2017 for the preparation of an EIR for an LRDP Amendment to facilitate the development of housing on the west campus. That NOP is no longer pertinent to this EIR as an LRDP amendment is not needed for the implementation of the proposed project on the selected site on the west campus. However, the comments received in response to that NOP were reviewed and all applicable comments were considered in the preparation of this Draft EIR.

2.4 STUDENT HOUSING WEST IMPACT SUMMARY

A detailed discussion regarding potential environmental impacts of the proposed project is provided in **Chapter 4.0, Environmental Setting, Impacts, and Mitigation Measures**. A summary of the impacts of the proposed SHW project is provided in **Table 2.0-1, Summary of SHW Project Impacts and Mitigation Measures**. The table also lists mitigation measures, which are proposed to avoid or reduce significant or potentially significant project impacts and indicates whether implementation of the recommended mitigation measures would reduce the impact to a less than significant level.

Table 2.0-2, Summary of Dining Facilities Expansion Project Impacts, provides a similar summary of the likely environmental impacts of the related Porter and Rachel Carson Dining Facilities Expansion project

Table 2.0-3, Summary Comparison of SHW Project Alternatives, presents the potentially significant and significant environmental impacts of the proposed SHW project and compares each alternative to the proposed project to demonstrate whether the alternative would increase or decrease the proposed project's significant impacts. If an alternative would result in a new significant impact that would not occur under the proposed project, that impact is also identified in the table. The table is intended to allow the decision makers, agencies, and the public to compare and contrast these alternatives with the proposed project and weigh their relative merits and demerits.

2.5 SUPPLEMENT TO THE 2005 LRDP EIR

In September 2006, The Regents certified UC Santa Cruz 2005 LRDP EIR (SCH #2005012113) and approved the UC Santa Cruz 2005 LRDP. The 2005 LRDP provides a comprehensive framework for the physical development of the UC Santa Cruz campus (which includes the 2,030-acre main campus and the 18-acre University-owned property at 2300 Delaware Avenue) to accommodate an on-campus three-quarter-average enrollment of 19,500 full time equivalent (FTE) students by 2020-21, or an increase of approximately 5,100 students from the 2003-04 baseline. The 2005 LRDP includes a building program to accommodate UC Santa Cruz's academic, research, and public service mission as enrollment grows, and a land use plan that assigns elements of the building program to designated land-use areas and describes general objectives that will guide development within those areas. The 2005 LRDP identified targets for on-campus housing for 50 percent of undergraduate students and 25 percent of graduate students. Thus, the 2005 LRDP EIR evaluated the addition of 2,300 student beds to the inventory of 6,891 beds existing in Fall 2004, for a total of 9,190 beds.

The certification of the 2005 LRDP Final EIR was challenged in 2007 by several entities, including the City of Santa Cruz. A ruling by the Santa Cruz County Superior Court in *City of Santa Cruz et. al. v. Regents of*

the University of California et. al. (CV155571, consolidated with Case No. CV155583) concluded that additional analyses relating to water supply, housing, and traffic mitigation were required. In August 2008, a Comprehensive Settlement Agreement (2008 Settlement Agreement) was executed by all parties to resolve the lawsuits. The 2008 Settlement Agreement was entered as a final judgment of the Court.

The University decided that to address the deficiencies pointed out by the Court, it would prepare a new water supply impact analysis and a new population and housing impact analysis of campus growth under the 2005 LRDP and circulate it with the SHW project EIR. Since the prior analyses were conducted for the 2005 LRDP EIR, several years have elapsed and many changes that have occurred, which include the changes in the conditions in the project area, changes in the campus's growth projections, and changes in the amount of student housing that would be provided by the University under the 2005 LRDP. Because of this, rather than simply update the 2005 analysis, the University has prepared a new water supply impact assessment for the 2005 LRDP (including the water demand associated with the SHW project), which replaces in full the prior water supply impact analysis reported in the 2005 LRDP Final EIR. Similarly, the University has prepared a new population and housing impact assessment for the 2005 LRDP, which replaces in full the prior analysis. The new analyses are presented in full in **Chapter 7.0** of this EIR, and their findings are presented below.

2.5.1 LRDP Water Supply Assessment

Similar to the conclusions of the 2005 LRDP Final EIR with regard to water supply impacts, the new water supply impact analysis finds that the City's water supplies are adequate to serve the incremental demand for water as a result of campus growth under the 2005 LRDP in normal water years. While the supplies would be insufficient in single dry water years, conservation and curtailment are expected to substantially but not fully address the shortfall. The water supplies would be substantially inadequate under multiple dry water year conditions. Although the Campus' incremental demand would constitute a small portion of the City's water demand for water through 2023, given the severity of the supply shortfall, the University conservatively concludes that the project's contribution is considerable and that campus growth under the 2005 LRDP would contribute to the need for the City to secure a new water source to address drought conditions. The analysis of probable environmental impacts of the City's potential new water sources (including but not limited to a recycled facilities project and a desalination project) shows that these projects could result in significant or significant and unavoidable impacts. Campus growth under the 2005 LRDP would contribute to those impacts. Mitigation measures are set forth to minimize the 2005 LRDP's impact on water supply. However, it is concluded that the impact would not be reduced to a less than significant level and would be significant and unavoidable.

2.5.2 LRDP Population and Housing Impact Assessment

Similar to the conclusions of the 2005 LRDP Final EIR with regard to population and housing impacts, the new population and housing analysis also finds that campus growth under the 2005 LRDP would result in a substantial increase in the region's population and would place a substantial demand on available housing in the City of Santa Cruz, resulting in the need for the construction of additional housing. The additional housing that would be constructed would not result in significant impacts on most resources that cannot be mitigated to a less than significant level. However, the additional housing would result in significant and unavoidable cumulative impacts related to traffic and water supply. Therefore, the analysis concludes that the 2005 LRDP would result in significant impacts related to population and housing. As no mitigation is feasible, the impacts would be significant and unavoidable.

Table 2.0-1
Summary of SHW Project Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Aesthetics			
SHW Impact AES-1: Implementation of the proposed project would have a substantial adverse effect on a scenic vista.	<i>Significant</i>	No mitigation is feasible.	<i>Significant and Unavoidable</i>
SHW Impact AES-2: Implementation of the proposed project would substantially damage scenic resources.	<i>Significant</i>	No project-level mitigation measures are available to minimize the impact on scenic resources from the development of the proposed project.	<i>Significant and Unavoidable</i>
SWH Impact AES-3: Implementation of the proposed project would substantially degrade the visual character or quality of the Hagar site.	<i>Potentially Significant</i>	SHW Mitigation AES-3: The project development at the Hagar site shall incorporate climate-appropriate shrubs and low trees on the parking lot and along the Hagar Drive and Glenn Coolidge Drive. Site appropriate earth tone colors that reduce the contrast between the proposed development and the surrounding meadow shall be used.	<i>Significant and Unavoidable</i>
SHW Impact AES-4: Implementation of the proposed project would not result in a substantial adverse effect related to light and glare.	<i>Less than Significant</i>	No mitigation is required.	<i>N/A</i>
SHW Impact C-AES-1: Implementation of the proposed project would not result in significant cumulative visual impacts.	<i>Less than Significant</i>	No mitigation is required.	<i>N/A</i>

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Air Quality			
SHW Impact AIR-1: Construction of the proposed project could result in construction emissions that violate an air quality standard or contribute substantially to an existing or projected air quality violation.	<i>Significant</i>	<p>SHW Mitigation AIR-1: The P3 developer shall submit an equipment and phasing plan to UC Santa Cruz for review and approval that will demonstrate the following:</p> <ul style="list-style-type: none"> • All diesel-powered off-road equipment larger than 25 horsepower and operating on the project construction sites for more than two days in a row shall meet, at a minimum, U.S. EPA standards for Tier 3 engines or equivalent. • All diesel-powered off-road equipment larger than 25 horsepower and operating on the project construction sites for more than two days in a row shall be equipped with diesel particulate matter filters that meet CARB-certified Level 3 Diesel Particulate Filters or alternatively-fueled equipment (i.e., non-diesel) would meet this requirement. • Signal boards shall be electrically powered. • Provide electrical line power so that diesel-fueled generator use shall be limited to 100 hours total at the Hagar site. • Minimize the use of diesel-fueled generators at the Heller site. • Ensure intensive construction activities (grading and building erection) at the Hagar and Heller sites do not overlap (note that current schedule indicates these would occur at separate times). 	<i>Less than Significant</i>
SHW Impact AIR-2: Operation of the proposed project would not result in operational emissions that would violate an air quality standard or contribute substantially to an existing or projected air quality violation.	<i>Less than Significant</i>	No mitigation is required.	N/A

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
SHW Impact AIR-3: Implementation of the proposed project would expose sensitive receptors to substantial concentrations of toxic air contaminants.	<i>Significant</i>	SHW Mitigation AIR-3: Implement SHW Mitigation AIR-1.	<i>Less than Significant</i>
SHW Impact AIR-4: Implementation of the proposed project would not create objectionable odors that could affect a substantial number of people.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact AIR-5: Implementation of the proposed project would not conflict with or obstruct implementation of the applicable air quality plan.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact C-AIR-1: Implementation of the proposed project would not result in a cumulatively considerable net increase of a criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standard.	<i>Less than Significant</i>	No mitigation is required.	N/A
Biological Resources			
SHW Impact BIO-1: Development of the proposed project would result in a substantial adverse impact on two sensitive natural communities.	<i>Potentially Significant</i>	SHW Mitigation BIO-1A: The restoration to compensate for the loss of the California oat grass grassland shall be performed using native species from local seed sources. The management and monitoring plan shall be reviewed and approved by the Campus.	<i>Less than Significant</i>
		<p>SHW Mitigation BIO-1B: The Campus shall mitigate for unavoidable losses of purple needlegrass grasslands by permanently protecting at least 15 acres of existing purple needlegrass grassland within the campus or by restoring purple needlegrass grassland at a ratio of at least 1:1.</p> <p>In the event that restoration is the chosen mitigation, the Campus will identify one or more potential sites for restoration on the campus, and will prepare a management and monitoring plan, including quantitative success criteria, for the restoration site(s). The plan will specify that restoration shall be performed with purple needlegrass from local seed sources. Success criteria for the restoration shall include providing equivalent or greater overall (rather than species specific) cover of purple needlegrass as is found in the purple needlegrass grasslands that will be lost to development.</p>	

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		This management and monitoring plan shall be reviewed and approved by the Campus. Management of the site shall continue for at least 5 years to protect the purple needlegrass management areas from reverting to annual grassland. If purple needlegrass restoration does not meet the success criteria after 5 years, restoration shall be remedied (e.g., replanting) or restoration will be attempted on a new, more suitable site.	
SHW Impact BIO-2: The proposed project may result in an adverse impact, directly and indirectly, to special-status plant species at the Hagar site.	<i>Potentially Significant</i>	<p>SHW Mitigation BIO-2: Prior to the initiation of construction, a qualified botanist will conduct a focused survey for marsh microseris, San Francisco popcorn-flower, and Santa Cruz clover at the Hagar site, including the proposed utility corridor, during the appropriate blooming period (April to June). The survey will be conducted in accordance with the CDFW's <i>Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities</i> (CDFG 2009).</p> <p>If one or more of these special-status plants are found at the Hagar site and cannot be avoided during construction, a management and monitoring plan shall be prepared and thereafter, reviewed and approved by the Campus. This management and monitoring plan shall provide the location of mitigation area(s) suitable for the plant species within the campus and shall include quantitative success criteria and monitoring and reporting requirements.</p> <p>Prior to construction of the project, special-status plant seeds shall be collected and broadcast and/or the plants shall be salvaged and transplanted to the protected mitigation area(s) on the campus. Salvaged plants and seeds shall be collected by hand. If the salvaged plants and seeds cannot be replanted by November 1, they will be properly stored in a cool and dry location and replanted the following fall (September 1 to October 31). The specific monitoring and performance criteria for the mitigation for special-status plants include the following:</p> <ul style="list-style-type: none"> • Areas replanted with the salvaged plants and seeds shall be monitored for a minimum period of 5 years. • The mitigation areas shall be surveyed 	<i>Less than Significant</i>

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>annually. The number of detectable plants in leaf and/or flower is expected to vary in the mitigation area from year to year, depending on precipitation, herbivory and other ecological variables.</p> <ul style="list-style-type: none"> • Mitigation will be considered to have been a success if, for the final period of 2 years of monitoring, the number of individual plants in the mitigation area is equal to the number of plants impacted by the project. • If the number of plants does not reach the performance criterion, then adaptive management actions shall be developed and supplemental activities may be performed. These adaptive management actions could include additional seed collection, plant propagation, and/or direct sowing. 	
SHW Impact BIO-3: The proposed project would not introduce or cause the spread of noxious weeds, which could reduce the abundance of native plants and sensitive communities.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact BIO-4: The proposed project would not result in a substantial adverse impact (i.e., loss or degradation of habitat) on cave invertebrates, including the Santa Cruz telemid spider, Dollof Cave spider, Empire Cave pseudoscorpion, or Mackenzie's Cave amphipod.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact BIO-5: The proposed project could result in a substantial adverse effect on important movement habitat and direct impacts to California red-legged frog.	<i>Potentially Significant</i>	<p>SHW Mitigation BIO-5A: In addition to LRDP Mitigation BIO-9, the project shall implement the following avoidance measures.</p> <ul style="list-style-type: none"> • Prior to the commencement of construction activities, a qualified biologist shall be present a training session for all project personnel to provide an overview on the CRLF, applicable regulatory policies and provisions regarding their protection, and the avoidance and minimization measures to be followed to protect the species. All crew members shall be briefed on the reporting process in the event that an inadvertent injury should occur to a special-status species during construction. This training shall be incorporated into the daily job orientation and safety 	<i>Less than Significant</i>

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>training provided to new craft coming onsite.</p> <ul style="list-style-type: none"> • The biologist may train one or more members of the contractor staff to serve as biological monitor with responsibility for daily inspection of the construction fencing as described below. • The contractor, in coordination with the biologist, shall install exclusionary fencing around the entire project work site. The fencing shall be heavy-duty silt-fence or similar material (not open-meshed). It shall be buried a minimum of 6 inches so that CRLF cannot crawl under the fence and shall be inspected and maintained throughout the construction period, as specified below. • Installation of the fencing shall be monitored by the biologist. Cover boards shall be placed at approximately 100-foot intervals outside the fence to provide cover for wildlife that encounters the fence. Cover boards shall be monitored weekly by the biological monitor to ensure that they remain in place and are functional. • A qualified wildlife biologist shall monitor all construction activities within CRLF upland or dispersal habitat daily during initial ground-disturbing activities, including grading, excavation, and vegetation removal. • The biologist shall perform spot checks of the site once a week. • If a CRLF is observed at any time during project activities, all work that may result in disturbance, injury, or mortality to the individual shall cease. The contractor shall notify the biologist, who shall in turn contact the Campus and USFWS. • Prior to the start of daily construction activities, the biologist or a biological monitor trained by the biologist shall inspect the perimeter fence to ensure that it is not ripped or has holes and that the base is still buried. The fence shall also be inspected to ensure that no CRLF are trapped in the fence. Any CRLF found along and outside the fence shall be closely monitored until the CRLF moves away from the construction area. 	

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		SHW Mitigation BIO-5B: Temporary exclusion fencing shall be placed around the perimeter of the trenched utility corridor. If possible, all trenched areas shall be completed and backfilled by the end of the work day. Any open trenches that cannot be backfilled shall be covered by the end of the work day. If installation of the utility lines cannot be completed within one day, the utility lines shall be trenched in sections no longer than 300 feet in length to allow CRLF movement around the exclusion fences. Trenching shall not occur in amounts greater than what can be completed during the following work day.	
SHW Impact BIO-6: The proposed project could result in direct impacts to California giant salamanders.	<i>Potentially Significant</i>	SHW Mitigation BIO-6: Implement SHW Mitigations BIO-5A and 5B.	<i>Less than Significant</i>
SHW Impact BIO-7: The proposed project would not result in the loss or abandonment of active nests for special-status raptors and other special-status and protected birds.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact BIO-8: The proposed project would not result in a substantial adverse impact on western burrowing owl.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact BIO-9: The proposed project would not result in a substantial adverse impact associated with the disturbance of roosting sites for special-status bats.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact BIO-10: The proposed project would not result in a substantial adverse impact associated with the loss of potential San Francisco dusky-footed woodrat nests.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact BIO-11: The proposed project could interfere with the movement of wildlife species or with established native resident or migratory wildlife corridors.	<i>Potentially Significant</i>	SHW Mitigation BIO-11: Implement SHW Mitigation BIO-5.	<i>Less than Significant</i>
SHW Impact BIO-12: Outdoor lighting associated with the proposed project could impact wildlife behavior adjacent to the project sites.	<i>Potentially Significant</i>	SHW Mitigation BIO-12: New outdoor lighting shall be directed away from the habitat surrounding the sites and away from the proposed enhanced wildlife movement corridors at the Heller site. If necessary, dimmer lights, the use of motion sensors, and late night off-periods shall be used to minimize lighting impacts to the adjacent	<i>Less than Significant</i>

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		habitat.	
SHW Impact BIO-13: The proposed project would not conflict with a local policy for protecting biological resources.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact BIO-14: The proposed project would not conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact C-BIO-1: The proposed project, in conjunction with other past, present and reasonably foreseeable future development, would not result in significant cumulative impacts on biological resources.	<i>Less than Significant</i>	No mitigation is required.	N/A
Cultural Resources			
SHW Impact CULT-1: The proposed project would not result in a substantial adverse change in the significance of a known historical resource.	<i>Less than Significant</i>	SHW Mitigation CULT-1: Prior to ground disturbing activities in the study area, a qualified archaeologist shall re-record and photo document the isolated feature P-UCSC-012H before removing it from its current location.	N/A
SHW Impact CULT-2: The proposed project could cause a substantial adverse change in the significance of a previously unknown historical or archaeological resource, or to human remains.	<i>Potentially Significant</i>	<p>SHW Mitigation CULT-2A: If any grading is proposed within 200 feet of the known margin of CA-SCR-142, the Campus will retain a qualified archaeologist to monitor the grading and to determine whether intact deposits are present.</p> <p>If archaeological materials are exposed by grading, the Campus shall implement LRDP Mitigation CULT-1G and LRDP Mitigation CULT-4B. If human remains are exposed and the County Sheriff-Coroner determines them to be of Native American origin, the Campus shall implement LRDP Mitigation CULT-4C.</p> <p>SHW Mitigation CULT-2B: A Native American monitor of the Amah Mutsun Tribal Band will be provided an opportunity to monitor during ground disturbance within 200 feet of a known prehistoric deposit. In addition, if a previously unknown prehistoric deposit is uncovered during construction, a native American monitor of the Amah Mutsun Tribal Band will be provided the opportunity to monitor grading within 200 feet of the find.</p> <p>SHW Mitigation CULT-2C: Once the vegetation on the</p>	<i>Less than Significant</i>

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		Hagar site is removed and before any grading for project construction is undertaken, another intensive pedestrian survey of the site will be conducted by a qualified archaeologist.	
SHW Impact CULT-3: The proposed project would not adversely affect paleontological resources or unique geologic resources.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact C-CULT-1: Implementation of the proposed project would not result in significant cumulative cultural resource impacts.	<i>Less than Significant</i>	No mitigation is required.	N/A
Geology and Soils			
SHW Impact GEO-1: The proposed project would not expose people and structures to substantial adverse effects related to fault rupture, seismic ground shaking, and/or seismic-related ground failure.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact GEO-2: The proposed project would not result in substantial soil erosion or the loss of topsoil.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact GEO-3: T The proposed project would result in construction of facilities in an area underlain by karst features, which could lead to settlement or collapse beneath the structures.	<i>Potentially Significant</i>	<p>SHW Mitigation GEO-3A: The project geotechnical engineer shall develop an assumed adequate design void span acceptable for the proposed building or development loads with respect to the underlying dolines. The intent of the design void span is to protect the proposed buildings and infrastructure against collapse if said design void occurs under them.</p> <p>SHW Mitigation GEO-3B: At the time of the building foundation excavation in areas underlain by dolines, the excavation shall be examined by the project geologist and geotechnical engineer, prior to backfilling of the excavation. A geologic map portraying the distribution of rock and soil shall be prepared by the project geologist, particularly showing the geometry of the exposed marble bedrock. If previously unidentified dolines in excess of the design void span are mapped in the excavation, the project shall be redesigned to span those voids, or further subsurface work shall be performed to adequately characterize the hazard and attendant risks related to karst processes.</p> <p>SHW Mitigation GEO-3C: Implement SHW Mitigations</p>	<i>Less than Significant</i>

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		HYD-2C and -2D.	
SHW Impact GEO-4: The proposed project would not be located on expansive soils or a geologic unit that could become unstable as a result of the project.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact GEO-5: The proposed project would not be located on soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact C-GEO-1: Implementation of the proposed SHW project would not result in significant cumulative impacts related to geology and soils.	<i>Less than Significant</i>	No mitigation is required.	N/A
Greenhouse Gas Emissions			
SHW Impact GHG-1: Project construction and operation would generate greenhouse gas emissions, either directly or indirectly, that would not have a significant impact on the environment.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact GHG-2: The proposed project would not conflict with state law, UC Policy on Sustainable Practices, or the UC Santa Cruz Climate Action Plan.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact C-GHG-1: The proposed project would not result in a significant cumulative GHG impact.	<i>Less than Significant</i>	No mitigation is required.	N/A
Hydrology and Water Quality			
SHW Impact HYD-1: Construction activities associated with the proposed SHW project would not substantially degrade surface or groundwater quality.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact HYD-2: Project occupancy and operations would have the potential to substantially degrade surface or groundwater quality.	<i>Potentially Significant</i>	<p>SHW Mitigation HYD-2A: The volume of runoff flowing to the existing detention basin at the intersection of Glenn Coolidge Drive and Heller Drive shall be reduced compared to existing conditions, by directing the remainder of the runoff toward Jordan Gulch.</p> <p>SHW Mitigation HYD-2B: The existing detention basin/sinkhole shall be modified to include a graded</p>	<i>Less than Significant</i>

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		filter. ^a SHW Mitigation HYD-2C: Runoff discharged to Jordan Gulch and to the existing basin at the intersection of Glenn Coolidge Drive and Heller Drive shall be treated to the standard required in the Post-Construction Requirements prior to discharge, and the rate of discharge to the ground surface shall be metered consistent with the peak flow specifications in the Post-Construction Requirements. SHW Mitigation HYD-2D: A minimum 60-foot buffer shall be established between infiltration areas and critical structures, existing or planned, such as buildings, roadways, and life/safety infrastructure.	
SHW Impact HYD-3: Implementation of the proposed SHW project would alter drainage patterns on both the Heller and Hagar sites and increase the rate or amount of surface runoff. However, the increase in rate or amount of surface runoff would not result in substantial siltation or erosion or flooding on or off site	<i>Less than Significant</i>	SHW Mitigation HYD-3: Implement SHW Mitigations HYD-2A through -2D .	N/A
SHW Impact HYD-4: Implementation of the proposed SHW project would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact HYD-5: Implementation of the proposed SHW project would not substantially deplete groundwater supplies such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact C-HYD-1: Implementation of the proposed project would not result in significant cumulative impacts with respect to hydrology and water quality.	<i>Less than Significant</i>	No mitigation is required.	N/A
Land Use and Planning			
SHW Impact LU-1: The proposed project would not conflict with the UC Santa Cruz 2005 LRDP once amended.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact LU-2: Implementation of the	<i>Less than Significant</i>	No mitigation is required.	N/A

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
proposed project would not result in development of land uses that are substantially incompatible with existing or planned adjacent land uses.			
SHW Impact LU-3: Implementation of the proposed project would not conflict with any applicable habitat conservation plan or natural community conservation plan.	<i>No Impact</i>	No mitigation is required.	N/A
SHW Impact C-LU-1: Implementation of the proposed project would not result in significant cumulative impacts with respect to land use.	<i>Less than Significant</i>	No mitigation is required.	N/A
Noise			
SHW Impact NOIS-1: Implementation of the proposed project would not expose project residents to noise levels in excess of applicable standards.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact NOIS-2: Implementation of the proposed project would not cause a substantial permanent increase in noise levels existing without the project.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact NOIS-3: Construction associated with the proposed project would not cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact NOIS-4: Construction associated with the proposed project would not generate and expose nearby receptors and buildings to excessive groundborne vibration or groundborne vibrations.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact C-NOIS-1: Implementation of the proposed project would not result in significant cumulative noise impacts.	<i>Less than Significant</i>	No mitigation is required.	N/A
Public Services			
SHW Impact PS-1: Implementation of the proposed SHW project would not result in significant environmental impacts associated with the provision of new or altered fire protection facilities to maintain applicable service	<i>Less than Significant</i>	No mitigation is required.	N/A

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
levels.			
SHW Impact C-PS-1: Implementation of the proposed project would not result in a significant cumulative public service impacts.	<i>Less than Significant</i>	No mitigation is required.	N/A
Transportation and Traffic			
SHW Impact TRA-1: Implementation of the proposed project would not increase traffic volumes and degrade off-campus intersection levels of service under 2020 or 2023 conditions.	<i>No Impact</i>	No mitigation is required.	N/A
SHW Impact TRA -2: Implementation of the proposed project would not increase traffic volumes and degrade existing on-campus intersection levels of service under 2020 conditions but would result in a significant impact at a new intersection.	<i>Potentially Significant</i>	SHW Mitigation TRA-2: Implement one of the following options: Option 1. Provide a second driveway to the Hagar site on Glenn Coolidge Drive. Construct right-in-right-out (i.e., no left turns permitted) driveways on both Hagar Drive and Glenn Coolidge Drive. Option 2. Construct two driveway access points on Hagar Drive. Option 3. Construct a separate southbound left turn on Hagar Drive to the project driveway.	<i>Less than Significant</i>
SHW Impact TRA-3: Construction period traffic could temporarily impact traffic conditions along roadways serving the project sites, including potential effect on emergency vehicle access.	<i>Potentially Significant</i>	SHW Mitigation TRA-3: The University shall require the Project Developer to prepare and implement a Construction Traffic Management Plan that will include, but will not necessarily be limited to, the following elements: <ul style="list-style-type: none"> Identify proposed truck routes to be used. Specify construction hours, including limits on the number of truck trips during the AM and PM peak traffic periods (7:00 – 9:00 AM and 4:00 – 6:00 PM), if conditions demonstrate the need. Include a parking management plan for ensuring that construction worker parking results in minimal disruption to surrounding uses. Include a public information and signage plan to inform student, faculty and staff of the planned construction activities, roadway changes/closures, and parking changes. Store construction materials only in designated areas that minimize impacts to nearby roadways. Limit the number of lane closures during peak hours 	<i>Less than Significant</i>

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>to the extent possible. At no time will more than one lane on any roadway be closed. Inform the Campus at least two weeks before any partial road closure.</p> <ul style="list-style-type: none"> • Use California Department of Transportation (Caltrans) certified flag persons for any temporary lane closures to minimize impacts to traffic flow, and to ensure safe access into and out of the project sites. • Install traffic control devices as specified in the California Department of Transportation Manual of Traffic Controls for Construction and Maintenance Work Zones. • When a pedestrian/bicycle path is to be closed, detour signs will be installed to clearly designate an alternative route. Temporary fencing or other indicators of pedestrian and bicycle hazards will be provided. • To minimize disruption of emergency vehicle access, affected jurisdictions (Campus Police, City Police, County Sheriff, and City Fire Department) will be consulted to identify detours for emergency vehicles, which will then be posted by the construction contractor. • Ensure that access to fire hydrants remains available at all times. • Coordinate with local transit agencies for temporary relocation of routes or bus stops in works zones, as necessary. • Coordinate with other projects under construction in the immediate vicinity, so an integrated approach to construction-related traffic is developed and implemented. 	
SHW Impact TRA-4: Implementation of the proposed project would not result in hazards due to design features or land use incompatibilities	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact TRA-5: The proposed project would not impair emergency access in the long-term.	<i>No Impact</i>	No mitigation is required.	N/A
SHW Impact TRA-6: The proposed project would conflict with UC Santa Cruz policies related to alternative transportation.	<i>Potentially Significant</i>	SHW Mitigation TRA-6A: The circulation element of the project design for the Heller site shall include provisions for a clear, safe path of travel from the project site to the	<i>Less than Significant</i>

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		<p>bus stop on the east side of Heller Drive, north of Oakes Road.</p> <p>Consistent with LRDP Mitigations TRA-4A and TRA-4C, the Campus shall monitor pedestrian traffic and transit times at the Heller Drive crossing adjacent to the project site and, if warranted, extend the existing crossing guard program to this crossing.</p> <p>SHW Mitigation TRA-6B: The Campus shall install a paved pathway along the north side of Glenn Coolidge Drive from the bus stop on Glenn Coolidge Drive to the intersection of Hagar Drive/Glenn Coolidge Drive and a crosswalk across the north leg of the intersection of Hagar Drive/Glenn Coolidge Drive prior to occupation of the proposed project. The design of the pathway and crosswalk shall meet the standards contained in the 2010 ADA Standards for Accessible Design. The Campus shall also improve the south side sidewalk to be ADA compliant.</p>	
SHW Impact C-TRA-1: Implementation of the proposed SHW project would not result in significant cumulative traffic impacts.	<i>Less than Significant</i>	No mitigation is required.	<i>Less than Significant</i>
Tribal Cultural Resources			
SHW Impact TCR-1: The proposed project could cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Section 21074.	<i>Potentially Significant</i>	SHW Mitigation TCR-1: Implement SHW Mitigation CULT-2A through 2C .	<i>Less than Significant</i>
SHW Impact C-TCR-1: Implementation of the proposed project would not result in a significant cumulative impact on Tribal Cultural Resources.	<i>Less than Significant</i>	No mitigation is required.	N/A
Utilities and Service Systems			
SHW Impact UTIL-1: The proposed project would not cause an exceedance of applicable wastewater treatment requirements but would entail the construction of new wastewater treatment facilities, the construction of which could result in significant environmental effects.	<i>Potentially Significant</i>	SHW Impact UTIL-1: Implement SHW Mitigations BIO-1B, BIO-2, and CULT-2B .	<i>Less than Significant</i>
SHW Impact UTIL-2: The proposed project would result in the construction of off-site wastewater conveyance infrastructure, the	<i>Potentially Significant</i>	SHW Mitigation UTIL-2: Implement SHW Mitigations BIO-1B, BIO-2, and CULT-2B .	<i>Less than Significant</i>

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
construction of which could cause significant environmental effects.			
SHW Impact UTIL-3: The proposed project would require the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.	<i>Potentially Significant</i>	SHW Mitigation UTIL-3: Implement SHW Mitigations BIO-1B, BIO-2, and CULT-2B.	<i>Less than Significant</i>
SHW Impact UTIL-4: The proposed project would increase the amount of water used on the project site, and would be adequately served by existing entitlements and water resources under normal water years but not under multiple dry year conditions.	<i>Significant</i>	No mitigation is feasible. The Campus has designed the proposed SHW project as a highly water efficient project that includes the use of recycled water and water efficient fixtures. No other design features or fixtures are available to further reduce the project's potable water demand.	<i>Significant and Unavoidable</i>
SHW Impact UTIL-5: The proposed project would increase the amount of solid waste generated on the project site, but would be adequately served by the regional landfill and would also comply with federal, state, and local statutes and regulations related to solid waste.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact C-UTIL-1: The proposed project, in conjunction with other past, present and reasonably foreseeable future development, would result in a significant cumulative impact on utilities.	<i>Significant</i>	No mitigation is feasible.	<i>Significant and Unavoidable</i>
Energy			
SHW Impact EN-1: Construction and operation of the proposed project would increase the use of energy resources on the project site but would not result in wasteful, inefficient or unnecessary consumption of energy resources.	<i>Less than Significant</i>	No mitigation is required.	N/A
SHW Impact EN-2: The proposed project would not require or result in the construction of new or expanded electrical or natural gas facilities, which would cause significant environmental effects.	<i>Less than Significant</i>	No mitigation is required.	N/A
Other Resources			
Impact AG-1: The proposed SHW project and the related dining facilities expansion project would not convert farmland to non-agricultural use, conflict with existing zoning for agricultural use	<i>Less than Significant</i>	No mitigation is required.	N/A

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
or a Williamson Act contract, or conflict with existing zoning for, or cause rezoning of, forestland or timberland. In addition, the proposed SHW project and the related dining facilities expansion project would not result in the loss of forestland or conversion of forestland to non-forest use, or involve other changes in the existing environment that could result in conversion of Farmland to non-agricultural use.			
Impact HAZ-1: The proposed SHW project and the related dining facilities expansion project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	<i>Less than Significant</i>	No mitigation is required.	N/A
Impact HAZ-2: The proposed SHW project and the related dining facilities expansion project would not 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.	<i>Less than Significant</i>	No mitigation is required.	N/A
Impact HAZ-3: The proposed SHW project and the related dining facilities expansion project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	<i>No Impact</i>	No mitigation is required.	N/A
Impact HAZ-4: The proposed SHW project and the related dining facilities expansion project would not 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, it would not create a significant hazard to the public or the environment.	<i>No Impact</i>	No mitigation is required.	N/A
Impact HAZ-5: The proposed SHW project and dining facilities expansion project would not be 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, and the proposed project would not result in a	<i>No Impact</i>	No mitigation is required.	N/A

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
safety hazard for people residing or working in the project area.			
Impact HAZ-6: The proposed SHW project and the related dining facilities expansion project would not be located within the vicinity of a private airstrip, and would not result in a safety hazard for people residing or working in the project area.	<i>No Impact</i>	No mitigation is required.	N/A
Impact HAZ-7: The proposed SHW project and the related dining facilities expansion project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	<i>Less than Significant</i>	No mitigation is required.	N/A
Impact HAZ-8: The proposed SHW project and the related dining facilities expansion project would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.	<i>Less than Significant</i>	No mitigation is required.	N/A
Impact MR-1: The proposed SHW and dining facilities expansion projects would not result in the loss of availability of a known mineral resource or in the loss of availability of a locally important mineral resource recovery site.	<i>Less than Significant</i>	No mitigation is required.	N/A
<p>Notes:</p> <p>a. Graded filters are a method of sinkhole repair that allow for downward seepage of water while retaining the soil so as to prevent any further sinkhole collapse. The sinkhole area is excavated to the throat of the sinkhole at the bedrock surface. The excavation is then filled with graded sand and gravel, which may be surrounded by a geotextile to prevent raveling of the sand and gravel.</p>			

Table 2.0-2
Summary of Dining Facilities Expansion Project Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Aesthetics			
DF Impact AES-1: The implementation of the proposed dining facilities project would not result in a significant impact on scenic vistas, scenic resources, visual character and quality, or light and glare.	<i>Less than Significant</i>	No mitigation is required.	N/A
Air Quality			
DF Impact AIR-1: The implementation of the proposed dining facilities project would not result in a significant impact on air quality during construction and operations.	<i>Less than Significant</i>	No mitigation is required.	N/A
Biological Resources			
DF Impact BIO-1: The proposed dining facilities expansion project would not result in potential significant impacts to nesting birds.	<i>Less than Significant</i>	No mitigation is required.	N/A
DF Impact BIO-2: The proposed dining facilities expansion project would result in potential significant impacts to California red-legged frog.	<i>Potentially Significant</i>	DF Mitigation BIO-2: Implement SHW Mitigation BIO-5.	<i>Less than Significant</i>
DF Impact BIO-3: Implementation of the proposed dining facilities expansion project would not interfere with wildlife movement.	<i>Less than Significant</i>	No mitigation is required.	N/A
DF Impact BIO-4: Implementation of the proposed dining facilities expansion project would not result in any significant conflicts with local plans and policies.	<i>Less than Significant</i>	No mitigation is required.	N/A
Cultural Resources			
DF Impact CULT-1: The implementation of the proposed dining facilities expansion project would not cause a substantial adverse change in the significance of prehistoric or historic period archaeological resources, human remains, or paleontological resources.	<i>Less than Significant</i>	No mitigation is required.	N/A

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Geology and Soils			
DF Impact GEO-1: The proposed dining facilities expansion project would not expose people and structures to substantial adverse effects related to fault rupture, seismic ground shaking, seismic-related ground failure, landslides and cut slopes, or existing geologic conditions. Project implementation would also not result in substantial soil erosion or involve soils incapable of adequately supporting the use of septic tanks.	<i>Less than Significant</i>	No mitigation is required.	N/A
Greenhouse Gas Emissions			
DF Impact GHG-1: The proposed dining facilities project would not generate greenhouse gas emissions, either directly or indirectly, that would have a significant impact on the environment, nor would the proposed trail conflict with any applicable plans or policies for reducing greenhouse gas emissions.	<i>Less than Significant</i>	No mitigation is required.	N/A
Hydrology			
DF Impact HYD-1: The implementation of the proposed dining facilities expansion project would not have a significant impact related to water quality; siltation, erosion or flooding due to the alternation of drainage patterns; and groundwater recharge.	<i>Less than Significant</i>	No mitigation is required.	N/A
Land Use and Planning			
DF Impact LU-1: The proposed dining facilities expansion project would not conflict with the 2005 LRDP or with plans, policies, and regulations. In addition, implementation of the proposed dining expansion facilities project would not result in incompatible land uses nor would it conflict with an applicable habitat conservation plan or natural community conservation plan.	<i>Less than Significant</i>	No mitigation is required.	N/A
Noise			
DF Impact NOI-1: Construction activities associated with the dining facilities expansion project would substantially increase noise levels at residential uses in the vicinity but would not	<i>Significant</i>	No further mitigation is feasible.	<i>Significant and Unavoidable</i>

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
expose persons to excessive groundborne vibration. The proposed project would not increase traffic-related noise levels.			
Public Services			
DF Impact PS-1: The implementation of the proposed dining facilities expansion project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police, schools, and parks. In addition, implementation of the proposed dining expansion facilities project would not 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.	<i>Less than Significant</i>	No mitigation is required.	N/A
Transportation and Traffic			
DF Impact TRA-1: The implementation of the proposed dining facilities expansion project would not conflict with any applicable plans, ordinances or policies establishing measures of effectiveness for the performance of the traffic circulation system; increase traffic hazards; or result in inadequate emergency access.	<i>Less than Significant</i>	No mitigation is required.	N/A
Tribal Cultural Resources			
DF Impact TCR-1: Implementation of the proposed project would be unlikely to cause a substantial adverse change in the significance of a Tribal Cultural Resource.	<i>Less than Significant</i>	No mitigation is required.	N/A
Utilities and Service Systems			
DF Impact UTIL-1: The implementation of the proposed dining facilities project would not cause substantial adverse impacts requiring new or expanded water supply or expansion of a water delivery system; result in the construction of new wastewater treatment facilities or	<i>Less than Significant</i>	No mitigation is required.	N/A

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
conveyance systems; or require construction or expansion of new storm water drainage facilities. The proposed dining facilities project would comply with all regulations related to solid waste and there would be sufficient landfill capacity to serve the proposed project.			
Energy			
DF Impact EN-1: Construction and operation of the proposed dining facilities expansion project would minimally increase the consumption of energy but would not result in wasteful, inefficient or unnecessary consumption of energy or exceed the capacity of distribution systems.	<i>Less than Significant</i>	No mitigation is required.	N/A

Table 2.0-3
Summary Comparison of SHW Project Alternatives^a

Project Impact	Proposed Project (Before and After Mitigation)	Alternative 1: No Project	Alternative 2: Reduced Project	Alternative 3: Heller Site Development Only	Alternative 4: Heller Site and North Remote Site Development
Aesthetics					
SHW Impact AES-1: Implementation of the proposed project would have a substantial adverse effect on a scenic vista.	<i>S/SU</i>	<i>Avoided; NI</i>	<i>Reduced; S/SU</i>	<i>Greater; S/SU</i>	<i>Reduced; S/SU</i>
SHW Impact AES-2: Implementation of the proposed project would substantially damage scenic resources.	<i>S/SU</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>
SWH Impact AES-3: Implementation of the proposed project would substantially degrade the visual character or quality of the Hagar site.	<i>PS/SU</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>

Project Impact	Proposed Project (Before and After Mitigation)	Alternative 1: No Project	Alternative 2: Reduced Project	Alternative 3: Heller Site Development Only	Alternative 4: Heller Site and North Remote Site Development
Air Quality					
SHW Impact AIR-1: Construction of the proposed project could result in construction emissions that violate an air quality standard or contribute substantially to an existing or projected air quality violation.	<i>S/LTS</i>	Avoided; <i>LTS</i>	Reduced; <i>LTS</i>	Similar; <i>S/LTS</i>	Similar; <i>S/LTS</i>
SHW Impact AIR-3: Implementation of the proposed project would expose sensitive receptors to substantial concentrations of toxic air contaminants.	<i>S/LTS</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>
Biological Resources					
SHW Impact BIO-1: Development of the proposed project would result in a substantial adverse impact on two sensitive natural communities.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Reduced; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>	Greater; <i>PS/LTS</i>
SHW Impact BIO-2: The proposed project may result in an adverse impact, directly and indirectly, to special-status plant species at the Hagar site.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>
SHW Impact BIO-5: The proposed project could result in a substantial adverse effect on important movement habitat and direct impacts to California red-legged frog.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>
SHW Impact BIO-6: The proposed project could result in direct impacts to California giant salamanders.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>
SHW Impact BIO-11: The proposed project could interfere with the movement of wildlife species or with established native resident or migratory wildlife corridors.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>
SHW Impact BIO-12: Outdoor lighting associated with the proposed project could impact wildlife behavior adjacent to the project sites.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>
Cultural Resources					
SHW Impact CULT-2: The proposed project could cause a substantial adverse change in the significance of a previously unknown historical or archaeological resource, or to human remains.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>

Project Impact	Proposed Project (Before and After Mitigation)	Alternative 1: No Project	Alternative 2: Reduced Project	Alternative 3: Heller Site Development Only	Alternative 4: Heller Site and North Remote Site Development
Geology and Soils					
SHW Impact GEO-3: The proposed project would result in construction of facilities in an area underlain by karst features, which could lead to settlement or collapse beneath the structures.	<i>PS/LTS</i>	Avoided; <i>LTS</i>	Reduced; <i>PS/LTS</i>	Reduced; <i>PS/LTS</i>	Reduced; <i>PS/LTS</i>
Hydrology and Water Quality					
SHW Impact HYD-2: Project occupancy and operations would have the potential to substantially degrade surface or groundwater quality.	<i>S/LTS</i>	Reduced; <i>LTS</i>	Similar; <i>S/LTS</i>	Similar; <i>S/LTS</i>	Similar; <i>S/LTS</i>
Transportation and Traffic					
SHW Impact TRA-2: Implementation of the proposed project would not increase traffic volumes and degrade existing on-campus intersection levels of service under 2020 conditions but would result in a significant impact at a new intersection.	<i>S/LTS</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>
SHW Impact TRA-3: Construction period traffic could temporarily impact traffic conditions along roadways serving the project sites, including potential effect on emergency vehicle access.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Reduced; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>
SHW Impact TRA-6: The proposed project would conflict with UC Santa Cruz policies related to alternative transportation.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Reduced; <i>PS/LTS</i>	Reduced; <i>PS/LTS</i>	Reduced; <i>PS/LTS</i>
Tribal Cultural Resources					
SHW Impact TCR-1: The proposed project could cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Section 21074.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Reduced; <i>PS/LTS</i>	Reduced; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>
Utilities and Service Systems					
SHW Impact UTIL-1: The proposed project would not cause an exceedance of applicable wastewater treatment requirements but would entail the construction of new wastewater treatment facilities, the construction of which could result in cause significant environmental effects.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Reduced; <i>PS/LTS</i>	Reduced; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>

Project Impact	Proposed Project (Before and After Mitigation)	Alternative 1: No Project	Alternative 2: Reduced Project	Alternative 3: Heller Site Development Only	Alternative 4: Heller Site and North Remote Site Development
SHW Impact UTIL-2: The proposed project would result in the construction of off-site wastewater conveyance infrastructure, the construction of which could cause significant environmental effects.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>
SHW Impact UTIL-3: The proposed project would require the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>
SHW Impact UTIL-4: The proposed project would increase the amount of water used on the project site, and would be adequately served by existing entitlements and water resources under normal water years but not under multiple dry year conditions.	<i>S/SU</i>	Greater; <i>S/SU</i>	Similar; <i>S/SU</i>	Similar; <i>S/SU</i>	Similar; <i>S/SU</i>
SHW Impact C-UTIL-1: The proposed project, in conjunction with other past, present and reasonably foreseeable future development, would result in a significant cumulative impact on utilities.	<i>S/SU</i>	Greater; <i>S/SU</i>	Similar; <i>S/SU</i>	Similar; <i>S/SU</i>	Similar; <i>S/SU</i>
Other Resources					
SHW Impact AG-1: The proposed SHW project and the related dining facilities expansion project would not convert farmland to non-agricultural use, conflict with existing zoning for agricultural use or a Williamson Act contract, or conflict with existing zoning for, or cause rezoning of, forestland or timberland. In addition, the proposed SHW project and the related dining facilities expansion project would not result in the loss of forestland or conversion of forestland to non-forest use, or involve other changes in the existing environment that could result in conversion of Farmland to non-agricultural use.	<i>LTS</i>	Avoided; <i>NI</i>	Similar; <i>LTS</i>	Similar; <i>LTS</i>	Greater; <i>LTS</i>

Project Impact	Proposed Project (Before and After Mitigation)	Alternative 1: No Project	Alternative 2: Reduced Project	Alternative 3: Heller Site Development Only	Alternative 4: Heller Site and North Remote Site Development
<p><i>a. This table lists only the significant or potentially significant environmental impacts of the proposed SHW project.</i></p> <p>KEY</p> <p>SU Significant and unavoidable</p> <p>S Significant impact</p> <p>PS Potentially significant impact</p> <p>LTS Less than significant impact</p> <p>NI No Impact</p> <p>Avoided Proposed project's impact avoided</p> <p>Similar Impact similar to proposed project</p> <p>Reduced Impact less than proposed project</p> <p>Greater Impact greater than proposed project</p>					

3.0 PROJECT DESCRIPTION

3.1 INTRODUCTION

This chapter of the EIR presents details of the proposed UC Santa Cruz Student Housing West project (“SHW project” or “proposed project”), including the need for the project and its objectives, its various components and design features, and construction schedule and activities.

The proposed project is an approximately 3,000-student bed project, which is planned for completion by UC Santa Cruz by 2022, via a public-private partnership (P3) delivery method. This Draft EIR evaluates the environmental impacts from the provision of approximately 2,852 student beds west of Heller Drive, and 148 beds for student families northeast of the intersection of Glenn Coolidge Drive and Hagar Drive. The development of student housing on the Hagar site would require an amendment of the 2005 LRDP to change the land use designation from Campus Resource Land to Colleges and Student Housing. The project would be constructed in phases with the first phase available for occupancy by Fall 2019 and the remainder of the project completed by Fall 2022.

3.2 PROJECT LOCATION AND SURROUNDING USES

The UC Santa Cruz campus is located in the City of Santa Cruz, with a portion of the campus outside City limits and within unincorporated Santa Cruz County. **Figure 3.0-1, Regional Location**, shows the location of the campus. The proposed project would be constructed on two sites: the first site is in the western portion of the campus, west of Heller Drive (“Heller site”) and the second site is in the southeastern portion of the campus on Glenn Coolidge and Hagar Drives (“Hagar site”) (**Figure 3.0-2, Project Locations**).

Public open space borders the campus on two sides: Pogonip City Park and Henry Cowell Redwoods State Park on the east and Wilder Ranch State Park on the west. On the south, the campus borders the city’s upper west side residential neighborhoods. The rural residential Cave Gulch neighborhood is located adjacent to a portion of the campus’s northwestern boundary. To the north, the campus is

bounded by private land and small-scale rural development. High Street, Bay Street, Western Drive and Empire Grade Road are the primary access routes to the campus.

3.2.1 Heller Site

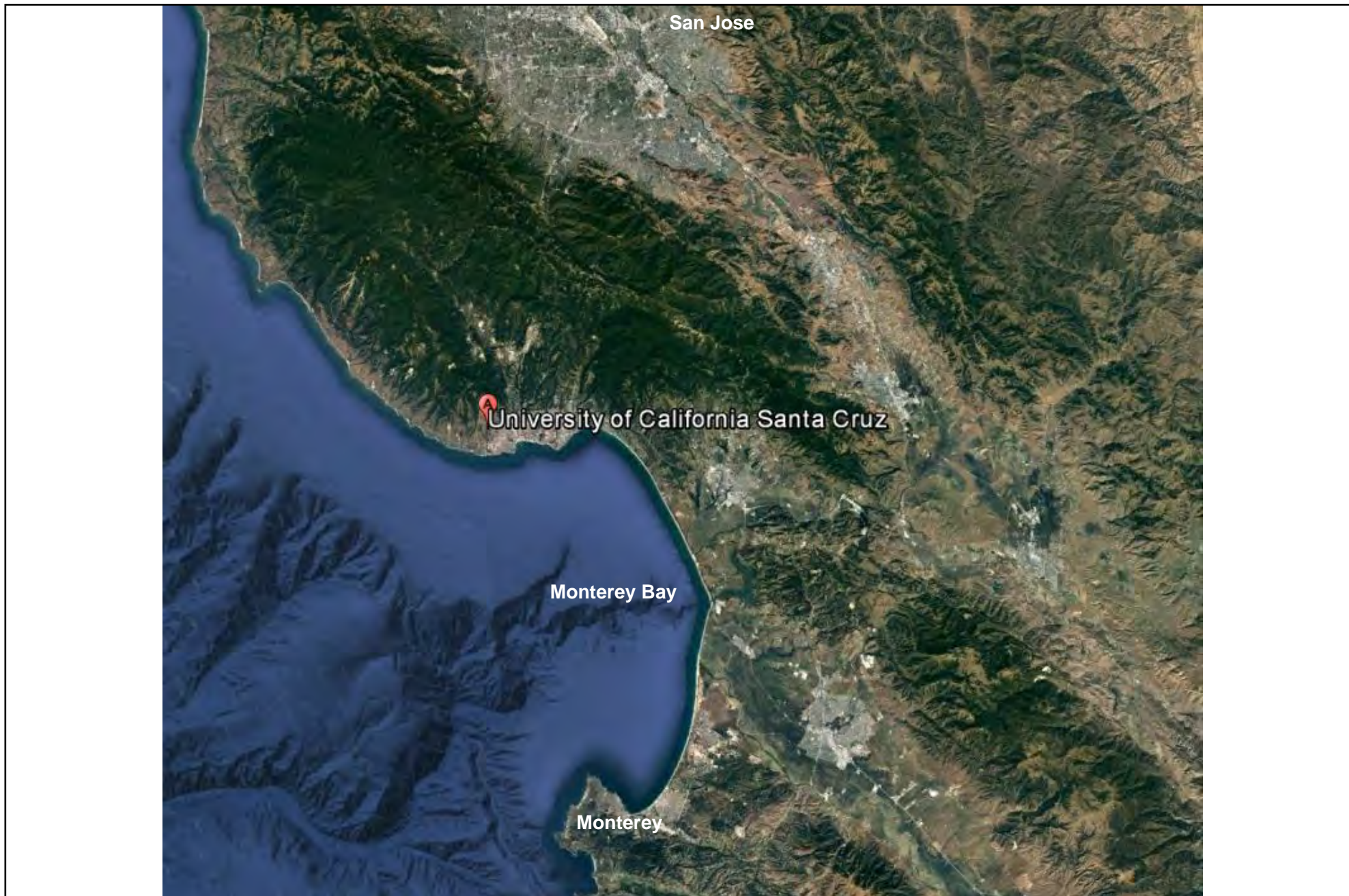
As shown in **Figure 3.0-3, Project Vicinity – Heller Site**, the 13-acre Heller site is located between Empire Grade Road and Heller Drive. Heller Drive is the main north-south roadway in this portion of the campus and also serves as the west entrance to the campus from Empire Grade Road. The Heller site is developed with the Family Student Housing (FSH) complex. This complex includes 199 two-bedroom townhouses in 42 two- and three-story apartment buildings, parking, utilities, roads, and pedestrian infrastructure. This housing serves undergraduate and graduate student couples with or without children as well as single-parent families. The FSH complex includes a 24-space childcare center located in one permanent building and several modular buildings, with an associated fenced play yard. The FSH complex contains 257 parking spaces. The FSH complex and childcare center currently have vehicular access from Heller Drive via Koshland Way. A pedestrian bridge that crosses over Heller Drive links the existing FSH complex to Rachel Carson College and its dining facility.

Land uses surrounding the Heller site include: (1) to the east, Rachel Carson and Oakes Colleges, which consist of classrooms, residence halls, parking lots, and athletic courts; (2) an informal recreational field and Heller Drive to the south; and (3) an undeveloped, wooded area to the west that descends west to Empire Grade Road; and (4) to the north, Porter Meadow an expansive meadow on rolling topography. Porter and Kresge Colleges are located east and north of Porter Meadow.

3.2.2 Hagar Site

As shown in **Figure 3.0-4, Project Vicinity – Hagar Site**, the approximately 15-acre Hagar site is located at the northeast corner of the intersection of Glenn Coolidge Drive and Hagar Drive. The site is a hillside with gently rolling topography that slopes down to both Glenn Coolidge and Hagar Drives. The site is undeveloped and covered with grasslands. A sinkhole is present in the southwestern corner of the site.

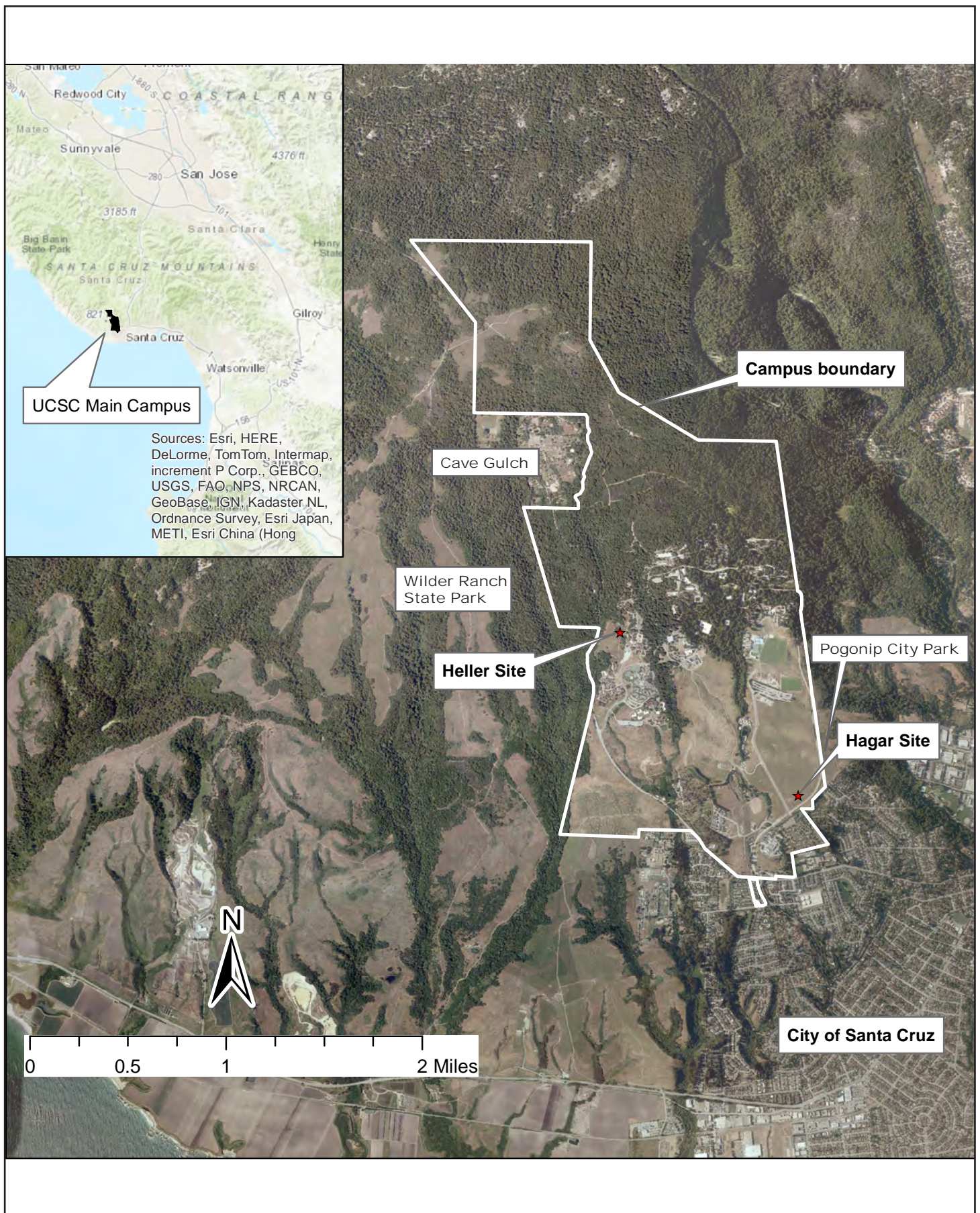
Land uses surrounding the Hagar site include employee housing to the south across Glenn Coolidge Drive, and Center for Agriculture and Sustainable Farm Systems (CASFS) to the west. Lands to the north and east are undeveloped and under grasslands. The project site is a portion of the area locally known as the East Meadow.



SOURCE: Impact Sciences, 2018

FIGURE **3.0-1**

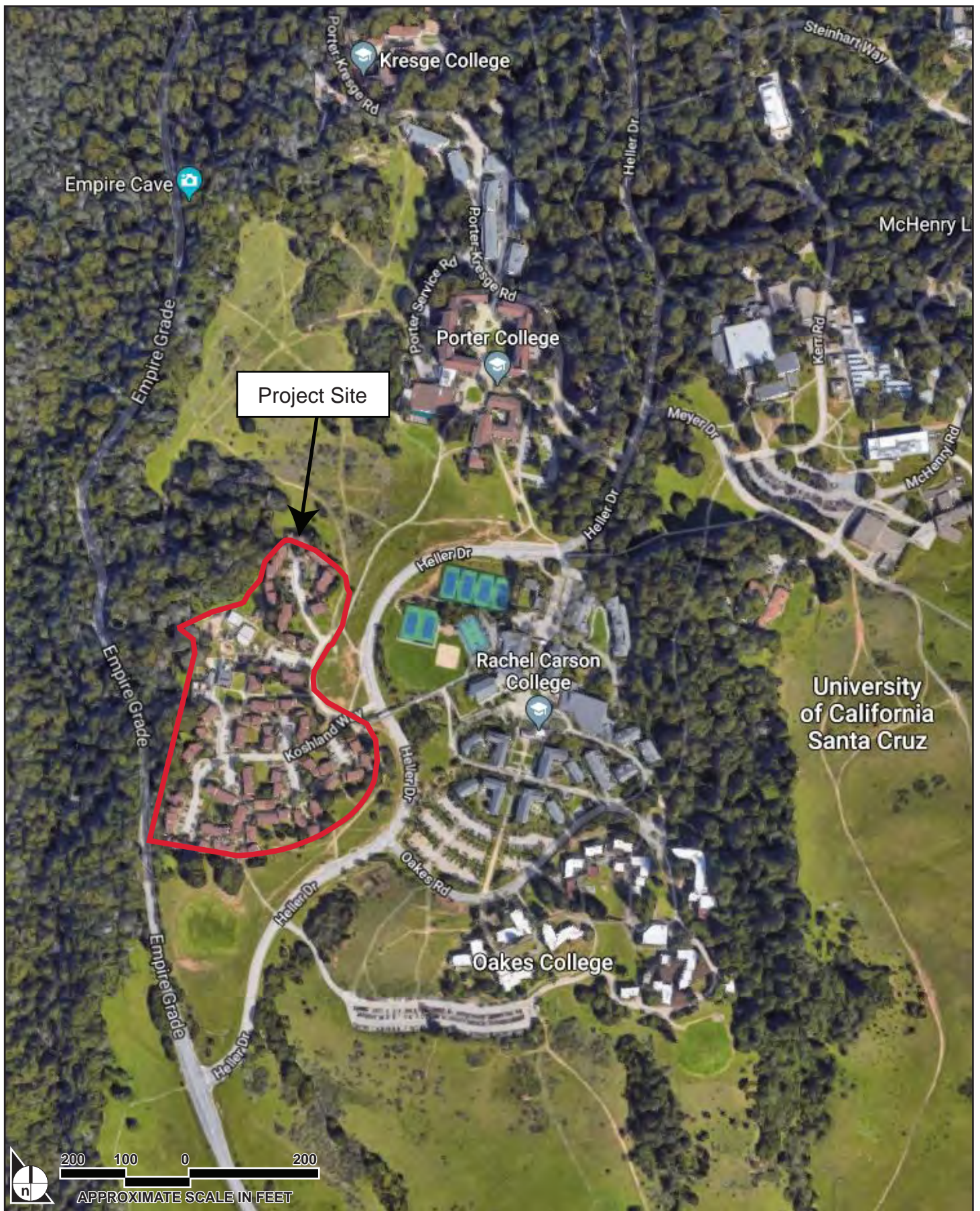
Regional Location



SOURCE: UCSC, 2017

FIGURE **3.0-2**

Project Location



SOURCE: Google Maps, 2017

FIGURE 3.0-3



SOURCE: Google Maps, 2017

FIGURE 3.0-4

3.3 PROJECT OBJECTIVES

Section 15124(b) of the State CEQA Guidelines requires that the project description in an EIR include “a statement of the objectives sought by the applicant,” which should include “the underlying purpose of the project.” The objectives of the proposed project are to:

- Comply with the University’s commitment under the 2008 Comprehensive Settlement Agreement (“Settlement Agreement”) to initiate housing development in the area west of Porter College before development of new beds in the North Campus Area;
- Support the development of sufficient and affordable, on-campus student housing under the UC President’s Housing Initiative;
- Develop additional housing in a timely manner in order to meet the provisions of the Settlement Agreement;
- Develop new housing while minimizing displacement impacts on students with families;
- Locate undergraduate, graduate, and family student housing on campus in order to facilitate convenient access to classrooms and other learning environments; student services; and campus amenities such as retail, restaurants and fitness facilities;
- Incorporate adequate support space needed for students and residential life staff (i.e., social space, recreational space, laundry facilities);
- Provide a childcare facility to serve both students and employees in a location that maximizes its accessibility to families living on and off campus.
- Incorporate design, massing, density, siting, and building footprint strategies to minimize removal of sensitive habitats and environmental impact;
- Develop housing at the highest level of sustainability that is consistent with other project objectives with Leadership in Energy and Environmental Design (LEED) Silver certification at a minimum; and
- Provide a reasonable amount of on-site parking to meet basic parking needs of the project while minimizing traffic impacts on campus.

3.4 PROJECT FEATURES AND OPERATIONS

3.4.1 Development Program

As discussed in **Chapter 1.0, Introduction**, as part of the Settlement Agreement, the University agreed to provide housing to accommodate 67 percent of new-student enrollment above 15,000 FTE within four years of reaching that enrollment level. At a total enrollment of 19,500, UC Santa Cruz would need to provide on-campus or University-controlled housing for 10,125 students. In 2016, the Campus conducted

a detailed review of its housing stock and concluded that it needed to provide approximately 3,000 additional student beds on the campus to satisfy the requirements of the Settlement Agreement, relieve overcrowding, and address the projected demand for student housing. Implementation of SHW project will enable UC Santa Cruz to increase its student housing stock, eliminate some overflow bed spaces in existing housing, replace aging housing, and meet its commitment under the Settlement Agreement.

The proposed project would construct a mix of student housing units, including upper division undergraduate student beds, graduate student beds, housing for students with families, and an expanded replacement childcare center. The upper division undergraduate beds would be provided in apartment configurations, with approximately 60 percent in single occupancy bedrooms and 40 percent in double occupancy bedrooms, where the doubles may or may not be converted to triples in the future. The maximum apartment capacity would not exceed six students. For every 300 students, there would also be one 2-bedroom unit with a laundry facility for live-in residential staff. Similarly, the housing for graduate students would be in apartment configurations. The proposed project also includes the construction of off-site component manufactured apartments for students with families and a childcare center that would replace the existing childcare center that would be displaced by the proposed project and support an expansion of the Campus' childcare program.

Table 3.0-1, Project Development Program Summary, provides a summary of the development program by site.

Table 3.0-1
Project Development Program Summary

Student Type	Housing Units	No. of Beds	No. of Buildings	Building Space (gross square feet)
<i>Heller Site Program</i>				
Undergraduate	725	2,652	5	930,980 ^a
Graduate	146	200	2	--
Student Commons	--	--	--	37,731
Wastewater Treatment Facility	--	--	--	3,500
<i>Subtotal</i>	<i>871</i>	<i>2,852</i>	<i>8</i>	<i>972,211</i>
<i>Hagar Site Program</i>				
Students with Families	148	148	37	140,600
Childcare Center	--	--	--	13,500
Community and Service Buildings	--	--	--	5,500

Student Type	Housing Units	No. of Beds	No. of Buildings	Building Space (gross square feet)
<i>Subtotal</i>	148	148	37	159,600
Total	1,019	3,000	45	1,131,811
<i>Source: Capstone 2017</i> <i>^a Includes both undergraduate and graduate building space</i>				

The proposed facilities are described below by site.

3.4.2 Heller Site

The proposed project includes the demolition of the existing FSH complex (including the existing childcare center) that currently occupies the Heller site, and the construction of new housing, parking, and other support spaces. The proposed facilities on this site are described below.

3.4.2.1 Undergraduate Housing, including Support Spaces

The proposed project would involve the construction of five apartment buildings on the Heller site for undergraduate students (shown as Buildings 1 through 5 on **Figure 3.0-5a, Proposed Site Plan – Heller Site**). Buildings 1 and 3 in the northern and western portion of the site would be seven to ten stories tall. Buildings 2, 4 and 5, which would be in the central and eastern portion of the site, would vary in height from five to seven stories, with the lower portions of those buildings closer to Heller Drive and the taller sections away from Heller Drive. The buildings would include 725 undergraduate units and provide a total of approximately 2,652 beds. The project would also include support spaces, such as laundry facilities, mail facilities, custodial space, storage, etc. In addition, centrally located student “hubs” would be included in Buildings 4 and 5, which would be located centrally within the site and would include retail amenities, a fitness center, administrative and student services, music practice rooms, multi-purpose rooms, study areas, convenience store, and social spaces for residents and neighboring student communities on the east side of Heller Drive.

3.4.2.2 Graduate Housing

Graduate student housing would be provided in two buildings located in the southeastern portion of the Heller site. Each building would be four stories high and would provide approximately 100 beds, including some studio units for couples, for a total of approximately 200 to 220 beds for graduate students.

3.4.2.3 Project and Building Design

The Heller site housing has been designed to address the housing needs of the campus while remaining within the area currently occupied by the FSH complex in order to minimize impacts to the habitat that surrounds the site. The project layout and design has been developed keeping in mind the surrounding landscape, other buildings on campus, the vision of the Student Housing West Design Guidelines, 2005 LDRP, and UC Santa Cruz Design Framework.

To minimize visual impacts and respect the human scale, the site plan has been developed so that the taller buildings would be located in the western and northern portions of the site, away from Heller Drive and adjacent to the redwood forest edge, whereas the buildings in the southern and eastern portions of the site would be shorter, and more compatible with other campus development across Heller Drive from the project site.

The tall modern-style buildings would have flat roofs to permit the installation of rooftop solar panel systems. Some buildings would have glass door entryways and expansive windows looking into the indoor common areas. The proposed exterior material palette would employ variations in material, texture, and color to create a variegated exterior envelope and provide the necessary articulation to reduce the visual scale of the project. Exterior plaster would be utilized for many of the exterior surfaces. The plaster would be juxtaposed with other surfaces having more color and texture, such as metal siding painted in a range of colors, colored cement board, cast in place concrete, and acetylated wood panels. At the tallest buildings for undergraduates along the south site's forest edge, verticality would be accentuated by full height slots for glazing to recall the character of the tall trees beyond. Vertically oriented metal siding in variegated forest colors would also lend to the verticality, while articulated sun shades at the upper floors would suggest a forest canopy and provide scale to the top of the buildings.

The two graduate student housing buildings on the lower part of the site would be clad in plaster and painted metal siding to contrast with adjacent buildings clad in plaster. These two buildings would be joined by an open-air bridge at each level. The bridges are envisioned as painted steel clad in a wood lattice, to provide security and act as an articulated wood element.

3.4.2.4 Outdoor Spaces and Landscaping

The proposed project includes a number of small plazas adjacent to all the undergraduate housing buildings and a large central plaza between Buildings 4 and 5. The proposed landscaping plan for the Heller site is shown on **Figure 3.0-5a**. The vast majority of the site would be planted with climate adaptive landscaping, which will comprise low growing native plants, climate adaptive ornamental shrubs, and groundcovers. Two lawn areas are planned centrally on the site, including one between



SOURCE: UCSC, 2018

FIGURE **3.0-5a**

Buildings 1 and 2, and one in the center of the site between Buildings 4 and 5. Grasslands would be maintained between the site and Heller Drive.

Figure 3.0-5a shows the existing trees on the Heller site that would remain. Existing clusters of mature trees in the southern and southeastern portions of the site would be maintained to continue to provide screening from viewpoints along Heller Drive. New trees would be planted in the open space areas and parking lots on the project site.

3.4.2.5 Access and Parking

The Heller site currently has vehicular access from Heller Drive via West Koshland Way. That roadway entrance to the site would be removed and replaced with a new driveway that would be located further south on Heller Drive across from Oakes Road, creating a four-way intersection at this location. This driveway and internal roadway would provide access to the parking areas located to the west of Buildings 1 and 2, and another roadway would extend from the north end of the parking areas east to connect to Heller Drive near the north end of the project site.

Pedestrian facilities would include the continued use of the pedestrian bridge over Heller Drive, as well as an additional path near the north end of the site linking the new housing to existing campus pedestrian facilities on Heller Drive.

Vehicle and bicycle parking would be provided on the site to serve the new residences, including necessary vehicular drop-off and accessible parking. The proposed project would provide approximately 174 surface parking spaces for residents and between 40 and 50 spaces for service vehicles and visitors. The spaces would be provided in a parking lot in the southwestern portion of the site and in two parking lots along the western edge of the project site west of Buildings 1 and 3. Accessible, oversized, electric vehicle charging spaces would be distributed throughout the parking areas. There would be 720 covered secured bicycle parking spaces for residents and 110 to 115 bicycle parking spaces in racks for visitors.

3.4.2.6 Utilities

Utilities needed for the proposed project would include potable and recycled water, wastewater, storm water management systems, natural gas, medium voltage and low voltage underground power, and underground telecommunications. The estimated demand for utilities associated with the Heller site development is presented in **Table 3.0-2** below. To report the project's total demand for utilities, the table also includes the utility demand associated with the Hagar site development.

**Table 3.0-2
Utility Demand**

Utility Type	Heller Site	Hagar Site	Existing FSH	Net New Demand
Potable Water	19.1 million gallons/year	9.5 million gallons/year	7,197,915 gallons/year	21.4 million gallons/year
Recycled Water	15,471,584 gallons/year	NA	NA	-15,471,584 gallons/year
Irrigation Water	2,566,491 gallons/year ^a	3,496,267 gallons/year	NA ^b	3,496,267 gallons/year ^c
Wastewater	100,000 gallons/day ^d	25,000 gallons/day	NA	25,000 gallons/day
Solid Waste	783,196 lbs/year	325,008 lbs/year	394,534 lbs/year	713,670 lbs/year
Natural Gas	31,920 cfh	0	NA	31,920 cfh
Electricity	17,986 KVA	1,891 KVA	NA	19,877 KVA
<p><i>a. All water used for irrigation at the Heller site would be provided by recycled water.</i></p> <p><i>b. Irrigation water use for most of the FSH landscaping is not metered separately from the buildings, therefore irrigation water use for existing FSH is included in the potable water use.</i></p> <p><i>c. Since recycled water would be used for all irrigation at the Heller site, there would be no new demand for irrigation water at the Heller site.</i></p> <p><i>d. All wastewater would be treated on site with no discharge to the sanitary sewer system.</i></p>				

Potable Water

To provide potable water to the Heller site development, a new 14-inch water main would be constructed within the utility corridor that would extend from the Kresge parking lot in the north, through Porter Meadow, to the Heller site. Both domestic and fire suppression water would be provided to the project via this main (**Figure 3.0-5b, Off-Site Utilities – Heller Site**).

Wastewater

Wastewater Collection System

Wastewater generated on the Heller site would be collected via an underground sewer line system constructed as part of the proposed project and would be conveyed to a wastewater treatment facility that would be located in the southwestern portion of the Heller site. The facility would treat the wastewater and generate recycled water (also referred to as treated effluent) for use on the Heller site and, potentially, in existing student residence halls at Porter College.



SOURCE: UCSC, 2018

FIGURE 3.0-5b

Off-site Utilities- Heller Site

Wastewater Treatment Facility

The wastewater generated on the project site would be treated at a membrane bioreactor (MBR) plant. The plant would have a footprint of approximately 3,500 square feet. MBR plants are modular in design and are prefabricated off-site and delivered to the project site on skids.

The MBR plant constitutes a complete system for the treatment of municipal wastewater. The MBR plant is a fully enclosed modular facility that would consist of the following components:

- Headworks – where incoming wastewater would be received and where inorganic solids would be separated from the wastewater using screens
- Primary tank – an equalization tank where freshly screened wastewater would be held prior to introduction into the MBR process
- MBR – comprises an anoxic tank, pre-aeration tank, and membrane tanks. The anoxic tank is a bioreactor in which aerobic bacteria digest organic material in the presence of dissolved oxygen. The membrane tanks contain a series of membrane cartridges. As effluent permeates through the membrane cartridges, suspended organic matter and bacteria are separated from the water.
- Disinfection system – where effluent from MBR would be treated to eliminate bacteria and provide clean non-potable water
- Clean water holding tank – where treated effluent would be held prior to distribution
- Dry wells – excess treated effluent would be discharged into dry wells
- Sanitary sewer connection – for emergency sewer overflow, the plant would have a metered connection to the existing sanitary sewer line located along Heller Drive.

The facility would also include an office for operators, a lab, a bathroom, and a shower. A back-up generator would be located inside the building for use in the event of power loss. The back-up generator would allow for complete treatment operations to continue, along with maintaining distribution to the recycled water system.

An MBR plant is capable of removing suspended solids to levels of below 5 ppm and BOD to below 10 ppm and producing an effluent with less than 2.0 NTU turbidity levels (and much better in some cases), which meet the current California Title 22 standards for unrestricted irrigation use and toilet flushing.

Chemicals used in treating wastewater at the MBR plant would include sodium hypochlorite (for membrane cleaning); sodium hydroxide for alkalinity; and industrial strength sodium hypochlorite for disinfection and water color. The chemicals would be stored on the skid in chemical tanks or in 55-gallon tanks on spill containment pallets.

Screened inorganic solids from the headworks would be deposited in garbage bags. The MBR plant would likely result in two large garbage bags per week to be collected for landfill disposal. Biological solids/sludge produced by the treatment process would be periodically pumped out of the plant and transported to an off-site properly regulated disposal site.

As odors could result from the headworks room, equalization tank, and the room containing the MBR, all three spaces would be under negative pressure with airflow ducted to an activated carbon odor control system that would scrub air of odors and compounds such as hydrogen sulfide. The exhaust from the odor control system would be located away from sensitive receptors such as occupied buildings and outdoor gathering spaces.

Recycled Water

Recycled water (treated effluent) generated at the MBR plant would be pumped into a recycled water main and distribution system (“purple” pipes) and conveyed throughout the Heller site development to provide water for toilet flushing and landscape irrigation. Recycled water would also be conveyed north via a recycled water main that would be located in the utility corridor extending between the Kresge parking lot and the Heller site. The main would convey recycled water to Porter College where the residence halls are already fitted with dedicated purple pipes to convey recycled water for toilet flushing and landscape irrigation. In the event that the recycled water cannot be used in Porter College for toilet flushing, about 15 million gallons of excess recycled water would be generated per year that would require disposal. Excess recycled water would be disposed of in one or two drywells, which would be located in the western or northwestern portion of the project site. It would be discharged to the municipal sewer system only in an emergency. The MBR plant would contain distribution pumps for the recycled water to deliver water to the buildings and site irrigation, with the back-up generator to ensure water delivery in the event of power loss.

Storm Water

The proposed project would replace and increase the total area of impervious surfaces on the 13-acre Heller site by about 2 acres (6 acres are currently under impervious surfaces, which would increase to 7.9 acres after project construction). As a result, additional storm water runoff would be generated that would require collection, treatment, disposal in compliance with NPDES requirements. The project is required to comply with water quality (treatment) and volume requirements as defined by the UC Santa Cruz Post-Construction Storm Water Management Requirements.

The proposed storm drain system would collect storm water runoff within bio-retention areas distributed throughout the site. The bioretention areas would be sized and designed to treat the runoff to standards

that are defined the UC Santa Cruz Post-Construction Storm Water Management Requirements (volume of runoff generated by the 85th percentile 24-hour storm event). The bioretention areas would be designed to remove urban pollutants and to allow on-site infiltration of some runoff. Overflow from the bioretention areas would be directed toward a storm drain main located within the proposed on-site road.

Two options are being considered for disposal of the discharge from the storm drain main. Under the first option, the storm drain main would discharge to an infiltration well, within the soil layer over the weathered schist bedrock. Subsurface detention pipes would meter the storm water discharge to the infiltration well at a rate that would not exceed the infiltration capacity of the well. Under the second option, the storm water runoff would be detained on-site and discharged at a metered rate (not to exceed the pre-project peak flows for the 2- through 10-year 24-hour storm events) to an existing detention basin on the east side of Heller Drive, to which most of the runoff from the existing development on the Heller site currently discharges. The existing outflow structure of the basin would be modified to increase the time that runoff stays in the basin to allow for additional infiltration to the subsurface.

The project site's side slopes that are not developed with impervious surfaces would be graded to be no more than 3:1 and planted with climate adaptive landscaping so that erosion is minimized.

Solid Waste

The proposed student housing at the Heller site would result in the generation of solid waste, recyclables, and compostable waste materials. The estimated increase in solid waste that would be generated at the Heller site is presented in **Table 3.0-2**, above. The project would include adequate facilities to encourage recycling and composting, and minimization of solid waste that would need landfill disposal.

Electricity and Natural Gas

Pacific Gas and Electric Company ("PG&E") provides 21 kV electrical distribution service to the southeast side of the campus. UC Santa Cruz maintains a primary 12 kV power distribution system on the campus. PG&E provides low voltage services directly to the FSH complex on the west side of the campus. The currently installed and configured PG&E distribution service to the campus on both the southeast side and the west side is limited in capacity and inadequate for the full scope of the proposed project. UC Santa Cruz has initiated an application with PG&E to provide new 21 kV service to serve the two project sites.

The demand for electricity associated with the Heller site development is presented in **Table 3.0-2** above. Electrical distribution system improvements at the Heller site would include an extension of the 21KV

line within Heller Drive right-of-way, from the existing point of connection to the north end of the Heller site. From this extension, two power mains would extend west into the Heller site, and additional distribution lines within the site would convey electricity to individual buildings. All electrical lines would be located underground.

Each building on the Heller site would be served by an emergency generator. The generators would vary in size based on the size of the building. The two graduate student housing buildings would include two 30 KW generators. The undergraduate student housing would include generators ranging in size from 180 KW to 400 KW. The generators would operate on natural gas with propane as a back-up fuel. The generators would be located adjacent to the buildings in small enclosures that would include pads for the generator and the propane tanks. The propane tanks would be sized to hold enough fuel to operate the generators for up to 4 hours. A back-up generator and fuel tank would also be installed as part of the MBR plant to provide electricity in case of power outage.

Natural gas is delivered to the campus via a high-pressure transmission line that runs along the railroad tracks south of Mission Street and a distribution line running along Western Drive to a primary service point of connection on High Street near Western Drive. From the point of connection, gas is delivered to individual facilities via a campus-owned distribution system. However, the existing FSH complex and employee housing complexes on the lower campus are served directly by PG&E. UC Santa Cruz currently uses natural gas to fuel boilers and emergency and backup generators throughout the campus, and to run the cogeneration plant, which produces electricity and heating hot water for buildings in the central campus. The demand for natural gas associated with the Heller site development is presented in **Table 3.0-2** above. Natural gas would not be used at the Heller site except to operate emergency generators in the event of an electrical outage.

Fire Protection

Key fire protection and life safety systems for all proposed buildings include:

- Sprinkler and standpipe system per NFPA 13 and California Fire Code (CFC);
- Fire pump system (if campus water pressure is insufficient to meet sprinkler demand);
- Fire protection and life safety alarm system compatible with UC Santa Cruz existing system;
- Emergency Responder Radio Coverage (ERRC) per CFC; and
- Fire hydrants in accordance with Fire Marshal requirements.

3.4.2.7 Proposed Habitat Improvements

Although the Heller site is currently developed with the existing FSH complex and childcare facility, it is located in an area that is designated critical habitat for the California red-legged frog (CRLF), a federal and state listed species. The proposed development on the Heller site has been designed to remain entirely within the area previously disturbed and developed with the FSH complex so as to avoid the removal of any CRLF dispersal habitat. In addition, the project has been designed to enhance opportunities for CRLF dispersal around and through the site. The project would enhance existing degraded dispersal habitat in a 40-foot wide corridor that would extend generally in a north-south direction between Heller Drive and the east and south side of the proposed development. This enhancement area would encompass about 1.76 acres. The Campus would also create a vegetated corridor to facilitate safe east-west frog movement through the site. Both areas are shown on **Figure 3.0-5a**. The enhanced dispersal habitat area to the east and south of the developed area would be planted with small to medium sized native shrubs and grasses of the native coastal scrub plant community. Using simple fences, the habitat area would be enclosed to keep pedestrians out and allow the frogs to disperse through the areas. The dispersal area would be graded to remove all vertical obstructions greater than 12 inches high to facilitate frog passage. Culverts would be installed to provide safe passage under roadways. The 48-inch wide elliptical culverts (with a minimum height of 24 inches) would be partially buried to provide uninterrupted travel on a continuous soil surface. The east-west dispersal area would be developed in a similar manner but would only be 15-20 feet wide.

3.4.3 Hagar Site

As noted above, there are currently 199 family student housing units and a childcare center located on the Heller site which would be demolished to construct the proposed undergraduate and graduate student housing. Of the 199 units, only 196 units are occupied at this time. On average, 87 of these units are occupied by families with children. The new housing on the Hagar site would replace 148 of these units, including all of the units occupied by families with children. The remaining family student housing units would be replaced by apartments suitable for couples in the two new graduate housing buildings on the Heller site. A new, and larger childcare center would be constructed on the Hagar site. The proposed site plan for the Hagar site is presented in **Figure 3.0-6a**.

3.4.3.1 Family Student Units

The proposed project includes the construction of a new family student housing complex on the Hagar site to provide approximately 148 student beds. The complex would comprise 37 two-story pre-fabricated townhouses, with each building comprising a two-bedroom apartment unit on the first floor and another two-bedroom apartment unit on the second floor. Each apartment would include approximately 950

square feet of interior space. Other elements of the housing complex would include community open spaces (unit commons comprising about 6,000 square feet of space); playgrounds located centrally on the site; a 2,000-square-foot community building located on the east side of the site near Glenn Coolidge Road; and a 2,500-square-foot service and maintenance building located at the northern end of the complex.

3.4.3.2 Childcare Center

A new childcare center would be constructed on the southwestern portion of the Hagar site, adjacent to Hagar Drive. The existing childcare facility has a capacity for 72 children but currently serves about 56 children of students. The existing facility has a staff of 15 persons. The new, approximately 13,500-square-foot facility would serve up to 140 children of both employees and students, with ages ranging from infants to school age children, and would employ 30 staff. The childcare facility would include an approximately 10,500-square-foot exterior play area. Play structures and administrative support spaces for childcare operations would be provided.

3.4.3.3 Project and Building Design

The Hagar site housing has been designed to provide the needed housing without developing the site densely and keeping buildings low profile in order to minimize visual impacts. The project layout and design has been developed keeping in mind the development's prominent location, surrounding landscape, and UC Santa Cruz Design Framework.

The two-story townhouses would be of modern design, which emphasizes functionality, simplicity, and efficiency. For sustainability and assist in meeting triple net zero (water, energy and waste) performance goals of the project, the buildings would have flat roofs for installation of photovoltaic panels, solar thermal and rainwater harvesting. The proposed exterior material palette would employ variations in material, texture, and color to create a variegated exterior envelope and provide the necessary articulation to reduce the visual scale of the project. Exterior surfaces would include cementitious walls combined with a secondary system of vertical wood panels or planks, referencing the neighboring barns. Decks, stairs and canopies would be made of metal or metal framing with high performance coatings, both for durability in the coastal marine condition and for an expressive quality appropriate to the semi-rural site.

3.4.3.4 Open Space and Landscaping

The outdoor spaces on the Hagar site would be landscaped to serve active and passive recreational functions. The landscaping would consist of a combination of lawn, walking paths, play areas, outdoor seating and benches, and outdoor amenities such as a gazebo, barbeque areas, and other gathering spaces.



SOURCE: UCSC, 2018

FIGURE 3.0-6a

3.4.3.5 Access and Parking

Primary access to the Hagar site development would be via a driveway on Hagar Drive. Both residents and childcare center bound traffic would use this driveway to enter and exit the site. An internal loop road would serve the apartment homes as well as the childcare center. One parking space would be provided for each apartment for a total of 148 parking spaces. Residential parking would be provided along the internal roadways. Between 30 and 40 spaces would be provided in a parking lot near the childcare center to serve the center as well as visitors to the residential complex. The project includes 30 to 37 covered, secured bicycle parking spaces for residents and employees, and 5 to 10 spaces for visitors.

3.4.3.6 Utilities

Water

Potable and fire water to the Hagar site development would be provided by connecting into an existing water main that is located in Hagar Drive adjacent to the site. Two points of connection would be made and an 8-inch water main would be installed on the site in a loop. Fire hydrants would be located throughout the development.

Wastewater

The on-site sanitary sewer system would consist of a main that would loop through the development and serve the proposed buildings. The main would travel to the southwest of the Hagar site, cross under Hagar Drive, continue south in a utility corridor that would parallel to Glenn Coolidge Drive, and connect to an existing 12-inch sewer main. The off-site section of the sewer main would be approximately 900 feet in length (**Figure 3.0-6b, Off –Site Utilities – Hagar Site**).

Storm Water

The proposed project would create approximately 7.1 acres of new impervious surfaces, including the townhouses, childcare center, pathways, roadways, and parking areas on the Hagar site, which would result in the generation of storm water runoff that would require collection and disposal. In addition, the storm water system for the new development must manage the storm water flowing onto the site from the area upgradient of the site. The project is required to comply with water quality (treatment) and volume requirements as defined by the UC Santa Cruz Post-Construction Storm Water Management Requirements. These require that new runoff be minimized, all storm water be treated before discharge into receiving waters, and that the post-development peak flows discharged from the site shall not exceed pre-project peak flows for the 2- through 10-year 24 hour storm events.

The site geology does not allow for localized infiltration. Therefore, all site runoff would be directed to pipes or lined bioswales. Treatment to remove urban pollutants would be accomplished in the bioswales and, if necessary, using engineered treatment systems. The bioswales would also serve to slow runoff, but underground detention pipes would be used detain runoff to reduce peak flows as required by the Post-Construction Standards. The treated and metered runoff, as well as run-on from the grasslands above the site, would be discharged to two locations, in order to limit the impact to the existing sinkhole at the intersection of Hagar and Glenn Coolidge Drives. Some of the treated and metered runoff may be discharged to this detention basin. The remainder of the runoff would be piped beneath Hagar Drive and the undeveloped meadow area and would be discharged through a dissipation structure into Jordan Gulch.

Solid Waste

The proposed family student housing at the Hagar site would result in the generation of solid waste, recyclables, and compostable waste materials. The estimated solid waste that would be generated at the Hagar site is presented in **Table 3.0-2**, above. The project would include adequate facilities to encourage recycling and composting, and minimization of solid waste that would need landfill disposal.

Electricity

The demand for electricity associated with the Hagar site development is presented in **Table 3.0-2** above. Electricity to the Hagar site would be provided by extending the service from the lines located on Glenn Coolidge Drive, adjacent to the site.

Fire Protection

Key fire protection and life safety systems for all proposed buildings include:

- Sprinkler and standpipe system per NFPA 13 and California Fire Code (CFC);
- Fire protection and life safety alarm system compatible with UC Santa Cruz existing system;
- Emergency Responder Radio Coverage (ERRC) per CFC; and
- Fire hydrants in accordance with Fire Marshal requirements.

3.5 PROPOSED LRDP AMENDMENT

The 15-acre Hagar site is located within a larger 20-acre area north of Hagar Drive that is currently designated as Campus Resource Land (CRL) in the 2005 LRDP. As stated in the 2005 LRDP EIR, this land use designation is assigned to lands on which no development is planned under the proposed 2005



SOURCE: UCSC, 2018

FIGURE 3.0-6b

LRDP, and that the 2005 LRDP envisions that these lands would be maintained in their natural state, to be reserved for future unidentified use. The EIR also noted that in the event that the Campus determines during the term of the 2005 LRDP that it needs to develop some portion of this land, the Campus will conduct additional environmental review and seek an LRDP amendment.

As part of the proposed SHW project, the Campus will request an LRDP amendment to change the land use designation of the 20-acre area from CRL to Colleges and Student Housing. Although the proposed development at the Hagar site would be located on about 15 acres, the remaining re-designated area, which is at the northern end of the site, would be used for grassland mitigation, maintenance of visual buffer, etc. The environmental effects of this proposed LRDP amendment are evaluated and disclosed in **Chapter 4.0** of this Draft EIR.

3.6 SUSTAINABLE DESIGN FEATURES

The proposed project has been designed to comply with the University of California Sustainable Practices Policy, which require UC projects to aim towards achievement of Triple Net Zero (Net Zero Energy, Net Zero Water and Net Zero Waste). The University also requires all UC projects to achieve a minimum of a Silver rating under United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) Building Design and Construction (BD+C) v4.0 Green Building Rating System (the "LEED Rating System"). The project is targeting to achieve a LEED Platinum certification.

3.6.1 Heller Site

The proposed Heller site development includes the following sustainable design features:

- All buildings would be designed and constructed to be energy efficient. The exterior envelope would be optimized to improve thermal isolation. The exterior walls and roofs would have enhanced insulating qualities. High-performance glass would be used to promote daylighting and passive solar heat gain in the winter without excessive use of glazing.
- The general lighting in the buildings would be accomplished through a combination of daylighting and general artificial lighting. In areas of special function, specialty lighting would be utilized. Light fixtures and lighting system would be selected based on performance and aesthetics.
- The student housing units would be provided with heating-only mechanical systems. Ventilation would be provided by unit exhaust with makeup air through trickle vents in the exterior wall. The units would also be provided with operable windows to provide natural ventilating and passive cooling whenever conditions are appropriate. Cooling would be provided only for certain spaces such as main electrical rooms.

- All space and water heating systems would operate on electricity. To minimize greenhouse gas emissions, no natural gas would be utilized on the project site except as fuel in emergency generators.
- Roof-top photovoltaics would be included in Buildings 1 through 5 to provide electricity to the project.
- Wastewater would be treated in an on-site MBR plant to generate recycled water to be used for toilet flushing and irrigation, thereby minimizing the project's demand for potable water and eliminating wastewater conveyance and treatment at the City's wastewater treatment plant.
- High efficiency electrical and water fixtures and appliances would be included in the proposed housing.
- The project would include adequate facilities to encourage recycling and composting, and minimization of solid waste that would need landfill disposal.
- Bicycle parking would be provided throughout the project site to encourage bicycle use.

3.6.2 Hagar Site

The sustainable design features of the Hagar site development include the following:

- Impervious paving will be minimized, where appropriate.
- The street network will be designed to encourage multi-modal circulation.
- Climate-appropriate plant materials will be used.
- The project will also seek to utilize renewable sources of energy including solar PVs, sewer heat recovery, and water recycling.
- Low-flow water fixtures, energy star appliances, high-efficiency irrigation systems, high-performance exterior building envelopes, insulated glazing, LED lighting, and natural ventilation will also be utilized.

3.7 PROJECT POPULATION

As discussed above, the SHW project is proposed to provide approximately 3,000 student beds on the UC Santa Cruz campus to comply with the Settlement Agreement. Student housing projects do not, in themselves, add population to a campus; rather they accommodate the students that are enrolled. Therefore, the project population discussed in this section is not additional to the maximum enrollment level of 19,500 FTE students allowed under the 2005 LRDP.

A breakdown of the undergraduate and graduate students as well as students with families, associated with the proposed project is detailed in **Table 3.0-3**.

**Table 3.0-3
Student Housing West Population Summary**

Population	Existing Students and Employees	Existing Dependents	Proposed Project Students and Employees	Dependents under Proposed Project	Net Change in Population
Undergraduate	0	0	2,652	0	2,652
Graduate	0	0	200	100	300
Family Student Housing	(196)	(351)	148*	296	(103)
Staff	(25)**	0	65***	0	40
Total	(221)	(351)	3,065	396	2,889
<p>* The project would move some student families that have no children into graduate student housing buildings. ** Includes 15 employees at the childcare center and 10 employees to manage FSH. *** Includes 30 employees at the childcare center; and 35 employees to run SHW at both sites.</p>					

3.8 CONSTRUCTION SCHEDULE AND DETAILS

3.8.1 Construction Phasing

The project would be constructed in two overlapping phases. Phase 1 would extend from approximately Fall 2018 through Fall 2019, and Phase 2 would extend from Spring 2019 through Fall 2022. The project's construction phasing plan is shown in **Figure 3.0-7, Construction Phasing Plan**. As the graphic indicates, Phase 1 would involve the construction of the new family student housing complex and childcare center on the Hagar site over a period of approximately 13 months. Once this housing complex is completed, families living in the existing FSH complex would be relocated into the new housing, and the childcare operations would be moved into the new childcare center.

Phase 2 would involve work on the Heller site, which would commence with utility infrastructure work. Then, once the FSH and childcare center are vacated, abatement and demolition work would be undertaken, with the commencement of new building construction in Fall 2019. Additional details about the construction activities at each site are presented below by site.

3.8.2 Heller Site

3.8.2.1 Construction Activities

Construction activities on the Heller site would commence with the installation of off-site utilities, including the water main and any other utilities that can be installed outside the existing FSH complex.

Once the FSH complex and childcare center are vacated, the project site perimeter would be fenced using a chain link fence, and outside the chain link fence, a California red-legged frog exclusion barrier would be installed. Following that, abatement and demolition of the existing FSH buildings would commence. Demolition of the existing buildings would generally proceed as follows: (1) the contents of the buildings would be characterized; (2) any hazards present would be abated, including, but not limited to, asbestos-containing materials and lead-based paint; (3) reusable and recyclable materials would be identified and removed; (4) the buildings and parking areas would be demolished and removed; and (5) the foundation slabs and underground utilities would be removed. Debris generated from the demolition of the buildings would be sorted into materials that can be reused or recycled, materials that are contaminated and cannot be reused, and non-hazardous waste materials. Each type of material would be appropriately reused, stored, and/or disposed.

Site clearing and demolition is expected to proceed from the northern end of the site to the south in two or more phases. Site clearing would be followed by excavation and grading. Excavated materials would be stockpiled and used as fill on the site. Between 30,000 and 40,000 cubic yards of fill would be imported. Following site grading, utility infrastructure would be installed, roadways constructed, and foundation work would be completed. Mat slab foundations are planned for the project. Subsequent construction phases would include building construction, completion of interior and exterior improvements, and installation of landscaping and hardscape. The undergraduate housing buildings would be cast in place concrete structures whereas the graduate housing buildings would be light gauge metal frame buildings. As **Figure 3.0-7** shows, construction of Buildings 1 and 2 would commence first, and as the remainder of the FSH complex is demolished, the construction of Buildings 3 through 7 would commence.

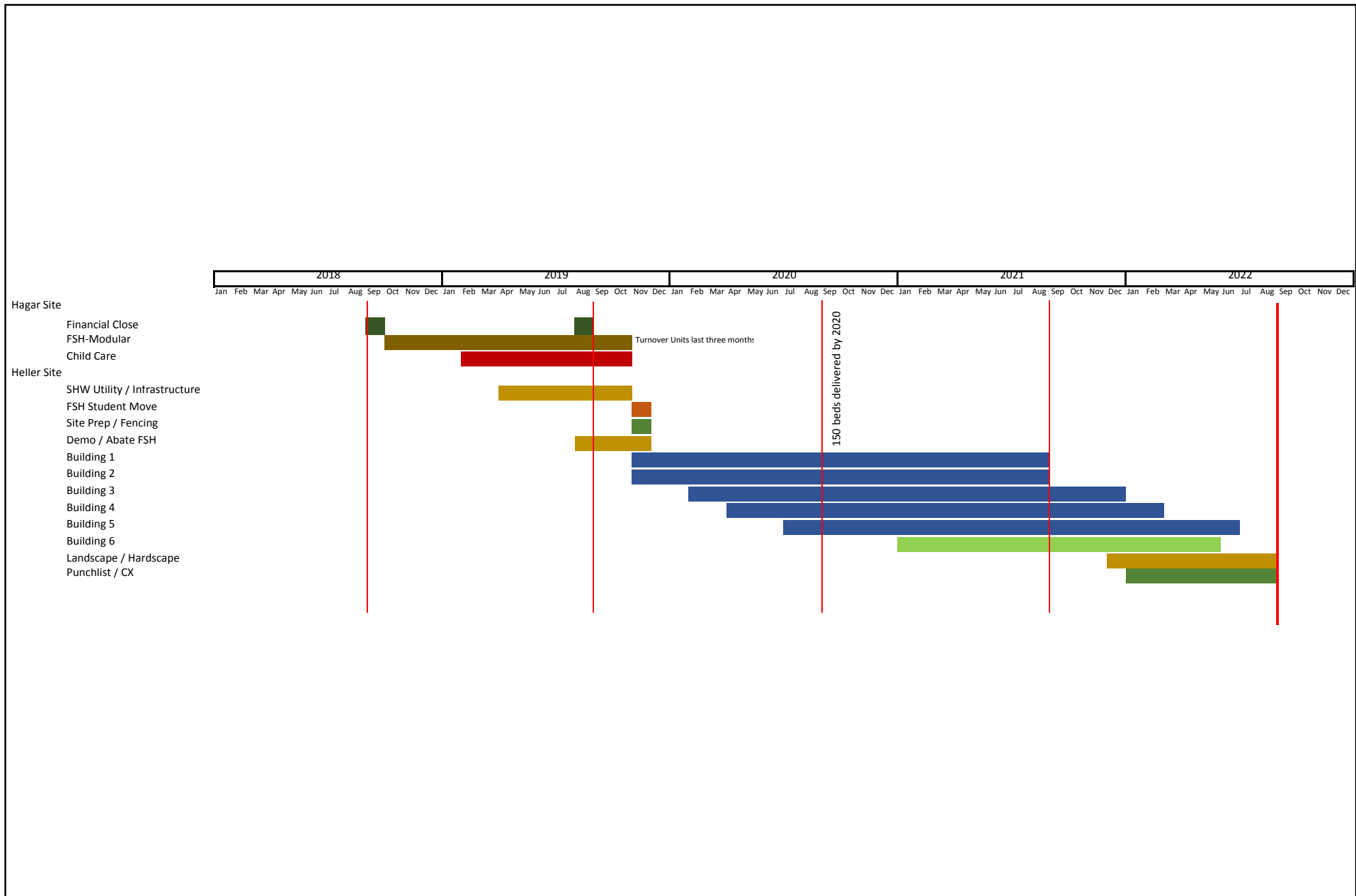
3.8.2.2 Construction Parking, Staging, and Access

Construction material storage and staging for the project would occur on site. However, due to the constrained construction site, construction trailers and some parking for contractor staff would be provided on the Oakes College parking lot across from the Heller site and construction worker parking would be provided on the West Remote Lot. All deliveries would be via Heller Drive and Empire Grade Road. Deliveries of materials would be coordinated in order to minimize truck traffic on local streets.

3.8.3 Hagar Site

3.8.3.1 Construction Activities

As the Hagar site is not developed with any facilities at this time, no demolition is required. Construction activities at this site would commence with clearing the site of existing vegetation and grading, followed by installation of utility infrastructure, roadways and parking lots, and foundations for the prefabricated



SOURCE: Impact Sciences, 2018

FIGURE 3.0-7



Construction Phasing Plan

townhomes as well as the childcare center and other buildings. Cut and fill on the site would be balanced and no import or export of earth materials would be required. As the site is underlain by marble, based on the recommendations of the site-specific geotechnical report, the areas with soft soils would be excavated and filled with lime-treated engineered fill, and site-appropriate mat foundations would be constructed.

The prefabricated building components of the proposed housing would be constructed out of state and delivered to the site for just-in-time use in the project construction sequence. The components would be assembled on site, the townhomes would be installed in place, and connected to the utilities. The childcare center building, the community building, and the service/maintenance buildings would involve conventional construction and would be erected and completed, including interior and exterior improvements. Lastly, landscaping and hardscape would be installed.

3.8.3.2 Construction Parking, Staging, and Access

Construction staging and parking for the project would occur on the 15-acre site. Construction traffic would access the site via the new driveway on Hagar Drive. All deliveries would be via Hagar Drive. Deliveries of materials would be coordinated in order to minimize truck traffic on local streets.

3.9 PROJECT RELATIONSHIP TO UC SANTA CRUZ 2005 LRDP AND 2005 LRDP EIR

3.9.1 Increase in Student Housing Due to SHW and Other Housing Projects

As discussed in **Chapter 1.0, Introduction**, the 2005 LRDP includes goals to house 50 percent of undergraduate students and 25 percent of graduate students in on-campus housing. Thus, the 2005 LRDP EIR evaluated the addition of 2,300 student beds to the inventory of 6,891 beds existing in fall 2004, for a total of about 9,190 beds. The 2005 LRDP envisions that one new college, College Eleven, would provide approximately 1,500 beds, student activity facilities, coffee shops, college counseling offices, and other resource and enrichment spaces. Additional undergraduate housing would be developed as infill in or near existing colleges where appropriate; through redevelopment of existing housing at higher densities or located on undeveloped land north of the core campus. Of the new undergraduate beds, 900 likely would be in residence halls and the remainder in apartments.

As part of the Settlement Agreement, the University agreed to provide housing to accommodate 67 percent of new-student enrollment above 15,000 FTE within four years of reaching that enrollment. At a total enrollment of 19,500, UC Santa Cruz would need to provide on-campus or University controlled housing for 10,125 students, which would be 935 more than analyzed in the 2005 LRDP EIR. In addition,

as part of the Settlement Agreement, the University agreed that housing development in the area west of Porter College will be initiated before development of new bed spaces in the north campus area.

Table 3.0-4 presents a summary of existing student housing stock in the LRDP EIR 2003-04 baseline, 2005 LRDP housing projections, and the revised student housing projections for UC Santa Cruz based on the Settlement Agreement.

Table 3.0-4
Student Housing Projections

	Beds
2003-2004	6,891
2005 LRDP Student Housing Projects	9,190
Revised Student Housing Projects, per the Settlement Agreement	10,125
Change from 2005 LRDP	935
<i>Source: UC Santa Cruz 2017</i>	

As discussed in **Chapter 1**, following a detailed evaluation of the existing student housing stock and the projected housing needs of the campus, UC Santa Cruz determined that it needed to provide approximately 3,000 additional student beds on the campus. This number of new beds would allow the Campus to meet the terms of the Settlement Agreement that 67 percent of enrollment above 15,000 FTE be served by on-campus or University-controlled housing within four years of the Campus reaching that enrollment level. In addition, it would allow the Campus to replace aging housing, remove overflow beds, and make more affordable housing available to the students in compliance with the UC President's Housing Initiative. In 2016, UC Santa Cruz commenced planning for the 3,000-bed SHW project, which is the focus of this EIR. In addition, as two separate projects, UC Santa Cruz is planning to develop additional student beds in Kresge and add a small number of new beds during renovation of student housing at Crown Colleges by 2023. **Table 3.0-5, UC Santa Cruz Student Housing Summary**, below presents a summary of current and projected student housing at UC Santa Cruz.

Table 3.0-5
UC Santa Cruz Student Housing Summary

Attribute	On Campus Student Beds	Total No. of Student Beds	Comment
LRDP Baseline (2003-04)	6,535	6,891	356 off campus beds in University Inn and University Town Center

Attribute	On Campus Student Beds	Total No. of Student Beds	Comment
2005 LRDP Projection at full enrollment	8,834	9,190	356 beds off campus in University Inn and University Town Center
Revised Projection per Settlement Agreement		10,125	
2017 Baseline (on-campus beds)	9,269	9,399	130 off-campus beds; 226 beds in University Inn removed from inventory
Housing to be removed	(1,094)	(1,094)	Approximately 900 overflow beds in colleges to be phased out; FSH has 196 beds, which are aging and would be removed.
Housing planned to be added	3,207	3,207	3,000 in SHW project; 185 new beds in Kresge College; and 22 new beds in Crown College
Total University-Controlled Housing (by 2023)	11,382	11,512	
Source: UC Santa Cruz 2017			

3.9.2 Student Enrollment and Campus Population

The 2005 LRDP projected that student enrollment would increase from approximately 14,050 students (academic year 2003-04) to approximately 19,500 students by academic year 2020-21. The 2003-04, 2015-16 (existing), and projected enrollment levels are presented in **Table 3.0-6, On-Campus Population Projections**. As the table shows, as of the time of preparation of this Draft EIR, enrollment at the campus had increased by approximately 3,000 students from the level in 2003-04. It is anticipated to continue to increase over the next 2 to 3 years under the existing 2005 LRDP.¹

The 2005 LRDP projected that on-campus faculty and staff would increase from 3,736 employees in 2003-04 to approximately 5,074 employees by academic year 2020-21. Based on the slower rate of growth in staff population since 2005, UC Santa Cruz now projects that the total employee population will not

¹ The Campus has commenced the preparation of a new LRDP that would address the growth of the campus in the years beyond 2020-21. That LRDP will identify the next increment of enrollment and employment growth at UC Santa Cruz and will include a campus land use plan to accommodate that growth. An EIR will be prepared that will analyze and disclose the impacts of the projected growth and the associated land use plan, and that EIR will need to be certified by the University before the plan is adopted and any development under that plan is undertaken.

increase to the extent previously projected. Employee populations for the years 2003-04, 2016-17 (existing), and 2020-21 are presented in **Table 3.0-6**.

Table 3.0-6
On-Campus Population Projections

Population	Baseline (2003-04)	2005 LRDP 2020-21 Projections	2016-17 (Existing)	Revised 2020-21 Projections
Students (FTE)	14,052	19,500	17,870	19,500
Faculty and Staff	3,736	5,074	3,996	3,994
<i>Subtotal</i>	<i>17,788</i>	<i>24,574</i>	<i>21,866</i>	<i>23,494</i>
Other Daily Population				
Non-UC Employees working on campus	150	250	166	190
Construction Workers	100	200	150	200
Visitors	200	250	240	250
<i>Subtotal</i>	<i>450</i>	<i>700</i>	<i>556</i>	<i>640</i>
Total	18,238	25,274	22,422	24,134
<i>Source: UC Santa Cruz 2016; UC Santa Cruz 2017 (Alisa's spreadsheet)</i>				

3.9.3 LRDP Building Program

The 2005 LRDP estimated that a total of approximately 3.18 million gsf of academic buildings, support facilities, and student housing would be required to support a total future enrollment level of 19,500 students. **Table 3.0-7, Existing and Projected Building Space under the 2005 LRDP (Gross Square Feet)**, presents the 2005 LRDP baseline, the previously projected building space, and the building space on campus at this time. As the table shows, only a small percentage of the planned building space has been developed on the campus since 2005. The building space proposed under the SHW project is well within approximately one million square feet of housing building space that remains under the 2005 LRDP.

**Table 3.0-7
Existing and Projected Building Space under the 2005 LRDP
(Gross Square Feet)**

Category	2003-04 Baseline	2005 LRDP 2020-21 Buildout	Building Space added under the 2005 LRDP	Total Building Space to date (2017)
Instruction & Research	1,522,607	2,630,607	97,864	1,620,471
ORA/ORU	136,542	361,542	0	136,542
Academic Support	459,790	616,790	0	459,790
Public Services	2,422	45,422	5,954	8,376
Student Services	200,579	354,579	7,620	208,199
PE and Recreation	81,954	232,954	0	81,954
Institutional Support	441,625	585,625	15,762	457,387
Housing (all Campus-owned)	1,979,770	3,175,770	48,997	2,028,767
Other	242,107	242,107	0	242,107
Totals	5,067,396	8,242,396	176,197	5,243,593
<i>Source: UC Santa Cruz 2005 LRDP FEIR; UC Santa Cruz 2017</i>				

3.10 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT

The Campus intends to replace and expand the existing dining facilities at Porter and Rachel Carson Colleges, close to the Heller site, by 2023. The dining expansion project is a separate project with its own separate source of funding and timeline for completion, and is not proposed as part of the SHW project. However, the dining facilities expansion project has been sized to serve the students who would live in the new housing on the Heller site and the opening of the expanded dining facilities is expected to be coordinated with the completion of the SHW project on the Heller site. The dining facility expansion project is, therefore, considered a related project, and is evaluated in this Draft EIR for its environmental impacts based on the information available at this time. The environmental impacts of the project are presented in this Draft EIR for purposes of disclosure as they are considered a foreseeable indirect consequence of the SHW project. Once the dining facilities expansion project is more completely defined, the Campus will conduct additional environmental review of that project to the extent required to form the basis of its approval or denial by the decision makers.

The proposed improvement at the Porter College Dining Hall is an expansion of the seating area to the south of the existing dining area, over an approximately 0.12-acre area. This additional seating area

would be on an elevated patio or second floor room located on piers. The proposed improvements at Rachel Carson Dining Hall include a new kitchen, server, and additional seating. The additional seating may be provided in a second floor dining area above the existing dining area or by extending the existing dining area to the south. The total additional building space added by the proposed project at both sites would be about 10,000 square feet. The proposed improvements at both colleges are shown in **Figures 3.0-8 and 3.0-9**.

3.11 LEAD AGENCY AND REQUIRED APPROVALS

As a public agency principally responsible for approving or carrying out the proposed SHW project, the University is the Lead Agency under CEQA and is responsible for reviewing the adequacy of the environmental document and certifying it and approving the proposed SHW project. Necessary project actions and approvals are anticipated to include, but are not limited to, consideration of the following by The Regents (anticipated in July 2018):

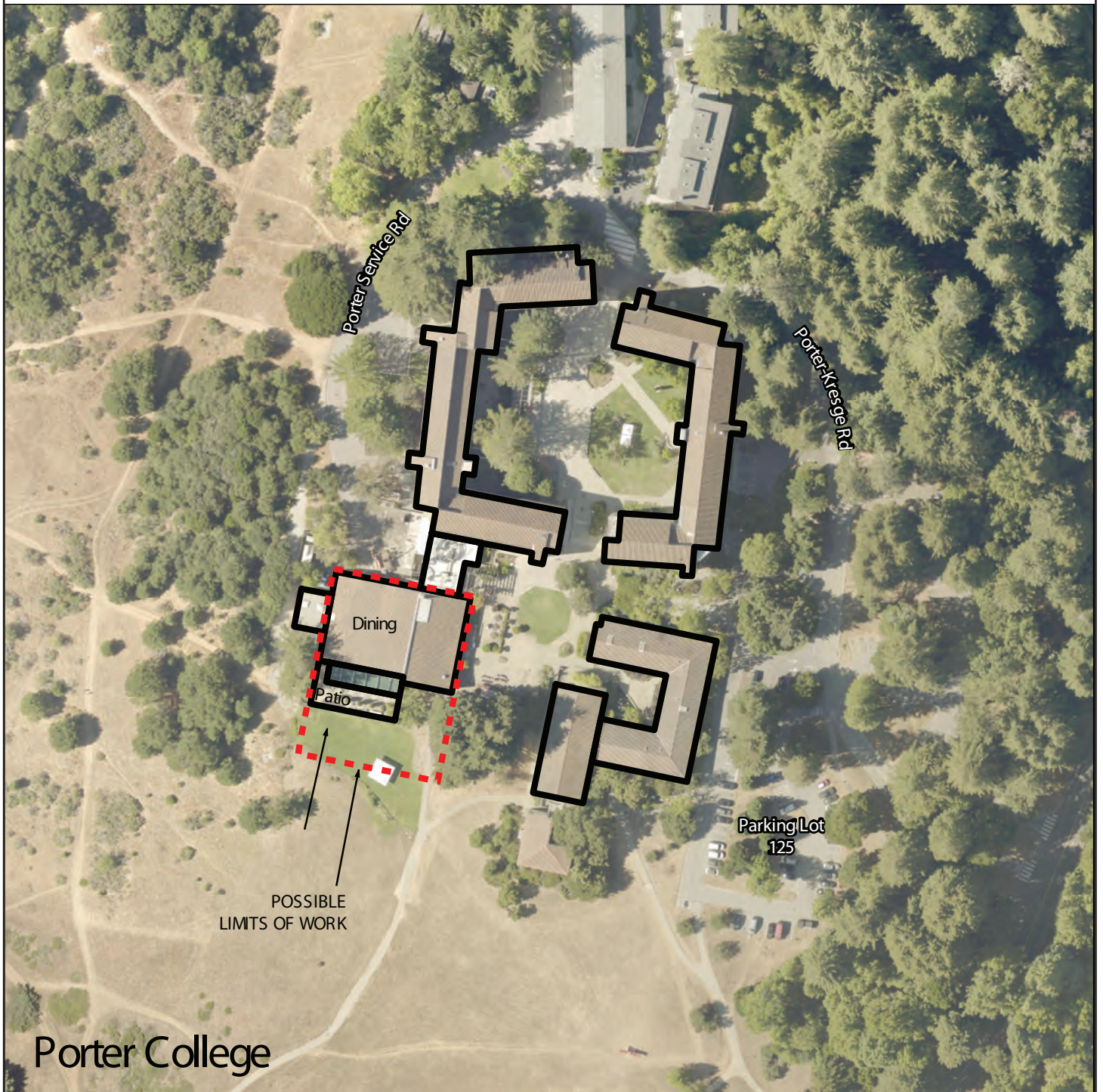
- Certification of the UC Santa Cruz Student Housing West and 2005 LRDP Supplement EIR;
- Adoption of an amendment to the UC Santa Cruz 2005 LRDP;
- Approval of the proposed SHW project design; and
- Execution of one or more ground lease agreements with the private developer.

3.12 RESPONSIBLE AND TRUSTEE AGENCIES

As defined by CEQA, “Responsible Agencies” are public agencies other than the Lead Agency that have discretionary approval over the project. The Draft EIR prepared for the proposed project would serve as the primary source of environmental information for each Responsible Agency. A “Trustee Agency” is defined under CEQA as a public agency having jurisdiction by law over natural resources affected by a project, which are held in trust for the people of the State of California. Responsible and trustee agencies for the proposed project include the following:

California Department of Fish and Wildlife (CDFW)

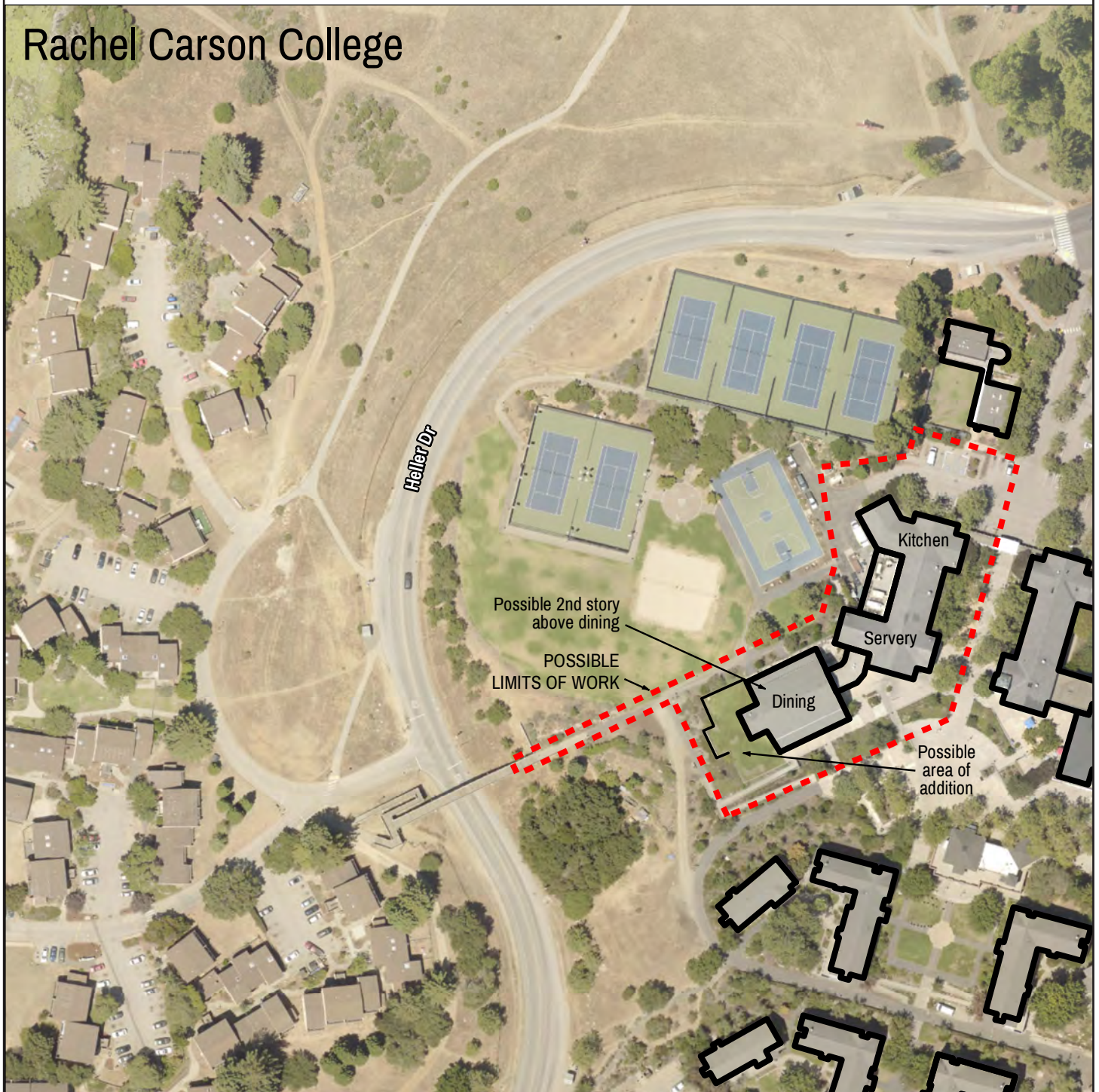
The CDFW has jurisdiction with regard to the fish and wildlife of the state, designated rare or endangered native plants, and to game refuges, ecological reserves, and other areas administered by the department. Although the Heller project site is developed with urban uses, the site still provides habitat for nesting birds and sensitive biological resources occur in the surrounding area. The Hagar site is undeveloped land, and is suitable habitat for common wildlife species. Both sites would be of interest to the CDFW.



SOURCE: UCSC, 2018

FIGURE **3.0-8**

Rachel Carson College



SOURCE: UCSC, 2018

FIGURE 3.0-9

CalFIRE

There are no trees on the Hagar site. Although the Heller site is not used for growing timber, the definition of timber under Public Resources Code 4526 is broad enough to include areas where commercial species trees such as redwoods, are growing within developed areas of the campus. If it is determined that there are areas considered timberland on the Heller site, then a timberland conversion permit from CalFIRE would be required.

Monterey Bay Air Resources District (MBARD)

The MBARD is responsible for monitoring ambient air pollutant levels throughout the basin and developing and implementing attainment strategies to ensure that future air quality will be within federal and state standards. Although no permit is required for building demolition, the MBARD requires notification of demolition projects of this size. Notification is performed through filing of a form provided by the MBARD. MBARD Regulation IV, Rule 424 also requires that a survey for asbestos be performed before demolition as well as the proper removal and disposal of any asbestos found.

Regional Water Quality Control Board – Central Coast Region (RWQCB)

The proposed project will need to submit a Notice of Intent for coverage under the State National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges of Stormwater Runoff Associated with Construction Activity (General Construction Permit).

RWQCB will review the project's Class V well information and potentially provide specific requirements to the US EPA for inclusion in the permit.

US EPA

The installation and operation of one or more dry wells to dispose excess recycled water and/or storm water will require an Underground Injection Control (UIC) permit from the US EPA who administers the UIC program and issues UIC permits for Class V wells. EPA will submit the project's Class V well information to the RWQCB for review.

4.0 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

4.0.1 INTRODUCTION

This section of the Tiered Draft Environmental Impact Report (EIR) presents potential environmental impacts of the proposed Student Housing West project ("SHW project" or "proposed project"). To assist the reader in understanding the manner in which the impact analysis has been conducted in **Sections 4.1 through 4.14** of this Tiered Draft EIR, this introductory section presents the definitions of key terms used in this EIR and key attributes of the analytical approach to impact assessment.

4.0.2 LEVELS OF SIGNIFICANCE

The Tiered Draft EIR uses a variety of terms to describe the levels of significance of adverse impacts identified during the course of the environmental analysis. The following are definitions of terms used in this Tiered Draft EIR:

- **Significant and Unavoidable Impact.** Impacts that exceed the defined standards of significance and cannot be eliminated or reduced to a less than significant level through the implementation of feasible mitigation measures.
- **Significant Impact.** Impacts that exceed the defined standards of significance and that can be eliminated or reduced to a less than significant level through the implementation of feasible mitigation measures.
- **Potentially Significant Impact.** Significant impacts that may ultimately be determined to be less than significant; the level of significance may be reduced in the future through implementation of policies or guidelines (that are not required by statute or ordinance), or through further definition of the project detail in the future. Potentially Significant Impacts may also be impacts about which there is not enough information to draw a firm conclusion; however, for the purpose of this Tiered Draft EIR, they are considered significant. Such impacts are equivalent to Significant Impacts and require the identification of feasible mitigation measures.
- **Less Than Significant Impact.** Impacts that are adverse but that do not exceed the specified standards of significance.
- **No Impact.** The project would not create an impact.

4.0.3 APPROACH TO PROJECT IMPACT ANALYSIS

The CEQA concept of "tiering" refers to the evaluation of general environmental matters in a broad program level EIR, with subsequent focused environmental documents for individual projects that

implement the program. State CEQA Guidelines provide that where an EIR has been prepared or certified for a program or plan, the environmental review for a later activity consistent with the program or plan should be limited to potentially significant effects on the environment that were not analyzed as significant in the prior EIR, that are susceptible to substantial reduction or avoidance (State CEQA Guidelines Section 15152[d]), or were not adequately addressed in the prior EIR (State CEQA Guidelines Section 15152[f]).

In September 2006, The Regents certified UC Santa Cruz 2005 LRDP EIR (SCH #2005012113) and approved the UC Santa Cruz 2005 LRDP. The 2005 LRDP provides a comprehensive framework for the physical development of the UC Santa Cruz campus to accommodate an on-campus three-quarter-average enrollment of 19,500 full time equivalent (FTE) students by 2020-21. The 2005 LRDP EIR is a program EIR that evaluates and discloses the environmental impacts from campus enrollment and employment growth and the physical development on the campus to accommodate this projected growth under the 2005 LRDP. As set forth in **Chapter 3.0, Project Description**, the proposed project is within the scope of the growth that was anticipated in the 2005 LRDP and evaluated in the 2005 LRDP EIR. In accordance with Sections 15152 and 15183 of the State CEQA Guidelines and Public Resources Code Section 21094, this document is a project EIR tiered from the UC Santa Cruz 2005 LRDP EIR. By tiering from the 2005 LRDP EIR, this Tiered Draft EIR relies on the 2005 LRDP EIR for a discussion of general background and setting information for environmental topic areas; overall growth-related issues; issues that were evaluated in sufficient detail in the 2005 LRDP EIR for which there is no significant new information or change in circumstances that would require further analysis; and an assessment of cumulative impacts. Additional information on the analytical approach used to evaluating project impacts is presented below.

- For each of the resource areas evaluated in the sections that follow, the Tiered Draft EIR describes the existing environmental setting derived primarily from the 2005 LRDP EIR with additional details presented for the two project sites based on project-specific surveys and reports.
- The Tiered Draft EIR uses the same significance criteria as used in the 2005 LRDP EIR to evaluate the significance of impacts. UC Santa Cruz examined the significance criteria and found that none of them require any changes given the passage of time since the 2005 LRDP EIR was prepared.
- Because the proposed project is within the scope of the growth anticipated in the 2005 LRDP, relevant mitigation measures adopted by The Regents in conjunction with the approval of the 2005 LRDP are included in and a part of the proposed project. These mitigation measures are listed in each resource subsection of **Section 4.0**. The analysis presented in the following subsections evaluates environmental impacts that would result from project implementation following the application of these mitigation measures, as part of the project as proposed. The mitigation measures that are included in the project would be monitored pursuant to the Mitigation Monitoring and Reporting Plan that will be adopted for the proposed project.

- Project-specific mitigation measures are set forth only in those instances where the LRDP EIR mitigation measures were determined to be inadequate to mitigate the project-specific impact.
- For purposes of the analyses in this Tiered Draft EIR, the year 2017 is used to establish the baseline or existing conditions for the proposed project. Impacts are evaluated in terms of environmental changes as a result of implementation of the proposed project as compared to existing conditions in 2017.

4.0.4 APPROACH TO CUMULATIVE IMPACT ANALYSIS

CEQA requires that in addition to project-specific impacts, EIRs evaluate and disclose a project's cumulative impacts. According to Section 15355 of the State CEQA Guidelines:

“Cumulative impacts” refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.

(a) The individual effects may be changes resulting from a single project or a number of separate projects.

(b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

Section 15130(a)(1) of the State CEQA Guidelines further states that “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.”

Section 15130(a) of the State CEQA Guidelines provides that EIRs discuss the cumulative impacts of a project when the project's incremental effect is “cumulatively considerable.”¹ Where a Lead Agency is examining a project with an incremental effect that is not cumulatively considerable, it need not consider the effect significant but must briefly describe the basis for its conclusion. If the combined cumulative impact associated with the project's incremental effect and the effects of other projects is not significant, Section 15130(a)(2) of the State CEQA Guidelines requires a brief discussion in the EIR of why the cumulative impact is not significant and why it is not discussed in further detail. Section 15130(a)(3) of the State CEQA Guidelines requires supporting analysis in the EIR if a determination is made that a project's contribution to a significant cumulative impact is rendered less than cumulatively considerable and, therefore, is not significant. CEQA recognizes that the analysis of cumulative impacts need not be as detailed as the analysis of project-related impacts, but instead should “be guided by the standards of

¹ Under Section 15065(a)(3) of the State CEQA Guidelines, “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.”

practicality and reasonableness” (State CEQA Guidelines Section 15130(b))., The discussion of cumulative impacts must reflect the severity of the impacts and the likelihood of their occurrence; however, the discussion need not be as detailed as the discussion of environmental impacts attributable to the project alone.

Section 15130(b) of the State CEQA Guidelines defines consideration of the following two elements as necessary to provide an adequate discussion of cumulative impacts: “(A) a list of past, present, and reasonably anticipated future projects producing related or cumulative impacts, including those projects outside the control of the Agency, or (B) a summary of projections contained in an adopted local, regional or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include: a general plan, regional transportation plan, or plans for the reduction of greenhouse gas emissions.”

Operational Phase Cumulative Impacts

As noted above, this project-level Tiered Draft EIR is tiered from the 2005 LRDP EIR, a program-level EIR that evaluated the cumulative effects of campus development and growth under the 2005 LRDP for a period of approximately 15 years - 2005 through 2020. As the proposed project is within the scope of the growth anticipated in the 2005 LRDP EIR, its cumulative impacts are captured and disclosed in the 2005 LRDP EIR. A new analysis of cumulative impacts is, therefore, not required. However, to aid the reader in understanding the nature of the previously analyzed cumulative impacts, LRDP EIR cumulative impacts applicable to the proposed project are summarized in each of the resource sections that follow.

This approach is used in all resource sections except water supply, population and housing, and greenhouse gas emissions. As noted in **Chapter 1.0 Introduction**, because the Santa Cruz County Superior Court determined the 2005 LRDP EIR’s analysis of water supply and population and housing impacts to be inadequate, the Draft EIR does not rely of the 2005 LRDP EIR for those analyses. Rather, in compliance with the court order and Settlement Agreement, the Campus has completed an updated analysis of the impacts of campus growth under the 2005 LRDP on water supply, and population and housing. That supplemental analysis is included in Chapter 7.0 of this Draft EIR.

Finally, the effects of greenhouse gas (GHG) emissions from campus growth under the 2005 LRDP were previously not analyzed in the 2005 LRDP EIR. However, CEQA does not require the analysis of GHG emissions as a "new significant impact" unless based on new information that "was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR" was certified. The EIR was certified in 2005. In 2005, information about the potential impacts of GHGs was widely known. The United Nations Framework Convention on Climate Change was established in 1992. The regulation of GHG emissions to reduce climate change impacts was extensively debated and analyzed throughout the early 1990s. The studies and analyses of this issue resulted in the adoption of the Kyoto Protocol in 1997. In the early and mid 2000s, GHGs and climate change were extensively discussed and

analyzed in California. In 2000, SB 1771 established the California Climate Action Registry for the recordation of GHG emissions to provide information about potential environmental impacts. Therefore, the impact of GHG emissions on climate change was known at the time of the certification of the EIR in 2005. Under CEQA standards, it is not new information that requires analysis in a supplemental EIR. With respect to the project-level GHG impacts of the SHW project, the reader is referred to that analysis in **Section 4.6** of this Draft EIR.

Construction Phase Cumulative Impacts

While the 2005 LRDP EIR discloses the cumulative impacts of campus growth and development through 2020-21, it evaluates construction-phase impacts of future development at a programmatic level. To confirm that the proposed project would not result in construction-phase cumulative impacts that were previously not disclosed, this Tiered Draft EIR examines reasonably foreseeable projects that would be constructed on the campus in the same general timeframe as the proposed project for the potential for construction-phase cumulative impacts. **Table 4.0-1** below lists reasonably foreseeable near-term projects that the Campus has identified as likely to be constructed or completed during the same time as the proposed project. These projects are considered in each resource section for potential near-term construction-phase cumulative impacts. (Note that all of these near-term projects are within the scope of the 2005 LRDP and any longer term operational impacts of these projects are captured in the analysis of operational impacts in the 2005 LRDP.)

Table 4.0-1
Near-Term Cumulative Projects

Project	Location	Description	Use	New sf	Status	Year of Completion
Student Life Seismic 2B	Central Campus (Crown Lane)	seismic upgrade or replacement of two buildings	Student services	up to 2,220 gsf	design	2019
EH&S	Central Campus (Heller Drive)	New EH&S building	regulated waste storage/handling	7,100 gsf	construction	2018
Kresge College	West Campus (Porter-Kresge Road)	Renovate/redevelop existing college	Student housing, student services, and academic building space	60,000 gsf (net new); 185 undergraduate student beds	design	2023
Crown College	Central Campus (Chinquapin Road)	Renovate existing college housing	Student housing	22 net new undergrad student beds (lower-division beds in residence halls)	construction	2020

4.0 Environmental Setting, Impacts, and Mitigation Measures

Project	Location	Description	Use	New sf	Status	Year of Completion
Rachel Carson and Porter Dining Hall Expansion	West Campus (Heller Drive)	Expand servery and/or seating area to accommodate SHW and existing population	Dining services	TBD, not more than 10,000 new gsf	pre-design	2023
Ranch View Terrace Phase 2	South Campus (Ranch View Road)	As analyzed in RVT EIR	Employee housing	42 3-4 BR single-family homes	approved, on hold	2022-2023
Student Health Services Addition	Central Campus (McLaughlin Drive)	Add 1-2 floors to existing building, incorporate into college renovation, or new building at site. Accommodate 36 staff (some are in temporary modulars now)	Student services	14,000 gsf	planned	2023

4.1 AESTHETICS

4.1.1 INTRODUCTION

This section describes the visual setting of the project sites and evaluates the potential for visual impacts due to the proposed Student Housing West (SHW) project, including the potential to affect significant visual resources, change the visual character of the project area, block or alter scenic vistas, and generate substantial light and glare.

The section also presents potential impacts to aesthetics from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and the existing colleges (see **Section 4.1.5** below).

The analysis in this section is tiered from the aesthetic impact analysis contained in the 2005 LRDP EIR, supplemented by project-specific analysis. Information used in the preparation of this section was obtained from various sources, including site visits, previous environmental documentation prepared for the UC Santa Cruz campus, including the 2005 LRDP EIR, and other campus data sources.

4.1.2 ENVIRONMENTAL SETTING

4.1.2.1 Regional Setting

The campus is located in the northwestern portion of the city of Santa Cruz. The city of Santa Cruz is the largest urban center in Santa Cruz County. The city occupies a picturesque location along the banks of the San Lorenzo River, between Monterey Bay and the Santa Cruz Mountains. Monterey Bay is part of the Monterey Bay National Marine Sanctuary, a federally protected marine environment. The city of Santa Cruz lies primarily on the projecting northern arm of the bay shore and has a southern aspect such that views southeastward from the campus encompass the city and the bay. The Santa Cruz Mountains serve as a scenic backdrop to the city and are visible from most areas of the city, including the coastline. Many locations in the city and on the campus, especially on the slopes of the coastal mountains, provide panoramic views of the Monterey Bay (UCSC 2006).

4.1.2.2 Campus Setting

UC Santa Cruz is known for the outstanding natural beauty of its campus landscape and the quality of the campus's built environment. Located on the southeastern end of Ben Lomond Mountain on a series of marine terraces, the campus ranges in elevation from 300 feet at the southern campus boundary along

High Street to a maximum elevation of approximately 1,120 feet at the northwestern campus boundary (UCSC 2006).

There are currently two entrances to the main campus. The Main Entrance to the UC Santa Cruz campus is at the intersection of Glenn Coolidge Drive and High Street. There is an informational kiosk located at this entrance as well and grassy areas flank the entrance to the east and west. The Barn Theater is located immediately west of the Main Entrance and residential neighborhoods lie further south. To the north of the entrance are campus support facilities such as the receiving fleet services, and offices, and buildings associated with the Cowell Lime Works Historic District.

The second campus entrance is the West Entrance at the intersection of Empire Grade Road and Heller Drive. A small kiosk in the center of the road marks the entrance to the campus. Open, rolling meadows lie on both sides of the West Entrance. The Family Student Housing (FSH) complex is visible on the north side of the West Entrance, while Oakes College and College Eight are visible to the east.

Visual Character

The visual character of the campus varies widely depending on which portion of the campus is in the viewer's viewshed. Grassland landscapes dominate the views in the lower portions of the campus, with large meadows rising from the main entrances. These meadows then transition to primarily second growth forest in the central and upper portions of the campus; therefore the views of the central and upper campus are dominated by dense forest landscapes. Deep forested ravines run north-south through central and lower campus. The bulk of campus buildings and colleges are located in the forested central campus: most structures in this area are not visible from the lower campus because they are located in forested areas and screened by trees. Buildings have deliberately been designed not to extend above trees. By contrast, the lower campus is largely open space, dominated by the Great Meadow, East Meadow, and the large meadow to the west of Empire Grade Road (UCSC 2006).

Scenic Views and Vistas

Scenic vistas may generally be described in two ways: panoramic views (visual access to a large geographic area, for which the field of view can be wide and extend into the distance) and focal views (visual access to a particular object, scene, setting, or feature of interest). Panoramic views are typically associated with vantage points that provide a sweeping geographic orientation and may include urban skylines, valleys, or mountain ranges. In addition, these views are typically available from a publicly accessible viewpoint, such as roads or public gathering places, rather than views available from private residences.

Scenic views are available from several prominent vantage points on the campus. As outlined in the 2005 LRDP EIR, exceptional vantage points on the campus include Cowell College plaza, Baskin Visual Arts Center, University House, the knoll at Porter College, the field at Oakes College, and the Great Meadow. Views from these areas are considered as having aesthetic value to the campus, although they are not identified as scenic vantage points by the City or County General Plans. There are also points along Heller Drive and Glenn Coolidge Drive that offer views of the bay as well as the City of Santa Cruz (UCSC 2006). These vantage points offer impressive long-range views of Santa Cruz, Monterey Bay, and adjacent hillsides. Short-range views on campus are influenced by topography, vegetation type and height density of vegetation, and density of buildings.

The campus is regarded by local residents as an important visual resource for the city because it provides a natural backdrop for the developed areas of western Santa Cruz. The lower campus grasslands and forest canopy of the upper campus are visible from various points throughout the city of Santa Cruz, including the wharf, the Boardwalk, and Highway 1. Because most campus buildings are located in the forested central campus, few campus buildings can be seen from these points. Due to substantial elevation changes, intervening development, and topography, views of the campus facilities from city streets to the south of the campus are limited.

Scenic Routes and Resources

There are no officially designated state scenic highways in Santa Cruz County¹ (DOT 2017). The County General Plan, however, designates Empire Grade Road as a scenic road. The City of Santa Cruz General Plan describes the foothills of the Santa Cruz Mountains, including the UC Santa Cruz campus, as a scenic resource. The City's General Plan also identifies the portions of Hagar Drive and Glenn Coolidge Drive through the lower campus meadows as scenic drives (UCSC 2006).

Several undeveloped open space areas are valued scenic resources on the campus and have been identified as Protected Landscapes in the 2005 LRDP. Protected Landscapes on the campus include a large portion of the Great Meadow and portions of the undeveloped north campus.

Light and Glare

Across the campus, sources of light and glare include parking lots, footpaths, and buildings. Light and glare from parking lots are associated with light standards (used to illuminate the lot) and from headlights on vehicles entering and exiting the lot. Campus Standards are intended to minimize lighting

¹ Highway 1 segment from the Santa Cruz County line north up to Half Moon Bay in San Mateo County is a designated state scenic highway.

impacts by limiting the amount of lighting around buildings and encouraging the implementation of non-glare down-lighting fixtures. In wooded areas of the campus, lighting consists of non-directional fixtures so as to increase the sense of security on paths. Some light pollution from the campus is visible at night, especially in foggy conditions (UCSC 2006).

4.1.2.3 Visual Characteristics of the Surrounding Area

The campus is generally surrounded by open-space park areas to the north, east and west and residential portions of the city of Santa Cruz to the south. The campus is bounded on the east by the Pogonip City Park and the Henry Cowell Redwoods State Park, on the north by private land, and on the west by Wilder Ranch State Park. Several residential neighborhoods lie to the south of the campus, and the rural residential Cave Gulch neighborhood lies just outside the western campus boundary. Most of the buildings in Cave Gulch area along the stretch of Empire Grade Road are single-family homes. In addition, a llama ranch and the Waldorf School are located in the Cave Gulch neighborhood. The campus edges along the western, northern and eastern campus boundaries are largely forested, with the exception of a portion of the edge along Pogonip City Park and the open area west of Empire Grade Road which are predominantly grassland. The southeastern and southern campus edges are largely developed: off-campus development in these areas includes single-family homes, mixed-density residential housing, an elementary school, several churches, and a short strip of commercial development. The southwestern edge of the campus consists of meadows both within the campus and outside of the campus boundaries.

4.1.2.4 Project Site Setting - Heller Site

Existing Visual Character of the Heller Site

The Heller site is located on the western edge of the campus, between Heller Drive to the east and south and Empire Grade Road to the west. It is currently the location of FSH complex, an existing 13-acre development that includes 199 housing units, a child care facility, recreation field, parking, utilities, roads and pedestrian infrastructure. The project site consists of clusters of buildings connected by natural and paved pathways and narrow roads with intervening open space areas. The apartment buildings are two-stories high and are partially screened by mature trees along the southern and eastern sides of the site, when viewed from Heller Drive.

Grassy open space surrounds the existing structures on the Heller site, and separates the buildings from roadways, including Heller Drive. Multiple grassy courtyards are present between clusters of buildings, providing communal outdoor. The FSH playing field, located at the southern end of the site, is a large field intended for informal athletics. The field is fenced on three sides and contains a baseball backstop.

Although these areas in and around the FSH complex are not natural landscapes, they contribute to the overall visual character of the Heller site.

Development and Landscape surrounding the Heller Site

The area to the east of the Heller site is developed with the Oakes and Rachel Carson Colleges, the West Field athletic and recreational facilities, and related parking lots. The Rachel Carson College sits directly east of the Heller site and gardens, six apartment buildings and eight residence hall buildings. Other buildings include the dining hall, Housing Office, and West Field House. Immediately south of Rachel Carson College, nestled against the redwood forest, are the Oakes College buildings, which consist of a series of dorms, apartments, a café and academic facilities.

Lands to the north and west of the Heller site are undeveloped. The Benjamin F. Porter Meadow, open, rolling topography consisting mostly of grassland with some scattered trees and shrubs, lies immediately north of the site. The meadow contains multiple dirt roads and paths, which connect the FSH complex with developments in the surrounding area, such as Kresge and Porter Colleges to the north and northeast. The mixed evergreen and oak forest of Wilder Ranch State Park lie to the northwest and west of the site, across Empire Grade Road. On the eastern side of Empire Grade Road, campus land between the roadway and the Heller site is also heavily wooded.

As described above, there is a playing field to the south of the FSH complex, and beyond it are grassy, undeveloped campus lands as well as a riparian corridor associated with the West Branch of Moore Creek.

Views from the Heller Site

Panoramic views of the bay are available on clear days from the southernmost portion of the Heller site. Long-range views from the majority of the project site are obstructed by buildings, vegetation, and topography. Short-range views from the Heller site consist of grassy open space with scattered oak trees and shrubs, Rachel Carson College and affiliated athletic courts to the east, Kresge College to the north, Porter College to the northeast, and dense woodland to the west.

Views of the Heller Site from On-Campus Viewpoints

Due to the trees surrounding the Porter and Kresge Colleges, long-range views of the Heller site from these colleges are largely obstructed. However, the site can be viewed clearly from the north from most areas of Porter Meadow, including the knoll at Porter College. From the areas to the east, the Heller site is visible from Heller Drive and areas within the Rachel Carson and Oakes Colleges. Views of the Heller site

are not available from the field at Oakes College. Views of the Heller site are available from the south from the West Entrance, from Heller Drive, and from the open meadows beyond that.

Views of the Heller Site from Off-Campus Viewpoints

The 2005 UC Santa Cruz LRDP describes the Heller site as having medium visibility from off-campus vantage points. Except for the portion of Empire Grade Road and a grassy open space to the west of the roadway near the West Entrance, views of the Heller site from the west are largely blocked by trees east of Empire Grade Road. Due to its location in the western portion of the campus, the Heller site is visible from the UC Santa Cruz Coastal Science Campus.

Existing Heller Site Light and Glare Sources

In general, the primary sources of light in the vicinity of the Heller site are the FSH complex and the parking lots at Rachel Carson College, located to the southwest across Heller Drive. Sources of glare at and near the Heller site include reflective surfaces such as pavement, building exteriors, and glass from the built-up area of the FSH complex and the West Colleges. Glare into buildings from the reflected sunlight off of adjacent buildings is generally minimized due to the relatively low density of development, the relatively low average height of buildings, the extent of mature trees and landscaping, and the limited use of reflective glass surfaces in existing buildings.

4.1.2.5 Project Site Setting - Hagar Site

Existing Visual Character of the Hagar Site

The Hagar site is located at the northern corner of the intersection of Glenn Coolidge Drive and Hagar Drive. The site is a hillside with gently rolling topography within the southern portion of the campus's East Meadow. The site is undeveloped and covered with annual grasslands. Like other parts of the campus, the Hagar site exhibits karst geologic features. The solution action of runoff has resulted in the formation of a sinkhole in the southeastern corner of the project site.

There is a paved pathway that runs along the east side of Hagar Drive, beside the fence that currently borders the Hagar site to the west. There is also an informal dirt path that follows Glenn Coolidge Drive, around the southern and eastern edge of the site. Two informal pathways run from Glenn Coolidge Drive up through the East Meadow, along the east and west sides of the project site. Other pathways in the area include the Spring Trail to the south and east of the site across Glenn Coolidge Drive and a paved bike path that runs adjacent to Farm Road, approximately 0.12 miles west of the Hagar site.

Development and Landscape surrounding the Hagar Site

The East Meadow extends to the north of the project site and as such, lands to the north and west of the Hagar site are composed of grasslands of composition similar to those on the site. Approximately 0.4 miles north of the Hagar site, at the top of the East Meadow, is the East Remote parking lot. The large lot consists of three parking areas that are immediately south of a groomed grass playing field and a smaller unpaved site used for construction contractor parking and staging and campus shuttle parking. About 0.12 miles west of the project site, across Hagar Drive, is the UC Santa Cruz Center for Agroecology and Sustainable Food Systems (CASFS) and affiliated agricultural fields. Also to the west of the site is the Cowell Lime Works Historic District. The Cardiff Terrace, Hagar Court and Hagar Meadow employee housing developments lie to the south and southwest of the Hagar site. An off-campus residential neighborhood that includes a small park and pond are situated in an old quarry east of the employee housing. To the east, beyond Glenn Coolidge Drive, are undeveloped grasslands that extend onto Pogonip Park.

Views from the Hagar Site

Views from the Hagar site towards the upper campus include Hagar Drive to the west and the rooftops of buildings in the East Field House area and Arts area to the north, across the East Meadow. The forest edge can be seen behind these buildings. Overall, the viewshed is dominated by large, open grasslands that comprise the East Meadow. Views from the site to the east, west and south comprise views of the lower campus housing, city neighborhoods, and the bay.

Views of the Hagar Site from On-Campus Viewpoints

The site is prominently located at the intersection of Hagar and Glenn Coolidge Drives, and is visible along both streets in close proximity to the site. However, along Glenn Coolidge Drive to the north of the Hagar intersection, the land slopes up and blocks views of the East Meadow. Additionally, due to the sloping nature of the East Meadow, the Hagar site is not visible from locations in and above the northern portion of the East Meadow, such as the East Remote Parking Lot and Cowell College Plaza.

Views of the Hagar Site from Off-Campus Viewpoints

The Hagar site is located within an area previously identified in the 2005 LRDP EIR as highly visible from off-campus viewpoints. Due to elevation change and its location in the lower portion of the East Meadow, it is not visible from the off-campus neighborhoods and the Pogonip to the east, nor is it visible from the off-campus areas to the south and west of the campus. Above the northeastern corner of the site, the land

risers above Glenn Coolidge Drive, screening the site from visibility. Thus, the site is also not visible from distant locations in the city—e.g., along Highway 1, or from the wharf.

Existing Hagar Site Light and Glare Sources

As the Hagar site is currently undeveloped, it produces no light or glare. The closest sources of light and glare are the residences to the south and CASFS facilities to the west. Besides one street light at the intersection of Glenn Coolidge and Hagar Drives, there is no street lighting present in the immediate vicinity of the Hagar site.

4.1.3 REGULATORY CONSIDERATIONS

4.1.3.1 Federal and State Laws and Regulations

There are no federal laws related to aesthetics that are applicable to the proposed project.

4.1.3.2 Regional and Local Plans

As a state entity, the University of California, of which UC Santa Cruz is a part, is not subject to regional or local plans and policies of cities or counties that regulate land uses. The land use plan applicable to the proposed project is the UC Santa Cruz 2005 LRDP. Relevant portions of the 2005 LRDP, Campus standards, and the Physical Design Framework that inform the siting and design of new facilities are summarized below.

Although the University is not subject to local plans of cities and counties, nevertheless, such plans and policies are of interest or concern because the campus and local development are coincident. UC Santa Cruz has a long tradition of working voluntarily and cooperatively with the City of Santa Cruz, Santa Cruz County and other regional agencies, and it is University policy to seek consistency with regional and local plans and policies, where feasible. Therefore, pertinent information from the City General Plan and County General Plan related to visual resources is also summarized below.

2005 Long Range Development Plan

The 2005 LRDP identifies several visual elements on the campus as valued elements of the visual landscape. According to the 2005 LRDP, the following views and vantage points are important to the campus community:

- Long-range views from central campus vantage points that include Cowell College plaza, Baskin Visual Arts Center, University House, the knoll at Porter College, and the field at Oakes College.

- Important vantage points looking across open space areas towards the upper campus include points along Empire Grade Road, Glenn Coolidge Drive, and Hagar Drive.

Other relevant policies from the 2005 LRDP include:

Land Use

- Respect the natural environment and preserve open space as much as possible: Development will rely on careful infill and clustering of new facilities to promote efficient land use, retain valuable visual and environmental features, and encourage a pedestrian friendly campus. Within the overall context of infill and clustering, sites will include a reasonable "buffer" between new buildings and major roads where possible.
- Integrate the natural and built environment: New development will respond to the aesthetic qualities of UC Santa Cruz's unique natural environment through siting, development patterns and architecture that are sensitive to the natural setting. In forested areas, buildings generally should not protrude above the surrounding tree canopy; in visually sensitive areas, interruption of prime viewsheds and viewpoints will be minimized.
- Encourage sustainability and efficiency in building layouts: Buildings shall be configured simply, to balance programmatic goals with sensitivity to the natural and/or built context. Efforts will be made to reduce building footprints and increase building height, where feasible.

Natural and Cultural Resources

- Respect major landscape and vegetation features: Development will be sensitive to preservation of UC Santa Cruz's distinctive physical features, including ravines, major grasslands, chaparral, and areas of redwood and mixed evergreen forests.
- Design exterior landscaping to be compatible with surrounding native plant communities: As much as possible, landscaping will favor the use of native plants, as well as noninvasive, drought-tolerant, and fire-resistant species.

UC Santa Cruz Physical Design Framework

A companion piece to the 2005 LRDP, the UC Santa Cruz Physical Design Framework highlights the complex and dynamic physical environment found on campus. The Framework categorizes key landscape types, building types and circulation types throughout the campus, articulating related guidelines that are intended to actuate sustainable and mindful campus development. The

predominant landscape types found at the project sites are Meadow Areas, Forest, Forest Edge. Guidelines specifically related to the proposed project are highlighted here.

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.

Forest Edge Areas

- 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.
- 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.

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.

General Building 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.

Student Housing West Project Planning and Design Principles

Student Experience

- Be conscious of the student's sense of the natural environment throughout the design of the buildings, landscape and circulation.
- Nurture a sense of place by allowing buildings and open spaces to respond to the natural surroundings.
- Orient outdoor gathering spaces to maximize views and provide good solar exposure.

Existing Campus Adjacencies

- Relate to the scale of existing colleges and new neighborhoods by providing appropriate transitions and screening.

New Program Adjacencies

- Address visual and audio privacy for each program type with berms and screening where necessary.

Building Massing and Orientation

- Consider tall buildings along the eastern forest edge of the site, where they will have less visual impact than in open meadow areas.
- Open up views to natural surroundings by considering use of smaller footprints to give the site more "breathing room".
- Allow placement of buildings to permit views into the meadow and the bay, from both the north area along Porter Kresge Road and the south area along Heller Drive.
- Utilize building forms to frame views.

Building Clusters and Gathering Spaces

- Create distinctive communities to align and relate to the scale of the existing campus.
- Allow clusters to be organized in response to the site topography rather than rigid axial site organization.

- Orient buildings so that large collective gathering spaces have maximize sun exposure and views toward water.

Vehicular Circulation + Parking

- Consider screening and berming of parking lots to preserve scenic character of Heller Drive.

UC Santa Cruz Campus Standards Handbook

The Campus Standards Handbook has extensive criteria regarding the development of the campus. It provides direction to maintain and progress UC Santa Cruz, with requirements covering everything from lighting and furnishing to signage to soil treatments. The handbook includes the following standards related to the design and aesthetics:

Exterior Lighting Standards

Lighting shall be provided for safety only. Decorative lighting shall be used only upon approval by the Campus Architect of a written justification submitted early in the design process. Such justification may include: lighting is necessary for public performances (in this case, lights shall be switched separately from safety lighting) or to achieve a limited effect at the building entrance. Refer to LRDP for lighting considerations and wildlife. Emergency egress lighting with required backup power source shall be provided to major roadways.

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.

County General Plan

The County of Santa Cruz General Plan includes a Conservation and Open Space Element that designates scenic roads. The Element identifies Empire Grade Road, from the northern Santa Cruz city limits to the north end of Empire Grade Road, as a scenic road that is valued for its vistas. The associated policy calls for the protection of public vistas from the designated roads. The Element includes additional policies about scenic protection, including policies to protect public and ocean vistas.

City of Santa Cruz General Plan

Policy 2.3.1 in the Land Use Element supports campus efforts to preserve open space and Community Design Policy 1.1.1 calls to preserve natural features that visually define areas. Policy 1.2.1 encourages UC Santa Cruz to maintain the visual quality and character of the campus, such as public views seen from the

city. Policy 1.4 supports maintaining visual and physical connections between the campus development and open space.

4.1.4 IMPACTS AND MITIGATION MEASURES

4.1.4.1 Significance Criteria

The impacts on aesthetics from the implementation of the proposed project would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the State CEQA Guidelines, the UC CEQA Handbook, and the 2005 LRDP EIR:

- 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;
- substantially degrade the existing visual character or quality of the site and its surroundings; or
- create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.

As stated in the 2005 LRDP EIR, a scenic vista is defined as an expansive view of a highly valued landscape, as observable from a public accessible vantage point. According to the 2005 LRDP EIR, important scenic vistas for the campus include views of the Monterey Bay as viewed from Cowell College plaza, Baskin Visual Arts Center, University House, the knoll at Porter College, Stevenson College knoll, and the field at Oakes College; and views across the campus and wooded backdrop as viewed from locations along Empire Grade Road between Western Drive and the campus west entrance, Glenn Coolidge Drive between Hagar Drive and Cowell College, and Hagar Drive between Glenn Coolidge Drive and the East Remote parking lot.

The 2005 LRDP EIR also defines scenic resources on the campus to include Cowell Ranch Historic District buildings and structures, rock exposures in the main entrance area, and all of the meadows on the lower campus, including Great Meadow, East Meadow, and the meadow west of Empire Grade Road. Meadows on the central campus (Kerr, Crown, Porter) are not considered scenic resources because these are not of a significant scale or part of a scenic vista.

The analysis below uses the guidance provided by the 2005 LRDP EIR to evaluate the project's impacts on scenic vistas and scenic resources.

4.1.4.2 CEQA Checklist Items Adequately Analyzed in the 2005 LRDP EIR or Not Applicable to the Project

Although redevelopment of the FSH complex on the Heller site was evaluated in the 2005 LRDP EIR, the currently proposed Heller site housing is substantially different from the previous proposal. With regard to the Hagar site, that site was not envisioned for any development under the 2005 LRDP. Therefore, although the analysis below uses the prior LRDP level analysis to the extent appropriate, none of the CEQA checklist items listed above under Significance Criteria are scoped out; all of the items are addressed in the project-level analysis below.

4.1.4.3 Methodology

The visual impact assessment provides a description of the physical setting surrounding the two project sites to illustrate the backdrop against which impacts of the proposed project are evaluated. The scale, massing, bulk, and form of the proposed project is evaluated in the context of the surrounding development and neighborhoods.

The potential for degradation of visual character of the campus and its surroundings is evaluated in terms of a substantial adverse change in the visual character or quality, including a change in land use, and development of currently undeveloped land. Visual change that is compatible with existing patterns of development would not be considered a significant impact.

4.1.4.4 2005 LRDP EIR Mitigation Measures Included in the Proposed Project

Table 4.1-1, 2005 LRDP EIR Mitigation Measures, presents the mitigation measures in the 2005 LRDP EIR that are applicable to the proposed project. Since these previously adopted mitigation measures are already being carried out as part of implementation of the 2005 LRDP, they are included in and are a part of the proposed project and will not be readopted. Implementation of these mitigation measures is assumed as part of the project impact analysis.

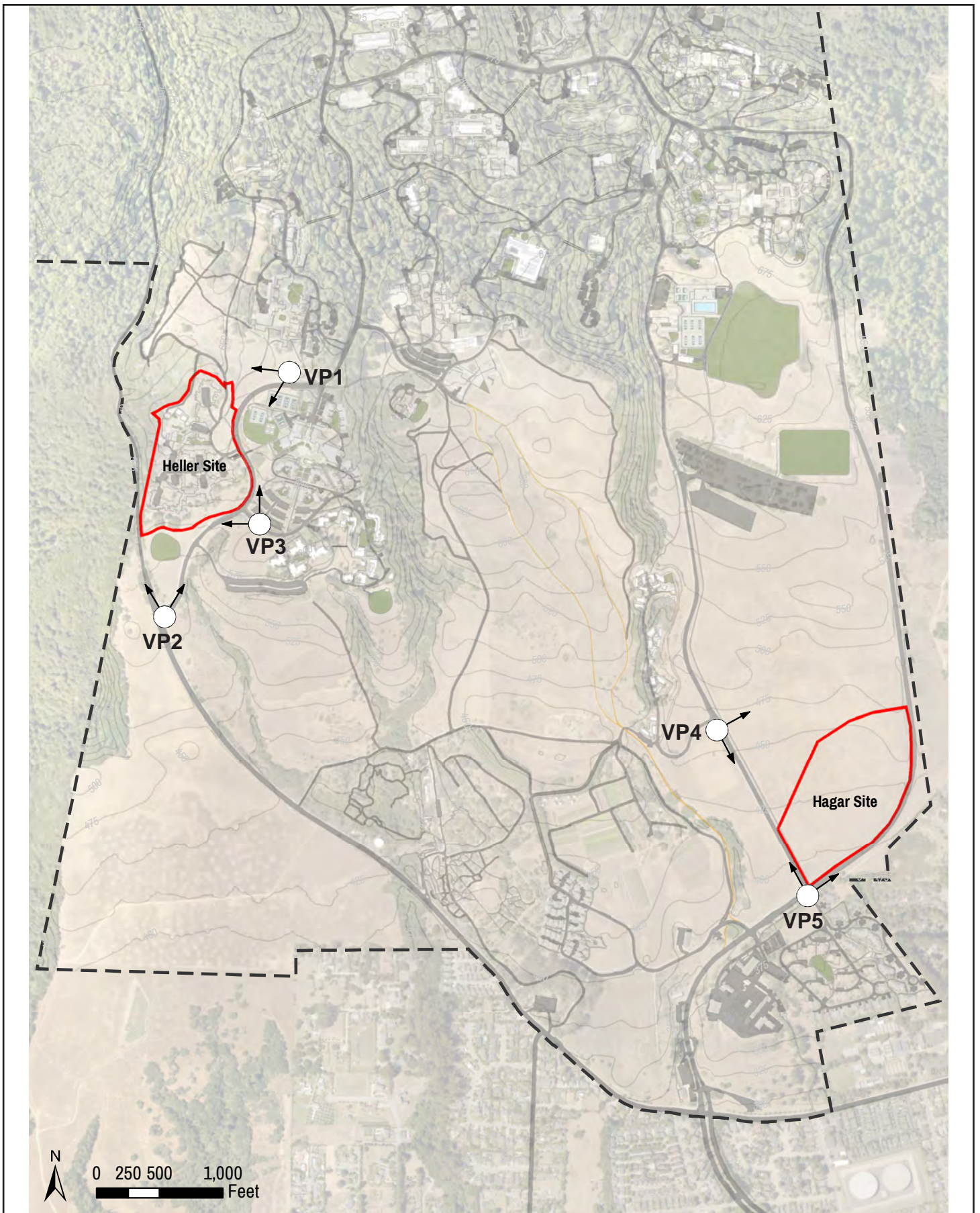
Table 4.1-1
2005 LRDP EIR Mitigation Measures

Mitigation Measure	Description
AES-3B	For development in meadow areas, the Campus shall limit the removal of natural vegetation, and cluster development at meadow edges to the extent feasible.
AES-5A	The UC Santa Cruz Design Advisory Board shall review project designs for consistency with the valued elements of the visual landscape identified in the 2005 LRDP, and the character of surrounding development so that the visual character and quality of the project area are not substantially degraded.
AES-5C	Campus development shall be designed and construction activities shall be undertaken in a manner that shall preserve healthy and mature trees around new projects to the greatest extent feasible.
AES-6A	Where there is a potential for reflective glare, as along meadow margins, project design shall provide for the use of non-reflective exterior surfaces, or other design measures to avoid new sources of reflected light.
AES-6B	Lighting for new development projects shall be designed to include directional lighting methods shielded to minimize light spillage and minimize atmospheric light pollution. This lighting should be compatible with the visual character of the project site and meet the UC Regents' Green Building Policies.
AES-6C	As part of the design review process, the UC Santa Cruz Design Advisory Board shall consider project-related light and glare and the Campus shall require the incorporation of measures into the project design to limit both to the extent allowed by code.
AES-6E	As part of the design review process, UC Santa Cruz Design Advisory Board shall review outdoor lighting fixtures for roads, pathways, and parking facilities to ensure that the minimum amount of lighting needed to achieve safe routes is used, and to ensure that the proposed illumination limits adverse effect on nighttime views.
<i>Source: UC Santa Cruz, 2006.</i>	

4.1.4.5 Project Impacts and Mitigation Measures

SHW Impact AES-1: Implementation of the proposed project would have a substantial adverse effect on a scenic vista. (*Significant; Significant and Unavoidable*)

To evaluate the impacts of the proposed project on scenic vistas, this EIR examines the potential change to views of the Monterey Bay from valued vantage points on the campus. In addition it evaluates changes to views across the campus meadows to its wooded backdrop on central and upper campus as viewed from Empire Grade Road between Western Drive and the West Entrance; Glenn Coolidge Drive between Hagar Drive and Cowell College; and Hagar Drive between Glenn Coolidge Drive and the East Remote parking lot, as views from these roadway segments are also considered scenic vistas pursuant to the 2005 LRDP. To assist in the evaluation of visual impacts, visual simulations of changes to views from the construction of the proposed project were prepared. The viewpoints used in the analysis are depicted on **Figure 4.1-1, Key to Vantage Point Locations**.



SOURCE: UCSC, 2018

FIGURE 4.1-1

Heller Site

The Heller site is located in the western most portion of the campus and the one valued on-campus vantage point from which this site is visible is the knoll at Porter College. The Heller site is currently developed with the FSH complex and views from the knoll looking towards the bay include the existing development. However, the two- to three-story buildings that make up the FSH complex do not obstruct long distance views from the knoll at Porter College (**Figure 4.1-2, Existing View from Porter Knoll**). As the proposed project would result in a more dense and substantially taller development than the current FSH complex, the panoramic view to the south and southeast from Porter College knoll would be partially obstructed by the proposed development, although the bay would still be visible in the distance from the knoll when looking southeast. To illustrate the change in view, a visual simulation of the project as viewed from the Porter knoll is presented in **Figure 4.1-3, View from Porter Knoll with Project**. The effect of the proposed development on views from the knoll is considered a significant impact.

Another key vantage point is the field at Oakes College. The Heller site is located west of the Oakes College field and is not anticipated that development would interrupt or adversely alter views of the ocean located to the far south of the Oakes College field. Thus, there would be no impact on scenic views from the field at Oakes College.

As views of the Heller site development would not be available from Glenn Coolidge Drive that are considered valued views, there would be no impacts to those valued scenic views. The Heller site development would not be visible from Hagar Drive segment. The impact on scenic views from the roadway would be less than significant.

As noted above, the 2005 LRDP values views across the campus meadows to its wooded backdrop on central and upper campus as viewed from Empire Grade Road between Western Drive and the West Entrance. The Heller site development would not be visible from most of this roadway segment due to topography and intervening vegetation. However, a view of the Heller site is available from near the West Entrance (**Figure 4.1-4, Existing View from West Entrance**). The changes in that view are presented in **Figure 4.1-5 (View from West Entrance with Project)**. As the visual simulation shows, although landscaping installed as part of the proposed project as well as the retention of existing trees in the southern portion of the Heller site would soften the appearance of the new development, as the project buildings are large, the project that would substantially change the existing view and the change to this view is considered a substantial adverse visual impact.



SOURCE: Leif Rideout 2018

FIGURE **4.1-2**



SOURCE: Leif Rideout, 2018

FIGURE **4.1-3**



SOURCE: Leif Rideout 2018

FIGURE **4.1-4**



SOURCE: Leif Rideout 2018

FIGURE **4.1-5**

The proposed Heller site housing would also be visible in the far distance from the Coastal Science Campus and would change the view of the main campus as observed from that campus. The new housing, although visible due to building mass and heights, would not extend above the tree line that forms the backdrop of the view and would not contrast strongly with the wooded background due to the materials and colors that would be used in the Heller site housing. The change in scenic views from that location would not be significant.

Hagar Site

The Hagar site is located in the lower portion of the East Meadow and the proposed housing would not interrupt and would be at most minimally visible in views from the campus's valued vantage points, including Cowell College plaza, Baskin Visual Arts Center, University House, the knoll at Porter College, and the field at Oakes College.

Comments received on the NOP identified a number of locations in the immediate vicinity of the Hagar site as potential viewpoints that would be adversely affected by the proposed development. Several of the viewpoints identified, specifically the East Playing Field, the entry to CASFS, Cowell Ranch Historic Hay Barn, bike path that runs through the Great Meadow, and the Music Center entry court, Hagar Court, and Parking Lot 116, are not valued vantage points. Furthermore, the Hagar site would not be visible from most of these locations due to intervening topography and vegetation, as well as elevation change. The commenter also identified locations along Hagar Drive and Coolidge Drive as likely to be affected. As portions of both roadways are identified in the 2005 LRDP as providing valued views, impacts from scenic vistas from viewpoints along both roadways are analyzed below.

As the Hagar site is currently undeveloped, uninterrupted views are available across the site from Hagar Drive between the intersection with Glenn Coolidge Drive and the East Remote parking lot. From Glenn Coolidge Drive, views across the Hagar site from the roadway are limited because the East Meadow slopes up from the roadway. As a result, only a small portion of the East Meadow is visible from the roadway. Furthermore, motorists on southbound Glenn Coolidge Drive are drawn to views to the east which are expansive views of the City and the Bay.

Development of the new FSH complex on this site would disrupt views from both roadways but as the complex would only be two-stories high and would be located at the lowest point of the East Meadow, the view across most of the East Meadow would still be available from the majority of points along the designated segments of Hagar Drive and Glenn Coolidge Drive. However, the proposed housing would be visible in the foreground of views from both roadways, which would alter the scenic vistas from both Hagar Drive and Glenn Coolidge Drive near the intersection with Hagar Drive. **Figure 4.1-6, Existing**

View from Southbound Hagar Drive (Viewpoint 4) and **Figure 4.1-7, View from Southbound Hagar Drive with Project**, present before and after view of the Hagar site as viewed from southbound Hagar Drive. **Figure 4.1-8, Existing View from Hagar and Coolidge Drive Intersection (Viewpoint 5)** and **Figure 4.1-9, View from Hagar and Coolidge Drive Intersection with Project**, shows before and after views of the Hagar site from the intersection of Glenn Coolidge and Hagar Drives. As these simulations show, the proposed development is clustered in the southern portion of the East Meadow and although it is low rise, it would obstruct a portion of the expansive meadow view. The landscaping would soften the appearance of the housing development but would not eliminate the obstruction of this view. Therefore, the change in views due to the Hagar site housing and childcare center would be substantial and adverse. The impact of the Hagar site development on scenic vistas is considered significant.

In summary, Heller site development would adversely affect scenic vistas as viewed from the Porter College knoll and Empire Grade near the West Entrance, and the Hagar site development would affect scenic vistas as viewed from the intersection of Hagar and Glenn Coolidge Drives. No mitigation is available to address the project's impact on scenic vistas from the Porter College knoll because the Heller site is constrained and the proposed buildings cannot be reoriented to provide view corridors through the site of the ocean to the south and east. Similarly no mitigation is available to address the impact to the view from Empire Grade Road near the West Entrance. Mitigation for the impact on scenic vistas from the Hagar and Glenn Coolidge Drive intersection is not feasible because the project is already sited and designed to be as low as possible in its vertical profile.

Mitigation Measures: No mitigation is feasible.

Significance after Mitigation: The impact on scenic vistas would be significant and unavoidable.

SHW Impact AES-2: Implementation of the proposed project would substantially damage scenic resources. (Significant; Significant and Unavoidable)

Heller Site

There is no officially designated state scenic route near the Heller site. However, the County General Plan designates Empire Grade Road, which borders the project site to the west, as a scenic road. The project site is visible from a limited segment of Empire Grade Road near the West Entrance. However, the site is already developed and does not contain any visual elements that would be considered scenic resources such as scenic trees, rock outcroppings, and historic buildings. As noted above, the view from the West



SOURCE: Leif Rideout 2018

FIGURE **4.1-6**

Existing View from Southbound Hagar Drive



SOURCE: Leif Rideout 2018

FIGURE **4.1-7**

View from Southbound Hagar Drive with Project



SOURCE: Leif Rideout 2018

FIGURE **4.1-8**



SOURCE: Leif Rideout, 2018

FIGURE **4.1-9**

Entrance would change, however it would not be considered an adverse impact to a scenic resource. The impact would be less than significant.

Hagar Site

There are no officially designated state scenic highways in the vicinity of the Hagar site. However, the Hagar site is a part of the East Meadow, which is considered a scenic resource by UC Santa Cruz. Consistent with LRDP Mitigation AES-3B, the proposed development at the Hagar site has been clustered and designed to minimize the impact on the East Meadow. Nonetheless, while the vast majority of the East Meadow would remain unaffected by development, the development of the proposed FSH complex would significantly alter the southern portion of the Meadow. This impact is significant.

Mitigation Measures: No project-level mitigation measures are available to minimize the impact on scenic resources from the development of the proposed project.

Significance after Mitigation: The impact on scenic resources from Hagar site development would be significant and unavoidable.

SWH Impact AES-3: Implementation of the proposed project would substantially degrade the visual character or quality of the Hagar site. *(Potentially Significant; Significant and Unavoidable)*

Heller Site

The Heller site is currently developed with the FSH complex. **Figure 4.1-10, Existing View of Heller Site from Koshland Way (Viewpoint 3)** and **Figure 4.1-11, View of Heller Site from Koshland Way with Project**, present the change in the visual character of the project site as observed from Koshland Way. Although the proposed project would replace the existing complex with a substantially larger development, the project has been designed to remain within the area developed with the FSH complex, and, consistent with LRDP Mitigations AES-3B and AES-5C, the removal of trees has largely been limited to those within the developed complex, and several clusters of trees along Heller Drive are planned to be preserved, to continue to provide screening to the new development. The project layout and design has also been developed keeping in mind the surrounding landscape, other buildings on campus, the vision of the Student Housing West Design Guidelines, 2005 LRDP, and UC Santa Cruz Physical Design Framework. To minimize visual impacts and respect the human scale, the site plan has been developed so that the taller buildings would be located in the western and northern portions of the site, away from



SOURCE: Leif Rideout, 2018

FIGURE **4.1-10**



SOURCE: Leif Rideout, 2018

FIGURE **4.1-11**

Heller Drive and adjacent to the redwood forest edge, whereas the buildings in the southern and eastern portions of the site would be shorter, and more compatible with other campus development across Heller Drive from the project site.

Furthermore, the proposed exterior material palette for the project is planned to employ variations in material, texture, and color to create a variegated exterior envelope and provide the necessary articulation to reduce the visual scale of the project. The palette has been developed to respond to the building massing as it cascades down from taller buildings along the forest edge to lower buildings near the meadow or Heller Drive. Exterior plaster would be utilized for many of the exterior surfaces. The plaster would be juxtaposed with other surfaces having more color and texture, such as metal siding painted in a range of colors, colored cement board, cast in place concrete, and acetylated wood panels. At the tallest buildings for undergraduates along the south site's forest edge, verticality would be accentuated by full height slots for glazing to recall the character of the tall trees beyond. Vertically oriented metal siding in variegated forest colors would also lend to the verticality, while articulated sun shades at the upper floors would suggest a forest canopy and provide scale to the top of the buildings. Two lower graduate housing buildings on the south site would be clad in painted metal siding to contrast with adjacent buildings clad in plaster. In addition, consistent with LRDP Mitigation AES-5A, the UC Santa Cruz Design Advisory Board has conducted a preliminary review of the project design and would conduct further review of the project designs for consistency with the valued elements of the visual landscape identified in the 2005 LRDP, and the character of surrounding development so that the visual character and quality of the project area are not substantially degraded. For all of these reasons, the impact on visual character of the area would be less than significant.

Hagar Site

Development at the Hagar site would significantly change the character of the site, as the new FSH complex and childcare center would occupy what is currently open space. However, the design of the complex would be sensitive to surrounding natural landscape and utilize low rise buildings, and earth tones exterior finishes and landscaping would be used pursuant to **SHW Mitigation AES-3** to avoid contrast with the surrounding natural lands. In addition, consistent with LRDP Mitigation AES-5A, the UC Santa Cruz Design Advisory Board has conducted a preliminary review of the project design and would conduct further review of the project designs for consistency with the valued elements of the visual landscape identified in the 2005 LRDP, and the character of surrounding development so that the visual character and quality of the project area are not substantially degraded. Nonetheless, because of the iconic location and the fact that the meadow is a valued resource on the campus, the proposed development would result in a significant impact on visual character and quality of the project site.

Mitigation Measures:

SHW Mitigation AES-3: The project development at the Hagar site shall incorporate climate-appropriate shrubs and low trees on the parking lot and along the Hagar Drive and Glenn Coolidge Drive. Site appropriate earth tone colors that reduce the contrast between the proposed development and the surrounding meadow shall be used.

Significance after Mitigation: The screening provided by the landscaping will reduce the contrast between the buildings and the meadow but the project would still place development on this iconic gateway to the campus. The impact would be significant and unavoidable.

SHW Impact AES-4: **Implementation of the proposed project would not result in a substantial adverse effect related to light and glare. (*Less than Significant*)**

Heller Site

The Heller site is currently developed with the FSH complex, which is a source of light and glare. Development of the proposed project would substantially increase sources of light through additional exterior lighting, used for security purposes and illuminating pedestrian and vehicular access points. Additionally, the buildings would include a considerable amount of glazing and windows and would emit more nighttime light than is currently produced at the site. However, the proposed project would implement LRDP Mitigations AES-6A, AES-6B, AES-6C, and AES-6E to minimize potential impacts due to the increase in light and reflective surfaces at the site. By employing appropriate lighting design standards and minimizing the quantity of reflective material used in new construction, the proposed buildings' light and glare impact would be reduced to a less-than-significant level.

To reduce dependence on the electrical grid and serve the project with green energy, the proposed development at the Heller site include installation of a series of roof-mounted solar PV systems on Buildings 1 through 5. The PV systems would comprise solar cell modules or panels installed building rooftops. The PV panels would be made with high quality PV glass (low-iron/high transmission glass) and treated with an anti-reflective (AR) coating that would prevent the modules from reflecting light and eliminate glare to the nearby residents. As the panels would be dark-colored and designed to capture and absorb sunlight rather than reflect it, and because they would be treated with an anti-reflective coating to

significantly reduce glare, the impact from any glare produced by the panels would be less than significant.

Hagar Site

The Hagar site is currently undeveloped and no light or glare is currently generated at the site. Construction of the new FSH complex would increase light and glare compared to existing conditions. However, the scale of development and the low-rise housing proposed for this site would not generate substantial new light. The project also includes landscaping that upon maturity would serve to screen lighted windows. Furthermore, the project would be required to implement LRDP Mitigations AES-6A, AES-6B, AES-6C, and AES-6E to minimize potential impacts due to the increase in light and reflective surfaces at the site. By employing appropriate lighting design standards and minimizing the quantity of reflective material used in new construction, the proposed project's light and glare impact would be reduced to a less-than-significant level.

Similar to the development on the Heller site, Hagar site development would also include solar panels on the roof tops of the proposed townhouses to generate electricity. Similar to small sets of panels used in single-family homes, the panels on the townhouse roofs would be of limited expanse. Furthermore, the panels would be dark-colored and designed to capture and absorb sunlight rather than reflect it, and would be treated with an anti-reflective coating to significantly reduce glare. Therefore, the impact from any glare produced by the panels at the Hagar site would be less than significant.

Mitigation Measures: No mitigation is required.

4.1.5 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

The proposed dining facilities expansion project would add to existing facilities on the west side of Rachel Carson College and to the southern end of Porter College. In both instances, the facilities would be located above or adjacent to existing buildings, or would replace the existing buildings with larger buildings. The areas where the improvements would be constructed are either currently developed or immediately adjacent to existing development. A portion of the expansion site for the Porter dining facility is covered by a cluster of trees.

Impacts and Mitigation Measures

DF Impact AES-1: **The implementation of the proposed dining facilities project would not result in a significant impact on scenic vistas, scenic resources, visual character and quality, or light and glare. (*Less than Significant*)**

Scenic Vistas

The proposed dining facilities would not be located in areas that would be a part of a valued scenic vista on the campus. By virtue of their locations, the improvements would not block any views of the bay from valued vantage points on the campus. The impact related to scenic vistas would be less than significant.

Scenic Resources

There are no valued scenic resources in the areas that would be affected by the proposed dining facilities expansion project. Nor are the sites of the project near a scenic route, including roadways on the campus that are considered scenic. There would be no impact on scenic resources.

Visual Character and Quality

The alterations and additions to the existing colleges due to the proposed dining facilities expansion project would not substantially affect the visual character and quality of the project sites and the vicinity. Furthermore, as a project proposed under the 2005 LRDP, the dining facilities expansion project would be required to comply with LRDP Mitigation AES-5A, pursuant to which the UC Santa Cruz Design Advisory Board will review project designs for consistency with the valued elements of the visual landscape identified in the 2005 LRDP, and the character of surrounding development so that the visual character and quality of the project area are not substantially degraded. Furthermore, in compliance with LRDP Mitigations AES-3B and AES-5C, tree removal in the area of the Porter College dining facility expansion would be minimized. Therefore, the impact of the project on the visual character and quality of the project area would be less than significant.

Light and Glare

The proposed dining facilities expansion project would expand or add to existing colleges, and given the scale of the proposed project, the incremental increase in light and glare would not be substantial. Furthermore, the project would be required to implement LRDP Mitigations AES-6A, AES-6B, AES-6C, and AES-6E to minimize potential impacts due to the increase in light and reflective surfaces at the sites. As a result, the impact related to light and glare would be less than significant.

Mitigation Measures: No mitigation is required.

4.1.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

SHW Impact C-AES-1: Implementation of the proposed project would not result in significant cumulative visual impacts. (*Less than Significant*)

The cumulative impact of campus development under the 2005 LRDP along with other development in the City of Santa Cruz on scenic vistas is analyzed in the 2005 LRDP EIR under LRDP Impact AES-7. The cumulative impact of campus development under the 2005 LRDP along with other development in the City of Santa Cruz on visual character and quality is analyzed under LRDP Impact AES-8, and the cumulative impact on light and glare is addressed in LRDP Impact AES-9. All of the cumulative impact evaluations in the 2005 LRDP EIR addressed changes to views of the campus as a result of LRDP development from off-site locations combined with changes to the same views from other reasonably foreseeable development.

Although the proposed Heller site development is substantially denser and taller than the redevelopment project included in the 2005 LRDP EIR for that site and no development on the Hagar site was included in the LRDP EIR cumulative impact assessment, due to the location of the proposed development at the Heller site and the low profile of the development at the Hagar site, these changes would not substantially increase the amount of campus development and light and glare that would be visible from off-campus areas, as analyzed in the LRDP EIR cumulative impact assessment. With respect to the dining facilities expansion project and other near-term cumulative projects listed in **Table 4.0-1**, all of the projects are within the scope of the 2005 LRDP, would be required to implement LRDP mitigation measures to minimize visual impacts, and would be implemented at the sites of existing development on the campus. Consequently, similar to the proposed project, they would not substantially increase the amount of campus development and light and glare that would be visible from off-campus areas. Therefore, the cumulative impacts on scenic vistas, visual character and quality, and light and glare analyzed in the 2005 LRDP EIR would still be less than significant.

Mitigation Measures: No mitigation is required.

4.1.7 REFERENCES

Department of Transportation (DOT). 2017. California Scenic Highway Mapping System. Available online at: http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/index.htm, accessed May 25.

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4.2 AIR QUALITY

4.2.1 INTRODUCTION

This section evaluates the potential impacts on air quality resulting from construction and operation of the proposed Student Housing West (SHW) project. This includes the potential for the proposed project to conflict with or obstruct implementation of the applicable air quality plan, violate an air quality standard or contribute substantially to an existing or projected air quality violation, result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment, expose sensitive receptors to substantial pollutant concentrations, or create objectionable odors affecting a substantial number of people.

The section also presents potential air quality from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and the existing colleges (see **Section 4.2.5** below).

The analysis in this section is tiered from the air quality impact analysis contained in the 2005 LRDP EIR, supplemented by project-specific analysis. Data used to prepare this section were taken from various sources, including the Monterey Bay Air Pollution Control District's *CEQA Air Quality Guidelines*, dated September 2008; Monterey Bay Air Pollution Control District's *Guidelines for Implementing the California Environmental Quality Act*, dated February 2016; the *2012-2015 Air Quality Management Plan (AQMP)*; and technical analyses conducted for the project by Illingworth & Rodkin (I&R). The technical memorandum documenting the I&R analysis is presented in **Appendix 4.2** of this EIR.

The project is located within the air basin that is under the jurisdiction of the Monterey Bay Air Resources District (MBARD), formerly known as the Monterey Bay Unified Air Pollution Control District (MBUAPCD). To avoid confusion the prior name of the District is not used in this section and the phrase "Air District" or the acronym "MBARD" is used to refer to the Air District. Similarly, although all of the Air District's CEQA guidance related to evaluating a project's air quality impacts was prepared when the Air District was known as MBUAPCD, the two guidelines are referred to as the MBARD 2008 guidelines and the MBARD 2016 guidelines.

4.2.2 EXISTING CONDITIONS

4.2.2.1 Existing Regional Air Quality

Background

The project site is located in the North Central Coast Air Basin (NCCAB or Basin), which consists of Santa Cruz, Monterey, and San Benito Counties. The NCCAB is under the jurisdiction of MBARD.

Air quality is affected by both the rate and location of pollutant emissions. Meteorological conditions such as wind speed, wind direction, solar radiation, atmospheric stability, along with local topography heavily influence air quality by affecting the movement and dispersal of pollutants. Predominant meteorological conditions in the NCCAB vary depending on the time of year. In the summer, a high pressure system results in strong west and northwest winds along the coast, as the northwest-southeast ranging mountains restrict onshore air currents from moving further inland. During the warm season, air pollutants are trapped near ground level, as a layer of hot air forms over the cooler coastal air and prevents vertical mixing.

In the winter, the high pressure system moves away from the NCCAB, reducing winds overall but generating more frequent easterly winds. Such winds carry San Francisco Bay Area and Central Valley air pollutants to the area, however, the air quality remains better due to cooler weather and storms.

The climate within the NCCAB is fairly moderate, with mild, cooler temperatures occurring near the coast and more variable temperatures and drier weather in the more inland areas. January is the coldest month throughout the NCCAB, and the annual average minimum temperature is 45°F in the City of Santa Cruz. September is usually the warmest month in the NCCAB, and annual average maximum temperatures are 76°F in Santa Cruz. Coastal areas often experience heavy fog, especially during the mornings, but overall the area is fairly dry. The City of Santa Cruz gets, on average, over 29 inches of precipitation annually (Western Regional Climate Center 2017).

Regional Air Quality

Air pollutants of concern in the NCCAB are primarily generated by two categories of sources: mobile and stationary. Mobile sources refer to operational and evaporative emissions from motor vehicles. Stationary sources include “point sources,” which have one or more emission sources at a single facility, and “area sources,” which are distributed/spread over a larger geographic area, rather than a single stationary point.” Point sources are usually associated with manufacturing and industrial uses and include sources such as refinery boilers or combustion equipment that produces electricity or process heat. Examples of

area sources include residential water heaters, painting operations, lawn mowers, agricultural fields, landfills, and consumer products, such as lighter fluid or hair spray.

The criteria pollutants relevant to the proposed project and of concern in the air basin are briefly described below. While VOCs are not considered to be criteria pollutants, they are commonly emitted by sources associated with land use development projects and are involved in photochemical reactions in the atmosphere to form ozone (O_3); therefore, VOCs are relevant to the proposed project and are of concern in the NCCAB.

- **Ozone (O_3).** O_3 is a gas that is formed when VOCs and nitrogen oxides (NO_x), both byproducts of internal combustion engine exhaust and other sources, undergo slow photochemical reactions in the presence of sunlight. Ozone concentrations are generally highest during the summer months when direct sunlight, light wind, and warm temperature conditions are favorable to the formation of this pollutant.
- **Volatile Organic Compounds (VOCs).** VOCs are compounds comprised primarily of atoms of hydrogen and carbon. Internal combustion associated with motor vehicle usage is the major source of hydrocarbons. Adverse effects on human health are not caused directly by VOCs, but rather by reactions of VOCs to form secondary air pollutants, including ozone. VOCs are also referred to as reactive organic compounds (ROCs) or reactive organic gases (ROGs). VOCs themselves are not “criteria” pollutants; however, they contribute to formation of O_3 .
- **Nitrogen Dioxide (NO_2).** NO_2 is a reddish-brown, highly reactive gas that is formed in the ambient air through the oxidation of nitric oxide (NO). NO_2 is also a byproduct of fuel combustion. The principle form of NO_2 produced by combustion is NO, but NO reacts quickly to form NO_2 , creating the mixture of NO and NO_2 referred to as NO_x . NO_2 acts as an acute irritant and, in equal concentrations, is more injurious than NO. At atmospheric concentrations, however, NO_x is only potentially irritating. NO_2 absorbs blue light, the result of which is a brownish-red cast to the atmosphere and reduced visibility.
- **Carbon Monoxide (CO).** CO is a colorless, odorless gas produced by the incomplete combustion of fuels. CO concentrations tend to be the highest during winter mornings, with little to no wind, when surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines and motor vehicles operating at slow speeds are the primary source of CO in the Basin, the highest ambient CO concentrations are generally found near congested transportation corridors and intersections.
- **Sulfur dioxide (SO_2).** SO_2 is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant mainly as a result of burning high-sulfur-content fuel oils and coal and from chemical processes occurring at chemical plants and refineries. When sulfur dioxide oxidizes in the atmosphere, it forms sulfates (SO_4).
- **Respirable Particulate Matter (PM_{10}).** PM_{10} consists of extremely small, suspended particles or droplets 10 micrometers or smaller in diameter. Some sources of PM_{10} , like pollen and windstorms, are naturally occurring. However, in populated areas, most PM_{10} is caused by road

dust, diesel soot, and combustion products, abrasion of tires and brakes, and construction activities.

- **Fine Particulate Matter (PM_{2.5}).** PM_{2.5} refers to particulate matter that is 2.5 micrometers or smaller in size. The sources of PM_{2.5} include fuel combustion from automobiles, power plants, wood burning, industrial processes, and diesel-powered vehicles such as buses and trucks. These fine particles are also formed in the atmosphere when gases such as sulfur dioxide, NO_x, and VOCs are transformed in the air by chemical reactions.
- **Lead (Pb).** Pb occurs in the atmosphere as particulate matter. The combustion of leaded gasoline is the primary source of airborne lead in the Basin. The use of leaded gasoline is no longer permitted for on-road motor vehicles, so most such combustion emissions are associated with off-road vehicles such as racecars that use leaded gasoline. Other sources of Pb include the manufacturing and recycling of batteries, paint, ink, ceramics, ammunition, and secondary lead smelters.

The U.S. Environmental Protection Agency (EPA) is the federal agency responsible for setting the National Ambient Air Quality Standards (NAAQS). The air quality of a region is considered to be in attainment of the NAAQS if the measured ambient criteria pollutant levels are not exceeded more than once per year, except for O₃, PM₁₀, and PM_{2.5}. The NAAQS for O₃, PM₁₀, and PM_{2.5} are based on statistical calculations over one- to three-year periods, depending on the pollutant. The California Air Resources Board (CARB) is the state agency responsible for setting the California Ambient Air Quality Standards (CAAQS). The air quality of a region is considered to be in attainment of the CAAQS if the measured ambient air pollutant levels for O₃, CO, NO₂, SO₂, PM₁₀, PM_{2.5}, and lead are not exceeded, and other standards are not equaled or exceeded at any time in any consecutive three-year period. The NAAQS and CAAQS for each of the monitored pollutants and their effects on health are summarized in **Table 4.2-1, Ambient Air Quality Standards**.

Table 4.2-1
Ambient Air Quality Standards

Air Pollutant	Averaging Time	California Standards	National Standards ^a		Health and Other Effects
			Primary ^{b,c}	Secondary ^{b,d}	
Ozone (O ₃)	8-hour	0.070 ppm (137 µg/m ³)	0.070 ppm (137 µg/m ³)	Same as primary	(a) Pulmonary function decrements and localized lung edema in humans and animals; (b) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (c) Increased mortality risk; (d) Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (e) Vegetation damage; and (f)
	1-hour	0.09 ppm (180 µg/m ³)	-- ^e	--	

Air Pollutant	Averaging Time	California Standards	National Standards ^a		Health and Other Effects
			Primary ^{b,c}	Secondary ^{b,d}	
					Property damage
Carbon Monoxide (CO)	8-hour	9.0 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	--	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; and (d) Possible increased risk to fetuses
	1-hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	--	
Nitrogen Dioxide (NO ₂)	Annual	0.030 ppm (57 µg/m ³)	0.053 ppm (100 µg/m ³)	Same as primary	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; and (c) Contribution to atmospheric discoloration
	1-hour	0.18 ppm (339 µg/m ³)	0.100 ppm ^f (188 µg/m ³)	--	
	Annual	--	-- ^g	--	
	24-hour	0.04 ppm (105 µg/m ³)	-- ^g	--	
	3-hour	--	--	0.5 ppm (1300 µg/m ³)	
Sulfur Dioxide (SO ₂)	1-hour	0.25 ppm (655 µg/m ³)	0.075 ppm ^g (196 µg/m ³)	--	Bronchoconstriction accompanied by symptoms, which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma
Respirable Particulate Matter (PM ₁₀)	Annual	20 µg/m ³	--	--	a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Declines in pulmonary function growth in children; and (c) Increased risk of premature death from heart or lung diseases in the elderly
	24-hour	50 µg/m ³	150 µg/m ³	Same as primary	
Fine Particulate Matter (PM _{2.5})	24-hour	No separate state standard	35 µg/m ³	--	(a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Declines in pulmonary function growth in children; and (c) Increased risk of premature death from heart or lung diseases in the elderly
	Annual	12 µg/m ³	12 µg/m ³	--	
Lead	Calendar Quarter	--	1.5 µg/m ³	Same as primary	(a) Increased body burden; and (b) Impairment of blood formation and nerve conduction
	30-day Average	1.5 µg/m ³	--	--	

Source: CARB, Ambient Air Quality Standards, accessed January 9, 2018 (<https://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm>)

ppm = parts per million by volume; µg/m³ = microgram per cubic meter; mg/m³ = milligrams per cubic meter.

a. Standards, other than for ozone and those based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

b. Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.

c. Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the U.S. Environmental Protection Agency (US EPA).

Air Pollutant	Averaging Time	California Standards	National Standards ^a		Health and Other Effects
			Primary ^{b,c}	Secondary ^{b,d}	
<i>d. Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.</i>					
<i>e. The national 1-hour ozone standard was revoked by US EPA on June 15, 2005. A new 8-hour standard was established in May 2008.</i>					
<i>f. The form of the 1-hour NO₂ standard is the 3-year average of the 98th percentile of the daily maximum 1-hour average concentration.</i>					
<i>g. On June 2, 2010 the US EPA established a new 1-hour SO₂ standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of the 1-hour daily maximum. The US EPA also revoked both the existing 24-hour and annual average SO₂ standards.</i>					

In addition to criteria pollutants, CARB periodically assesses levels of toxic air contaminants (TACs) in the NCCAB. TACs are defined by California Health and Safety Code Section 39655:

“Toxic air contaminant” means an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health. A substance that is listed as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the federal act (42 U.S.C. Sec. 7412(b)) is a toxic air contaminant.

Table 4.2-2 Attainment Status of the North Coast Central Air Basin below presents the current attainment status of the NCCAB with respect to State and federal air quality standards.

**Table 4.2-2
Attainment Status of the North Coast Central Air Basin**

Pollutant	State	Federal
Ozone (O ₃)	Non-attainment	Attainment/Unclassified
Particulate Matter (PM ₁₀)	Non-attainment	Attainment
Particulate Matter (PM _{2.5})	Attainment	Attainment/Unclassified
Carbon Monoxide (CO)	Monterey- Attainment San Benito- Unclassified Santa Cruz- Unclassified	Attainment/Unclassified
Nitrogen Dioxide (NO ₂)	Attainment	Attainment/Unclassified
Sulfur Dioxide (SO ₂)	Attainment	Attainment
Lead	Attainment	Attainment/Unclassified
Source: MBARD 2015. NCCAB Area Designations and Attainment Status- January 2015.		

4.2.2.2 Existing Local Air Quality

The U.S. EPA requires all air pollution control districts to submit monitoring assessments every five years. In order to comply with federal requirements, the MBARD utilizes seven permanent air monitoring stations located in King City, Carmel Valley, Pinnacles, Hollister, Salinas, Santa Cruz, and San Lorenzo Valley. The closest air monitoring station to the project site is the Santa Cruz 2544 Soquel Avenue station. This station is located at 2544 Soquel Avenue, across the street from Harbor High School,

approximately 3.25 miles east of the Hagar project site. Santa Cruz 2544 Soquel Avenue station monitors ozone and PM_{2.5}, but hasn't monitored PM₁₀ since 2011.

Although the NCCAB is considered in attainment or unclassifiable for all federal ambient air quality standards, the air basin is considered non-attainment for ozone and PM₁₀ with regards to standards established by the State of California. **Table 4.2-3, Ambient Pollutant Levels Near the Project Site**, illustrates the concentrations of ozone and particulate matter measured at the Santa Cruz 2544 Soquel Avenue monitoring station from 2014 to 2016. There were no ozone or PM_{2.5} exceedances recorded at the monitoring station.

**Table 4.2-3
Ambient Pollutant Levels Near the Project Site**

Pollutant	Year		
	2014	2015	2016
Ozone (ppm), 1- Hour average	0.076	0.076	0.064
Number of days of State exceedances	0	0	0
Number of days of Federal exceedances	0	0	0
Ozone (ppm), 8-Hour average	0.068	0.061	0.058
Number of days of State exceedances	0	0	0
Number of days of Federal exceedances	0	0	0
Particulate Matter < 10 microns, Worst 24 Hours	N/A	N/A	N/A
Number of days of State exceedances	-	-	-
Number of days of Federal exceedances	-	-	-
Particulate Matter < 2.5 microns, 24 – Hour average	15.7	20.5	12.7
Number of days of State exceedances	0	0	0
Number of days of Federal exceedances	0	0	0
Source: CARB, Aerometric Data Analysis and Measurement System (ADAM), Available at https://www.arb.ca.gov/adam . Accessed January 9, 2018. Data from Santa Cruz-2544 Soquel Avenue air monitoring station. No stations in Santa Cruz during the 2014-2016 time period measured PM10. The last period with PM10 measured was in 2011, in which there were no exceedances.			

4.2.2.3 Sensitive Receptors

Some groups of people are considered more sensitive to adverse effects from air pollution than the general population. The California Air Resources Board, or CARB, has identified the following persons as most likely to be affected by air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks.

Sensitive receptors, which include residences, are located near the project sites. For the Heller site, these are student residences that do not include small children or infants. Although there is family student housing and a childcare center on the Heller site at the present time, both the student families and the childcare center would be relocated into the new housing and childcare center on the Hagar site before any construction on the Heller site is commenced.

With respect to the Hagar site, there is UC Santa Cruz employee housing within 350 feet of the site and there are off-campus residences to the east on Rockridge Lane and Spring Street, with the nearest homes within 650 feet of the Hagar site. All residences near the Hagar site are assumed to include infants or small children. For typical construction cancer risk assessments, only infants are considered sensitive receptors because of the high sensitivity to cancer causing contaminants, or TACs, whereas, children and adults are much less sensitive and the exposure periods are relatively short.

4.2.3 REGULATORY FRAMEWORK

Air quality within the air basin is addressed through the efforts of various federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies responsible for improving the air quality within the air basin are discussed below.

4.2.3.1 Federal and State

U.S. Environmental Protection Agency

The U.S. EPA is responsible for enforcing the federal Clean Air Act and the NAAQS. The U.S. EPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain locomotives. The U.S. EPA also maintains jurisdiction over emissions sources beyond State waters (outer continental shelf), and establishes various emissions standards for vehicles sold in states other than California. These standards identify levels of air quality for seven criteria pollutants: ozone (O₃), CO, NO₂, SO₂, PM₁₀, PM_{2.5}, and lead. The thresholds are considered to be the maximum concentrations of ambient (background) air pollutants determined safe to protect the public health and welfare with an adequate margin of safety.

As part of its enforcement responsibilities, the U.S. EPA requires each state with areas that do not meet the federal standards to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the time frame identified in the SIP. The MBARD 2012-

2015 Air Quality Management Plan (2012-2015 AQMP) is the regulatory mechanism by which the CARB demonstrates conformity to U.S. EPA regulations.

The 1990 Clean Air Act Amendments were enacted to better protect the public's health and create more efficient methods for lowering pollutant emissions. The major areas of improvement addressed in the amendments include NAAQS, air basin designations, automobile/heavy-duty engine emissions, and hazardous air pollutants. The U.S. EPA has designated air basins as being in attainment or nonattainment for each of the seven criteria pollutants. Nonattainment air basins for ozone are further ranked (marginal, moderate, serious, severe, or extreme) according to the degree of nonattainment. CARB is required to describe in its SIP how the State will achieve federal standards by specified dates for each air basin that has failed to attain a NAAQS for any criteria pollutant. The MBARD developed the *2012-2015 AQMP*, which demonstrates how the region will attain the air quality standards set forth in the Clean Air Act Amendments.

California Air Resources Board

CARB oversees air quality planning and control throughout California. It is primarily responsible for ensuring implementation of the California Clean Air Act, responding to the federal Clean Air Act planning requirements applicable to the State, and regulating emissions from motor vehicles and consumer products within the State. In addition, CARB sets health-based air quality standards and control measures for TACs. Much of CARB's research goes toward automobile emissions, as they are primary contributors to air pollution in California. Under the State Clean Air Act, CARB has the authority to establish more stringent standards for vehicles sold in California and for various types of equipment available commercially. It also sets fuel specifications to further reduce vehicular emissions.

The California Clean Air Act established a legal mandate for air basins to achieve the CAAQS by the earliest practical date. These standards apply to the same seven criteria pollutants as the federal Clean Air Act and also include sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride. The State standards are generally more stringent than the federal standards.

CARB supervises and supports the regulatory activities of local air quality districts as well as monitors air quality itself. Health and Safety Code Section 39607(e) requires CARB to establish and periodically review area designation criteria. These designation criteria provide the basis for CARB to designate areas of the State as attainment, nonattainment, or unclassified according to State standards. CARB makes area designations for 10 criteria pollutants: O₃, CO, NO₂, SO₂, PM₁₀, PM_{2.5}, sulfates, lead, hydrogen sulfide, and

visibility-reducing particles.¹ The air quality of a region is considered to be in attainment of the State standards if the measured ambient air pollutant levels for O₃, CO, NO₂, PM₁₀, PM_{2.5}, SO₂ (1- and 24-hour), and lead are not exceeded, and all other standards are not equaled or exceeded at any time in any consecutive three-year period. As aforementioned, the NCCAB is classified by the state as a nonattainment area for the O₃ and PM₁₀ standards.

Monterey Bay Air Resources District (MBARD)

The management of air quality in the NCCAB is the responsibility of the MBARD. Elected local governing bodies appoint the Board of Directors, which then appoints citizens to the District's Advisory Committee as well as the Hearing Board. The District is responsible for attainment planning related to criteria air pollutants, as well as rule development and enforcement. The District manages air quality in the areas under its jurisdiction and strives to conform to federal and state air quality standards. Specifically, the MBARD is responsible for monitoring ambient air pollutant levels throughout the air basin and for developing and implementing attainment strategies to ensure that future emissions will be within federal and state standards.

The MBARD primarily regulates emissions from stationary sources such as manufacturing and power generation. Mobile sources such as buses, automotive vehicles, trains, and airplanes are largely out of the MBARD's jurisdiction and are up to CARB and the U.S. EPA to regulate. In order to achieve air quality standards, the MBARD adopts an Air Quality Management Plan that serves as a guideline to help the District meet its air quality goals.

MBARD CEQA Air Quality Guidelines

In 1995, the MBARD adopted its *California Environmental Quality Act (CEQA) Air Quality Guidelines* to assist local government agencies and consultants in preparing environmental documents for projects subject to CEQA. The most recent update to the MBARD CEQA Guidelines was in 2008. The document describes the criteria that MBARD uses when reviewing and commenting on the adequacy of environmental documents. It recommends thresholds of significance in order to determine if a project will have a significant adverse environmental impact. Other important contents are methodologies for

¹ California Air Resources Board, "Area Designations (Activities and Maps)," <http://www.arb.ca.gov/desig/desig.htm>. 2010. According to California Health and Safety Code, Section 39608, "State board, in consultation with the districts, shall identify, pursuant to subdivision (e) of Section 39607, and classify each air basin which is in attainment and each air basin which is in nonattainment for any State ambient air quality standard." Section 39607(e) States that the State shall "establish and periodically review criteria for designating an air basin attainment or nonattainment for any State ambient air quality standard set forth in Section 70200 of Title 17 of the California Code of Regulations. California Code of Regulations, Title 17, Section 70200 does not include vinyl chloride; therefore, CARB does not make area designations for vinyl chloride.

estimating project emissions and mitigation measures that can be used to avoid or reduce air quality impacts.

Subsequently in 2016, MBARD published revised *Guidelines for Implementing the California Environmental Quality Act*. The revised 2016 guidelines provide numeric thresholds for evaluating the significance of a project's construction and operational emissions.

MBARD 2012-2015 Air Quality Management Plan

The MBARD is required to produce Air Quality Management Plans describing how air quality will be improved. The California Clean Air Act (CCAA) requires that these plans be updated triennially in order to incorporate the most recent available technical information. In addition, the U.S. EPA requires establishment of transportation conformity budgets based on the most recent planning assumptions (i.e., within the last five years). Plan updates are necessary to ensure continued progress toward attainment of the NAAQS and to avoid a transportation conformity lapse and associated federal funding losses. A multi-level partnership of governmental agencies at the federal, State, regional, and local levels implement the programs contained in these plans. Agencies involved include the U.S. EPA, CARB, local governments, Association of Monterey Bay Area Governments (AMBAG), and the MBARD.

Since 1991, a number of AQMPs have been prepared in response to the CCAA. The MBARD adopted the most recent *2012-2015 AQMP* in March 2017. The AQMD demonstrates a long-term trend toward achieving ozone standards.

MBARD Rules and Regulations

The MBARD is responsible for limiting the amount of emissions that can be generated throughout the air basin by various stationary, area, and mobile sources. Specific rules and regulations adopted by the MBARD limit the emissions that can be generated by various uses/activities and that identify specific pollution reduction measures, which must be implemented in association with these uses and activities. These rules regulate the emissions of the federal and state criteria pollutants as well as toxic air contaminants and acutely hazardous materials.

Association of Monterey Bay Area Governments (AMBAG)

AMBAG is a council of governments for the Counties of Monterey, Santa Cruz, and San Benito. As a regional planning agency, AMBAG serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. AMBAG also serves as the regional

clearinghouse for projects requiring environmental documentation under federal and State law. In this role, AMBAG reviews projects to analyze their impacts on AMBAG's regional planning efforts.

Although AMBAG is not an air quality management agency, it is responsible for several air quality planning issues. Specifically, as the designated Metropolitan Planning Organization for the region, it is responsible, pursuant to Section 176(c) of the 1990 amendments to the Clean Air Act, for providing current population, employment, travel, and congestion projections for regional air quality planning efforts. It also manages transportation demand and is currently in the process of updating its 2035 Metropolitan Transportation Plan/ Sustainable Communities Strategy (MTP/SCS). AMBAG also maintains Jurisdictional Greenhouse Gas Emissions Inventories.

4.2.4 IMPACTS AND MITIGATION MEASURES

4.2.4.1 Significance Criteria

The impacts related to air quality from the proposed project would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the State CEQA Guidelines, the UC CEQA Handbook, and the 2005 LRDP EIR:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

The State CEQA Guidelines (Section 15064.7) provide that, when available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make determinations of significance. The potential air quality impacts of the proposed project are, therefore, evaluated utilizing the thresholds developed by the MBARD. As noted above, MBARD set forth significance thresholds and guidance in its *CEQA Air Quality Guidelines* adopted in 1995, and last revised in 2008 for use by lead agencies in the Air Basin. The MBARD 2008 guidelines set forth numeric thresholds for evaluating a project's operational emissions of criteria pollutants. With respect to construction emissions, the MBARD 2008 guidelines provided a numeric threshold only for evaluating PM₁₀ emissions. Subsequently in 2016, MBARD published *Guidelines for Implementing the*

California Environmental Quality Act. The updated MBARD 2016 guidelines provide numeric thresholds for evaluating the impacts of both construction and operational emissions. The thresholds address the checklist questions contained in Appendix G of the State CEQA Guidelines and are used in this EIR to evaluate project impacts. (Note that these thresholds are different from the thresholds used in the 2005 LRDP Final EIR which predates the 2016 guidelines.)

Construction Emissions

Impacts related to construction emissions associated with the proposed project would be considered significant if construction emissions from all sources including exhaust and fugitive, would exceed the MBARD construction emissions thresholds specified in **Table 4.2-4, MBARD Daily Construction Emission Thresholds**.

Table 4.2-4
MBARD Daily Construction Emissions Thresholds

Pollutant	Significance Threshold (pounds per day)
ROG	137
NO _x	137
CO	550
PM ₁₀	82
PM _{2.5}	55
<i>Source: MBUAPCD 2016</i>	

Operational Emissions

Impacts related to operational emissions associated with the proposed project would be considered significant if its operational emissions exceed the thresholds set forth in **Table 4.2-5, MBARD Daily Operational Emission Thresholds**. The thresholds address both direct and indirect emissions. Direct emissions refer to emissions produced by sources located on the project site, such as boilers, generators and other stationary sources (whether or not they are permitted). Indirect emissions refer to project-related emissions that would occur off-site and typically include emissions generated by project-related vehicle trips. The thresholds address all sources including mobile, stationary and area sources.

Table 4.2-5
MBARD Daily Operational Emission Thresholds

Pollutant	Significance Threshold (pounds per day)
ROG	137 (direct & indirect)
NO_x	137 (direct & indirect)
CO	550 (direct)
PM₁₀	82 (direct)
PM_{2.5}	55 (direct)
<i>Source: MBUAPCD 2008; MBUAPCD 2016</i>	

Carbon Monoxide

According to the MBARD 2008 guidelines, the numeric threshold for CO emissions in **Table 4.2-5** above is applicable only to direct emissions, i.e., CO emissions from sources located on the project site. For CO emissions associated with project related vehicles, the guidelines note that a potentially significant CO impact would occur if the addition of project traffic degrades the LOS of roadway segments and intersections from Level of Service (LOS) D to LOS E or F, or increase delay by more than 10 seconds at intersections already operating at LOS E or F; or increase the volume to capacity ration by more than 0.05 at intersections and roadway segments operating at LOS E or F; or decrease the capacity at an unsignalized intersection; or generate a substantial amount of truck traffic.

Toxic Air Contaminants

According to MBARD 2016 guidelines, a project would have a significant TAC impact if the project's TAC emissions resulted in an exceedance of the health risk public notification thresholds adopted by the District. The guidelines also set forth the following thresholds, which are the same as the public notification thresholds:

- The hazard index is greater than 1 for acute or chronic impacts; or
- The cancer risk is greater than 10 in one million.

Cumulative

According to MBARD, "A consistency analysis and determination serve as the project's analysis of cumulative impacts on regional air quality. Project emissions which are not consistent with the AQMP are not accommodated in the AQMP and will have a significant cumulative impact unless offset." MBARD's 2008 guidelines state that

AMBAG provides consistency determinations for population related projects and the District provides a consistency determination for all other projects. Projects that are determined to be consistent would result in a less than significant cumulative air quality impact.

4.2.4.2 CEQA Checklist Items Adequately Addressed in the 2005 LRDP EIR or not Applicable to the Project

All of the CEQA checklist items listed above as significance criteria are addressed in the following analysis. However a CO analysis was not considered necessary for the project because the proposed project would not result in any net increase of traffic to the road network. In fact, as demonstrated by the analysis in **Section 4.10, Traffic and Transportation**, the provision of housing on the campus would reduce daily trips compared to the No Project scenario because students who would otherwise live off campus and make trips to the campus would instead live on campus and the trips to the campus would be avoided.

4.2.4.3 Methodology

The California Emissions Estimator Model (CalEEMod) Version 2016.3.2 was used to estimate emissions from construction and operation of the project assuming full build-out conditions. The project land use types and size, and anticipated construction schedule were input into CalEEMod. Separate modeling was conducted for the Heller and Hagar sites. The Heller site modeling was divided into two scenarios: Demolition and Construction. In addition, the Hagar site construction modeling was conducted separately for the residential and daycare portions.

Although the MBARD 2016 guidelines do not specify whether a project's average daily construction emissions should be estimated and used as the basis of impact evaluation, or whether the impact assessment should be based on the highest construction emissions that would occur on a summer day, both analyses were completed for this project. The average daily emissions of each pollutant were calculated by dividing the total annual emissions by the number of construction days in a given year. The maximum summer day emissions are based on the maximum summer day output for each site, and are provided by the CalEEMod outputs.

Heller Site

For the Heller site, the proposed project land uses input to CalEEMod included:

- 725 dwelling units to represent undergraduate housing, at 900,779 square feet (sf),
- 146 dwelling units to represent graduate housing, at 67,932 sf,

- 3,500 sf of “General Heavy Industry” to represent the wastewater treatment plant, and
- 414 spaces of “Parking Lot.”

CalEEMod provides emission estimates for both on-site and off-site construction activities. On-site activities are primarily made up of grading and the use of construction equipment, while off-site activities include worker, hauling, and vendor traffic. The project was assumed to include 40,000 cubic yards (cy) of soil import during site grading.

Demolition of the Heller site would include the removal of 199 townhouses in 42 buildings. To estimate truck trips, each dwelling unit was estimated to be 1,200 sf (this includes amenity spaces). Demolition activity is assumed to occur for 4 months, beginning in 2019.

The construction schedule for the Heller site assumes that the project would be built out over a period of approximately 3 years, beginning in August 2019, or an estimated 790 construction workdays (assuming an average of almost 22 construction days per month).

Hagar Site

For the Hagar site, the proposed project land uses input to CalEEMod included:

Residential Construction:

- 148 dwelling units to represent Family Housing Units, at 146,100 sf,
- 30 spaces of “Parking Lot.”

Daycare Construction:

- 13,500 sf of “Day-Care Center”

The proposed apartments at the Hagar site would benefit from industrialized component manufacturing wherein components of the building will be manufactured off-site and delivered to the site for assembly. Therefore, the Hagar site construction of the housing units would be less intensive than conventional construction. However for purposes of this analysis and estimation of emissions, conventional construction is assumed. On-site activities would comprise grading and the use of construction equipment emissions, while off-site activities would include worker, hauling, and vendor traffic. The project at the Hagar site is expected to be balanced with respect to import/export, but 1,000 cy of soil/material import and export was assumed during site grading and was entered into the model to reflect the number of haul trips anticipated.

The construction schedule for this site assumes that the residential project would be built out over a period of approximately 330 days, beginning in September 2018, while the day-care facility is constructed over a period of 5 months during in late 2018. In 2018, there would be an estimated 110 days of day-care facility construction and 60 days of residential construction. In 2019, there would be an estimated 220 days of residential construction.

Community Health Risk Impacts

The methodology used to assess community health risk impacts from exposure to construction-phase TAC emissions is described under **SHW Impact AIR-3**.

4.2.4.4 LRDP EIR Mitigation Measures included in the Proposed Project

Table 4.2-6, 2005 LRDP EIR Mitigation Measures, presents the mitigation measures in the 2005 LRDP EIR that are applicable to the proposed project. Since these previously adopted mitigation measures are already being carried out as part of implementation of the 2005 LRDP, they are included in and are a part of the proposed project and will not be readopted. Implementation of these mitigation measures is assumed as part of the project impact analysis.

**Table 4.2-6
2005 LRDP EIR Mitigation Measures**

Mitigation Measure	Description
AIR-1	<p>The Campus shall apply standard MBARD[®] recommended mitigation measures during construction of new facilities under the 2005 LRDP, as appropriate:</p> <ul style="list-style-type: none"> • Water all active construction areas at least twice daily. • Prohibit all grading activities during periods of high wind (over 15 mph). • Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days). • Apply non-toxic binders (e.g., latex acrylic copolymer), as appropriate, to exposed areas after cut and fill operations and hydroseed area. • Require haul trucks to maintain at least 2 feet of freeboard. • Cover all trucks hauling dirt, sand, or loose materials. • Plant vegetative ground cover in disturbed areas as soon as possible. • Cover inactive storage piles. • Install wheel washers at the entrances to construction sites for all exiting trucks. • Pave all roads on construction sites. • Damp-sweep streets if visible soil material is carried out from the construction site. • Post a publicly visible sign that specifies the telephone number and person to contact regarding dust complaints. This person shall respond to complaints and take corrective action within 48 hours. The phone number of the Monterey Bay Unified Air Pollution Control District shall be visible to ensure compliance with Rule 402. • To the extent feasible, limit the area under construction at any one time.

Mitigation Measure	Description
AIR-2A	The Campus shall consider design and construction features that reduce natural gas dependence in the design of each new project, and incorporate those measures that are feasible and that would be effective for the site, such as: <ul style="list-style-type: none"> • Orientation of buildings to optimize solar heating and natural cooling • Use of solar or low-emission water heaters in new buildings • Install best available wall and attic insulation in new buildings
AIR-2B	The Campus shall implement LRDP Mitigation TRA-1B to reduce motor vehicle trips.
AIR-4A	The Campus will work with AMBAG to ensure that campus growth associated with the 2005 LRDP is accounted for in the regional population forecasts.
AIR-4B	The Campus will work with MBARD to ensure that the campus growth-related emissions are accounted for in the regional emissions inventory and mitigated in future regional air quality planning efforts.
AIR-5A	The Campus shall develop and implement an emergency generator maintenance-testing schedule consistent with Draft EIR Table 4.3-22.
AIR-6	The Campus will minimize construction emissions by implementing measures such as those listed below: <ul style="list-style-type: none"> • Require the use of cleaner fuels in construction equipment • Require that construction contractors use electrical equipment where possible • Require construction contractors to minimize the simultaneous operation of multiple pieces equipment at a construction site • Discourage idling of construction equipment and vehicles • Schedule operations of construction equipment to minimize exposure as much as possible
AIR-7	UC Santa Cruz will continue its efforts in the area of TAC emission reduction.
<p><i>Source: UC Santa Cruz 2006</i></p> <p><i>a. LRDP Mitigations AIR-1 and AIR-4B have been updated with minor changes. The original mitigation measures used the acronym MBUAPCD to refer to the Air District. That is updated to MBARD to reflect the revised name of the Air District.</i></p>	

4.2.4.5 Project Impacts and Mitigation Measures

SHW Impact AIR-1: Construction of the proposed project could result in construction emissions that violate an air quality standard or contribute substantially to an existing or projected air quality violation. (Significant; Less than Significant with Mitigation)

The proposed project would involve construction activities at both construction sites. At the Heller site, the project would require demolition, site preparation, grading, building construction, pavement and asphalt installation, landscaping and hardscaping, and architectural coatings. The Hagar site would involve the same construction activities but no demolition would be required.

Criteria Pollutant Emissions

As noted above, using project data for both sites as input, CalEEMod Version 2016.3.2 model was used to estimate annual, average daily, and maximum summer day construction emissions of criteria pollutants from 2018 to 2022. The results are shown in **Table 4.2-7, Estimated Unmitigated Construction Emissions (Average Daily)**. The estimated maximum summer day emissions are presented in **Table 4.2-8**. As both tables show, the MBARD significance threshold for ROG, CO, PM₁₀ and PM_{2.5} would not be exceeded during construction. However, NO_x emissions would exceed the significance threshold. Therefore, it is concluded that construction emissions would result in a significant impact on air quality.

Table 4.2-7
Estimated Unmitigated Construction Emissions (Average Daily)

Construction Year	Emissions in Pounds per Day				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
2018	7	53	36	5	3
2019	20	139	82	21	9
2020	9	74	76	11	5
2021	31	49	60	7	3
2022	49	7	11	2	1
Highest Emissions in Any Year	49	139	82	21	9
MBARD Threshold:	137	137	550	82	55
Exceeds Threshold?	NO	YES	NO	NO	NO
Source: Illingworth and Rodkin 2018					

Table 4.2-8
Estimated Unmitigated Construction Emissions (Maximum Summer Day)

Construction Year	Emissions in Pounds per Day				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
2018	11	135	79	12	6
2019 ^a	93	30	25	6	2
2019 ^b	14	169	86	24	12
2020	13	157	83	23	11
2021	58	65	83	10	4
2022	51	18	21	2	1
Highest Emissions in Any Year	93	169	86	24	12
MBARD Threshold:	137	137	550	82	55
Exceeds Threshold?	NO	YES	NO	NO	NO

Construction Year	Emissions in Pounds per Day				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
<i>Source: Illingworth and Rodkin 2018</i> <i>a. Assumes maximum Hagar construction and Heller demolition occur simultaneously.</i> <i>b. Only Heller Residential construction, which would not overlap with Hagar construction or Heller demolition.</i>					

As a project under the 2005 LRDP, the proposed project would be required to implement **LRDP Mitigation AIR-6** to minimize emissions during construction. In addition, **SHW Mitigation AIR-1** is proposed to provide more specific requirements for this project, which would reduce the project's NO_x (and diesel particulate matter) emissions.

Fugitive Dust

Construction activities, particularly during site preparation and grading, would temporarily generate fugitive dust, including PM₁₀ and PM_{2.5}. Sources of fugitive dust would include disturbed soils at the construction site during grading and soil remediation and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. Fugitive dust emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. Fugitive dust emissions would also depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site. Although, as shown in **Tables 4.2-7** and **4.2-8** above, the project's construction-phase dust emissions would be below MBARD thresholds, measures listed in **LRDP Mitigation AIR-1**, which is included in the proposed project, would further reduce the impact from dust emissions.

Mitigation Measures:

SHW Mitigation AIR-1: The P3 developer shall submit an equipment and phasing plan to UC Santa Cruz for review and approval that will demonstrate the following:

- All diesel-powered off-road equipment larger than 25 horsepower and operating on the project construction sites for more than two days in a row shall meet, at a minimum, U.S. EPA standards for Tier 3 engines or equivalent.
- All diesel-powered off-road equipment larger than 25 horsepower and operating on the project construction sites for

more than two days in a row shall be equipped with diesel particulate matter filters that meet CARB-certified Level 3 Diesel Particulate Filters or alternatively-fueled equipment (i.e., non-diesel) would meet this requirement.

- Signal boards shall be electrically powered.
- Provide electrical line power so that diesel-fueled generator use shall be limited to 100 hours total at the Hagar site.
- Minimize the use of diesel-fueled generators at the Heller site.
- Ensure intensive construction activities (grading and building erection) at the Hagar and Heller sites do not overlap (note that current schedule indicates these would occur at separate times).

Significance after Mitigation: The project's maximum summer day emissions were recalculated after incorporating the mitigation measures listed above into the model. As shown in **Table 4.1-9** below, with the implementation of **SHW Mitigation AIR-1**, the construction of the proposed project would not result in substantial emissions of NO_x and the impact would be reduced to a less than significant level.

Table 4.2-9
Estimated Construction Emissions with Mitigation (Maximum Summer Day)

Construction Year	Emissions in Pounds per Day				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
2018	5	76	84	7	4
2019 ^a	93	25	25	3	1
2019 ^b	5	111	105	24	12
2020	5	108	104	23	11
2021	55	52	88	10	5
2022	50	14	24	2	1
Maximum Emissions in Any Year	93	111	105	24	12
MBARD Threshold:	137	137	550	82	55
Exceeds Threshold?	NO	NO	NO	NO	NO
<p>Source: Illingworth and Rodkin, 2018</p> <p>a. Assumes maximum Hagar construction and Heller demolition occur simultaneously.</p> <p>b. Only Heller residential construction, which would not overlap with Hagar construction or Heller demolition.</p>					

SHW Impact AIR-2: Operation of the proposed project would not result in operational emissions that would violate an air quality standard or contribute substantially to an existing or projected air quality violation. (*Less than Significant*)

The proposed project would not result in substantial daily emissions from the use of automobiles. This is because students living in the proposed on-campus housing would walk, ride a bike or take a UC Santa Cruz shuttle to travel between the project site, classes, and other campus facilities. In addition, as explained further in **Section 4.11, Transportation and Traffic**, the project would reduce daily trips because students who would otherwise live off campus and make trips to the campus would instead live on campus.

Sources of operational emissions associated with the proposed project include area (consumer products, architectural coatings, landscape equipment, etc.), energy (electricity use), mobile source (motor vehicles), and, in the case of the Heller site, stationary source emissions (on-site emergency generators). **Table 4.2-10, Estimated Unmitigated Operational Emissions (Maximum Summer Day)**, shows the predicted emissions in terms of maximum daily operational emissions in pounds per day.

Table 4.2-10
Estimated Unmitigated Operational Emissions (Maximum Summer Day)

Emissions Source	Emissions in Pounds Per Day			
	ROG	NO _x	PM ₁₀	PM _{2.5}
Hagar site				
Area	4	<1	<1	<1
Energy	<1	<1	<1	<1
Mobile	5	21	9	3
Total	9	22	9	3
Heller site				
Area	26	1	<1	<1
Energy	<1	2	<1	<1
Mobile	14	66	37	10
Stationary	4	<1	<1	<1
Total	45	70	37	11
Total (Hagar and Heller Combined)	54	92	46	14
MBARD Threshold	137	137	82	55
Exceeds Threshold?	NO	NO	NO	NO
<p><i>Source: Illingworth and Rodkin 2018.</i></p> <p><i>Note: Emissions displayed in this table are gross emissions and do not include credit for existing uses on the Heller site. The proposed project would not add mobile source emissions. Because the estimates include mobile source emissions, emissions estimates are considered conservative.</i></p>				

As shown in **Table 4.2-10**, the maximum summer day emissions of ROG, NO_x, PM₁₀, or PM_{2.5} emissions associated with project operation would not exceed the significance thresholds. Thus, the impact from operational emissions would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact AIR-3: **Implementation of the proposed project would expose sensitive receptors to substantial concentrations of toxic air contaminants. (*Significant; Less than Significant with Mitigation*)**

The CEQA guidelines put forth by MBARD require that potential health impacts from TAC emissions associated with a proposed project be evaluated and disclosed in a CEQA document. The potential for project-related TACs to affect human health is typically assessed in terms of an increase in cancer risk and non-cancer health effects. The MBARD has established a threshold for evaluating human health risk impacts from TACs, which is based on an incremental increase in cancer risk. Potential non-cancer health effects are assessed by use of a "Hazard Index." Hazard indices are calculated for both long-term (chronic) and short-term (acute) health effects, and a separate hazard index is calculated for each target organ group affected by the TACs being assessed. The potential for project construction activities and operations to expose receptors to excessive TAC concentrations is evaluated below.

Operational TAC Impacts

The proposed project is a residential project which would add undergraduate and graduate student housing at the Heller site and family student housing and a childcare facility at the Hagar site. The project would not include any stationary sources of TACs on either site which could expose both on-site and nearby off-site receptors to substantial TAC emissions. The project includes a number of emergency generators that would be periodically tested and used during power outages. However, consistent with UC Santa Cruz policy, all emergency generators would operate on natural gas, and in the event that natural gas supply to the generator is interrupted, the generator would operate on propane. The testing of these generators would produce emissions periodically; however natural gas is not considered a TAC and any emissions that are produced would not result in human health impacts. There would be no impact as there would be no operational emissions of TACs due to the project.

Construction TAC Impacts

Construction activities at both project sites would generate emissions of diesel particulate matter (DPM) from the combustion of diesel in construction equipment and vehicles. DPM from diesel-fueled engines has been determined by CARB to be a TAC, as defined under Section 39655 of the Health and Safety

Code. The potential for the project's construction-phase DPM emissions to result in human health impacts is evaluated below.

Heller Site

The MBARD guidelines do not provide guidance as to the conditions under which a health risk assessment must be prepared for a given construction project. However, the neighboring Bay Area Air Quality Management District's CEQA guidelines recommend analyzing the community health risk from a project's construction TAC emissions if sensitive receptors are present within 1,000 feet of a construction site. As noted earlier, sensitive receptors are defined as residences (which could harbor susceptible populations such as young children, elderly, and the sick), day care centers, schools and elderly care facilities. There are no residences, schools, daycare centers or elderly care facilities within 1,000 feet of the Heller site. The homes in Cave Gulch are more than 4,900 feet from the site. Although student housing is located within 400 feet to the east of the site, as explained in **Section 4.2.2.3** above, for construction risk assessments, university students are not considered sensitive receptors. Thus, there would be no health risk impacts associated with project construction activities at the Heller site.

Hagar Site

Project construction activities at the Hagar site would have the potential to expose sensitive receptors to substantial TAC concentrations. The closest sensitive receptors are employee residences south of the construction site, across Glenn Coolidge Drive at approximately 350 feet from the edge of the site. Additional residences are located to the east on Rockridge Lane and Spring Drive, with the closest home at 650 feet from the edge of the project site. Thus, a community health risk assessment was conducted to evaluate the effect of DPM emissions during project construction on nearby receptors.

Construction activity for the proposed project at the Hagar site would include site grading, placement of utilities, building construction, paving, application of architectural coatings, and interior finishing. Construction equipment and associated heavy-duty truck traffic generates exhaust which contains DPM. DPM emissions were estimated and dispersion modeling was conducted to predict the off-site concentrations resulting from project construction, so that lifetime excess cancer risks and non-cancer health effects could be predicted. Health risks were evaluated for a hypothetical maximally exposed individual (MEI) located in the nearby residential buildings. The hypothetical MEI is an individual assumed to be located where the highest concentrations of air pollutants are predicted to occur. Figure 1 in **Appendix 4.2** shows the project site, sensitive receptor locations (residences) used in the air quality dispersion modeling analysis where potential health impacts were evaluated, and the location of the MEI.

As a first step, on-site construction-phase DPM emissions were computed using the CalEEMod model. Inputs to the model are described under **Methodology**. The number and types of construction equipment and diesel vehicles, along with the anticipated length of their use, were based on a site-specific construction activity schedule (see **Appendix 4.2**). Emissions from truck traffic on or near the site were included in the modeling. The CalEEMod model was run with trip lengths of 1.0 mile to represent on-site truck emissions. Construction of the proposed project is anticipated to occur over an approximate 16 month period (starting in 2018). The projected construction schedule and the DPM emission calculations are provided in **Appendix 4.2**.

Next, the US EPA AERMOD dispersion model was used to predict concentrations of DPM at existing sensitive receptors surrounding the project site. The AERMOD modeling utilized an area source encompassing the different construction areas on the project site to represent the on-site DPM exhaust emissions. An emission release height of 6 meters was used for the exhaust emissions from construction equipment. The elevated source height reflects the height of the equipment exhaust pipes and buoyancy of the exhaust plume. Emissions from vehicle travel around the project site were included in the modeled area sources. The AERMOD model requires the use of hourly meteorological data that are representative of conditions in the vicinity of the site area being modeled. For this evaluation, since site-specific meteorological data was not available, a screening meteorological data set designed to produce conservatively high air concentrations was used. The screening meteorological data was created for the AERMOD model with the U.S. EPA MAKEMET program, which is designed to find the meteorological conditions that result in the highest pollutant concentrations for the area. DPM concentrations were calculated at nearby residential receptors at a receptor height of 1.5 meters.

A health risk assessment for exposure to TACs requires the application of a risk characterization model to the results from the air dispersion model to estimate potential health risk at each sensitive receptor location. The State of California Office of Environmental Health Hazard Assessment (OEHHA) and CARB developed recommended methods for conducting health risk assessments. The most recent OEHHA risk assessment guidelines were published in February of 2015. These guidelines incorporate substantial changes designed to provide for enhanced protection of children, as required by state law, compared to previous published risk assessment guidelines. CARB has provided additional guidance on implementing OEHHA's recommended methods. This health risk assessment used the recent 2015 OEHHA risk assessment guidelines and CARB guidance. Current MBARD regulations and guidelines (Rule 1000 – Permit Guidelines and Requirements for Sources Emitting Toxic Air Contaminants) specify use of the most recent OEHHA guidelines when conducting health risk assessments. The new OEHHA guidelines and CARB recommended exposure parameters were used in this analysis.

Potential increased cancer risk from inhalation of TACs was calculated based on the TAC concentration over the period of exposure, inhalation dose, the TAC cancer potency factor, and an age sensitivity factor to reflect the greater sensitivity of infants and children to cancer causing TACs. The inhalation dose depends on a person's breathing rate, exposure time and frequency of exposure, and the exposure duration over a 70-year lifetime period. These parameters vary depending on the age, or age range, of the persons being exposed and whether the exposure is considered to occur at a residential location or other sensitive receptor location.

The current OEHHA guidance recommends that cancer risk be calculated by age groups to account for different breathing rates and sensitivity to TACs. Specifically, they recommend evaluating risks for the third trimester of pregnancy to age zero, ages zero to less than two (infant exposure), ages two to less than 16 (child exposure), ages 16 to 70 (adult exposure). Age sensitivity factors (ASFs) associated with the different types of exposure are an ASF of 10 for the third trimester and infant exposures, an ASF of 3 for a child exposure, and an ASF of 1 for an adult exposure. Also associated with each exposure type are different breathing rates, expressed as liters per kilogram of body weight per day. Parameters and formulas used to calculate cancer risk can be found in **Appendix 4.2**. Health risk parameters used in this evaluation are summarized in **Table 4.2-11**.

Table 4.2-11
Health Risk Parameters Used for Cancer Risk Calculations

Parameter	Exposure Type	Infant		Child	Adult
	Age Range	3rd Trimester	0<2	2<16	16-30
DPM Cancer Potency Factor (mg/kg-day) ⁻¹		1.10E+00	1.10E+00	1.10E+00	1.10E+00
Daily Breathing Rate (L/kg-day) ^a		361	1,090	745	335
Inhalation Absorption Factor		1	1	1	1
Averaging Time (years)		70	70	70	70
Exposure Duration (years)		0.25	2	14	14
Exposure Frequency (days/year)		350	350	350	350
Age Sensitivity Factor		10	10	3	1
Fraction of Time at Home		1.0	1.0	1.0	0.73
Source: Illingworth & Rodkin, Inc. 2018 a. 95th percentile breathing rates.					

The maximum modeled DPM concentrations from construction activities occurred at a receptor east of the site, northeast of the intersection of Spring Court and Spring Street. The location of this receptor is identified in Figure 1 (in **Appendix 4.2**). Based on the maximum average annual modeled DPM concentration for each year of construction, the maximum increased cancer risk was calculated. Due to

the short duration of project construction activities, infant exposures were assumed in calculating all cancer risks. Because an infant breathing rate is greater than for the 3rd trimester, the contribution to total cancer risk from an infant exposure is greater than if the initial exposure assumed a 3rd trimester exposure. In addition to infant exposures, adult exposures and increased cancer risks were calculated.

Results of this assessment, as shown in **Table 4.2-12, Maximum Community Risks from Hagar Site Construction**, indicate that without mitigation, the maximum residential lifetime excess cancer risk (LECR) would be 59.7 in 1 million for an infant exposure and 1.3 in one million for an adult exposure. While the residential adult LECR is below the MBARD's threshold of greater than 10 in 1 million, the LECR for a residential infant exposure is greater than the significance threshold and would be considered a significant impact unless mitigated.

Table 4.2-12
Maximum Community Risks from Hagar Site Construction
(Unmitigated and with Mitigation)

Location	Lifetime Excess Cancer Risk (per million)	Hazard Index
Maximum Unmitigated Residential (infant exposure)	59.7	0.05
<i>Significance Threshold</i>	10	1.0
<i>Exceeds Threshold?</i>	<i>Yes</i>	<i>No</i>
Maximum Residential with Mitigation	7.7	<0.01
<i>Significance Threshold</i>	10	-
<i>Exceeds Threshold?</i>	<i>No</i>	-
<i>Source: Illingworth & Rodkin, Inc. 2018.</i>		

Potential non-cancer health effects due to chronic exposure to DPM were also evaluated. Evaluation of potential non-cancer health effects from exposure to short-term concentrations in the air was performed by comparing modeled concentrations in air with the reference exposure levels (RELs). A REL is a concentration in the air at or below which no adverse health effects are anticipated. RELs are based on the most sensitive adverse effects reported in the medical and toxicological literature. Potential non-cancer effects were evaluated by calculating a ratio of the modeled concentration in the air and the REL. This ratio is referred to as a hazard quotient/index (HI). The cancer potency factors, unit risk values, and RELs used to characterize health risks associated with modeled concentrations in the air were obtained from information set forth by the MBARD and OEHHHA. As reported in **Table 4.2-12**, the maximum computed

chronic HI is 0.05, which is much lower than the MBARD significance criterion of a hazard index greater than 1.0. Thus, the impact would be less than significant impact.

In summary, project operation would not result in the exposure of sensitive receptors to substantial pollutant concentrations. Project construction at the Hagar site would, however, expose nearby sensitive receptors to substantial concentrations of TACs, resulting in a significant community health risk impact unless mitigated.

Mitigation Measures:

SHW Mitigation AIR-3: Implement SHW Mitigation AIR-1.

Significance after Mitigation: SHW Mitigation AIR-1, presented under SHW Impact AIR-1 above, would be implemented to reduce DPM emissions. As shown in **Table 4.2-12**, with implementation of **SHW Mitigation AIR-1**, the computed maximum LECR from construction would be 7.7 in one million or less for an infant exposure. The project's impact related to DPM emissions would be reduced to a less than significant level.

SHW Impact AIR-4: Implementation of the proposed project would not create objectionable odors that could affect a substantial number of people. (*Less than Significant*)

Construction of the proposed project would require the use of diesel-fueled equipment, architectural coatings, and asphalt paving, all of which have an associated odor. However, these odors are not pervasive enough to cause objectionable odors affecting a substantial number of people. Consequently, construction of the proposed facilities would not cause substantial odors.

Typically, wastewater treatment plants, wastewater pumping facilities, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing, fiberglass manufacturing, painting/coating operations, rendering plant, coffee roaster, food processing facilities, feed lots and dairies, green waste and recycling operations, and metal smelting plants are considered odor emitting facilities. The campus does not contain any of these facilities. Therefore, the proposed project would not expose receptors to odors from existing sources. Although the proposed project includes a MBR wastewater treatment plant, the facility would be a fully enclosed modular plant and does not include any open channels or holding ponds that would emit odors. As odors could result from the headworks room, equalization tank, and the room containing the MBR, all three spaces in the MBR facility would be under negative pressure with airflow ducted to an activated carbon odor control

system that would scrub air of odors and compounds such as hydrogen sulfide. The exhaust from the odor control system would be located away from sensitive receptors such as occupied buildings and outdoor gathering spaces. Therefore, the proposed MBR facility would not expose the Heller site residents and other students in nearby existing student housing as well as faculty and staff to odor impacts. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact AIR-5: Implementation of the proposed project would not conflict with or obstruct implementation of the applicable air quality plan. (*Less than Significant*)

In compliance with the State CEQA Guidelines, this EIR evaluates whether the proposed project would conflict with or otherwise obstruct implementation of regional air quality plans. According to the MBARD 2008 *Guidelines for Implementing CEQA*, a project that is consistent with the Air Quality Management Plan (AQMP) is considered to be accommodated in the AQMP and therefore would not have a significant impact on regional air quality. AQMPs are developed for regions that do not meet ambient air quality standards. As shown above in **Table 4.2-2**, the region currently is not in attainment of the state ozone and PM₁₀ standards. The AQMP for the MBARD is based on population and housing forecasts prepared by the Association of Monterey Bay Area Governments (AMBAG). The growth of the campus projected under the 2005 LRDP is accounted for in the current AMBAG forecasts and regional emissions inventory and thus mitigated in regional air quality planning efforts.

The proposed SHW project would not increase the campus population to exceed the population projected under the 2005 LRDP and included in the AMBAG projections and accounted for the regional air quality plan. Furthermore, as the analysis under **SHW Impact AIR-2** shows, the project's operations would not result in a significant increase in criteria air pollutant emissions. In general, projects that result in less than significant operational emissions are not expected to set back regional air quality planning efforts. Therefore, the project would not conflict with the applicable air quality plan, and the impact would be less than significant.

Mitigation Measures: No mitigation is required.

4.2.5 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

The proposed dining facilities expansion project would add to existing facilities on the west side of Rachel Carson College and to the southern end of Porter College. In both instances, the facilities would be located above or adjacent to existing buildings, or would replace the existing buildings with larger buildings. Approximately 10,000 square feet of building space would be added to the two colleges.

Impacts and Mitigation Measures

DF Impact AIR-1: **The implementation of the proposed dining facilities project would not result in a significant impact on air quality during construction and operations. (*Less than Significant*)**

Construction Phase Emissions

The MBARD 2008 CEQA guidance provide that if a project involves grading and excavation on less than 2.2 acres per day, or the project involves minimal grading and excavation and the overall project site is less than 8.1 acres, it can be assumed that the project's construction phase impact would be less than significant. The dining facilities expansion project would involve minimal grading and excavation and the project site is well below 8.1 acres. Furthermore, the project would add only 10,000 square feet of new building space to existing facilities. Given the limited area that would be disturbed and the small amount of building construction involved, it is anticipated that the construction emissions of the project would result in a less than significant impact on air quality.

Operational Emissions

There would be a minimal increase in criteria pollutant emissions due to the dining facilities expansion project. This is because the project would expand dining areas and a kitchen, adding less than 10,000 square feet of building space. It would not increase the campus population and therefore would not generate vehicle trips that would increase indirect emissions. The impact on air quality from project operations would be less than significant.

Mitigation Measures: No mitigation is required.

4.2.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

SHW Impact C-AIR-1: Implementation of the proposed project would not result in a cumulatively considerable net increase of a criteria pollutant for which the project region is nonattainment under an applicable federal or State ambient air quality standard. (*Less than Significant*)

According to the MBARD 2008 *Guidelines for Implementing CEQA* “A consistency analysis and determination serve as the project’s analysis of cumulative impacts on regional air quality. Project emissions which are not consistent with the AQMP are not accommodated in the AQMP and will have a significant cumulative impact unless offset.” The analysis of consistency is performed by AMBAG for population-related projects and by the Air District for all others. A consistency analysis was performed for campus population growth under the 2005 LRDP and discussed under LRDP Impact AIR-4. The analysis concluded that given that campus growth under the LRDP was not accounted for in the regional population forecasts, the 2005 LRDP was not consistent with the AQMP, and would therefore result in a cumulatively considerable contribution of ozone precursors to the regional air basin. The 2005 LRDP EIR noted that the Campus would implement LRDP Mitigations AIR-2A through AIR-2C and LRDP Mitigation AIR-4A and AIR-4B to minimize operational emissions and address the emissions that would result from campus growth under the 2005 LRDP, but the cumulative impact would remain significant and unavoidable. The proposed SHW project and other near term housing projects on the campus are within the scope of the 2005 LRDP and would not, in themselves, cause any enrollment increases. The student population at the campus in 2020-21 would remain below 19,500 FTE students and therefore there would be no change to the previously analyzed cumulative air quality impacts disclosed in the 2005 LRDP EIR. Although that impact was found to be significant and unavoidable, the proposed project would not make any contribution to the impact as it would not result in any enrollment increase.

With respect to emissions of localized pollutant CO, the 2005 LRDP EIR noted that LRDP Impact AIR-3 evaluated CO concentrations at study area intersections that would result under two scenarios: a 2020 Without LRDP Project scenario which estimated increase in CO concentrations as a result of the increase in background traffic volumes between 2005 and 2020, and a 2020 With LRDP Project scenario, which includes 2005 LRDP-related traffic volumes added to 2020 background volumes. Note that the 2020 background traffic volumes were derived from the AMBAG regional traffic model and reflect the increased traffic that would result from population and employment growth projected in the study area through 2020 by AMBAG. The analysis presented under LRDP Impact AIR-3, therefore, presented the cumulative CO impact of campus growth and found it to be less than significant. As stated in **Section 4.11, Transportation and Traffic**, the proposed SHW project (as well as other reasonably foreseeable campus housing projects) would reduce the total daily and peak hour traffic to and from the campus and

therefore the proposed SHW project would not contribute to the cumulative CO impact analyzed for the 2005 LRDP growth.

Mitigation Measures: No mitigation is required.

4.2.5 REFERENCES

- Bay Area Air Quality Management District. 2017. *California Environmental Quality Act Air Quality Guidelines*. May.
- California Air Resources Board. 2005. *Air Quality and Land Use Handbook: A Community Health Perspective*.
- Monterey Bay Area Unified Air Pollution Control District (MBUAPCD). 2015. North Central Coast Air Basin, California: Air Monitoring Network Assessment. June.
- Monterey Bay Area Unified Air Pollution Control District (MBUAPCD). 2008. *CEQA Air Quality Guidelines*.
- MBUAPCD. 2016. *Guidelines for Implementing California Environmental Quality Act*. Adopted April 1996, revised February 2016.
- Western Regional Climate Center. 2017. City of Santa Cruz climate data. <https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7916>.

4.3 BIOLOGICAL RESOURCES

4.3.1 INTRODUCTION

This biological resources chapter provides an evaluation of the biological resources, including special-status species and sensitive habitats, on and in the immediate vicinity of the SHW project. It also presents potential impacts to biological resources from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and the existing colleges (see **Section 4.3.5** below).

The analysis in this section is tiered from the biological resources impact analysis contained in the 2005 LRDP EIR, supplemented by project-specific surveys and studies. Based on focused site specific studies for special status plants and wildlife as well as habitat evaluation, the biological resources assessment describes the existing conditions on the project sites (e.g., vegetation types and sensitive habitats, and special-status species observed or expected), identifies potential impacts to sensitive habitat and special-status plants, invertebrates, amphibians, reptiles, birds, and mammals, and sets forth mitigation/avoidance measures for impacts found to be significant.

4.3.2 ENVIRONMENTAL SETTING

4.3.2.1 Regional Setting

The SHW project is located on the UC Santa Cruz campus in the City of Santa Cruz in Santa Cruz County, California (**Figure 3.0-2**). The proposed project would be constructed on two sites: the first site is in the western portion of the campus, west of Heller Drive (“Heller site”), and the second site is in the southeastern portion of the campus on Glenn Coolidge and Hagar Drives (“Hagar site”). The project is situated within the *Santa Cruz, Calif.*, United States Geological Survey (USGS) 5- by 11-minute quadrangle. Land uses adjacent to the campus include Pogonip City Park and Henry Cowell Redwoods State Park to the east, Wilder Ranch State Park to the west, residential neighborhoods to the south, the rural residential Cave Gulch neighborhood to the northwest, and private land and small-scale rural development to the north (**Figure 3.0-2**).

4.3.2.2 Project Site Setting

Heller Site

The approximate 13-acre Heller site is located between Empire Grade Road and Heller Drive (**Figure 3.0-3**). The Heller site is developed with the Family Student Housing (FSH) complex, an apartment complex

with about 40 buildings and associated roadways and parking. The FSH complex also includes a childcare center which is located in one permanent building and several modular buildings, with an associated fenced play yard. Land uses surrounding the Heller site include: (1) Rachel Carson and Oakes Colleges to the east; (2) an informal recreational field and Heller Drive to the south; (3) an undeveloped, wooded area to the west; and (4) Porter Meadow to the north, an expansive meadow on rolling topography.

Hagar Site

The approximate 14-acre Hagar site is located in a meadow at the northeastern corner of the intersection of Glenn Coolidge Drive and Hagar Drive (**Figure 3.0-4**). The site consists of a hillside with gently rolling topography that slopes down to Glenn Coolidge Drive. The site is undeveloped and covered with grasslands. A sinkhole/detention basin is present in the southeastern corner of the site.

With regard to the surrounding land uses, the East Meadow extends to the north of the project site and as such, lands to the north and west of the Hagar site are composed of grasslands of composition similar to those on the site. Approximately 0.4 miles north of the Hagar site, at the top of the East Meadow, is the East Remote parking lot. The large lot consists of three parking areas that are immediately south of a groomed grass playing field and a smaller unpaved site used for construction contractor parking and staging and campus shuttle parking. The UC Santa Cruz Center for Agroecology and Sustainable Food Systems (CASFS) and affiliated agricultural fields are located across Hagar Drive to the west of the project site. Also to the west of the site is the Cowell Lime Works Historic District. The Cardiff Terrace, Hagar Court and Hagar Meadow employee housing developments lie to the south and southwest of the Hagar site. An off-campus residential neighborhood that includes a small park and pond are situated in an old quarry east of the employee housing. To the east, beyond Glenn Coolidge Drive, are undeveloped grasslands that extend onto Pogonip Park.

4.3.2.3 Project Site Surveys and Mapping

Biological resources on the Heller and Hagar project sites were identified through the review and compilation of existing information, including detailed surveys, studies, and mapping prepared by biological resource consultants, and completion of reconnaissance-level field surveys by LSA, the EIR biologist. The review provided information on general resources in the area and the distribution and habitat requirements of special-status species that have been recorded from or are expected to occur in the project vicinity, including: records on occurrences of special-status species and sensitive natural communities maintained by the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDDB; CDFW 2017) and the California Native Plant Society's (CNPS) On-line

Inventory of Rare and Endangered Plants (CNPS 2017). The following studies and mapping of the project sites have been completed for the project:

- California Red-legged Frog Site Assessment for University of California Santa Cruz, West Campus Housing Area. Prepared by Biosearch Associates (Biosearch 2016; 2017).
- West Campus Housing Project, University of California, Santa Cruz, Rare Plant Survey Report. Prepared by Biotic Resources Group (BRG 2016).
- Results of Botanical Survey of Lower Quarry Field. Prepared by Biotic Resources Group (BRG 2013).
- University of California Santa Cruz California Red-legged Frog Site Assessment. Prepared for Campus Planning, University of California Santa Cruz. Prepared by EcoSystems West (EcoSystems 2000).
- West Campus Housing Project on the University of California Santa Cruz Campus, Presence-Absence Survey Report for the Endangered Ohlone Tiger Beetle. Prepared by Entomological Consulting Services, Ltd. (ECS 2016).
- Potential California Red-legged Frog Use of College Eight Detention Basin, U.C. Santa Cruz. Prepared by H.T. Harvey & Associates Ecological Consultants (HT Harvey 2008).
- Biological Assessment for the California Red-legged Frog, Stormwater Infrastructure Improvements Phase II, University of California, Santa Cruz.. Prepared by H.T. Harvey & Associates Ecological Consultants (HT Harvey 2009).
- Final Habitat Conservation Plan, Ranch View Terrace, University of California, Santa Cruz. Prepared by Jones & Stokes (Jones & Stokes 2005).
- California Red-legged Frog Habitat Assessment of the University of California, Santa Cruz Lower Campus. Prepared by Jones & Stokes (Jones & Stokes 2002).
- UC Santa Cruz Site Stewardship Grassland Monitoring Program Progress Report. Prepared by Lucy Lynn (Lynn 2007).

Biologists from LSA conducted field reconnaissance surveys of the Heller site on May 2 and June 24, 2017 and of the Hagar site on October 5 and December 7, 2017. The surveys were conducted in order to verify habitat conditions described in the background biological resources reports and identify sensitive habitat

and areas subject to special regulations, such as potential waters of the United States and/or areas which likely support or harbor special-status species. The surveys involved walking throughout the two sites to ensure that all habitat types and features were identified. All plants and animals observed were recorded in field notes.

In addition to LSA's reconnaissance surveys, the following focused assessments and surveys were conducted for the proposed project:

- In conjunction with a California red-legged frog (*Rana draytonii*; CRLF) site assessment, Biosearch Environmental Consulting conducted field surveys within the vicinity of the Heller site, including the proposed utility corridor, on May 10 and 13, 2016; June 7 and 10, 2016; and May 2 and June 8, 2017 (Biosearch 2016; 2017).
- Biotic Resources Group conducted protocol-level plant surveys within the vicinity of the Heller site, including the proposed utility corridor on March 23, April 16, May 6, May 20, and June 13, 2016 (BRG 2016).
- Entomological Consulting Services conducted adult Ohlone tiger beetle (*Cicindela ohlone*) surveys within suitable habitat in the vicinity of at the Heller site, including the proposed utility corridor on March 10, 16, 22, and 31, April 8, 16, 24, and 30, and May 6, 2016 and larval burrow surveys on June 21, 2016 (ECS 2016).
- LSA and Biosearch Associates conducted a CRLF field survey and site assessment within the vicinity of the Heller site, including the proposed utility corridor and mapped potential CRLF dispersal corridors through the site, on May 2, 2017.
- LSA surveyed the Hagar site and proposed utility corridor to map the vegetation and assessed the habitat for special-status plants on October 5, 2017.
- LSA conducted a burrowing owl survey within suitable habitat on and within 500 feet of the Hagar site within 2 hours of dusk on December 7, 2017. The survey was conducted to assess non-breeding use of the site in accordance with the CDFW 2012 Staff Report on Burrowing Owl Mitigation (CDFG 2012). The survey was conducted by walking transects spaced up to 50 feet apart throughout the survey area, which included the development footprint at the Hagar site, the proposed utility corridor, and adjacent suitable habitat within 500 feet, where access was permitted. LSA also surveyed portions of the upper East Meadow just south of the east remote parking lot. LSA did not conduct a protocol-level burrowing owl survey, which includes multiple

surveys, at the Heller site because burrowing owls are not known to winter in the vicinity of the Heller site, which is likely due to the lack of preferred habitat, such as short grasslands.

In addition to the above surveys, several additional field surveys have been conducted on the UC Santa Cruz campus in which the survey area overlapped with the Heller and Hagar sites. Specifically, Biotic Resources Group conducted focused plant surveys and coastal prairie habitat mapping on May 8 and June 1, 2013 within the proposed utility corridor southwest of Hagar Drive (BRG 2013). Most of the other surveys are referenced in the 2005 LRDP EIR (UCSC 2006).

The habitat maps from the special-status plant reports (BRG 2013 and 2016) were used for mapping the habitat types for the Heller and Hagar sites. LSA biologists field-verified these mapped habitats and mapped additional areas of purple needlegrass grasslands. LSA digitized and modified the habitat map of the project site provided in the rare plant survey report for the Heller site (BRG 2016). Imagery for the habitat maps was acquired from ESRI World Imagery (dated July 23, 2016) and has a 0.1-meter resolution.

4.3.2.4 Vegetation and Wildlife Habitat Present on the Project Sites

The Heller and Hagar project sites encompass approximately 27 acres on the campus. Habitats and land cover types within the Heller site consist of developed areas, wild oats grassland, California oats grassland, purple needlegrass grassland, coyote brush scrub, California bay forest, redwood forest, and developed/landscaped lands (**Figure 4.3-1**), while habitat and land cover within the Hagar site consist of purple needlegrass grassland and developed land (**Figure 4.3-2**).

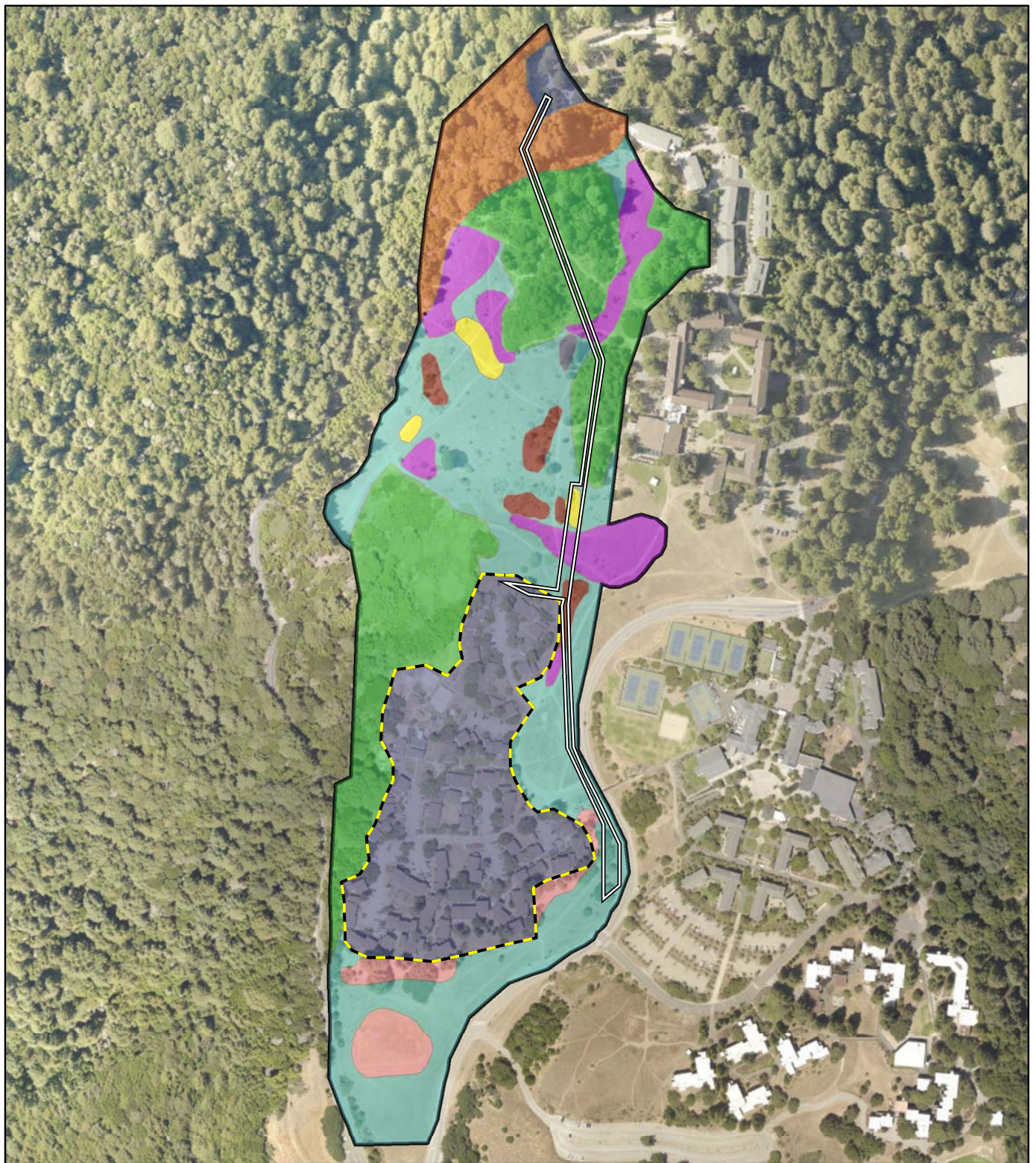
Soils

Several soil units have been mapped at the Heller and Hagar sites, most of which are various types of loam soils. The soil units at the Heller site are mapped as Watsonville loam, Aptos loam, Lompico-Felton complex, Elkhorn sandy loam, and Tierra-Watsonville complex, while the soil units mapped within the proposed utility corridor are Los Osos loam, Lompico-Felton complex, and Tierra-Watsonville complex (UC Davis Soil Resource Laboratory 2017). The soil units at the Hagar site are mapped as Elkhorn sandy loam, Danville loam, and Aptos loam, warm, while the soil units at the proposed utility corridor are mapped as Elkhorn sandy loam and Danville loam (UC Davis Soil Resource Laboratory 2017).

Vegetation Communities/Land Cover Types

Heller Site

The proposed development footprint at the Heller site encompasses approximately 13 acres within the existing developed FSH complex, where natural habitats are not present. However, vegetation and land



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Legend

- Study Area Boundary
- Heller Site
- Proposed Utility Corridor

Land Cover Types

- California Bay Forest
- California Oat Grass Prairie
- Coyote Brush Scrub
- Developed
- Landscaping
- Purple Needlegrass Grassland
- Redwood Forest
- Wild Oats Grassland

SOURCE: UCSC, 2017

FIGURE 4.3-1

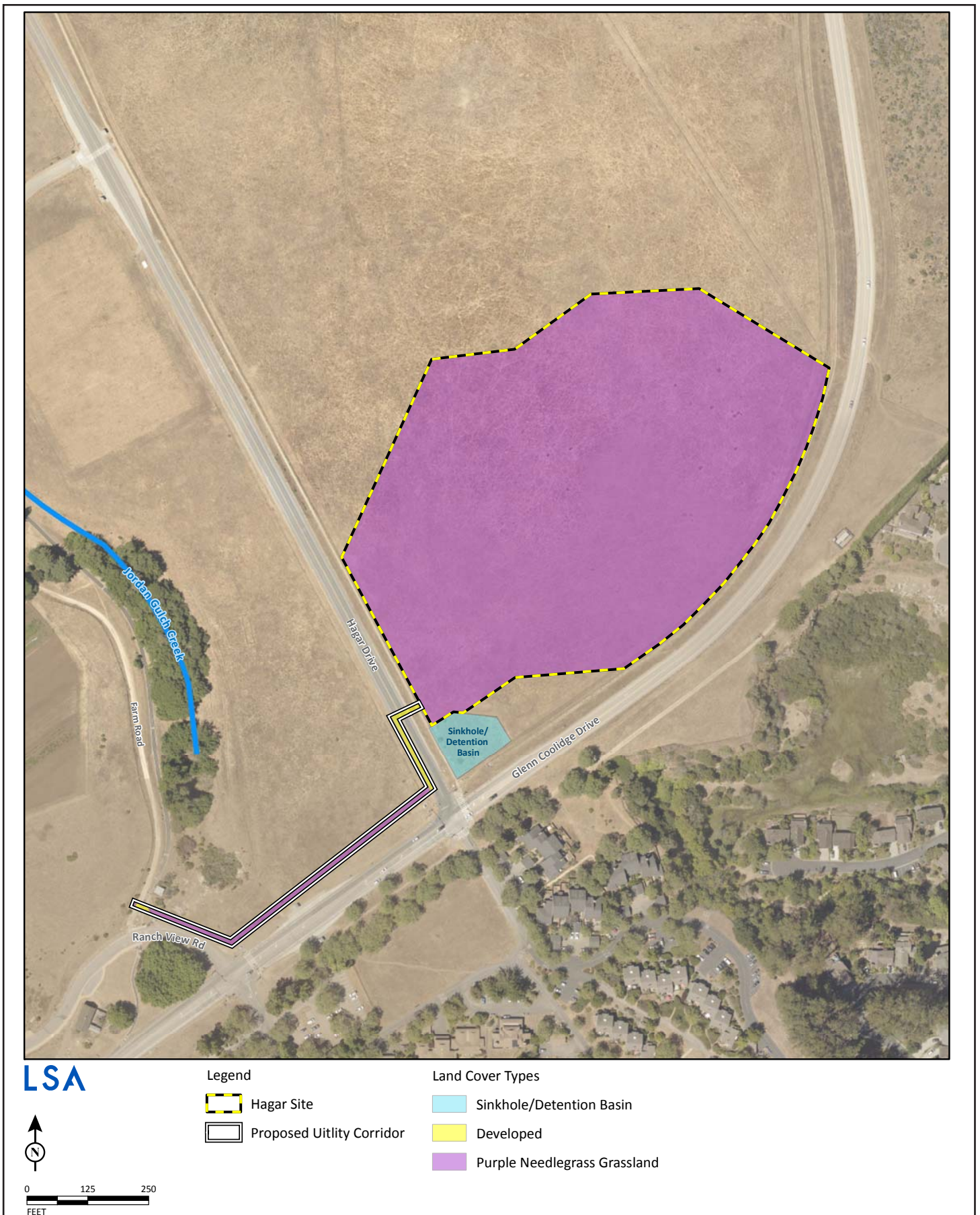


FIGURE 4.3-2

Land Cover at the Hagar Site

cover types in the area around the Heller site consist of mostly plant species associated with the grassland, coyote brush scrub, mixed evergreen forest, coastal prairie, grassland, as well as developed/landscaped habitats. The proposed utility corridor, which extends north from the Heller site, occurs within mostly natural vegetation communities (**Figure 4.3-1**). The approximate acreages of the habitat/land cover communities within the proposed utility corridor were derived from the plant survey report prepared by the Biotic Resources Group (BRG 2016). The vegetation communities associated with the project site and utility corridor are presented in **Table 4.3-1, Land Cover Types at the Heller Site**, below. Each of these vegetation communities is described below.

Table 4.3-1
Land Cover Types at the Heller Site

Habitat/Land Cover Type	Acres
<i>Project Site</i>	
Developed/Landscaped	13.0
<i>Utility Corridor</i>	
California Oat Grass Prairie	0.1
Purple Needlegrass Grassland	0.1
Wild Oats Grassland	0.5
Coyote Brush Scrub	0.1
California Bay Forest	0.3
Redwood Forest	0.1
Developed/Landscaped	0.1
Total	14.3

California Oat Grass Prairie (Danthonia californica Herbaceous Alliance)

California oat grass (*Danthonia californica*) prairie occurs within portions of the Porter Meadow, along a slope west of Porter College, and along a portion of the grassy ridge west of Porter College (toward Empire Grade Road). Areas with greater than 10 percent cover by California oat grass were classified as California oat grass prairie (coastal prairie) (BRG 2016). This cover value threshold is consistent with classification of perennial grasslands presented in the Manual of California Vegetation (Sawyer et al. 2009). In addition to California oat grass, the prairie supports other native grasses, including purple needlegrass (*Stipa pulchra*) and meadow barley (*Hordeum brachyantherum*). Non-native grasses are also present, such as wild oat (*Avena barbata*), rattlesnake grass (*Briza maxima*), and rattail sixweeks grass (*Festuca myuros*). In general, the composition of native and non-native forbs is similar to the purple needlegrass grassland discussed below. Two additional native forbs, yellow Mariposa lily (*Calochortus luteus*) and Ithuriel's spear (*Triteleia laxa*), were also present within the California oat grass prairie. All

associations within this alliance are considered sensitive natural communities by the California Department of Fish and Wildlife (CDFW).

Purple Needlegrass Grassland (Nassella pulchra [Stipa pulchra] Herbaceous Alliance)

This vegetation alliance is characterized by the presence of greater than 10 percent cover of purple needlegrass, which is the cover value threshold listed in the Manual of California Vegetation (Sawyer et al. 2009). Within the study area, additional non-native grass species such as soft chess (*Bromus hordeaceus*), rye grass (*Festuca perennis*), and false brome (*Brachypodium distachyon*) are also present. Non-native forbs present include English plantain (*Plantago lanceolata*), filaree (*Erodium botrys*), cut-leaved plantain (*Plantago coronopus*), wild radish (*Raphanus sativa*), sheep sorrel (*Rumex acetosella*), cat's ear (*Hypochaeris* spp.), hairy hawkbit (*Leontodon saxatilis*), common sow thistle (*Sonchus oleraceus*), California bur clover (*Medicago polymorpha*), and scarlet pimpernel (*Anagallis arvensis*). Native forbs are also present, but are less abundant. Commonly observed species include sun cups (*Taraxia ovata*), blue-eyed grass (*Sisyrinchium bellum*), checkerbloom (*Sidalcea malviflora*), sky lupine (*Lupinus nanus*), California buttercup (*Ranunculus californica*), miniature lupine (*Lupinus bicolor*), soap plant (*Chlorogalum pomeridianum*), California poppy (*Eschscholzia californica*), and spreading rush (*Juncus patens*). All associations within this alliance are considered sensitive natural communities by CDFW.

Wild Oats Grassland (Avena barbata Semi-Natural Herbaceous Stands)

Wild oats grassland is the dominant plant cover type within the Heller site vicinity. Grassland occurs both south and north of FSH complex and west of Porter College. The composition and density of native and non-native grasses and forbs vary throughout the survey area based on slope, human activities, and land management actions. Wild oat is co-dominant with other non-native species such as ripgut brome (*Bromus diandrus*) and rattlesnake grass. In addition to wild oat and ripgut brome, other non-native species are present, such as rattail sixweeks grass, soft chess (*Bromus hordeaceus*), dogtail grass (*Cynosurus echinatus*), false brome, silver hair grass (*Aira caryophyllea*), rye grass, orchard grass (*Dactylis glomerata*), and quaking grass (*Briza minor*). Non-native forbs are prevalent throughout the grassland and include species observed in the purple needlegrass grassland. This alliance is not considered a sensitive natural community by CDFW.

Coyote Brush Scrub (Baccharis pilularis Shrubland Alliance)

Coyote brush scrub is dispersed in patches amid the grasslands as well as along the edges of the California bay forest. The scrub is dominated by coyote brush (*Baccharis pilularis*), with lesser amounts of poison oak (*Toxicodendron diversilobum*) and immature Coast live oak (*Quercus agrifolia*). A small amount of annual and perennial grasses and forbs typical to the adjacent grasslands occurs in the understory,

with the addition of bracken fern (*Pteridium aquilinum* var. *pubescens*), yarrow (*Achillea millefolium*), hedgenettle (*Stachys* sp.), California cudweed (*Pseudognaphalium californicum*), bull thistle (*Cirsium vulgare*), California blackberry (*Rubus ursinus*), and poison hemlock (*Conium maculatum*). **Figure 4.3-1** depicts the areas of coyote brush scrub in the Heller site vicinity. This alliance is not considered a sensitive natural community by CDFW.

California Bay Forest (Umbellularia californica Forest Alliance)

California bay forest is present along the western edge of the Heller site and along the northern end of the proposed utility corridor. Co-dominants vary throughout the stand and include coast live oak, Douglas fir (*Pseudotsuga menziesii*), and tan oak (*Notholithocarpus densiflorus* var. *densiflorus*). Other native species present include redwood (*Sequoia sempervirens*) and madrone (*Arbutus menziesii*). The forest understory is dense and diverse with small trees and shrubs; commonly observed species include poison oak, California hazel (*Corylus cornuta* subsp. *californica*), coyote brush, snowberry (*Symphoricarpos* sp.), blue elderberry (*Sambucus nigra* subsp. *caerulea*), Oregon grape (*Berberis aquifolium* var. *dictyota*), and California blackberry. Native herbaceous species present include hound's tongue (*Cynoglossum grande*), Western sword fern (*Polystichum munitum*), wood strawberry (*Fragaria vesca*), bracken fern, yerba buena (*Clinopodium douglasii*), miner's lettuce (*Claytonia perfoliata* subsp. *perfoliata*), California man-root (*Marah fabacea*), and woodland tarweed (*Anisocarpus madrioides*). Non-native species observed include pines, French broom (*Genista monspessulana*), English ivy (*Hedera* spp.), cotoneaster (*Cotoneaster* sp.), bull thistle, Italian thistle (*Carduus pycnocephalus*), English daisy (*Bellis perennis*), and greater periwinkle (*Vinca major*). **Figure 4.3-1** depicts areas of California bay forest in the survey area. All associations within this alliance are considered sensitive natural communities by CDFW.

Redwood Forest (Sequoia sempervirens Forest Alliance)

A small amount of redwood forest is present within the study area, and intergrades with the adjacent California bay forest. Redwood trees dominate these stands with other native trees present in smaller numbers, such as Douglas fir, madrone, California bay, and tan oak. The understory is sparse, with a layer of duff, with a few scattered species present such as hound's tongue, sword fern, and wood strawberry (*Fragaria vesca*). All of the redwood forest on the campus has been logged at least once and is therefore second-growth. All associations within this alliance are considered sensitive natural communities by CDFW.

Ball Field (Landscaped)

To the south of the Heller site, one area is a mowed and maintained softball field vegetated with Bermuda grass (*Cynodon dactylon*).

Developed/Landscaped

Within the Heller site, developed and landscaped areas support native and non-native landscape trees, shrubs, and herbaceous species (**Figure 4.3-1**). The landscaped and developed areas include buildings, roads, trails, ornamental shrubs, and native and non-native trees, such as non-native pines (*Pinus* sp.), coast redwood, and ornamental trees.

Hagar Site

Vegetation and land cover types at the Hagar site consist of mostly plant species associated with the purple needlegrass grassland and developed habitats. The approximate acreage of the habitat/land cover communities within the Hagar site and the utility corridor was derived from LSA's site visits. **Figure 4.3-2** provides a map of habitat within the Hagar site. The approximate acreages of the habitat/land cover communities within the Hagar site and proposed utility corridor are listed in **Table 4.3-2, Land Cover Types at the Hagar Site**, below:

Table 4.3-2
Land Cover Types at the Hagar Site

Habitat/Land Cover Type	Acres
<i>Project Site</i>	
Purple Needlegrass Grassland	15.0
<i>Utility Corridor</i>	
Purple Needlegrass Grassland	0.3
Developed	0.1
Total	15.4

Purple Needlegrass Grassland (Nassella pulchra [Stipa pulchra] Herbaceous Alliance

The Hagar site supports stands of purple needlegrass, with other non-native grass species present such as wild oats, rip gut brome, and Mediterranean barley (*Hordeum marinum*). Common forb species present are predominantly non-native and include wild radish, Italian thistle, bindweed (*Convolvulus arvensis*), English plantain, sheep sorrel, filaree, and cat's ear. Native species observed include California poppy and coast tarweed (*Madia sativa*). All associations within this alliance are considered sensitive natural communities by CDFW.

Developed

Within the Hagar site, the developed areas occur along the proposed utility corridor where the utility lines will be installed beneath roads, Hagar Drive and Farm Road (**Figure 4.3-2**).

Wildlife

The habitat types present on the Heller and Hagar sites provide suitable habitat for many common native animals that have adapted to rural settings. Wildlife species observed at or near the Heller site during LSA's surveys consist of those typically associated with grassland and forested habitats, including western fence lizard (*Sceloporus occidentalis*), red-tailed hawk (*Buteo jamaicensis*; including young), red-shouldered hawk (*B. lineatus*), American kestrel (*Falco sparverius*), common raven (*Corvus corax*), California scrub-jay (*Aphelocoma californica*; including young), band-tailed pigeon (*Patagioenas fasciata*), acorn woodpecker (*Melanerpes formicivorus*), chestnut-backed chickadee (*Poecile rufescens*), western wood-pewee (*Contopus sordidulus*), oak titmouse (*Baeolophus inornatus*), Bewick's wren (*Thryomanes bewickii*), western bluebird (*Sialia mexicana*), violet-green swallow (*Tachycineta thalassina*), dark-eyed junco (*Junco hyemalis*), black-headed grosbeak (*Pheucticus melanocephalus*), spotted towhee (*Pipilo maculatus*), lesser goldfinch (*Spinus psaltria*), house finch (*Haemorhous mexicanus*), Botta's pocket gopher (*Thomomys bottae*), and black-tailed deer (*Odocoileus hemionus columbianus*).

Wildlife or animal sign observed at or near the Hagar site during LSA's surveys consist of those typically associated with grassland habitats, including red-tailed hawk, red-shouldered hawk, American kestrel, white-tailed kite (*Elanus leucurus*), common raven, California scrub-jay, northern mockingbird (*Mimus polyglottos*), mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), yellow-rumped warbler (*Setophaga coronata*), oak titmouse (*Baeolophus inornatus*), bushtit (*Psaltiriparus minimus*), chestnut-backed chickadee (*Poecile rufescens*), Bewick's wren, Say's phoebe (*Sayornis saya*), European starling (*Sturnus vulgaris*), western meadowlark (*Sturnella neglecta*), savannah sparrow (*Passerculus sandwichensis*), golden-crowned sparrow (*Zonotrichia atricapilla*), house finch, Botta's pocket gopher, California ground squirrel (*Otospermophilus beecheyi*), Audubon's cottontail (*Sylvilagus audubonii*), black-tailed deer, and coyote (*Canis latrans*).

4.3.2.5 Special-Status Species

LSA reviewed the CNDDDB (CDFW 2017) for records of special-status species occurrences within 5 miles of the project sites, and the CNPS On-line Inventory of Rare and Endangered Plants (CNPS 2017) was also reviewed for species in the Santa Cruz, Davenport, Felton, Laurel, and Soquel USGS quadrangles. LSA also reviewed the special-status species lists from the UC Santa Cruz 2005 LRDP EIR (UCSC 2006). Using these sources, lists of special-status plants and animals that have the potential to occur on or in the vicinity of the Heller and Hagar sites were compiled (Table 1, in **Appendix 4.3**).

For the purposes of this assessment, special-status species are defined as follows:

- Species that are listed, formally proposed, or designated as candidates for listing as threatened or endangered under the federal Endangered Species Act (ESA);
- Species that are listed, or designated as candidates for listing, as rare, threatened, or endangered under the California Endangered Species Act (CESA);
- Plant species given the California Rare Plant Ranking (CRPR) of 1A, 1B, 2, 3, and 4 as assigned by a collaborative group of over 300 botanists in government, academia, non-governmental organizations, and the private sector. This group is sanctioned by, and jointly managed by, CDFW and the CNPS;
- Animal species designated as Species of Special Concern or Fully Protected by CDFW;
- Species that meet the definition of rare, threatened, or endangered under Section 15380 of the CEQA guidelines; or Species that are considered a taxa of special concern by local agencies.

The scientific and vernacular nomenclature for the plant and wildlife species used in this analysis are from the following standard sources: plants, Baldwin et al. (2012) and updates listed on the Jepson Herbarium website (<http://ucjeps.berkeley.edu/eflora/>); amphibians and reptiles, Crother (2017) and/or AmphibiaWeb (www.amphibiaweb.org); birds, American Ornithologists' Union (1998) and supplements through 2017; and mammals, Bradley et al. (2014). To the extent feasible, vegetation cover within the project site was classified according to Sawyer et al. (2009).

Special-Status Plant Species

The available background information identifies 46 special-status plant species that have potential to occur in the region (Table 1, in **Appendix 4.3**).

Although marginal habitat for many of these species occurs within the proposed utility corridor associated with the Heller site, protocol-level surveys conducted in 2016 for these and other special-status plant species resulted in no observations of special-status plant species (BRG 2016).

Protocol-level plant surveys were also conducted within an area encompassing the utility corridor southwest of Hagar Drive in 2013 (BRG 2013). However, the Hagar site has not been surveyed during the appropriate time of the year to observe special-status plants that might occur on the site. Three special-status plants that have the potential to occur at the Hagar site due to the presence of suitable grassland habitat consist of Point Reyes horkelia (*Horkelia marinensis*), marsh microseris (*Microseris paludosa*), and San Francisco popcorn-flower (*Plagiobothrys diffusus*). Point Reyes horkelia is a CRPR List 1B species that has been recorded along the Empire Grade Road north of Santa Cruz (CDFW 2017) and within the

campus at Marshall Field (UCSC 2006). Marsh microseris is a CRPR List 1B species that has been recorded in the City of Santa Cruz near Graham Hill Road and within the campus at Marshall Field (CDFW 2017). San Francisco popcorn-flower is a state-listed endangered species and CRPR List 1B species that has been recorded within Marshall Field, Pogonip City Park, and along the Moore Creek greenbelt (CDFW 2017). An additional special-status plant, the Santa Cruz clover (*Trifolium buckwestiorum*), could occur at the Hagar site due to the presence of suitable grassland habitat. On March 15, 2018, a LSA senior botanist conducted a focused plant survey at the proposed Hagar site. The survey area consisted of the proposed development footprint and off-site improvements at the Hagar site and an additional buffer survey area of approximately 25 feet surrounding the project site. The survey was conducted in accordance with the *California Department and Fish Wildlife's Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009). No special-status plants were observed during the survey.

Special-Status Wildlife Species

Based on the CNDDDB search (and species lists in the 2005 LRDP EIR), 47 special-status animal species were evaluated for their potential to occur on or in the general vicinity of the project sites (Table 1, in **Appendix 4.3**). More detailed evaluation is provided below for the following special-status species and/or species groups which are known or may occur at the project sites and could be affected by project construction. The only special-status wildlife species observed during LSA's surveys was the white-tailed kite, which was foraging over the Hagar site during the December 2017 survey.

Ohlone Tiger Beetle. The Ohlone tiger beetle (Federally Endangered) occurs in poorly drained clay or sandy clay soil over bedrock of Santa Cruz mudstone within remnant native grasslands with California oat grass and purple needlegrass in Santa Cruz County (CDFW 2017). The Santa Cruz County soil maps identifies these soils as Watsonville loams, which are often characterized by mima mounds (Bowman and Estrada 1980 as cited in ECS 2016; ECS 2016). Grasslands occupied by Ohlone tiger beetles have been observed primarily on level ground, where the vegetation is sparse or bare ground is prevalent (ECS 2016).

Presence-absence surveys for the Ohlone tiger beetle within the Heller site utility corridor were conducted during the spring of 2016 by Dr. Richard Arnold (ECS 2016). No Ohlone tiger beetles were found during the 2016 surveys (ECS 2016). Although California oat grass prairie and purple needlegrass grasslands occur on the Heller site utility corridor, Watsonville loams are absent, which likely precludes the presence of this beetle (ECS 2016). This species is not likely to occur at the Hagar site due to the lack of suitable habitat, including Watsonville loams.

California Red-legged Frog. CRLF is a Federally Threatened species and California Species of Special Concern [SSC] that is known to occur in the creeks, drainages, and ponds in Santa Cruz County. CRLF are known to occur in the vicinity of the Heller site and the site is located within designated CRLF critical habitat unit SCZ-1 (USFWS 2010). Moore Creek on the UC Santa Cruz campus occurs along the eastern boundary of SCZ-1. Critical habitat designation applies only to specific areas within the mapped units that provide those physical and biological features essential to the conservation of the species (USFWS 2010). Because CRLF are known to use aquatic, riparian, and upland habitat, they may be present in any of these habitat types. USFWS considers upland habitat as areas that provide shelter, shade, moisture, foraging opportunities, and predatory avoidance up to 1 mile from occupied breeding and non-breeding habitat, depending on surrounding landscape and dispersal barriers (USFWS 2010; Biosearch 2016). Maintaining dispersal corridors between breeding and non-breeding habitats is considered essential for preserving CRLF populations (USFWS 2010; Biosearch 2016).

CRLF have been recorded in at least 14 locations within 1 mile of the Heller site, all within the Moore Creek watershed (CDFW 2017; Biosearch 2016). CRLF have been observed in four locations along the West Branch of Moore Creek, situated just south of the Heller site and at College Eight detention basin just east of Heller Drive (CDFW 2017), but this detention basin does not provide suitable breeding habitat for CRLF (Biosearch 2016). CRLF have also been observed along the East Branch of Moore Creek between 0.2 and 0.4 mile southeast of the Heller site, in pools in Moore Creek downstream of Empire Grade approximately 0.7 mile south-southeast of the site, and in a seasonal pond above a tributary to Moore Creek located approximately 0.7 mile south of the site (CDFW 2017; Biosearch 2016). The closest breeding site for CRLF is the Arboretum Pond, located approximately 0.5 mile southeast of the Heller site (Biosearch 2016; EcoSystems West 2000; Jones and Stokes 2002). In addition to these occurrences, CRLF have been observed along Adams Creek, a tributary to Wilder Creek approximately 1.2 miles to the northwest (CDFW 2017), Wilder Ranch State Park approximately 1.4 miles to south-southwest, the Upper Dairy Gulch Pond (which is a breeding pond) approximately 1.7 mile to the south-southwest, along Wilder Creek approximately 1.9 miles to the southwest (CDPR 2001, 2005 as cited in Biosearch 2016), and along a drainage at Jade Ranch approximately 1.6 miles to the south-southwest (Biosearch 2016).

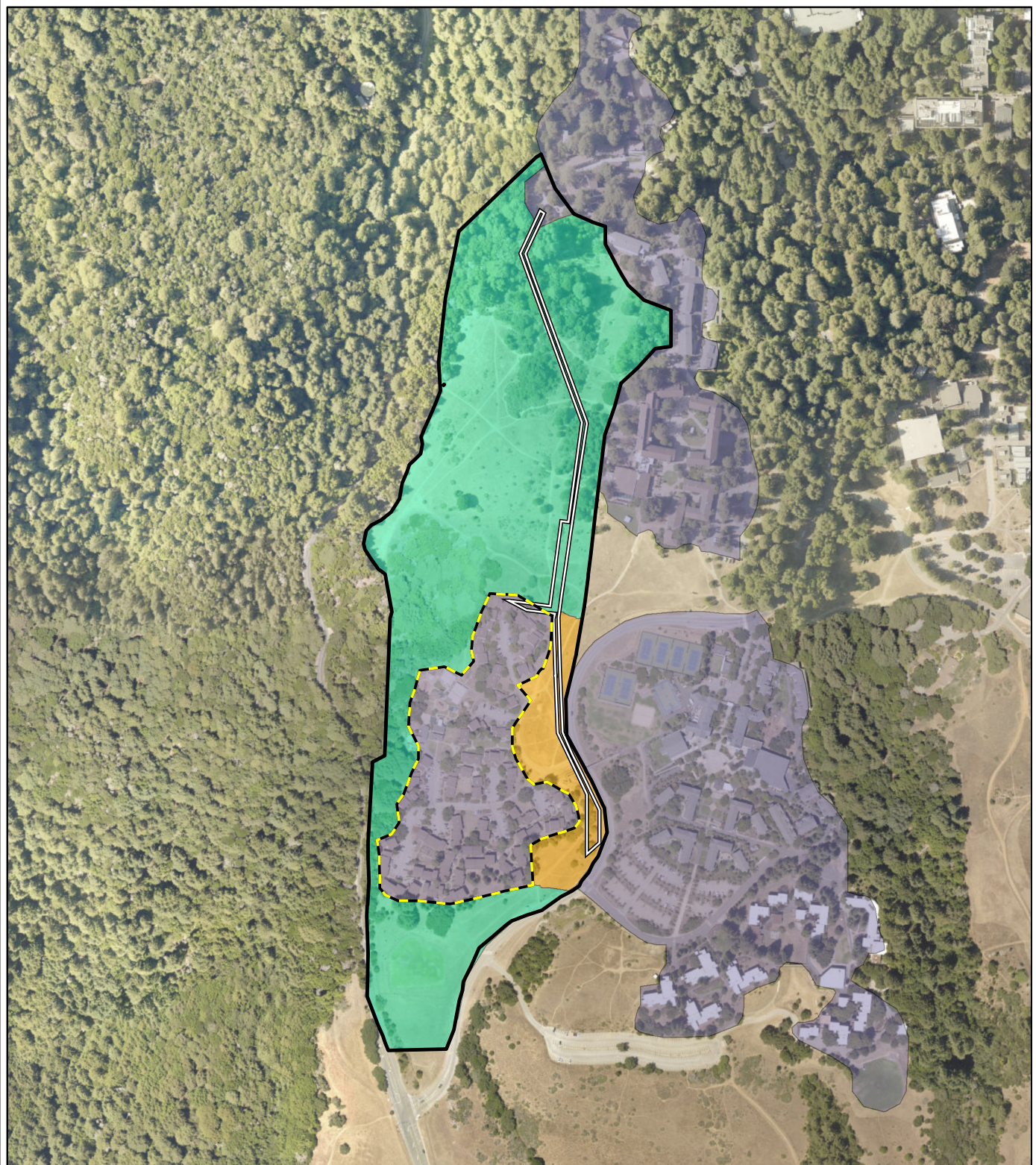
In 2016, Biosearch prepared a CRLF site assessment for the proposed Heller site and adjacent Porter Meadow where the utility corridor is proposed in accordance with U.S. Fish and Wildlife Service's 2005 *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog*. Biosearch visited the project site in May and June, 2016 to document habitat conditions for CRLF (Biosearch 2016). Biologists from Biosearch and LSA also conducted a site visit on May 2, 2017 and Biosearch conducted another site visit on May 10, 2017 to evaluate dispersal habitat at and around the Heller site. For the CRLF site assessment, the suitability of upland and dispersal habitats for CRLF was evaluated based on vegetation

type, presence of potential refugia, moisture and distance from known breeding sites and the presence or absence of barriers to overland movements (buildings, roads, retaining walls) that were considered and characterized as either impassable or passable (Biosearch 2016; 2017). In part, because portions of Moore Creek, Cave Gulch, and Wilder Creek provide suitable non-breeding aquatic habitat for CRLF (EcoSystems West 2000; Jones and Stokes 2002; Biosearch 2017), the forest, coyote brush scrub, and grassland habitats on or near the Heller site were determined to provide upland and dispersal habitat for CRLF (**Figure 4.3-3**).

The Heller site is also situated within a mile of the Arboretum Pond, a known CRLF breeding site. Potential CRLF movement corridors from the Arboretum Pond to non-breeding habitat occur along the East Branch of Moore Creek both north and south of the Arboretum Pond, across Empire Grade to the west towards Wilder Creek, and between the Moore Creek and the Wilder Creek watersheds (EcoSystems West 2000; Jones & Stokes 2002; Biosearch 2016, 2017).

The developed areas of the UC Santa Cruz campus, including the FSH complex, Porter College, Porter and Kresge Infill Apartments, Oakes College, and Rachel Carson College, present substantial barriers to CRLF movements, but Heller Drive, although it likely results in mortality to dispersing CRLF, is not considered a complete movement barrier to CRLF (Biosearch 2016). The FSH complex, proposed site of the Heller site housing development, is developed and presents extensive and substantial barriers to CRLF movements, including buildings, retaining walls, storm drains and other barriers and hazards to dispersal (Biosearch 2016). The eastern edge of the FSH complex supports mostly mowed grassland interspersed with trees and lacks dense vegetation or leaf litter. However, California ground squirrel burrows, which provide cover, moisture and shade for CRLF, were observed in this area (Biosearch 2016). The proposed utility corridor, which supports grassland, coyote brush scrub, and forest habitats (**Figure 4.3-1**), occurs within the CRLF upland and dispersal habitat. Habitat features that provide shade, moisture, foraging opportunities and predator avoidance for CRLF, including dense vegetation, leaf litter, organic debris, and California ground squirrel burrows occur along the proposed utility corridor (Biosearch 2016).

CRLF are not known to occur in the vicinity of the Hagar site due to the lack of suitable aquatic habitat and the site's isolation from occupied suitable habitat west of the site.



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Legend

- Study Area Boundary
- Heller Site
- Proposed Utility Corridor

California Red-legged Frog Habitat

- Minimal Dispersal Habitat
- Upland and Dispersal Habitat
- Developed and Roads – Substantial Dispersal Barriers

SOURCE: UCSC, 2017

FIGURE 4.3-3

California Giant Salamander. The California giant salamander (*Dicamptodon ensatus*; SSC) is known to occur in Wilder Creek, Cave Gulch stream, and Empire Cave (CDFW 2017). It occurs in wet coastal forests near streams and seeps with aquatic larvae inhabiting cold, clear streams, or occasionally in lakes and ponds and adults occurring in wet forests under rocks. Adult salamanders have been observed within the California bay forest near the southern portion of the Porter Meadow (CNR 2017). This salamander could occur at the Porter Meadow and forest habitat within the proposed utility corridor for the Heller site.

Western Pond Turtle. Western pond turtles (*Emys marmorata*; SSC) may briefly occur along the creeks in the vicinity of the project sites, but no suitable aquatic habitat is present on or immediately adjacent to the sites. This species has been documented approximately a half mile from the Heller site in the Arboretum Pond within the UC Santa Cruz campus and in lower Moore Creek just south of the campus (CDFW 2017). The Arboretum Pond and the pool areas of lower Moore Creek are the only suitable breeding habitat for western pond turtles on or immediately adjacent to the campus (Jones & Stokes 2004 as cited in UCSC 2006).

Special-Status Birds. Several special-status bird species are known to or could occur near the Heller and Hagar sites, including the golden eagle (*Aquila chrysaetos*; California Fully Protected), northern harrier (*Circus cyaneus*; SSC), white-tailed kite (California Fully Protected), short-eared owl (*Asio flammeus*; SSC), long-eared owl (*Asio otus*; SSC), loggerhead shrike (*Lanius ludovicianus*; SSC), Vaux's swift (*Chaetura vauxi*; SSC), black swift (*Cypseloides niger*; SSC), olive-sided flycatcher (*Contopus cooperi*; SSC), grasshopper sparrow (*Ammodramus savannarum*; SSC), tricolored blackbird (*Agelaius tricolor*; SSC), and burrowing owl (*Athene cunicularia*; SSC). Golden eagles, white-tailed kites, long-eared owls, Vaux's swifts, and olive-sided flycatcher could nest in the forest habitats, loggerhead shrikes could nest in the trees and shrubs, and northern harriers, short-eared owls, burrowing owls, and grasshopper sparrows could nest in the grassland habitats on and adjacent to the sites. Vaux's swift, black swift, and tricolored blackbird could forage on or adjacent to the sites.

Burrowing owls could winter and/or forage in the grassland habitat on or adjacent to the sites. They winter in ground squirrel burrows, pipes, culverts, concrete piles, rock rip-rap, and other artificial structures. Burrowing owls historically nested within the UC Santa Cruz campus grassland habitat with several breeding pairs observed nesting during the 1970s, but nesting was last confirmed in the grasslands south of the east remote parking lot in the early 1980s (UCSC 2006). Currently, burrowing owls are known to winter within the upper East Meadow south of the east remote parking lot and north of the Hagar site (CDFW 2017).

Nests of all native birds, regardless of their regulatory status, are protected by the Federal Migratory Bird Treaty Act and provisions of the California Fish and Game Code. Suitable nesting habitat is present on and adjacent to the Heller and Hagar sites for both special-status and common bird species, and if conducted during the nesting season (February through August), construction activities could result in the destruction and/or disturbance of active bird nests, if present.

Special-Status Bats. The Townsend's western big-eared bat (*Corynorhinus townsendii townsendii*; SSC), pallid bat (*Antrozous pallidus*; SSC), western mastiff bat (*Eumops perotis californicus*; SSC), western red bat (*Lasiurus blossevillei*; SSC), long-eared myotis (*Myotis evotis*; Western Bat Working Group [WBWG] - Medium Priority), fringed myotis (*Myotis thysanodes*; WBWG - High Priority), long-legged myotis (*Myotis volans*; WBWG - High Priority), and yuma myotis (*Myotis yumanensis*; WBWG - Low-Medium Priority) may periodically fly or forage over the Heller and Hagar sites, but no suitable roosting habitat for these bat species occurs on or in close proximity to the sites.

San Francisco Dusky-footed Woodrat. The San Francisco dusky-footed woodrat (*Neotoma fuscipes annectans*; SSC) could build woodrat houses within the California bay forest, redwood forest, and coyote brush scrub habitat at or near the Heller site. No woodrat houses were observed during LSA's reconnaissance surveys at the Heller site. No suitable woodrat habitat is present at the Hagar site.

American Badger. The American badger (*Taxidea taxus*; SSC) occurs in grassland habitat where prey species, such as small mammals, occur. This species could occur at or near the Hagar site, although no potential den sites were observed during LSA's focused burrow survey (for burrowing owls) conducted in December 2017. A dead badger was found in 2004 at UC Santa Cruz, north of the Hagar site between the east remote parking lot and the east recreation playing fields (CDFW 2017). This species is unlikely to occur within the Porter Meadow near the Heller site due to the limited habitat present and the site's proximity to urban development and isolation from larger grasslands.

4.3.2.6 Sensitive Natural Communities

The California oats grassland (coastal prairie), California bay forest, and purple needlegrass grassland on and near the Heller site and the utility corridor and the purple needlegrass grassland at the Hagar site and the utility corridor are considered to be sensitive natural communities by CDFW.

4.3.2.7 Wetlands and Other Jurisdictional Waters

No wetlands or other jurisdictional features occur at the Heller and Hagar sites. Wilder Creek occurs near the Heller site and a sinkhole/detention basin and Jordan Gulch Creek occur near the Hagar site, but the proposed project will not impact these features.

4.3.2.8 Wildlife Movement Corridors and Wildlife Nursery Sites

Wildlife such as black-tailed deer (*Odocoileus hemionus columbianus*), raccoons (*Procyon lotor*), coyotes (*Canis latrans*), gray foxes (*Urocyon cinereoargenteus*), bobcats (*Lynx rufus*), reptiles, amphibians (including CRLF), birds, and occasionally mountain lions (*Felis concolor*) move through the grassland, forest, and coyote brush scrub habitats at the Heller and/or Hagar sites (**Figures 4.3-1 and 4.3-2**).

Within the vicinity of the Heller site, wildlife movement corridors are present within the grassland in the Porter Meadow north of the existing FSH complex, the California bay forest west of the FSH complex, the ball field south of the FSH complex, and within a narrow stretch of habitat that extends in a north-south direction between the FSH complex and Heller Drive. The Porter Meadow between the FSH complex and Porter College supports an important wildlife movement corridor that provides a linkage between the habitat north and west of the Heller site to the habitat to the east, including habitat associated the West and East Branches of Moore Creek. In regards to CRLF movement, most of these areas provide suitable dispersal habitat for CRLF with the exception of the north-south corridor between the FSH complex and Heller Drive, which provides minimal dispersal habitat for CRLF due to its relatively narrow width (**Figure 4.3-3**).

The Hagar site is situated in the lower most portion of the East Meadow and is bordered by grasslands within the East Meadow to the north, by Hagar Drive, grasslands, Jordan Gulch, agricultural lands, and development to the west, and Glenn Coolidge Drive and development to the south, and Glenn Coolidge Drive and the Pogonip City Park to the east (**Figure 3.0-4, Project Vicinity- Hagar Site**).

No known native wildlife nursery sites occur on or immediately adjacent to near the Heller or Hagar sites.

4.4.3 REGULATORY CONSIDERATIONS

4.4.3.1 Federal Laws and Regulations

Federal Endangered Species Act

The federal Endangered Species Act (FESA) of 1973, as amended, provides the regulatory framework for the protection of plant and animal species (and their associated critical habitats), which are formally listed, proposed for listing, or candidates for listing as endangered or threatened under the FESA. The FESA has four major components: provisions for listing species, requirements for consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries, prohibitions against “taking” of listed species, and provisions for permits that allow

incidental “take.” The FESA also discusses recovery plans and the designation of critical habitat for listed species. Both the USFWS and the NOAA Fisheries share the responsibility for administration of the FESA. During the CEQA review process, each agency is given the opportunity to comment on the potential of the proposed project to affect federally listed plants and animals.

Clean Water Act, Section 404 and 401

The USACE and the United States Environmental Protection Agency (U.S. EPA) regulate the discharge of dredged or fill material into waters of the U.S., including wetlands, under Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344). Waters of the U.S. are defined in Title 33 CFR Part 328.3(a) and include a range of wet environments such as lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds. The lateral limits of jurisdiction in those waters may be divided into three categories – territorial seas, tidal waters, and non-tidal waters – and is determined depending on which type of waters is present (Title 33 CFR Parts 328.4(a),(b),(c)). Activities in waters of the U.S. regulated under Section 404 include fill for development, water resource projects (such as dams and levees), infrastructure developments (such as highways and airports), and mining projects. Section 404 of the CWA requires a federal license or permit before dredged or fill material may be discharged into waters of the U.S., unless the activity is exempt from Section 404 regulation (e.g., certain farming and forestry activities).

Section 401 of the CWA (33 U.S.C. 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the U. S. to obtain a certification from the state in which the discharge originates or would originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the affected waters. At the point where the discharge originates or would originate, the discharge would have to comply with the applicable effluent limitations and water quality standards. A certification obtained for the construction of any facility must also pertain to the subsequent operation of the facility. In California, the responsibility for the protection of water quality under the CWA rests with the State Water Resources Control Board (SWRCB) and its nine RWQCBs.

Migratory Bird Treaty Act & Bald and Golden Eagle Protection Act

The Federal Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.), Title 50 Code of Federal Regulations (CFR) Part 10, prohibits taking, killing, possessing, transporting, and importing of migratory birds, parts of migratory birds, and their eggs and nests, except when specifically authorized by the Department of the Interior (DOI). As used in the act, the term “take” is defined as meaning “to pursue, hunt, capture, collect, kill or attempt to pursue, hunt, shoot, capture, collect or kill, unless the context

otherwise requires.” With a few exceptions, most birds are considered migratory under the MBTA. Disturbances that causes nest abandonment and/or loss of reproductive effort or loss of habitat upon which these birds depend would be in violation of the MBTA.

The Bald Eagle Protection Act (16 U.S.C. 668) was passed in 1940 to protect bald eagles (*Haliaeetus leucocephalus*) and was later amended to include golden eagles (*Aquila chrysaetos*). Under the act it is unlawful to import, export, take, sell, purchase, or barter any bald eagle or golden eagle, their parts, products, nests, or eggs. Take includes pursuing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing eagles.

4.4.3.2 State Laws and Regulations

California Endangered Species Act

California enacted similar laws to the FESA, the California Native Plant Protection Act (NPPA) in 1977 and the CESA in 1984. The California Endangered Species Act (CESA) expanded upon the original NPPA and enhanced legal protection for plants, but the NPPA remains part of the California Fish and Game Code. To align with the FESA, CESA created the categories of “threatened” and “endangered” species. It converted all “rare” animals into the CESA as threatened species, but did not do so for rare plants. Thus, these laws provide the legal framework for protection of California-listed rare, threatened, and endangered plant and animal species. CDFW implements NPPA and CESA, and its Biogeographic Data Branch maintains the CNDDDB, a computerized inventory of information on the general location and status of California’s rarest plants, wildlife, and natural communities. During the CEQA review process, CDFW is given the opportunity to comment on the potential of the proposed project to affect listed plants and wildlife species.

Fully Protected Species and Species of Special Concern

The classification of “fully protected” was CDFW’s initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, amphibian and reptiles, birds, and mammals. Most of the species on these lists have subsequently been listed under CESA and/or FESA. The California Fish and Game Code sections (fish at §5515, amphibian and reptiles at §5050, birds at §3511, and mammals at §4700) dealing with “fully protected” species states that these species “...may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected species,” although take may be authorized for necessary scientific research. This language makes the “fully protected” designation the strongest and most restrictive regarding the “take” of these species. In

2003, the code sections dealing with fully protected species were amended to allow CDFW to authorize take resulting from recovery activities for state-listed species.

California Species of Special Concern are broadly defined as animals not listed under the FESA or CESA, but which are nonetheless of concern to CDFW because they are declining at a rate that could result in listing or historically occurred in low numbers and known threats to their persistence currently exist. This designation is intended to result in special consideration for these animals by CDFW, land managers, consulting biologists, and others, and is intended to focus attention on the species to help avert the need for costly listing under FESA and CESA and cumbersome recovery efforts that might ultimately be required. This designation is also intended to stimulate collection of additional information on the biology, distribution, and status of poorly known at-risk species, and focus research and management attention on them. Although these species generally have no special legal status, they are given special consideration under CEQA during proposed project review.

California Fish and Game Code, Sections 3503 and 3513

According to Section 3503 of the California Fish and Game Code it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird (except house sparrows (*Passer domesticus*) and European starlings (*Sturnus vulgaris*)). Section 3503.5 specifically protects birds in the orders Falconiformes and Strigiformes (birds-of-prey). Section 3513 essentially overlaps with the MTBA, prohibiting the take or possession of any migratory non-game bird. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered “take” by CDFW.

California Fish and Game Code, Section 1600

Streams, lakes, and riparian vegetation as habitat for fish and other wildlife species, are subject to jurisdiction by CDFW under Sections 1600-1616 of the California Fish and Game Code. Any activity that will do one or more of the following: (1) substantially obstruct or divert the natural flow of a river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake; generally require a 1602 Lake and Streambed Alteration Agreement. Removal of riparian vegetation also requires a Section 1602 Lake and Streambed Alteration Agreement from CDFW.

California Native Plant Society (CNPS) Rare Plant Ranking System

The CNPS has been involved in assembling, evaluating, and distributing information on special-status plant species in the state, as listed in the *Inventory of Rare and Endangered Plants of California* (CNPS 2001

and electronic inventory update). CNPS has recently updated their rating system for the rarity of special-status plants, and now include both a California Rare Plant Rank and a Threat Rank. Species are ranked according to their rarity status.¹ CEQA requires government agencies to consider environmental impacts of discretionary projects and to avoid or mitigate them where possible. Under Section 15380, CEQA provides protection for both State-listed species and for any other species which can be shown to meet the criteria for State listing. The CDFW recognizes that special-status plants with a California Rare Plant Rank of 1A (Presumed extinct in California), 1B (Rare, threatened, or endangered in California and elsewhere), and 2 (Rare and endangered in California, but are more common elsewhere) in the CNPS Inventory consist of plants that, in a majority of cases, would qualify for listing and these species should be addressed under CEQA review. In addition, CDFW recommends, and local governments may require, protection of species which are regionally significant, such as locally rare species, disjunct populations, essential nesting and roosting habitat for more common wildlife species, or plants with a CNPS California Rare Plant Rank of 3 (Plant species for which additional data is needed – a review list) and 4 (Plant species of limited distribution - a watch list).

Sensitive Vegetation Communities

Sensitive vegetation communities are natural communities and habitats that are either unique, of relatively limited distribution in the region, or of particularly high wildlife value. These resources have been defined by federal, state, and local conservation plans, policies or regulations. CDFW ranks sensitive communities as “threatened” or “very threatened” and keeps records of their occurrences in its CNDDDB. Sensitive vegetation communities are also identified by the CDFW on its List of California Natural Communities Recognized by the CNDDDB. Impacts to sensitive natural communities and habitats identified in local or regional plans, policies, regulations or by federal or state agencies must be considered and evaluated under CEQA (CCR: Title 14, Div. 6, Chap. 3, Appendix G).

Although sensitive natural communities have no legal protective status under FESA and CESA, they are provided some level of protection under CEQA. The CEQA Guidelines identify potential impacts on a sensitive natural community as one of six significance criteria. As an example, a discretionary project that has a substantial adverse effect on any riparian habitat, native grassland, valley oak woodland, or other sensitive natural community would normally be considered to have a significant effect on the

¹ The CNPS Inventory contains the following listings:
 1A = Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere.
 1B = Plants Rare, Threatened, or Endangered in California and Elsewhere.
 2A = Plants Presumed Extirpated in California, But More Common Elsewhere.
 2B = Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere.
 3 = Plants About Which More Information is Needed – A Review List.
 4 = Plants of Limited Distribution – A Watch List.

environment. Further loss of a sensitive natural community could be interpreted as substantially diminishing habitat, depending on its relative abundance, quality and degree of past disturbance, and the anticipated impacts to the specific community type. Where determined to be a significant impact under CEQA, the potential impact would require mitigation through avoidance, minimization of disturbance or loss, or some type of compensatory mitigation when unavoidable.

4.3.3.3 Local Plans and Policies

As a state entity, the University of California, of which UC Santa Cruz is a part, is not subject to local ordinances for the protection of biological resources. The Campus's policies for the protection of biological resources are set forth in the 2005 LRDP, and include the following.

- Respect major landscape and vegetation features. Development will be sensitive to preservation of UC Santa Cruz's distinctive physical features, including ravines, major grasslands, chaparral, and areas of redwood and mixed evergreen forests.
- Maintain continuity of wildlife habitats. To the extent possible, development will minimize interruption of wildlife movement and fragmentation of habitats.
- Maintain natural surface drainage flows as much as possible. UC Santa Cruz will use financially viable sustainable design strategies to manage storm water, thereby preserving groundwater supplies, major springs, seep zones, year round springs, and major drainage channels, while at the same time preventing slope erosion.

4.3.4 IMPACTS AND MITIGATION MEASURES

4.3.4.1 Significance Criteria

The impacts of the proposed project on biological resources would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the State CEQA Guidelines, UC CEQA Handbook, and the 2005 LRDP EIR:

- have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by 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 federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

- 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.

4.3.4.2 CEQA Checklist Items Adequately Analyzed at the 2005 LRDP Level or Not Applicable to the Project

Although redevelopment of the FSH complex on the Heller site was evaluated in the 2005 LRDP EIR, the currently proposed Heller site housing is substantially different from the previous proposal and includes an off-site utility corridor which was not previously evaluated for biological resource impacts. The Hagar site and associated utility corridor were not envisioned for development under the 2005 LRDP. Therefore, although the analysis below uses the prior LRDP level analysis to the extent appropriate, all of the CEQA checklist items listed above under Significance Criteria are addressed in the project-level analysis below.

4.3.4.3 Methodology

Both project sites and utility corridors were surveyed to identify habitats present within the areas to be disturbed or developed. The areas were also surveyed using specific protocols to determine the presence or absence of certain special-status plant and wildlife species. The information gathered was used to quantify and evaluate likely impacts on sensitive habitats and special-status species. The significance of project impacts was identified by comparing the impacts to thresholds of significance set forth above.

4.3.4.4 2005 LRDP EIR Mitigation Measures Included in the Proposed Project

Table 4.3-3, 2005 LRDP EIR Mitigation Measures, presents the mitigation measures in the 2005 LRDP EIR that are applicable to the proposed project. Since these previously adopted mitigation measures are already being carried out as part of implementation of the 2005 LRDP, they are included in, and they are a part of the proposed project, and will not be readopted. Implementation of these mitigation measures is assumed as part of the proposed project impact analysis.

Table 4.3-3
2005 LRDP EIR Mitigation Measures

Mitigation Measure	Description
BIO-2A	<p>The Campus shall avoid removal of coastal prairie through redesign of proposed development areas and road alignments where possible. The design of all campus facilities shall include a buffer between development and prairie in order to reduce indirect impacts from edge effects such as increases in noxious weed species. The width of each buffer will depend on the site and the nature of adjacent development. The minimum buffer shall be 30 feet from the edge of paved areas or buildings to the edge of coastal prairie.</p> <p>Landscaped areas are acceptable within the habitat buffer, provided that they are planted with species that are not invasive in coastal prairie (i.e., no non-native grasses) and are not fire prone.</p>
BIO-2B	<p>The Campus shall mitigate for unavoidable losses of coastal prairie by restoring coastal prairie at a 3:1 ratio. Before impacts to coastal prairie occur, a management and monitoring plan, including quantitative success criteria, shall be prepared for the restoration site. Success criteria for the restoration shall include providing equivalent or greater overall (rather than species specific) cover of native perennial bunchgrasses (such as purple needlegrass, California oatgrass, and Pacific panic grass) and native forbs (such as white hyacinth and dwarf brodiaea) as is found in the coastal prairies that will be lost to development. Management of the site shall continue for at least 15 years to protect the coastal prairie management areas from reverting to annual grassland. If coastal prairie restoration does not meet the success criteria after 5 years, restoration shall be remedied (e.g., replanting) or restoration attempted on a new, more suitable site.</p>
BIO-6	<p>To avoid or minimize the introduction or spread of noxious weeds into uninfested areas, the Campus shall incorporate the following measures into the project plans and specifications for work at the project sites:</p> <ul style="list-style-type: none"> • Only certified, weed-free materials shall be used for erosion control. • The Campus shall identify appropriate best management practices to avoid the dispersal of noxious weeds. The Campus shall then include appropriate practices in construction standards to be implemented during construction in all north campus areas. Typical best management practices include the use of weed-free erosion control materials and revegetation of disturbed areas with seed mixes that include native species and exclude invasive non-natives. • In uninfested areas, topsoil removed during excavation shall be stockpiled and used to refill the trench on site if it is suitable as backfill. • For the proposed utility corridors at the Heller and Hagar sites, surveys shall be conducted for noxious plant species in construction and staging areas before and during construction. Photographs of the utility corridor both before and after construction shall be taken to document site conditions. • Rumble-strips shall be installed to reduce transport of noxious weed seeds within the soil on truck and equipment tires. • Noxious species shall be removed if introduced to the sites.
BIO-8	<p>The Campus 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 appropriate signage and educational literature, Campus Natural Reserve website information, or other appropriate measures.</p>
BIO-9	<p>UC Santa Cruz will implement the following measures to avoid direct impacts to the CRLF:</p> <ul style="list-style-type: none"> • Initial ground-disturbing activities in the Moore Creek watershed, including grading and vegetation removal, will not occur during the period when CRLF are most likely to be in or near aquatic environments and not dispersing. Therefore, construction in CRLF habitat shall be restricted to the period after May 1 and before October 15. • A qualified biologist shall examine the project area 24 hours before project

Mitigation Measure	Description
	<p>activities begin and during any initial vegetation, woody debris, tree removal, or other initial ground-disturbing activities. If a CRLF is observed at any time before or during project activities, all activities will cease. The Campus will coordinate with the appropriate agencies to develop avoidance measures before commencing project activities.</p> <ul style="list-style-type: none"> Initial construction activities, including vegetation removal and grading, shall not occur when it is raining.
BIO-10	<p>Prior to construction or site preparation activities, a qualified biologist shall be retained to conduct nest surveys at each site that has appropriate nesting habitat. The survey shall be required for only those projects that will be constructed during the nesting/breeding season of golden eagle, northern harrier, long-eared owl, white-tailed kite, or other special-status birds, or other birds protected by the Migratory Bird Treaty Act and/or California Fish and Game Code (typically February 1 through August 31).</p> <p>The survey area shall include all potential nesting habitat, including the California bay forest, redwood forest, isolated trees, shrubs, and grasslands that are within 200 feet of the proposed project grading boundaries. The survey shall be conducted no more than 14 days prior to commencement of construction activities.</p> <p>If active nests of golden eagle, northern harrier, long-eared owl, white-tailed kite, and other special-status birds, or other species protected under the Migratory Bird Treaty Act and the California Fish and Game Code are present in the construction zone or within 300 feet of the construction zone, a temporary fence shall be erected at a distance of 50 to 300 feet around the nest site (to be determined by the biologist according to the species and site conditions). Clearing and construction within the fenced area shall be postponed until juveniles have fledged and there is no evidence of a second nesting attempt as determined by the biologist.</p>
BIO-12A	<p>Prior to any ground disturbance of grassland habitats on the lower campus, a qualified biologist will conduct a preconstruction survey to identify western burrowing owls and/or potential habitat features (e.g., burrows) and to evaluate use by burrowing owls in accordance with current CDFW survey guidelines (CDFG 2012).¹ Surveys will be conducted within the proposed disturbance footprint and a 500-foot radius of the disturbance boundary of each proposed project. For construction activities occurring within the western burrowing owl habitat (whether during breeding or non-breeding seasons), surveys will be conducted within 30 days prior to construction. The surveys will document whether burrowing owls are nesting on or directly adjacent to disturbance areas. Survey results will be valid only for the season during which the survey is conducted. If western burrowing owls are found during the breeding or nonbreeding season, Mitigation BIO-8B will be implemented.</p>
BIO-12B	<p>If burrowing owls are found, the Campus will avoid all burrowing owl nest sites to the extent feasible. Avoidance will include establishment of a non-disturbance buffer zone of at least 250 feet around each nest site during the breeding season. If burrowing owls are found outside the breeding season (September 1–January 31), avoidance will include the establishment of at least a 160-foot non-disturbance buffer zone around each burrow being used. In both cases, highly visible temporary construction fencing will delineate the buffer zone.</p> <p>If burrowing owl nest sites cannot be avoided, burrowing owls may be excluded from burrows using one-way doors, provided that a Burrowing Owl Exclusion Plan is developed and approved by CDFW prior to implementation. This measure is described in detail below.</p> <p>In order to displace burrowing owls without destroying eggs, young, or adults, one-way doors will be installed on owl burrows before February 1 prior to disturbance, and each burrow will be monitored following CDFW's protocol (CDFG 2012). Suitable artificial burrows will be created nearby according to the conservation measures established for this species. The protocol includes monitoring the burrow for a 48-hour period after the one-way doors are installed. The doors will be checked every 24 hours following installation to determine whether they are still intact. If the one-way door is still correctly installed after a continuous 48-hour period (i.e., no animals have dug up the door and rendered it useless), then the one-way door will be removed and the burrows will be excavated using hand tools and plastic tubing to maintain an escape route for any animals still inside the burrow.</p>

Mitigation Measure	Description
BIO-13A	If tree removal or grading activity commences on a project site in the north campus during the breeding season of native bat species (April 1 through August 31), a field survey shall be conducted by a qualified biologist to determine whether active roosts of special-status bats (pallid bat, Townsend's big-eared bat, western red bat, long-eared myotis, fringed myotis, long-legged myotis, yuma myotis, or greater western mastiff bat) are present on the site or in areas containing suitable roosting habitat within 50 feet of the site. Field surveys shall be conducted in late April or early May in the season before construction begins, when bats are establishing maternity roosts but before pregnant females give birth. If no roosting bats are found, no further mitigation would be required.
BIO-13B	If roosting bats are found, disturbance of the maternity roosts shall be avoided by halting construction until either (1) the end of the breeding season or, (2) a qualified biologist removes and relocates the roosting bats in accordance with CDFW requirements.
BIO-14	A pre-construction/grading survey of all suitable San Francisco dusky-footed woodrat habitat within 100 feet of the proposed grading footprint shall be conducted by a qualified biologist to detect any woodrat nests. The survey shall be conducted no more than 14 days prior to commencement of construction activities. If active nests (stick houses) are identified within the construction zone or within 100 feet of the construction zone, a fence shall be erected around the nest site with a 100-foot minimum buffer from construction activities. At the discretion of the biologist, clearing and construction within the fenced area would be postponed or halted until juveniles have left the nest. The biologist shall serve as a construction monitor during those periods when construction activities will occur near active nest areas to ensure that no inadvertent impacts on these nests will occur. If any woodrat is observed within the grading footprint outside of the breeding period, individuals shall be trapped and relocated to a suitable location in proximity to the project site by a qualified biologist in accordance with CDFW requirements, and the nest dismantled so it cannot be reoccupied.
<p>Source: UC Santa Cruz 2006</p> <p>^a LRDP Mitigations BIO-12A and 12B have been updated with minor changes. The original mitigation measures used the acronym CDEG. That is revised here to CDFW to reflect the revised name of the California Department of Fish and Wildlife. In addition, the LRDP mitigation refers to the 1995 Burrowing Owl survey guidelines. Those have since been updated and the current guidelines are from 2012.</p>	

4.3.4.3 Project Impacts and Mitigation Measures

SHW Impact BIO-1: Development of the proposed project would result in a substantial adverse impact on two sensitive natural communities. (Potentially Significant; Less than Significant with Mitigation)

Two natural communities that are considered sensitive natural communities by CDFW occur on the project sites or within the utility corridors associated with the two project sites. Project impacts on the two communities are discussed below.

California Oat Grass Grassland/Coastal Prairie

California oat grass grassland (referred to as coastal prairie in the 2005 LRDP EIR) is a sensitive natural community that occurs in the Porter Meadow to the north of the Heller site (**Figure 4.3-1**). The proposed housing development would not impact this habitat, but the proposed utility corridor may temporarily

impact approximately 0.1 acre of California oat grass grassland. However, the project would implement LRDP Mitigation BIO-2, which requires projects to avoid and minimize impacts to this sensitive community and maintain minimum buffers to protect the resource. In the event that removal of the sensitive natural community cannot be avoided, the mitigation measure requires compensation for the acreage removed by restoring suitable habitat at a 3:1 ratio. As a result of compliance with the LRDP mitigation, the impact on this community would be less than significant. An additional mitigation measure (**SHW Mitigation BIO-1A**) is set forth below to further strengthen and clarify LRDP Mitigation BIO-2, and would be implemented to mitigate the impact.

Purple Needlegrass Grassland

Purple needlegrass grassland is a sensitive natural community that occurs in the Porter Meadow to the north of the Heller site, in the area where the Heller site utility corridor is proposed, and it occurs throughout the Hagar site both where the housing development is proposed and where utility corridor and storm drain are proposed (**Figures 4.3-1 and 4.3-2**). The proposed development at the Heller site would temporarily impact approximately 0.1 acre of purple needlegrass grassland within the proposed utility corridor, while the proposed development at the Hagar site would permanently impact approximately 15 acres of purple needlegrass grassland and temporarily impact approximately 0.4 acre within the proposed utility corridor and storm drain alignment. The impact on this sensitive natural community would be considered significant. **SHW Mitigation BIO-1B** is set forth below to mitigate this impact.

Mitigation Measures:

SHW Mitigation BIO-1A: The restoration to compensate for the loss of the California oat grass grassland shall be performed using native species from local seed sources. The management and monitoring plan shall be reviewed and approved by the Campus.

SHW Mitigation BIO-1B: The Campus shall mitigate for unavoidable losses of purple needlegrass grasslands by permanently protecting at least 15 acres of existing purple needlegrass grassland within the campus or by restoring purple needlegrass grassland at a ratio of at least 1:1.

In the event that restoration is the chosen mitigation, the Campus will identify one or more potential sites for restoration on the campus, and will prepare a management and monitoring plan, including quantitative success criteria, for the restoration site(s). The plan will specify that

restoration shall be performed with purple needlegrass from local seed sources. Success criteria for the restoration shall include providing equivalent or greater overall (rather than species specific) cover of purple needlegrass as is found in the purple needlegrass grasslands that will be lost to development. This management and monitoring plan shall be reviewed and approved by the Campus. Management of the site shall continue for at least 5 years to protect the purple needlegrass management areas from reverting to annual grassland. If purple needlegrass restoration does not meet the success criteria after 5 years, restoration shall be remedied (e.g., replanting) or restoration will be attempted on a new, more suitable site.

Significance after Mitigation: Implementation of LRDP mitigation and **SHW Mitigations BIO-1A** and **BIO-1B** would reduce the impacts on sensitive natural communities to a less than significant level.

SHW Impact BIO-2: **The proposed project may result in an adverse impact, directly and indirectly, to special-status plant species at the Hagar site. (*Potentially Significant; Less than Significant with Mitigation*)**

Focused plant surveys conducted at the Heller site and the associated utility corridor resulted in no identified special-status plants. Therefore, project development on the Heller site would not impact special-status plants.

Although focused plant surveys were conducted in 2013 where the Hagar site utility corridor is proposed, no recent or complete focused plant surveys have been conducted at the Hagar site. A habitat evaluation was conducted by LSA in late 2017 which concluded that three special-status plants, including marsh microseris, San Francisco popcorn-flower, and Santa Cruz clover, have a low potential to occur at the Hagar site due to the presence of suitable grassland habitat. As noted earlier, in March 2018, a focused plant survey was completed that covered the Hagar site and the area of its off-site improvements. No special-status plants were observed during the survey. Therefore, the likelihood of encountering special-status plants on the Hagar site is considered low. However, because some of the special-status plants bloom later in the year, their absence from the site cannot be ruled out. Therefore, development of the Hagar site with the proposed housing and childcare center and the utility corridor would have the potential to affect special-status plants, should they be present on the site. The impact is considered potentially significant. **SHW Mitigation BIO-2** is set forth below to mitigate this impact.

Mitigation Measures:**SHW Mitigation BIO-2:**

Prior to the initiation of construction, a qualified botanist will conduct a focused survey for marsh microseris, San Francisco popcorn-flower, and Santa Cruz clover at the Hagar site, including the proposed utility corridor, during the appropriate blooming period (April to June). The survey will be conducted in accordance with the CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009).

If one or more of these special-status plants are found at the Hagar site and cannot be avoided during construction, a management and monitoring plan shall be prepared and thereafter, reviewed and approved by the Campus. This management and monitoring plan shall provide the location of mitigation area(s) suitable for the plant species within the campus and shall include quantitative success criteria and monitoring and reporting requirements.

Prior to construction of the project, special-status plant seeds shall be collected and broadcast and/or the plants shall be salvaged and transplanted to the protected mitigation area(s) on the campus. Salvaged plants and seeds shall be collected by hand. If the salvaged plants and seeds cannot be replanted by November 1, they will be properly stored in a cool and dry location and replanted the following fall (September 1 to October 31). The specific monitoring and performance criteria for the mitigation for special-status plants include the following:

- Areas replanted with the salvaged plants and seeds shall be monitored for a minimum period of 5 years.
- The mitigation areas shall be surveyed annually. The number of detectable plants in leaf and/or flower is expected to vary in the mitigation area from year to year, depending on precipitation, herbivory and other ecological variables.
- Mitigation will be considered to have been a success if, for the final period of 2 years of monitoring, the number of individual

plants in the mitigation area is equal to the number of plants impacted by the project.

- If the number of plants does not reach the performance criterion, then adaptive management actions shall be developed and supplemental activities may be performed. These adaptive management actions could include additional seed collection, plant propagation, and/or direct sowing.

Significance after Mitigation: Implementation of **SHW Mitigation BIO-2** would reduce the impact on special-status plants to a less than significant level.

SHW Impact BIO-3: **The proposed project would not introduce or cause the spread of noxious weeds, which could reduce the abundance of native plants and sensitive communities. (*Less than Significant*)**

Noxious weeds are defined as plants on the California Department of Food and Agriculture's List of California Noxious Weeds; or weeds rated as high or moderate by the California Invasive Plant Council (CDFA 2017; Cal-IPC 2017). Noxious weeds occur in the Porter Meadow at the Heller site and at the Hagar site in the grasslands at both of the proposed development site and the proposed utility corridor. Noxious weeds observed at the project sites include Italian thistle, bull thistle, field bindweed, wild oats, ripgut brome, false brome, and rye grass.

Construction activities at the project sites could introduce noxious weeds or result in their spread into adjacent habitat, such as the California oats grassland and purple needlegrass grassland, which could adversely impact these sensitive natural communities. Noxious weeds could disperse within these habitats via construction equipment or personnel. However, the proposed project would implement LRDP Mitigation BIO-6, which sets forth measures that the Campus incorporates into project plans and specifications for work at each project site to avoid or minimize the introduction or spread of noxious weeds. Therefore, with the LRDP mitigation incorporated into the project, the impact of the proposed project related to noxious weeds would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact BIO-4: The proposed project would not result in a substantial adverse impact (i.e., loss or degradation of habitat) on cave invertebrates, including the Santa Cruz telemid spider, Dollof Cave spider, Empire Cave pseudoscorpion, or Mackenzie's Cave amphipod. (*Less than Significant*)

Four special-status cave invertebrate species, the Santa Cruz telemid spider, Dollof Cave spider, Empire Cave pseudoscorpion, and Mackenzie's Cave amphipod are known to occur in the Empire Cave, which is a karst formation along the Cave Gulch stream just west of Porter Meadow near the Heller site. The 2005 LRDP EIR included an evaluation of the increasing number of students living on the campus and the resulting potential increase in trespassing through the cave, which could in turn increase impacts to Empire Cave and these special-status invertebrates. The EIR set forth LRDP Mitigation BIO-8 to reduce trespass, and concluded that the impact would be reduced to a less than significant level. The proposed development at the Heller site would add more students to the western portion of the campus compared to the number of students analyzed for this portion of the campus in the 2005 LRDP EIR. Therefore, the potential for increased trespass would be greater than previously analyzed. However, LRDP Mitigation BIO-8 is adequate to address this impact. The Campus will continue to implement the LRDP mitigation measure, and the project's impact would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact BIO-5: The proposed project could result in a substantial adverse effect on important movement habitat and direct impacts to California red-legged frog. (*Potentially Significant; Less than Significant with Mitigation*)

The Hagar site is not located in an area that provides any upland or dispersal habitat for CRLF. CRLF are not known to occur in the vicinity of the Hagar site due to the lack of suitable aquatic habitat and the site's isolation from occupied suitable habitat west of the site. The Hagar site is separated from the CRLF breeding site at the Arboretum Pond, which is located approximately 0.5 mile to the west, by several barriers to dispersal, including the Ranch View Terrace development, roads, and buildings associated with the arboretum and the Center for Agroecology and Sustainable Food Systems. Jordan Gulch Creek, which is located near the proposed utility corridor for the Hagar Site is not known to support CRLF due to the lack of suitable breeding or high quality non-breeding aquatic habitat (HT Harvey 2009; EcoSystems 2000). No other suitable aquatic habitat is present near the Hagar site. The site is also outside the portion of the campus that is mapped as designated critical habitat for the species (USFWS 2010). Therefore, project development on the Hagar site would have no adverse effect on CRLF or its movement habitat.

The Heller site and utility corridor do not contain any water bodies that provide suitable breeding or non-breeding aquatic habitat for CRLF. The Heller site and utility corridor are, however, located within 0.5 mile of the Arboretum Pond, a known breeding site for CRLF. Furthermore, CRLF has been documented in the West Branch of Moore Creek just south and southeast of the Heller site on the opposite side of Heller Drive as well as in the East Branch of Moore Creek between 0.2 and 0.4 mile from the Heller site (CDFW 2017; Biosearch 2017). Based on the known occurrences of the species in the project vicinity, and the manner in which the species is known to disperse and move between drainages and breeding sites, the Heller site and utility corridor are located in an area that provides upland and dispersal habitat for CRLF. The area surrounding the Heller site has also been mapped as designated critical habitat (USFWS 2010). Therefore the development of housing at the Heller site would have the potential to affect CRLF.

Recognizing the potential for the Heller site development to affect CRLF, in 2017, the Campus prepared an updated Site Assessment in accordance with the USFWS 2005 *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog*. The purpose of this assessment was to identify those areas on and around the Heller site that would be considered upland and dispersal habitat and those areas that would not support CRLF dispersal and would not be considered critical habitat. USFWS guidance related to CRLF critical habitat notes that the critical habitat designation applies only to specific areas within the mapped units that provide those physical and biological features essential to the conservation of the species (constituent habitat elements) (USFWS 2010). This assessment evaluated the study area for constituent habitat elements and identified the existing FSH housing complex as containing substantial barriers to overland movement by the species and hence not suitable dispersal habitat. The assessment also concluded that although Heller Drive potentially results in mortality of dispersing CRLF, the roadway is not a barrier to CRLF movement and that CRLF likely disperse across and along the roadway and through Porter Meadow to the north of the FSH complex and through the playing field to the south of the FSH complex. Using this information, and to avoid any reduction in CRLF upland and dispersal habitat, the Campus selected the site of the proposed housing to be limited to the existing FSH complex and childcare facility. The Campus also communicated with the USFWS in July 2017, and discussed the results of the Site Assessment and the proposed siting of the Heller site housing with the USFWS. Based on input received from the USFWS, the Campus further refined the project design to include two enhanced dispersal areas for CRLF (**Figure 3.0-5a, Proposed Site Plan-Heller Site**). The first approximately 1.76-acre dispersal area would enhance an existing movement corridor that would extend generally in a north-south direction between Heller Drive and the east and south side of the proposed development, and the second dispersal area would consist of a barrier-free CRLF corridor that would extend east-west through the proposed housing development. The enhanced movement corridor along the west side of Heller Drive would be 40 feet wide and would be planted with small- to medium-sized native shrubs and grasses of the native coastal scrub plant community. The enhanced movement corridor

would be installed with open fencing to restrict access from people, but allow CRLF to disperse through the areas. These areas would be graded to remove all vertical obstructions greater than 1 foot high to allow for CRLF dispersal, and culverts would be installed to provide a movement corridor under the roadways. The 48-inch wide elliptical culverts (with a minimum height of 2 feet) would be partially buried to provide uninterrupted dispersal movement on a continuous ground surface. The corridor across the site would be similar to the enhanced movement corridor but would be only 15-20 feet wide and would not be fenced. The Campus submitted the proposed project site plan and habitat enhancement concept to the USFWS for comment. The Campus also identified the avoidance measures that would be implemented during project construction. The Service confirmed on March 1, 2018, that the proposed project area and the avoidance and mitigation measures identified by the Campus were consistent with its advice and that the Campus had taken measures to reduce the potential for take of CRLF.

Based on the proposed site plan for the Heller site, the proposed project would essentially be developed within the existing footprint of the FSH complex, with approximately 0.67 acre of habitat along the project's eastern edge also incorporated into the project site. This small loss of marginal dispersal upland habitat would be offset by the enhanced dispersal areas provided as part of the project.

While the proposed project design would avoid loss of CRLF upland and dispersal habitat, construction activities at the Heller site, including the proposed utility corridor, could directly impact CRLF, if present on the site during project construction. The 2005 LRDP EIR included LRDP Mitigation BIO-9, which stipulates the conditions that construction projects must comply with to avoid mortality of CRLF during project construction. While this mitigation measure would be implemented as part of the proposed project and would help reduce the impact on CRLF during construction, the impact would still be potentially significant. Additional avoidance measures, which are the same set of avoidance measures submitted to and reviewed by the USFWS, are listed in **SHW Mitigation BIO-5A** below to reduce impacts related to construction activities to a less than significant level.

Lastly, construction of the proposed utility corridor at the Heller site could temporarily impact dispersal of CRLF through Porter Meadow. The utility corridor, which would extend in a north-south direction through Porter Meadow would be approximately 9-12 feet wide and 2,300 -feet long. Construction of the utility corridor would take approximately 45 days and would involve trenching within grassland and other habitats and the installation of exclusion (silt) fencing that would temporarily disrupt the movement of CRLF through the meadow. To address this short-term potentially significant impact on CRLF movement, **SHW Mitigation BIO-5B** is set forth below, which would reduce the impact to a less than significant level.

Mitigation Measures:

SHW Mitigation BIO-5A: In addition to LRDP Mitigation BIO-9, the project shall implement the following avoidance measures.

- Prior to the commencement of construction activities, a qualified biologist shall be present a training session for all project personnel to provide an overview on the CRLF, applicable regulatory policies and provisions regarding their protection, and the avoidance and minimization measures to be followed to protect the species. All crew members shall be briefed on the reporting process in the event that an inadvertent injury should occur to a special-status species during construction. This training shall be incorporated into the daily job orientation and safety training provided to new craft coming onsite.
- The biologist may train one or more members of the contractor staff to serve as biological monitor with responsibility for daily inspection of the construction fencing as described below.
- The contractor, in coordination with the biologist, shall install exclusionary fencing around the entire project work site. The fencing shall be heavy-duty silt-fence or similar material (not open-meshed). It shall be buried a minimum of 6 inches so that CRLF cannot crawl under the fence and shall be inspected and maintained throughout the construction period, as specified below.
- Installation of the fencing shall be monitored by the biologist. Cover boards shall be placed at approximately 100-foot intervals outside the fence to provide cover for wildlife that encounters the fence. Cover boards shall be monitored weekly by the biological monitor to ensure that they remain in place and are functional.
- A qualified wildlife biologist shall monitor all construction activities within CRLF upland or dispersal habitat daily during initial ground-disturbing activities, including grading, excavation, and vegetation removal.

- The biologist shall perform spot checks of the site once a week.
- If a CRLF is observed at any time during project activities, all work that may result in disturbance, injury, or mortality to the individual shall cease. The contractor shall notify the biologist, who shall in turn contact the Campus and USFWS.
- Prior to the start of daily construction activities, the biologist or a biological monitor trained by the biologist shall inspect the perimeter fence to ensure that it is not ripped or has holes and that the base is still buried. The fence shall also be inspected to ensure that no CRLF are trapped in the fence. Any CRLF found along and outside the fence shall be closely monitored until the CRLF moves away from the construction area.

SHW Mitigation BIO-5B: Temporary exclusion fencing shall be placed around the perimeter of the trenched utility corridor. If possible, all trenched areas shall be completed and backfilled by the end of the work day. Any open trenches that cannot be backfilled shall be covered by the end of the work day. If installation of the utility lines cannot be completed within one day, the utility lines shall be trenched in sections no longer than 300 feet in length to allow CRLF movement around the exclusion fences. Trenching shall not occur in amounts greater than what can be completed during the following work day.

Significance after Mitigation: Implementation of LRDP Mitigation BIO-9 which is included in the proposed project, and **SHW Mitigations BIO-5A and 5B** would reduce the impacts to CRLF to a less than significant level.

SHW Impact BIO-6: The proposed project could result in direct impacts to California giant salamanders. (*Potentially Significant; Less than Significant with Mitigation*)

No suitable habitat for California giant salamanders is present within or adjacent to the Hagar site. Construction of the project within the proposed utility corridor associated with the Heller site could directly impact California giant salamanders, particularly within the forest habitats, if present during construction activities. The impact would be potentially significant.

Mitigation Measures:

SHW Mitigation BIO-6: Implement SHW Mitigations BIO-5A and 5B.

Significance after Mitigation: Most of the measures listed in SHW Mitigation BIO-5A and -5B would also apply to California giant salamanders, other amphibians, reptiles, and small mammals and implementation of these measures, such as construction monitoring, and environmental awareness training would reduce the potential for direct impacts to California giant salamanders and other small animals. Implementation of SHW Mitigation BIO-5A and -5B would reduce the impacts to California giant salamanders to a less than significant level.

SHW Impact BIO-7: The proposed project would not result in the loss or abandonment of active nests for special-status raptors and other special-status and protected birds. (*Less than Significant*)

Tree removal and construction activities on the Heller and Hagar sites, if conducted during the nesting season, could result in the loss of active bird nests. Construction activities at both sites, including construction-related noise, could result in the loss or abandonment of active nests of special-status bird species, such as the golden eagle, northern harrier, long-eared owl, white-tailed kite, and other protected bird species, that may be present within and/or near the project sites and the utility corridors. However, the proposed project would implement LRDP Mitigation BIO-11, which sets forth measures that the Campus requires all projects to implement during construction to avoid impacts to nesting birds, including preconstruction surveys of all potential nesting habitats at and within 200 feet of the project work areas, and establishment of appropriately sized buffer zones in the event that active nests are observed in the survey area. Therefore, with the LRDP mitigation incorporated into the project, the impact of the proposed project on nesting birds would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact BIO-8: The proposed project would not result in a substantial adverse impact on western burrowing owl. (*Less than Significant*)

Western burrowing owls are known to overwinter at UC Santa Cruz within the East Meadow and grasslands in the southwestern corner of the campus (CDFW 2017). Burrowing owls historically nested within the campus grassland habitat with several breeding pairs observed nesting during the 1970s, but

nesting was last confirmed in the grasslands south of the East Remote parking lot in the early 1980s (UCSC 2006). Currently, burrowing owls are known to overwinter within the upper East Meadow south of the east remote parking lot (CDFW 2017). The proposed Hagar site development would be located in the southern portion of the East Meadow. The site was surveyed by LSA for burrowing owls in December 2017. Although no ground squirrel burrows or other potential burrow sites were observed within the area proposed for development on the Hagar site during the survey, potential burrow sites were observed at the sinkhole/detention basin immediately adjacent to the site and within the proposed utility corridor west of the site (**Figure 4.3-2**). Burrowing owls could also occur within the Porter Meadow adjacent to the Heller site. The proposed project would have the potential to impact western burrowing owls if the species were present on or adjacent to the sites during construction activities. However, LRDP EIR Mitigations BIO-12A and BIO-12B are applicable to the proposed project and would be implemented as part of the proposed project. These measures require that preconstruction surveys be conducted to confirm the absence of the species from the project sites and vicinity prior to commencement of construction. In the event that burrowing owls are found, all active burrow sites will be avoided to the extent feasible and non-disturbance buffers will be established. Therefore, with the LRDP mitigation incorporated into the project, the project's impact on burrowing owls would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact BIO-9: **The proposed project would not result in a substantial adverse impact associated with the disturbance of roosting sites for special-status bats. (*Less than Significant*)**

Eight special-status bat species have the potential to forage over or roost near the sites: pallid bat, Townsend's big-eared bat, western red bat, long-eared myotis, fringed myotis, long-legged myotis, yuma myotis, and greater western mastiff bat. However, habitat in the vicinity of the Hagar site is not highly suitable for these bat species and given the distance to the nearest trees that might contain roosts, noise from construction activities at the Hagar site is not expected to result in abandonment of roosts. With regard to the Heller site, although bats can roost in buildings, the buildings on the Heller site are occupied and well maintained and are unlikely to contain roosting bats. However, high quality roosting habitat is located within the forest habitat adjacent to the Heller site. Should special-status bat species establish a maternity or other roost near the Heller site, noise generated by construction could cause abandonment of roosts. The 2005 LRDP EIR set forth Mitigations BIO-13A and BIO-13B to avoid and minimize impacts on special-status bat species. Both measures are applicable to the proposed project and would be implemented as part of the proposed project. These measures require that preconstruction

surveys be conducted to confirm the absence of active bat roosts from the project site and vicinity prior to commencement of construction. In the event that special-status bat roosts are observed, all roost sites will be avoided to the extent feasible and non-disturbance buffers will be established. Therefore, with the LRDP mitigation incorporated into the project, the project's impact on special-status bats would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact BIO-10: The proposed project would not result in a substantial adverse impact associated with the loss of potential San Francisco dusky-footed woodrat nests. (*Less than Significant*)

Suitable habitat for San Francisco dusky-footed woodrat occurs in the California bay forest, redwood forest, and coyote brush scrub habitats within or adjacent to the Heller site and associated utility corridor. Inhabited woodrat nests have been observed in the north campus area (Bankie 2005 as cited in UCSC 2006) and in the Campus Natural Reserve (Jones & Stokes 2004 as cited in UCSC 2006). Construction activities immediately adjacent to the forest habitats and within the proposed utility corridor at the Heller site could impact woodrat nests, if present. The 2005 LRDP EIR set forth Mitigation BIO-14 to avoid and minimize impacts on this species. The measure is applicable to the proposed project and would be implemented as part of the proposed project. It requires that preconstruction surveys be conducted to confirm the absence of the species from the project work areas prior to commencement of construction. In the event that active woodrat nests are observed, a 100-foot buffer shall be erected around the nest to avoid disturbance. Therefore, with the LRDP mitigation incorporated into the project, the project's impact on the San Francisco dusky-footed woodrat would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact BIO-11: The proposed project could interfere with the movement of wildlife species or with established native resident or migratory wildlife corridors. (*Potentially Significant; Less than Significant with Mitigation*)

The 2005 LRDP EIR identified Moore Creek and Jordan Gulch as wildlife movement routes between the lower campus and the north campus (UCSC 2006). These corridors help provide connectivity for larger animals, such as raccoon, bobcat, gray fox, mountain lion, and black-tailed deer, to travel between the Great Meadow and adjacent open space areas of the upper campus, Wilder Ranch State Park, Pogonip

City Park, and Henry Cowell Redwoods State Park. The proposed project would not affect these movement routes.

Wildlife movement corridors in the vicinity of the Heller site include the East Branch of Moore Creek to the east and Cave Gulch and Wilder Creek to the west. The intervening area between these drainages is developed with Rachel Carson and Porter Colleges as well as FSH complex, which reduce the ability of wildlife to pass through this area. East-west movement between these drainages is available via Porter Meadow, although Heller Drive, retaining walls and other development do reduce movement through the area.

Placement of the proposed housing on the developed FSH complex site would avoid any reduction in the area available to wildlife for movement via Porter Meadow. Furthermore, the proposed development at the Heller site has been designed to enhance wildlife corridors (**Figure 3.0-5a**). Construction of the proposed utility corridor at the Heller site, however, could temporarily impact movement of smaller animal species, such as CRLF (See **SHW Impact BIO-5**). However, implementation of **SHW Mitigation BIO-5** would reduce this impact to a less than significant level.

Development of the grasslands within the Hagar site would not significantly impact wildlife movement, since the large animal species could continue to move through a larger portion of the East Meadow north of the site, which would not be impacted. Additionally, other wildlife that currently move through the Hagar site are generally species that are adapted to the campus environment and would likely continue to move through or around the site after project construction is completed. The development is proposed at the lower end of the East Meadow near Hagar and Glenn Coolidge Drives and although the acreage of the meadow would decrease by approximately 15 acres, the proposed development would not fragment any grassland habitat within the East Meadow. The impact on wildlife movement at the Hagar site would be less than significant.

Mitigation Measures:

SHW Mitigation BIO-11: Implement **SHW Mitigation BIO-5**.

Significance after Mitigation: Less than significant

SHW Impact BIO-12: Outdoor lighting associated with the proposed project could impact wildlife behavior adjacent to the project sites. (*Potentially Significant; Less than Significant with Mitigation*)

Outdoor lighting could impact the behavior of wildlife species, such as CRLF and other nocturnal species. Artificial lighting could impact these species by altering their reproductive behavior, such as disrupting their territorial or courtship vocalizations. Wildlife that are active at night may avoid areas that are exposed to lighting, since many of these species use the darkness as cover to protect them from predation by other animals. Glare from the outdoor lighting has the potential to also impact Wilder Creek and the forest habitat surrounding the creek channel, which support habitat for CRLF, California giant salamanders and other amphibians, which are often more active at night. The impact would be potentially significant.

Mitigation Measures:

SHW Mitigation BIO-12: New outdoor lighting shall be directed away from the habitat surrounding the sites and away from the proposed enhanced wildlife movement corridors at the Heller site. If necessary, dimmer lights, the use of motion sensors, and late night off-periods shall be used to minimize lighting impacts to the adjacent habitat.

Significance after Mitigation: Implementation of **SHW Mitigation BIO-12** would reduce the impact to a less than significant level.

SHW Impact BIO-13: The proposed project would not conflict with a local policy for protecting biological resources. (*Less than Significant*)

LRDP policies for the protection of biological resources state that development will be sensitive to preservation of UC Santa Cruz's distinctive physical features, including ravines, major grasslands, chaparral, and areas of redwood and mixed evergreen forests, and that to the extent possible, development will minimize interruption of wildlife movement and fragmentation of habitats. The LRDP also notes that UC Santa Cruz will use financially viable sustainable design strategies to manage storm water, thereby preserving groundwater supplies, major springs, seep zones, year round springs, and major drainage channels, while at the same time preventing slope erosion.

As discussed under **SHW Impact BIO-5**, at the Heller site which is within an area that provides upland and dispersal habitat for CRLF, and is adjacent to forested lands that provide habitat for other species, the

project has been designed to remain within the previously developed area and avoid and minimize impacts to biological resources. Furthermore, the project has been designed to avoid reduction in wildlife movement habitat and to enhance movement through the area. The Heller site development has been designed to include sustainable design strategies for storm water management consistent with NPDES requirements. With regard to the Hagar site development, the proposed development is clustered at the southeastern end of the East Meadow near the two existing roads and other nearby development. This manner of siting and development minimizes the amount of grassland habitat that would be removed and fragmentation or substantial loss of movement habitat. As the preceding analysis shows, with implementation of the LRDP and proposed project-specific mitigation measures, impacts to biological resources would be less than significant. Therefore, the project will not conflict with the 2005 LRDP policies for the protection of biological resources on the campus, and the impact would be less than significant. The City of Santa Cruz and Santa Cruz County general plans and ordinances, including any tree protection ordinances, do not apply to the Campus.

Mitigation Measures: No mitigation is required.

SHW Impact BIO-14: The proposed project would not conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan. (*Less than Significant*)

The proposed project would not conflict with an adopted habitat conservation plan (HCP), natural community conservation plan, or other approved local, regional, or state habitat conservation plan. The Ranch View Terrace HCP addresses impacts of that project on CRLF and Ohlone tiger beetle. The proposed project is consistent with the Campus's commitments under the Ranch View Terrace HCP, and therefore, no impact would occur.

Mitigation Measures: No mitigation is required.

4.3.5 PORTER AND RACHEL CARSON DINING FACILITIES PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

Vegetation communities and land cover types at the sites of the related Porter and Rachel Carson dining facilities expansion project consists of wild oats grasslands and developed/landscaped areas (**Figures 3.0-8 and 3.0-9**). The wild oats grassland is a plant community that supports primarily annual non-native grass species. The proposed elevated seating and dining area associated with the Porter Dining Hall would be constructed over approximately 0.12 acre of wild oats grassland.

The area of the proposed Rachel Carson dining hall expansion is developed and/or landscaped, and does not provide habitat for special-status plant species. The grassland area where the Porter dining hall expansion is proposed was surveyed for plant species in 2016 (BRG 2016). No special-status plant species were observed in the area during the focused surveys.

The project sites are mapped within the USFWS-designated critical habitat for CRLF (USFWS 2010). The area of Rachel Carson dining hall expansion is developed and/or landscaped, with retaining walls that form barriers to CRLF movement, and therefore does not qualify as designated habitat or suitable dispersal habitat. The grassland habitat south of the Porter dining hall provides suitable dispersal habitat for CRLF that may disperse between Wilder Creek and Moore Creek (**Figure 4.3-3**). Other wildlife, such as black-tailed deer may also forage and move through this grassland habitat. No other special-status wildlife species are likely to occur within these grasslands since they are situated closed to the existing development at Porter College, are frequently mowed, and thus provide limited cover for wildlife, but birds protected by the Migratory Bird Treaty Act and/or California Fish and Game Code could nest in the area.

Impacts and Mitigation Measures

DF Impact BIO-1: The proposed dining facilities expansion project would not result in potential significant impacts to nesting birds. (*Less than Significant*)

Construction of the proposed Porter and Rachel Carson dining facilities could result in adverse impacts on nesting birds, if active bird nests are present on or near the sites at the time of construction. Construction activities could directly impact active bird nests or result in nest abandonment, which would be a violation of the Migratory Bird Treaty Act and/or California Fish and Game Code. However, the proposed dining facilities expansion project would implement LRDP Mitigation BIO-11, which sets forth measures that the Campus implements to avoid impacts to nesting birds, including preconstruction surveys of all potential nesting habitats at and within 200 feet of the project work areas, and

establishment of appropriately sized buffer zones in the event that active nests are observed in the survey area. Therefore, with the LRDP mitigation incorporated into the project, the impact of the project on nesting birds would be less than significant.

Mitigation Measures: No mitigation is required.

DF Impact BIO-2: The proposed dining facilities expansion project would result in potential significant impacts to California red-legged frog. (*Potentially Significant; Less than Significant with Mitigation*)

Design of the Porter dining hall expansion would either consist of the addition of a second story to the existing building or if it is a building extension, the extension would be constructed on piers to allow CRLF to continue to move through and use the site, which will avoid the removal of any suitable upland or dispersal habitat for CRLF.

While the proposed project design would avoid loss of CRLF upland habitat, construction activities at the Porter Dining site could directly impact CRLF, if present on the site during project construction. The 2005 LRDP EIR included LRDP Mitigation BIO-9, which stipulates the conditions that construction projects must comply with to avoid mortality of CRLF during project construction. While this mitigation measure would be implemented as part of the proposed project and would help reduce the impact on CRLF during construction, the impact would still be potentially significant. Additional avoidance measures are identified in **DF Mitigation BIO-2**, which is the same set of avoidance measures submitted to and reviewed by the USFWS for **SHW Mitigation BIO-5A**, would reduce impacts related to construction activities to a less than significant level.

Mitigation Measures:

DF Mitigation BIO-2: Implement **SHW Mitigation BIO-5**.

Significance after Mitigation: Implementation of **SHW Mitigation BIO-5** would reduce the impact to a less than significant level.

DF Impact BIO-3: Implementation of the proposed dining facilities expansion project would not interfere with wildlife movement. (*Less than Significant*)

Expansion of the dining facilities at Rachel Carson College would not interfere with wildlife movement as the improvements would be located within a developed area that does not currently provide high quality wildlife movement. The proposed Porter dining hall expansion could, however, impact existing wildlife movement in the vicinity but the impact would not be significant for reasons presented below. During construction, wildlife may alter their movements to surrounding grassland areas, however that impact

would be temporary and of a short duration. Regarding long-term impacts on wildlife movement, although the expansion area is situated within undeveloped wild oats grassland, this grassland is mowed and is situated immediately adjacent to the existing dining hall facility where wildlife movement is less frequent due to the lack of higher quality grasslands with cover and proximity to human activity and not likely to be used for movement by special-status species, such as CRLF. Because the proposed seating and dining area would be elevated, CRLF and other animals, such as lizards and small mammals would be able to continue to move through the site. Furthermore, a relatively large area of grassland within the existing wildlife movement corridor, which provides a greater amount of wildlife movement, would remain intact. For these reasons, the impact of the expansion project on wildlife movement would be less than significant.

Mitigation Measures: No mitigation is required.

DF Impact BIO-4: Implementation of the proposed dining facilities expansion project would not result in any significant conflicts with local plans and policies. (*Less than Significant*)

The City and County plans and ordinances are not applicable to the dining facilities expansion project. The project has been designed to reduce impacts to biological resources and with implementation of the LRDP mitigation measures and other mitigation measures, impacts to biological resources would be less than significant.

Mitigation Measures: No mitigation is required.

4.3.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

SHW Impact C-BIO-1: The proposed project, in conjunction with other past, present and reasonably foreseeable future development, would not result in significant cumulative impacts on biological resources. (*Less than Significant*)

The cumulative impacts of campus development under the 2005 LRDP along with other development in the City of Santa Cruz, on biological resources are analyzed in the 2005 LRDP EIR under LRDP Impacts BIO-17, BIO-18, and BIO-19, and were determined to be less than significant because campus projects would be required to implement appropriate LRDP mitigation measures to avoid or minimize impacts to significant resources. As stated in the impact analysis above, as an element of the planned development under the 2005 LRDP, the proposed project would implement applicable mitigation measures from the 2005 LRDP EIR as well as additional project-specific mitigation measures as necessary, and therefore would not result in new or greater impacts than previously analyzed in the 2005 LRDP EIR. The

cumulative impacts of the proposed project are adequately addressed by the analysis in the 2005 LRDP EIR, and would be less than significant.

Mitigation Measures: No mitigation is required.

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4.4 CULTURAL RESOURCES

4.4.1 INTRODUCTION

This section of the Draft Environmental Impact Report (Draft EIR) evaluates the potential impacts to cultural resources (historical, archaeological, and paleontological) from the implementation of the proposed UC Santa Cruz Student Housing West project (“SHW project” or “proposed project”).

The section also presents potential impacts related to cultural resources from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and the existing colleges (see **Section 4.4.8** below).

Cultural resources include historic and prehistoric archaeological sites and features, historic structures and buildings, historic districts, and other prehistoric and historic objects and artifacts. Paleontological resources include (vertebrate, invertebrate, and plant fossils, and fossil localities). California Environmental Quality Act (CEQA) Guidelines also include “unique geologic resources” under the category of cultural resources. Under the category of cultural resources, CEQA also considers impacts to human remains, including Native American burials found in the context of an archaeological site.

The analysis is tiered from the 2005 LRDP EIR and therefore a brief description of the prehistoric and historic context, derived largely from the 2005 LRDP EIR, is provided in this section. The section focuses on presenting information derived from project site surveys, archaeological literature, and archival searches prepared for the proposed project by Condor Country Consulting, Inc.

4.4.2 ENVIRONMENTAL SETTING

The UC Santa Cruz main campus lies in the hills above the city of Santa Cruz, and it is located at the northern end of Monterey Bay. The campus is located northwest of the historic center of the city of Santa Cruz.

The campus crosses three major ecological zones ranging upslope from south to north. The southern one-third of the campus (lower campus) consists of open grasslands covering rolling hills that slope southward toward Monterey Bay. To the north of the grasslands, the central one-third of the campus (central campus) includes redwood- and oak-forested slopes and grassy meadows, dissected by stream gullies. The upper one-third of the campus (north and upper campus) consists of a mix of meadows, redwood/oak, and madrone forest areas, and includes a cluster of springs (Edwards et al. 1978). Two roughly north-south oriented drainage systems divide the campus, the Moore Creek drainage on the west

side and the Jordan Gulch drainage system on the eastern side of the campus. Cave Gulch runs along the western margin of the campus in some areas. Several smaller gullies run roughly eastward from the eastern margins of the campus into Pogonip City Park.

Substantial land-altering activity and development occurred on the campus and surrounding area during the latter half of the 19th century and early decades of the 20th century, including redwood logging, limestone quarries and kilns, and development related to cattle ranching. Since the mid-1960s, modern campus development has substantially altered about 600 acres of the campus.

The proposed project study area is located in unsectioned land of the Cañada del Rincon en El Rio San Lorenzo de Santa Cruz Rancho and in Section 11 of the Santa Cruz 7.5-minute USGS topographic map. The study area comprises approximately 27 acres divided between two sites within the campus. The first site is located in the western portion of the campus, west of Heller Drive (“Heller site”) and the second site is located in the southeastern portion of the campus near the intersection of Glenn Coolidge and Hagar Drives (“Hagar site”). Adjacent to each site is a utility corridor.

Construction at the 13-acre Heller site will occur within the current footprint of the Family Student Housing (FSH) complex, which lies between Empire Grade Road and Heller Drive. The FSH complex is comprised of apartment buildings, a childcare facility, and parking, as well as roads and pedestrian pathways. The proposed project includes the demolition of the existing FSH complex and the construction of new housing, parking, utilities, and support spaces. Heller Drive is the main north-south roadway in this portion of the campus and it serves as the west entrance to the campus from Empire Grade Road. The environment in this portion of the campus is composed of developed areas as well as undeveloped land consisting of mixed evergreen forest, coastal live oaks, coyote bush scrub, and open grassland. The landscape surrounding the Heller site includes: (1) colleges, student housing, parking lot, and recreational fields and facilities to the east; (2) an informal recreational field, pond, and the intersection of Heller Drive and Empire Grade Road to the south; (3) an undeveloped woodland of mostly mixed evergreen and oak forest with rolling open grassland to the west, which descends west to Empire Grade Road; and (4) Porter Meadow, an expansive meadow on rolling topography to the north.

The approximately 15-acre Hagar site lies on a hillside with gently rolling topography that slopes south toward Glenn Coolidge Drive. The site lies on an undeveloped portion of the campus locally known as the East Meadow. Dense annual grasses cover this area. A sinkhole is present in the southeastern corner of the site. The East Meadow continues to the north of the site, and the undeveloped meadow continues to the west beyond Hagar Drive. The Cowell Lime Works Historic District and the Center for Agroecology and Sustainable Farm Systems (CASFS) farm lie further to the west. To the east lies Glenn Coolidge Drive and undeveloped grasslands that extend onto the adjacent Pogonip, a City of Santa Cruz

open space; and to the south lies UC Santa Cruz employee housing. A proposed underground utility corridor extends southwest of the intersection of Glenn Coolidge and Hagar Drives entering the eastern boundary of the Cowell Lime Works Historic District but lies at least 100 feet east of any historic structures.

4.4.3 PREHISTORIC AND HISTORICAL RESOURCES

4.4.3.1 Prehistoric Overview

Archaeological sites on the Central Coast of California have been documented by several researchers, including Breschini and Haversat (1980, 1989), Cartier (1993a,b), Dietz et al. (1988), Dietz and Jackson (1981), and Hylkema (1991). Since the 1990s, surface data, including 1,200 radiocarbon dates from nearly 300 Central Coast sites has led to the identification of emerging patterns that have contributed to the development of cultural and regional chronologies for the Central Coast (Breschini and Haversat 2005). In the Santa Cruz area, Hylkema (1991, 2002) for the coast, and Hildebrandt and Mikkelsen (1993a, b) for the interior, provide syntheses of archaeological research in the region.

While few sites have been identified from the Paleoindian through the Early Archaic (8000 to 3500 B.C.) in the Santa Cruz area, numerous sites have been dated to the Middle Archaic (3500 B.C. to A.D. 1250) and Late Archaic (A.D. 1250 – A.D. 1769) (Jones 1991; Moratto 1984). At least one site near Santa Cruz is believed to be from the Late Prehistoric Period (A.D. 1000 to about A.D. 1600) (Fitzgerald and Ruby 1997; Hylkema 1991). The earliest confirmed evidence of prehistoric occupation in the Santa Cruz region comes from an archaeological site located 4 miles northeast of the campus near Scotts Valley, CA-SCR-177, where radiocarbon dates from charcoal clearly associated with a feature suggest that occupation might have begun approximately $6,970 \pm 150$ to $7,050 \pm 110$ years Before Present (B.P.), and possibly earlier (Cartier 1989, 1993a; Fitzgerald and Jones 1999).

Archaeological testing across the UC Santa Cruz campus has resulted in the discovery of two human burials and nearly 1,300 artifacts from 23 sites and several isolated features and artifacts (UC Santa Cruz 2005). Artifact types and radiocarbon dates suggest occupation of campus land from as early as 3550 B.C. to A.D. 1750 (UC Santa Cruz 2005).

Archaeological evidence indicates that native groups of the region participated in extensive trade networks. They successfully pursued a wide range of subsistence practices including hunting large and small terrestrial and marine animals; fishing and shell fishing; and gathering and processing plant foods. As throughout much of central California, acorns were an important plant food staple. They developed a technological expertise in bow making (after about A.D. 500), basketry, and the creation and use of boats (Jones and Klar 2007; Jones et al. 2007). In addition to the well-known plant and animal foods, important

resources available locally included Monterey banded chert, which Native Americans used for the manufacture of chipped stone tools such as arrowheads, scrapers, and awls. The Monterey Bay was also an exceptional source of abalone (*Haliotis* sp.) and olive snail (*Olivella*) shells, raw material for the manufacture of shell ornaments and beads that Native Americans traded throughout California and much of the West, and which were important wealth items often placed in graves (Jones et al. 2007).

The Protohistoric Period (1602 to 1797 A.D.) – the time during which native cultures began to experience nonnative influences – is demarcated by the first contact with Europeans. Sebastián Vizcaíno, a Spanish explorer, landed in the area of Monterey in 1602, and missions were established in the Santa Cruz region beginning in 1770. The Spanish referred to the indigenous population in this region as Costano or "coast people;" historically they have become known as Costanoan. The Costanoans were composed of eight ethnically and linguistically linked groups (Shipley 1978:84 and Levy 1978:485). Costanoans were historically recognized as having been part of the Utian linguistic family along with their neighbors to the north, the Miwoks (Shipley 1978:84). Levy (1978:485) suggests that in 1770, just before missionization, the Costanoan group was composed of approximately 50 politically autonomous nations and tribelets. A group known as the Awaswas occupied the Santa Cruz area at this time.

Mission life, nonnative diseases and cultural disruption took a severe toll on the Costanoan population. One effect was that groups of mixed ethnicity 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. However, many descendants of the San Francisco Bay and Monterey Bay region formerly referred to as Costanoan now identify themselves as Ohlone. Several of these tribal groups are seeking federal recognition.

4.4.3.3 Historic Overview

The Protohistoric Period (A.D. 1600 to A.D. 1800) in California – the time during which Native American cultures began to experience non-native influences is demarcated by the first contact with Europeans. Sebastián Vizcaíno, a Spanish explorer, landed in the area of Monterey in 1602 (Chapman 1920; Heizer 1947; Wagner 1929). In 1769, the expedition led by Captain Gaspar de Portolá was the first nonnative exploration party to visit the area between the San Lorenzo River and Wilder Creek (Rice et al. 2012). The first mission, Carlos Borromeo de Carmelo, was established in Carmel in 1770 (Rice et al. 2012). The Spanish established a mission in Santa Cruz near the San Lorenzo River in 1791 as part of Spanish colonization efforts in Alta California.

The Spanish likely used campus lands for grazing and/or agricultural fields during the Mission period (Edwards and Kimbro 1986; Hoover et al. 1966; ARG 2006). It is possible that lime for plaster and whitewash was produced locally during the Mission period, as well as high quality limestone and wood for firing the kilns (Piwarzyk 1994; ARG 2006), but this has not been documented.

After Mexico won its independence from Spain in 1821, the Mexican government began systemized secularization of church lands (Haas 1995). Starting in 1834, the mission properties were distributed among Spanish/Mexican immigrants and, rarely, Native American citizens (Haas 1995). The lands that were to become the UC Santa Cruz campus consisted of portions of three Mexican-era land grants, Rancho de la Cañada del Rincon en el Rio San Lorenzo de Santa Cruz, Rancho Zayante, and Rancho Rufugio (State Lands Commission 1982).

In 1848, Mexico lost the Mexican-American War (1846-48) to the United States, and California became a state shortly thereafter (Bauer 1992). When gold was discovered at Sutter's Mill near Sacramento in 1848, thousands of gold-seekers from all over the world began a rush to California (Holliday 1981). This major influx of population resulted in a rapid increase in demand for goods and services, including house-building supplies. At this time, quicklime, a principal ingredient in mortar, plaster, and stucco, shipped from the east around Cape Horn, was very expensive (Wheeler 1998). 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, and constructed three lime kilns for the production of quicklime (ARG 2006). The site provided all the necessary resources, including high-quality limestone, abundant redwood to fuel the kilns, and access to a port for shipping. Davis and Jordan produced 21,000 barrels of lime in 1855, one third of Santa Cruz County's production in that year (ARG 2006).

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 campus's main 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 (Eselius 2003; ARG 2006). The business included quarrying and lumbering operations, a wooden tramway for hauling limestone and lumber, and 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, worker's houses, a carriage house, and other facilities had also been established on the campus site, along with buildings to support agricultural operations to feed and power the lime industry.

In 1888, when Davis died, Henry Cowell took control of the entire lime company operation and land holdings, renaming it Henry Cowell Company (later, the Henry Cowell Lime and Cement Company). When Henry Cowell died in 1903, his son, Ernest Cowell, took over management of the family business. Because much of the easily accessible redwood had been logged, and in response to improved quicklime production technology, Ernest introduced a new oil-burning lime kiln, which was constructed adjacent to the other kilns near the future campus entrance. However, the demand for quicklime had already begun to decline. The Santa Cruz Portland Cement Company, which opened in Davenport in 1905, began producing cement with superior building qualities. In 1906, the devastating San Francisco earthquake demonstrated that brick and mortar were poor building materials for this region. The Cowell Ranch quicklime operations began a major decline, and the lime kiln complex near the campus entrance was closed during the early decades of the 20th century, although the Upper Quarry and other kilns on the campus site continued in operation until 1946. During the first decades of the 20th century, the agricultural operations on the lower ranch became more important, although quarrying continued sporadically for several decades (ARG 2006).

In 1951, plans were begun for the construction of a new campus within the University of California system, to be located within the south-central coastal region south of San Francisco. By 1961, The Board of Regents of the University of California system had chosen Santa Cruz as the location of the new campus. Architect John Carl Warnecke and landscape architect Thomas Church planned the campus on the Oxford and Cambridge University model of small, independent liberal arts colleges (Fischer 1968; Garret 1967). They conceived the campus as a group of “scholarly villages,” with each village representing a different academic discipline. They designed the colleges to be semi-autonomous in function and distinct in architectural and academic style. They designed each college and its associated libraries, walkways and dormitories to appear and function as integral parts of the immediate natural landscape (Carter 1971). This design concept has been carried out in the plan and architecture of the colleges built to date.

4.4.3.4 Record Search and Literature Review

On December 11, 2017, Condor Country Consulting, Inc. archaeologist conducted a records search (#17-1613) at the Northwest Information Center (NWIC) of the California Historical Resources Information System (CHRIS) for the UC Santa Cruz Student Housing West project. Condor Country Consulting, Inc. staff also reviewed technical reports, site records, and maps provided by UC Santa Cruz.

The literature search indicated that 16 prior cultural resource surveys and/or studies occurred within a 0.5-mile radius of the Heller site and seven included at least a portion of the Heller site (Table 1 in **Appendix 4.4**). The search indicated that 63 prior archaeological resources surveys and/or studies occurred within a 0.5-mile radius of the Hagar site. Nine prior surveys or studies included at least a

portion of the Hagar site (Table 2 in **Appendix 4.4**). The last intensive survey that covered the entire Hagar site occurred in 1977 (Edwards et al. 1977).

The literature review indicated that there are no recorded archaeological sites or historic resources in the Heller site or within the utility corridor associated with the Heller site. There are three previously recorded archaeological sites within 0.5-mile of the Heller site (**Table 4.4-1**). They include prehistoric archaeological sites CA-SCR-142, CA-SCR-143, and historic-era site CA-SCR-359H (Edwards and Simpson-Smith 1990; Elliott 2005; Reese 2005a-d; Stafford and Stafford 1976a,b). Prehistoric archaeological site (CA-SCR-142) is the closest of these three sites, and it is mapped approximately 400 feet south of the Heller site (Edwards and Simpson-Smith 1990a, b; Reese 2005a-c; Stafford and Stafford 1976).

Within the Hagar site, there is one previously mapped archaeological site and one feature. There is one historic district mapped in its associated utility corridor (**Table 4.4-2**). These cultural resources include historic site CA-SCR-277H, historic isolate P-UCSC-012H, and the Cowell Lime Works Historic District (CA-SCR-198H) (ARG 2005a; ARG and Pacific Legacy, Inc. 2005b; Calciano and Collet 1973a; Edwards and Simpson-Smith 1986; Maley 2007; Podzorski and Toenjes 1978; Reese 2005b, 2009a, b; UCSC 2007). The Cowell Lime Works Historic District (CA-SCR-198H) is an historic resource listed on the National Register of Historic Places (NRHP) (NPS 2007; UCSC 2007), and as such, it is automatically listed in the California Register of Historic Resources (CRHR). Historic site CA-SCR-277H is recorded as the location of a destroyed Mission-period agricultural site (Edwards and Simpson-Smith 1986; Edwards and Kimbro 1986). Distinctive plow marks were visible in aerial photographs in 1931 but recorders in 1986 observed no artifacts or non-artifactual constituents on the ground (Calciano and Collet 1973b; Edwards and Simpson-Smith 1986; Edwards et al 1978; Kimbro, n.d; Kimbro 1978). Historic isolate P-UCSC-012H is located on the Hagar site; but as an isolate, it is not eligible for the NRHP. The nearest prehistoric site, CA-SCR-094 is mapped on the opposite side of Glenn Coolidge Drive and it extends south and southwest of the Hagar site (Edwards 1986; Lönnberg 1974; Reese 2005e). Faculty housing has been constructed on a portion of this site (Souza et al. 1984).

Table 4.4-1
Prior Cultural Resources documented within 0.5-miles of the Heller Site

Site	Age	Description	Recorders and Year	NRHP/CRHR Status
CA-SCR-142	Prehistoric	Sparse lithic scatter; possibly destroyed	Edwards, R. and, C. Simpson-Smith 1990; Reese, E. 2005a-c; Stafford, D. and,	Unevaluated; presumed eligible

Site	Age	Description	Recorders and Year	NRHP/CRHR Status
			J. Stafford 1976a	
CA-SCR-143	Prehistoric	Sparse to moderately dense lithic scatter; shell midden habitation site	Elliott, M. 2005; Stafford, D. and, J. Stafford 1976b;	Unevaluated: presumed eligible
CA-SCR-359H	Historic	The reservoir site consists of three earthen dams, a brick water tower, a stone spillway, and a historic refuse feature situated around the reservoir bed	Reese, E. 2005d	Unevaluated; presumed eligible

Table 4.4-2
Prior Cultural Resources documented within 0.5-miles of the Hagar Site

Site	Age	Description	Recorders and Year	NRHP/CRHR Status	Within Study Area
CA-SCR-094 P-000098	Prehistoric	Sparse lithic scatter. The 2005 site record update places the site outside proposed project boundaries.	Lönnberg, A. 1974; Reese, E. 2005d; Souza, et al. 1984;	Unevaluated; presumed eligible but probably not eligible due to lack of physical integrity	N
CA-SCR-181	Prehistoric	Lithic scatter	Toenjes, J. 1978	Unevaluated; presumed eligible	N
CA-SCR-182H P-44-000184	Historic	Historic railway and limestone quarry feature	Dexter, S.D.; Ratcliff, F. 2008; Pryor, J. 1978; Reese, E. 2005f	Unevaluated; presumed eligible; some segments do not contribute to site eligibility	N
CA-SCR-184H; P-44-000186	Historic	Historic dugout structure	Reese, E. 2005g; Toenjes, J. 1978;	Unevaluated; presumed eligible	N
CA-SCR-186H	Historic	Ranch features, presumed associated with Cowell Ranch. Wood fence, 2 metal water tubs, 1 cement water trough, metal water pipes in Moore Creek drainage below Oakes Provost House	Elliott, M. 2005; Pryor, J. 1978;	Unevaluated; possibly eligible in association with related ranch features	N
CA-SCR-000277H; P-44-000276	Historic	Mission-period agricultural field	Edwards, R.L. and, C. Simpson-Smith 1978	Unevaluated; Likely ineligible as site is not extant	Y
*CA-198-H; P-44-000200	Historic	Cowell Lime Works Historic District.	ARG 2005a; ARG and Pacific Legacy, Inc. 2005b; Maley	NRHP and CRHR listed (NPS 2007)	Y (utility corridor only)

Site	Age	Description	Recorders and Year	NRHP/CRHR Status	Within Study Area
			et al. 2007; Calciano and Collet 1973a; Maley 2007; Podzorski, P.V. and J. Toenjes 1978, Reese, E. 2009a,b; UCSC 2007		
CA-SCR-359H	Historic	The reservoir site consists of three earthen dams, a brick water tower, a stone spillway, and a historic refuse Feature situated around the reservoir bed.	Reese, E. 2005b,d	Unevaluated; presumed eligible	N
P-44-000579	Historic	900 High Street, Santa Cruz, CA 95060; First Congregational Church	Aratin, S. and, Galvin and Associates 2005	Unevaluated; presumed eligible	N
P-44-000587;CA-SCR-UCSC-003;	Historic	Historic barn or outbuilding foundation. Limestone and concrete foundation of structure visible in 1931 aerial photo.	Reese, E. 2005h	Unevaluated; presumed eligible	N
P-44-000855	Historic District	Cowell Home Ranch District	Eselius, D.G. 2006	NRHP Listed; CRHR Listed	N
P-44-000954	Historic District	Theatre / Horse Barn	Charles Hall and, MW, Page & Associates 1976a	NRHP Listed; CRHR Listed	N
P-44-000955	Historic District	UC Santa Cruz Campus Police/ Cookhouse	Charles Hall and, MW, Page & Associates 1979b	NRHP Listed; CRHR Listed	N
P-44-000956	Historic District	Carriage House	Charles Hall and, MW, Page & Associates 1979a	NRHP Listed; CRHR Listed	N
P-44-000957	Historic District	Blacksmith Shop	UCSC 2007	NRHP Listed; CRHR Listed	N
P-44-000958	Historic District	Blacksmith Shop Feature 1	Reese, E. 2009b	NRHP Listed; CRHR Listed	N
P-44-001023	Historic District	Granary and Paymasters House; day care Center	Charles Hall and, MW, Page & Associates 1976b	NRHP Listed; CRHR Listed	N
P-44-001024	Historic District	Bull Barn and	Charles Hall	NRHP Listed;	N

Site	Age	Description	Recorders and Year	NRHP/CRHR Status	Within Study Area
		Worker's Housing	and, MW, Page & Associates 1976c	CRHR Listed	
P-44-001025	Historic District	Cooperage and Lime Kilns	Charles Hall and, MW, Page & Associates 1976d	NRHP Listed; CRHR Listed	N
P-44-001026	Historic District	Barn	Charles Hall and, MW, Page & Associates 1976e	NRHP Listed; CRHR Listed	N
P-44-001027	Historic District	Two Barns	Charles Hall and, MW, Page & Associates, 1976f	NRHP Listed; CRHR Listed	N
P-44-001041	Historic	Building - 650 Spring Street	Charles Hall and, MW, Page & Associates 1976g	Unevaluated; presumed eligible	N
P-UCSC-012H	Historic (Possibly modern)	(Isolate) Metal water trough	Pacific Legacy, Inc. 2005	Unevaluated; ineligible (isolate)	Y
<i>*The Cowell Lime Works Historic District is in the utility corridor of the Hagar site; however, the proposed project will not affect any of its buildings, structures, or features.</i>					

4.4.3.5 Field Surveys

In June 2016, Pacific Legacy, Inc. conducted a cultural resources investigation of a 57-acre study area for the UC Santa Cruz West Campus Housing Study, which included the Heller site. Pacific Legacy's investigation included an archival and records search of the study area and its surrounding 0.5-mile radius; contact with the Native American Heritage Commission (NAHC) and potential Native American stakeholders; and a field inventory of the study area on June 8, 2016. The purpose of the inventory was to identify cultural resources that may be adversely impacted by ground disturbing activities associated with the development of student housing in the 57-acre study area. Using a transect interval of 15 meters, Pacific Legacy, Inc. Senior Archaeologist Mr. Marc Greenberg, MA examined all accessible portions of the study area.

On November 24, 2017, Principal Archaeologist Mr. Sean Dexter from Condor Country Consulting, Inc. conducted a pedestrian survey of the study area and utility corridors for the proposed project (Dexter and Fitzgerald 2017). Mr. Dexter also carefully surveyed the mapped boundaries of prehistoric site CA-SCR-142 and its surrounding area, as the exact boundaries of the site were uncertain (Stafford and Stafford 1976; Edwards and Simpson-Smith 1990a, b; Reese 2005a-c). Mr. Dexter conducted a 10-to 15-meter spaced transect survey except when environmental conditions or the presence of a previously recorded site necessitated tighter transects (5 meters). Mr. Dexter examined all accessible portions of the study area and utility corridors, paying particular attention to areas of greater surface variability, specifically areas exposed along existing footpaths, roads, and because of bioturbation by rodents. While Mr. Dexter conducted no subsurface testing, he did utilize his trowel to scrape and carefully examine the subsurface and remove leaf litter and other obstructions (Dexter and Fitzgerald 2017).

At the Heller site, Mr. Dexter surveyed from the southern intersection of Heller Drive and Empire Grade Road north to the recorded boundaries of prehistoric site CA-SCR-142. Mr. Dexter attempted to relocate site CA-SCR-142, a prehistoric lithic scatter but was unable to relocate the site (Edwards and Simpson-Smith 1990a, b; Reese 2005a-c; Stafford and Stafford 1976). Mr. Dexter had 95 percent surface visibility in the recorded site boundaries, clear weather conditions, and excellent visibility of the subsurface due to extensive bioturbation by squirrels and other rodents. Mr. Dexter observed no cultural resources in the recorded boundaries of the site on the campus (East) side of Empire Grade Road in the site vicinity. He then continued north examining a playing field cut before continuing east around the study area boundary following the footprint of the FSH complex (Dexter and Fitzgerald 2017). Mr. Dexter continued his survey along the western side of Heller Drive following it until he diverged northeast to north around the FSH complex. Mr. Dexter walked transects to the far northern end of the proposed utility corridor. Visibility ranged from 80 percent near the southeastern end of the FSH complex to 40 percent in the area near Building 2, to 50 percent along the proposed utility corridor. Visibility was affected by developed lands (pavement, asphalt, built structures), as well as undeveloped natural lands with dense grasses and foliage. The study area terrain varies, but it includes slopes of 5 to 10 degrees north to south, and it is bordered on the west by steeper (~30° slopes) that descend toward Cave Gulch and Wilder Creek. Soils present included medium-brown silty loam with 5 to 10 percent angular or subangular gravels (Pacific Legacy 2016:7). Mr. Dexter observed no cultural resources during his survey of the Heller site study area or its associated utility corridor (Dexter and Fitzgerald 2017).

Mr. Dexter conducted a 15-meter-spaced transect survey of the entire Hagar site, including the proposed utility corridor that extends east of the intersection of Hagar and Glenn Coolidge Drives and northeast of Glenn Coolidge Drive into the boundary of the Cowell Lime Works Historic District (CA-SCR-198). Surface visibility during the survey was very poor -- approximately 5 percent due primarily to dense

grasses; however, visibility was good closer to Glenn Coolidge Drive. While the utility corridor associated with the Hagar site extends into the Cowell Lime Works Historic District (CA-SCR-198), Mr. Dexter determined that there would be no impacts to any of the structures, buildings, or features that comprise the district. Mr. Dexter did not observe site CA-SCR-094 within the Hagar site. Mr. Dexter noted no physical trace of site CA-SCR-277 in the field in 2017. Any remnant of a plowed agricultural field within the Hagar site is eroded and/or destroyed, despite UC Santa Cruz using the field only for cattle grazing.

Mr. Dexter observed one isolated Monterey banded chert core reduction flake within the Hagar site. He also observed a metal cattle trough in the study area (Dexter and Fitzgerald 2017). This is the same trough described by Pacific Legacy (2005) as P-UCSC-012H in UC Santa Cruz grid section (or Quad #) 107 as an “iron water trough in southeast corner of pastures between Hagar and Glenn Coolidge Drives.” The trough measures 2.5 feet by 1.5 feet and has a stopper plug in the drain marked “Voss.” Pacific Legacy, Inc. describes the trough as being in “fair to poor condition” and states that it is badly rusted (Pacific Legacy, Inc. 2005). In their report, Pacific Legacy state it is unknown if the trough is in-situ from the Cowell Ranch era (Pacific Legacy 2005). Mr. Dexter said the trough was modern (post-1931).

4.4.3.6 Archaeological Resources

Within the Heller site, there are no recorded prehistoric or historic-era archaeological resources. Within the Hagar site, there are two previously recorded unevaluated archaeological sites, and one isolated feature. However, historic-era site CA-SCR-277 is no longer extant; no physical trace of this landscape feature is extant. Mr. Dexter has noted that P-UCSC-012H appears modern (post-1940), and does not date to the period of significance of the Cowell Lime Works Historic District (1853-1920).

CA-SCR-198H: The Cowell Lime Works Historic District includes archaeological sites, features, and buildings relating to industrial limestone quarrying and lime production, including lime kilns, including a cooperage, supporting barns, residential structures, and historic circulation routes, dating to the latter 19th century and early decades of the 20th century (ARG 2005,a,b; ARG and Pacific Legacy, Inc. 2006:2; Edwards and Kimbro 1986; Maley 2007; Reese 2009a; UCSC Maps Collection Photo 1931; UCSC 2007). A row of worker’s cabins along the east rim of the Jordan Gulch, opposite the Cooperage were once located within the Cowell Lime Works. The cabins are no longer extant, and the associated archaeological deposits are not identified as contributing elements to the historic district. UC Santa Cruz conducted archaeological studies in the location of some of these cabins. The Cowell Lime Works Historic District was listed in the NRHP on November 21, 2007 and it is cross-listed in the CRHR (NPS 2007).

CA-SCR-277: This historic-era site was located in the East Meadow and it is described as a Mission-period agricultural field that was associated with the Mission Santa Cruz; however, there is no primary documentary evidence to suggest that this is a Mission-period agricultural field (Edwards and Simpson-Smith 1986; Edwards and Kimbro 1986; Edwards et al 1978). This site was located in pasture land to the north of where Hagar Drive intersects Glenn Coolidge Drive on the Hagar site. It crosses into the far northern portion of the Hagar site. Caliciano and Collet (1973) observed aerial photographs on file at UC Santa Cruz that showed distinctive plow marks of a pattern associated with single blade (bitted) hand-guided and/or ox plows cutting through the shallow topsoil to expose the limestone base (Calciano and Collet 1973b; Edwards et al 1978; Fairchild Aerial Surveys, Inc. 1931). Calciano and Collet (1973b) noted that “weeds” in the meadow in 1973 were of Mediterranean origin, which suggested to them the possibility of early Spanish activity in the southeastern portion of the East Meadow. Edwards and Kimbro (1986) noted that the Spanish established the Mission Santa Cruz 2 miles southeast of the UC Santa Cruz campus, and state that its fields were spread over many miles from Santa Cruz to Año Nuevo (Edwards et al. 1978; Edwards and Kimbro 1986). Mr. Dexter noted no physical trace of this site during an examination of Google Earth historical maps from 1993 forward, or in the field in 2017. Any remnants of agricultural fields within the Hagar site are presumed eroded and destroyed.

P-UCSC-012H: This isolate is described as a metal water trough for cattle (Pacific Legacy 2005). It is located in the southeastern corner of the pasture between Hagar and Glenn Coolidge Drives in UC Santa Cruz grid section 107. The trough measures 2.5 feet by 1.5 feet and has a stopper plug in the drain marked “Voss.” This hardware labelled “Voss,” was most likely was manufactured by the agricultural supply company VOSS Automotive, Inc., in Wipperfurth, Germany, which was founded in 1931 and manufactured agricultural supply products through the 1950s. The trough is in poor condition and badly rusted. As an isolated feature, the trough is not eligible for the NRHP. Given the dating of the hardware of definitively post 1931, it is not from a period of significance of the nearby Historic District, although it is clearly associated with the tail end of the period of Cowell Ranch operation. Despite not being a unique archaeological resource, Condor Country Consulting, Inc. recommends that the trough be photo documented, and relocated to the Cowell Lime Works Historic District.

4.4.3.7 Human Remains

There are no known prehistoric or historic period burials or cemeteries in the study area, proposed utility corridors, or within a 0.5-mile radius of the study area.

4.4.3.8 Historical Resources

The Cowell Lime Works Historic District is an historic property under Section 106 of the National Historic Preservation Act (NHPA) and an historical resource under CEQA §15064.4(a)(3), (NPS 2007; UCSC 2007). The utility corridor extends within approximately 100 feet of the closest building, the historic Powder House. However, the proposed project would not cause an adverse effect on the significance of the historical district, as only the proposed utility corridor would enter the far eastern boundary of the district. The University of California at Santa Cruz plans to place the utility corridor below the surface, so there would be no lasting visual or aesthetic effects to the historic district. Outside of the utility corridor, the Hagar Site does not contain any historical resources.

4.4.4 PALEONTOLOGICAL CONTEXT

Paleontological resources, with a few rare exceptions, occur only in sedimentary deposit formations or deposits. On the UC Santa Cruz campus, several major marine formations contain fossils. The information below is drawn from the Geology section of the UC Santa Cruz 2005 LRDP EIR (UCSC 2006).

The Santa Cruz region provides a record of geologic and paleontologic history that spans more than 120 million years, beginning in the late Cretaceous period (Jennings and Burnett 1961; Cummings et al. 1962; Clark 1981). In the Santa Cruz region, fossil discoveries investigated since the early 1900s (Branner et al. 1909), have occurred almost exclusively in marine sediments. The marine rocks in this region of Santa Cruz County have yielded significant invertebrate and vertebrate fossils, including several taxa of marine mammals. Marine formations on the UC Santa Cruz campus include Santa Margarita sandstones, Santa Cruz mudstone, and Quaternary marine terrace deposits (UCSC 2006).

Only limited areas within the main campus have any potential for yielding fossils, due to the paucity of sedimentary rocks within the campus boundaries. There are three potentially fossil-bearing formations on the main campus: the Santa Margarita sandstones, doline fill deposits in area underlain by marble, and Quaternary marine or non-marine terrace deposits. Santa Margarita sandstone formations in the Santa Cruz region have yielded significant marine vertebrate fossils. Although no such finds have occurred in the Santa Margarita sandstone formation on the campus, this may be because there has been no development in these areas. Santa Margarita sandstone formations on the campus thus 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 the campus, despite extensive development in areas underlain by doline and 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 on the campus appears to be low (UCSC 2006).

Condor Country Consulting, Inc. consulted a geologic map of the campus and a report produced for UC Santa Cruz's LRDP Draft EIR by its consultants in 2005, to determine whether geologic formations and rock units determined to be fossiliferous were present within the study area or the utility corridors. Paleozoic schist with nearby pockets of Quaternary doline fill underlies the Heller site, while Paleozoic marble underlies the Hagar site (UCSC 2006). There is a possibility that undocumented doline fill deposits may be present beneath the marble on the Hagar site.

4.4.5 UNIQUE GEOLOGIC FEATURES

Santa Cruz County includes, in its Geographic Information System (GIS) database, significant hydrological, geological, and paleontological features, which are rare or unique and representative in Santa Cruz County because of their scarcity, scientific or educational value, aesthetic quality, or cultural significance (Santa Cruz County 2005; UCSC 2006). The County database identifies limestone caves worth protecting in the Wilder Creek area (UCSC 2006). The existing Campus Natural Reserve (CNR) includes limestone caves along Cave Gulch, including Empire Cave, on the western margin of the campus. The caves lie within 500 feet of the Heller site. These caves may qualify as unique geologic features because of their scientific value and because such caves are relatively rare. Some of the caves, which possess unusual hydrological and lithologic features, also host several special-status species (UCSC 2006).

4.4.6 REGULATORY CONSIDERATIONS

4.4.6.1 Federal Laws and Regulations

National Historic Preservation Act, Section 106

The National Historic Preservation Act establishes the National Register of Historic Places (NRHP), and defines federal criteria for determining the historical significance of archaeological sites, historic buildings and other resources (ACHP 2016). To be determined eligible for the NRHP, a potential historic property must meet one of four historical significance criteria (listed below), and must possess sufficient deposition, architectural, or historic integrity to retain the ability to convey the resource's historic significance. Resources determined to meet these criteria are eligible for listing in the NRHP and are termed historic properties. A resource may be eligible at the local, state, or national level of significance.

A property is eligible for the NRHP if it possesses integrity of location, design, setting, materials, workmanship, feeling, and association, and it:

1. is associated with events that have made a significant contribution to the broad patterns of our history;

2. is associated with the lives of a person or persons of significance in our past;
3. embodies the distinctive characteristics of a type, period or method of construction, or represents the work of a master, or possesses high artistic value, or represents a significant and distinguishable entity whose components may lack individual distinction; or
4. has yielded or may be likely to yield information important in prehistory or history.

A resource that lacks historic integrity or does not meet one of the NRHP criteria of eligibility is not considered a historic property, and effects to such a resource are not considered significant under the NHPA.

4.4.6.2 State Laws and Regulations

California Environmental Quality Act

Under the *California Environmental Quality Act Guidelines* Section 15064.4, 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. The Guidelines define cultural resources as including both historical and archaeological properties, set forth criteria for establishing the significance of historical resources, and state that cultural resources that meet the criteria of eligibility for the CRHR are significant historical resources under CEQA. The criteria for eligibility of resources to the CRHR closely mirror the NRHP criteria listed above.

California Register of Historic Resources

In 1992, the California Register of Historical Resources was created to identify resources deemed worthy of preservation on a state level and was modeled closely after the National Register process. The criteria are nearly identical to those of the National Register but focus on resources of statewide, rather than national, significance (California Natural Resources Agency 2016). The CRHR encourages public recognition and protection of resources of architectural, historical, archeological, and cultural significance, identifies historical resources for state and local planning purposes, determines eligibility for state historic preservation grant funding, and affords certain protections under CEQA. The CRHR automatically includes resources listed on the National Register. Specifically, the CRHR includes the following resources:

- Resources formally determined eligible for, or listed in, the National Register of Historic Places State
- Historical Landmarks numbered 770 or higher

- Points of Historical Interest recommended for listing by the State Historical Resources Commission (SHRC)

Resources nominated for listing and determined eligible in accordance with criteria and procedures adopted by the SHRC including:

- individual historic resources and historic districts;
- resources identified as significant in historical resources surveys which meet certain criteria, and
- resources and districts designated as city or county landmarks pursuant to a city or county ordinance when the designation criteria are consistent with California Register criteria.

California Historical Landmarks

California Historical Landmarks are buildings, structures, sites, or places that have been determined to have statewide historical significance by meeting at least one of the criteria listed below (OHP 2017a). The resource also must be approved for designation by the County Board of Supervisors or the City/Town Council in whose jurisdiction it is located; be recommended by the State Historical Resources Commission; and be officially designated by the Director of California State Parks.

California Points of Historical Interest

California Points of Historical Interest are sites, buildings, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value (OHP 2017b). Points of Historical Interest designated after December 1997 and recommended by the State Historical Resources Commission are also listed in the California Register. No historical resource may be designated as both a Landmark and a Point. If a Point is subsequently granted status as a Landmark, the Point designation will be retired.

SB 18 Consultation

California Senate (SB) 18 requires cities and counties to notify and consult with California Native American Tribes about proposed local land use planning decisions in order to protect Traditional Tribal Cultural Places. Cities and counties must obtain a list of the California Native American tribes from the Native American Heritage Commission (NAHC) whose traditional lands within the agency's jurisdiction may be affected by a proposed adoption or amendment of a general plan or proposed project. Prior to the adoption or substantial amendment of the General Plan or Proposed project, a local government must refer the proposed project to those tribes on the Native American contact list that have traditional lands within the agency's jurisdiction. SB 18 is not applicable to the University of California.

Health and Safety Code

Sites that may contain human remains important to Native Americans that must be identified and treated in a sensitive manner, consistent with the California Health and Safety Code and Public Resources Code as reviewed below:

In the event that human remains are encountered during project development and in accordance with the Health and Safety Code Section 7050.5, the County Sheriff-Coroner must be notified if potentially human bone is discovered. The Sheriff-Coroner will then determine within two working days of being notified if the remains are subject to his or her authority. If the Sheriff-Coroner recognizes the remains to be Native American, he or she shall contact the Native American Heritage Commission (NAHC) by phone within 24 hours, in accordance with Public Resources Code Section 5097.98. The NAHC will then designate a Most Likely Descendant (MLD) with respect to the human remains. The MLD then has the opportunity to recommend to the property owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and associated grave goods. (California Legislative Information 2017)

4.4.7 IMPACTS AND MITIGATION MEASURES

4.4.7.1 Significance Criteria

The impact of the proposed project on cultural resources would be considered significant if it would exceed the following standards of significance, in accordance with Appendix G of the CEQA Guidelines, the UC CEQA Handbook, and the 2005 LRDP EIR:

- cause a substantial adverse change in the significance of a historical resource as defined in State CEQA Guidelines §15064.4;
- cause a substantial adverse change in the significance of an archaeological resource pursuant to State CEQA Guidelines §15064.4;
- directly or indirectly destroy a unique paleontological resource or site or unique geological feature; or
- disturb any human remains, including those interred outside of formal cemeteries.

CEQA requires that projects address impacts to significant archaeological and historic resources, which it terms “historical resources”; to unique archaeological, paleontological, and geologic resources; and to human remains, including native American remains in an archaeological context (Public Resources Code [PRC] §21083.2, 21084.1; CEQA Guidelines §15064.4 and Appendix G, V). However, not all cultural resources meet the CEQA criteria that define historical resources or unique archaeological resources.

Determination of whether a project has a potential for significant cultural resources impacts is a two-step process. First, cultural resources inventories of the project area are conducted to determine whether any cultural resources are present. Second, the significance of each identified resource is assessed relative to significance criteria established by CEQA, as outlined below. Project impact assessment focuses on those resources that meet CEQA significance criteria. The following sections delineate CEQA resource significance criteria.

CEQA Resource Significance Criteria. Cultural resources considered under CEQA may be either historical resources or unique archaeological, paleontological, or geologic resources. Human remains are also treated as cultural resources. The Public Resources Code and the State CEQA Guidelines provide criteria for the assessment of the significance of cultural resources in order to determine whether they are historical resources or unique archaeological, paleontological, or geologic resources. Resources that do not meet the significance criteria are not given further consideration under CEQA. A definitive assessment of resource significance may require archaeological testing or detailed historical research, which has not been conducted for all resources identified as potentially meeting the criteria set forth in CEQA. In these circumstances, identified resources in most cases are assumed significant, and treated as such, until they can be formally assessed. The exception to this practice is that isolated prehistoric and historic artifacts and features, and fragments of historic features disassociated from their historic context generally are considered not to be significant because, once recorded, their potential to provide additional information of value is slight.

Historical Resources. Under CEQA §15064.4(a)(3), an historical resource is defined as “any object, building, structure, site, area, place, record or manuscript, which 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.” A resource is usually considered for its historical significance after it reaches the age of 50 years. This threshold is not absolute; it was chosen as a reasonable span of time after which a professional evaluation of historical significance can be made. Because PRC §5024 mandates that State Agencies inventory all state-held buildings over 50 years of age, this standard is commonly used in determining which buildings should be assessed under CEQA.

PRC 5024.1 establishes the CRHR, and defines an historical resource as a resource listed in, or determined to be eligible for listing in, the CRHR; included in a local register of historical resources; or deemed significant pursuant to CRHR criteria. All California properties already listed in the NRHP and those formally determined to be eligible for the NRHP, as well as specific listings of State Historical Landmarks and State Points of Historical Interest, are automatically included in the CRHR. Under PRC 5024.1, a resource may be listed in or determined eligible to the CRHR if it meets any of the following criteria:

- It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- It is associated with the lives of persons important in our past;
- It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic value; or
- It has yielded, or may be likely to yield, information important in prehistory or history.

Archaeological deposits that have been extensively disturbed or redeposited, or historic features and buildings that have been substantially altered or moved, often are considered to have lost the integrity of the historic period, and thus may not be eligible for listing in the CRHR.

Cultural resources that are not eligible for the CRHR generally are not considered further under CEQA, unless they qualify as unique resources (see below).

Unique Archaeological, Paleontological, and Geologic Resources. Public Resources Code also provides criteria that define “unique archaeological resource.” Under PRC § 21083.2(g), a unique archaeological resource is a resource for which it can be clearly demonstrated that without merely adding to the current body of knowledge there is a high probability that it:

- Contains information needed to answer important scientific questions and there is a demonstrable public interest in that information;
- Is directly associated with a scientifically recognized important prehistoric event; and
- Has a special and particular quality, such as being the oldest of its type or the best available example of its type.

While CEQA Guidelines Appendix G refers to unique paleontological and geologic resources, CEQA does not define these terms. For the purposes of this EIR, the relevant provisions of the statute used to define a unique archaeological resource are employed. In addition, California state law explicitly considers vertebrate paleontological sites and fossil footprints, and it provides for their recordation (Archaeological, Paleontological, and Historic Sites Statute at PRC 5097 et seq.).

4.4.7.2 CEQA Checklist Items Adequately Analyzed at the 2005 LRDP Level or Not Applicable to the Project

Although redevelopment of the FSH complex on the Heller site was evaluated in the 2005 LRDP EIR, the currently proposed Heller site housing is substantially different from the previous proposal. With regard to the Hagar site, that site was not envisioned for development under the 2005 LRDP. Therefore, although

the analysis below uses the prior LRDP level analysis to the extent appropriate, none of the CEQA checklist items listed above under Significance Criteria are scoped out; all of the items are addressed in the project-level analysis below.

4.4.7.3 Methodology

The proposed project would involve extensive grading and excavation at the Heller and Hagar sites and their associated utility corridors. Consistent with LRDP Mitigation CULT-1A, previous survey coverage of both sites and utility corridors was assessed. A review of the all technical reports, site records, and maps indicated that most of the Heller site had been surveyed; however, the Hagar site had not been intensely surveyed using transects since 1977. Consequently, consistent with LRDP Mitigation CULT-1B, Condor Country Consulting, Inc. conducted a survey of the unbuilt portions of the project site on November 24, 2017. In addition, Condor Country Consulting conducted a survey of the areas adjoining the Heller site, including a survey of the utility corridor for that site.

4.4.7.4 2005 LRDP EIR Mitigation Measures Included in the Proposed Project

Table 4.4-3, 2005 LRDP EIR Mitigation Measures, presents the mitigation measures in the 2005 LRDP EIR that are applicable to the proposed project. Since these previously adopted mitigation measures are already being carried out as part of implementation of the 2005 LRDP, they are included in, are a part of the proposed project, and will not be readopted. Implementation of these mitigation measures is assumed as part of the proposed project impact analysis.

Table 4.4-3
2005 LRDP EIR Mitigation Measures

Mitigation Measure	Description
CULT-1A	As early as possible in the project planning process, the Campus shall define the proposed project's area of potential effects for archaeological resources. The Campus 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. The Campus shall also review confidential resource records to determine whether complete intensive archaeological survey has been performed on the site and whether any previously recorded cultural resources are present.
CULT-1B	Where native soils will be disturbed, the Campus shall provide and shall require contractor crews to attend an informal training session prior to the start of earth moving, regarding how to recognize archaeological sites and artifacts. In addition, campus employees whose work routinely involves disturbing the soil shall be informed how to recognize evidence of potential archaeological sites and artifacts. Prior to disturbing the soil, contractors shall be notified that they are required to watch for potential archaeological sites and artifacts and to notify the campus if any are found. In the event of a find, the Campus shall implement LRDP Mitigation CULT-1G, below.
CULT-1C	For project sites that have not been subject to prior complete intensive archaeological survey, the Campus shall ensure that a complete intensive surface survey is conducted by a qualified archaeologist during project planning, design, and prior to soil disturbing activities. If an archaeological deposit is discovered, the archaeologist will prepare a site record and file it with the California Historical Resource Information

Mitigation Measure	Description
	System. In the event of a find within the area of potential effects, the Campus shall consult with a qualified archaeologist to design and conduct an archaeological subsurface investigation and/or a construction monitoring plan of the project site to ascertain the extent of the deposit relative to the project's area of potential effects, to ensure that impacts to potential buried resources are avoided.
CULT-1D	If it is determined that the resource extends into the project's area of potential effects, the Campus shall ensure that the resource is evaluated by a qualified archaeologist, who will determine whether it qualifies as a historical resource or a unique archaeological resource under the criteria of CEQA Guidelines §15064.4. This evaluation may require additional research, including subsurface testing. If the resource does not qualify, or if no resource is present within the project APE, this will be reported in the environmental document and no further mitigation will be required unless there is a discovery during construction.
CULT-1E	If a resource within the project's area of potential effects is determined to qualify as an historical resource or a unique archaeological resource (as defined by CEQA), the Campus shall consult with the qualified archaeologist to consider means of avoiding or reducing ground disturbance within the site boundaries, including minor modifications of building footprint, landscape modification, the placement of protective fill, or other means that will permit avoidance or substantial preservation in place of the resource.
CULT-1F	If avoidance or substantial preservation in place is not possible for an archaeological site that has been determined to meet CEQA significance criteria, the Campus shall retain a qualified archaeologist who, in consultation with the Campus, shall prepare a research design, and plan and conduct archaeological data recovery and monitoring that will capture those categories of data for which the site is significant, prior to or during development of the site. The Campus shall also ensure that appropriate technical analyses are performed, and a full written report prepared and filed with the California Historical Resources Information System, and also shall provide for the permanent curation of recovered materials.
CULT-1G	If an archaeological resource is discovered during construction (whether or not an archaeologist is present), all soil disturbing work within 100 feet of the find shall cease. The Campus shall contact a qualified archaeologist to provide and implement a plan for survey, subsurface investigation as needed to define the deposit, and assessment of the remainder of the site within the project area to determine whether the resource is significant and would be affected by the project. LRDP Mitigation CULT-1F shall also be implemented.
CULT 1H	If, in the opinion of the qualified archaeologist and in light of the data available, the significance of the site is such that data recovery cannot capture the values that qualify the site for inclusion on the CRHR, the campus shall reconsider project plans in light of the high value of the resource, and implement more substantial modifications to the proposed project that would allow the site to be preserved intact, such as project redesign, placement of fill, or project relocation or abandonment. If no such measures are feasible, the Campus shall implement LRDP Mitigation CULT-3A
CULT-2A	For projects within Cowell Ranch Historic District over- lay, the Campus shall implement LRDP Mitigations AES-4A and AES-4B.
CULT-2B	As early as possible in the project planning process, the Campus shall define the project's area of potential effect for historic structures. The Campus shall determine the potential for the project to result in impacts to or alteration of historic structures, based on the extent of site and building modifications anticipated for the proposed project.
CULT-2C	Before altering or otherwise affecting a building or structure 50 years old or older that has not been evaluated previously, the Campus 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 University 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 is less than significant.
CULT-2D	For a building or structure that qualifies for listing on the CRHR, the Campus shall consult with the architectural historian to consider measures that would enable the project to avoid direct or indirect impacts to the building or structure. These could include preserving a building on the margin of the project site, using it "as is," or other measures that would not alter the building.
CULT-2E	If the project cannot avoid modifications to a significant building or structure, the Campus shall ensure that documentation and treatment shall be carried out by a qualified architectural historian, as described below: 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

Mitigation Measure	Description
	<p>the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings” (Weeks and Grimmer 1995).</p> <p>If a significant historic building or structure is proposed for major alteration or renovation, or to be moved and/or demolished, the campus shall ensure that a qualified architectural historian thoroughly documents the building and associated landscaping and setting.</p> <p>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.</p> <p>If preservation and reuse at the site are not feasible, the historical building shall be documented as described in item (ii) and, when it is physically and financially feasible, it shall be moved and preserved or reused.</p>
CULT-2F	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, the Campus shall reconsider project plans in light of the high value of the resource, and implement more substantial modifications to the proposed project that would allow the structure to be preserved intact. These could include project redesign, relocation or abandonment. If no such measures are feasible, the Campus shall implement LRDP Mitigation CULT-3B.
CULT-3A	If a significant archaeological resource cannot be preserved intact, before the property is damaged or destroyed, the Campus shall ensure that the resource is appropriately documented by implementing a program of research-directed data recovery, consistent with LRDP Mitigation CULT-1F.
CULT-3B	If a significant historic resource or unique archaeological resource cannot be preserved intact, before the property is damaged or destroyed the Campus shall ensure that the important information represented by the resource is preserved, by implementing a program of documentation as described in LRDP Mitigation CULT-2D.
CULT-4A	The Campus shall implement LRDP Mitigations CULT-1A through CULT-1H to minimize the potential for disturbance or destruction of human remains in an archaeological context and to preserve them in place, if feasible.
CULT-4B	The Campus shall provide a representative of the local Native American community an opportunity to monitor any excavation (including archaeological excavation) within the boundaries of a known Native American archaeological site.
CULT-4C	In the event of a discovery on campus of human bone, suspected human bone, or a burial, the Campus shall ensure that all excavation in the vicinity halts immediately and the area of the find is protected until a qualified archaeologist determines whether the bone is human. If the qualified archaeologist determines the bone is human, or if a qualified archaeologist is not present, the Campus will notify the Santa Cruz County Coroner of the find and protect the find without further disturbance until the Coroner has made a finding relative to PRC 5097 procedures. If it is determined that the find is of Native American origin, the Campus will comply with the provisions of PRC § 5097.98 regarding identification and involvement of the Native American Most Likely Descendant (MLD).
CULT-4D	<p>If human remains cannot be left in place, the Campus shall ensure that the qualified archaeologist and the MLD are provided an opportunity to confer on archaeological treatment of human remains, and that appropriate studies, as identified through this consultation, are carried out. The Campus shall provide results of all such for local Native American involvement in any interpretative reporting.</p> <p>As required by the provisions of the California Native American Graves Protection and Repatriation Act (NAGPRA), the Campus shall ensure that human remains and associated artifacts recovered from campus projects on state lands are repatriated to the appropriate local tribal group if requested, if the appropriate group can be identified through California NAGPRA procedures.</p>
CULT-5A	During project planning, the Project Manager shall consult the most recent Campus Soils and Geology map to determine whether the proposed project is underlain by a formation that is known to be sensitive for paleontological resources.
CULT-5B	If the project site is underlain by paleontologically sensitive formations, the Campus shall retain a qualified paleontologist to determine, through assessment of results of geotechnical investigations or site

Mitigation Measure	Description
	inspection, whether proposed excavation or grading has the potential to encounter the members of sensitive formations that are fossiliferous, and if so, to develop a paleontological monitoring and data recovery plan and implement it during the construction period as appropriate. In addition, the paleontologist shall conduct a construction crew education session regarding paleontological potential and significance, and of stop-work provisions in the event of a discovery.
CULT-5C	In the event of a discovery of a paleontological resource on campus, work within 50 feet of the find shall halt until a qualified paleontologist has examined and assessed the find and, if the resource is determined to be a unique paleontological resource, the resource is recovered. The Campus shall ensure that all finds are adequately documented, analyzed, and curated at an appropriate institution.
CULT-5D	In the event that a proposed project would result in impacts to a unique paleontological resource, the project planning team shall work together to reduce impacts to the find through design and construction modifications, to the extent feasible.
CULT-6	The Campus shall implement LRDP Mitigation BIO-8.
CULT-7	The Campus shall implement LRDP Mitigations CULT-1 through CULT-4.
Source: UC Santa Cruz 2006	

4.4.7.5 Project Impacts and Mitigation Measures

SHW Impact CULT-1: The proposed project would not result in a substantial adverse change in the significance of a known historical resource. (*Less than Significant*)

There are no historic period structures, buildings, or features on the Heller site. The FSH complex, including the childcare center, currently occupies the Heller site. The complex was completed in 1971. Due to its age, lack of unique architectural qualities, and the poor physical condition of the structures, the complex does not meet the criteria for listing on the CRHR. Therefore, its demolition would not constitute a substantial adverse impact on a historical resource.

Two historic-period resources were observed within the proposed project limits at the Hagar site. The first resource is an isolated feature P-UCSC-012H, which was found not to meet the criteria for listing as a historic resource, and therefore its removal would not constitute a significant impact. However, a mitigation measure is set forth for the treatment of this feature. The second historic period resource is CA-SCR-198, the Cowell Lime Works Historic District that is located to the west and southwest of the Hagar site. Development of the Hagar site with the proposed housing development and childcare facility would have no direct or indirect impacts on the historic district. The proposed project would only temporarily affect the landscape of the district via the placement of an underground utility corridor within the eastern boundary of the Cowell Lime Works Historic District. There would be limited trenching (less than 200 feet long) in the area, which would not require removal of any structures, buildings, or features, and once the wastewater pipeline is installed in the utility corridor, the ground surface would be restored. As a result, other than a temporary disturbance within the historic district,

there would be no impact to any of the buildings, structures, and features that contribute and constitute this district. The impact would be less than significant.

Mitigation Measures:

SHW Mitigation CULT-1: Prior to ground disturbing activities in the study area, a qualified archaeologist shall re-record and photo document the isolated feature P-UCSC-012H before removing it from its current location.

Significance after Mitigation: Not applicable

SHW Impact CULT-2: *The proposed project could cause a substantial adverse change in the significance of a previously unknown historical or archaeological resource, or to human remains. (Potentially Significant; Less than Significant with Mitigation)*

The proposed project would involve ground-disturbing activities, and as such, it has the potential to result in impacts to unknown archaeological resources of the prehistoric or historic period. While development in the proposed study area and utility corridors could cause a substantial adverse change in the significance of an unknown archaeological deposit or feature, the impact would be significant only for those resources that meet CRHR eligibility criteria or for those that are defined as “unique” under CEQA.

As noted above, consistent with LRDP Mitigation CULT-1A, previous survey coverage of the Heller site and utility corridor was assessed and it was determined that only an intensive archaeological survey of the utility corridor was required. Furthermore, it was noted that one prehistoric site, CA-SCR-142, a prehistoric lithic scatter (scatter of stone tools and tool manufacturing debris) was recorded previously to the south of the housing complex. The exact boundaries of the site in the proposed project vicinity are unclear because the eastern portion of the prehistoric site apparently was altered by a road cut, and a portion of the deposit may have been graded away or buried (Reese 2005a). Consistent with LRDP Mitigation CULT-1B, the utility corridor and the vicinity of the prehistoric site were extensively surveyed. The surface surveys did not identify any cultural materials within the area surveyed. Based on this information, it is determined that excavation and grading at the Heller site (including the grading and trenching in the utility corridor) is unlikely to affect any known prehistoric or historic-period archaeological resources.

Similarly, consistent with LRDP Mitigation CULT-1B, the Hagar site and the utility corridor were surveyed and aside from the presence of the Cowell Lime Works Historic District within the utility corridor boundaries, no cultural materials other than two isolates (chert flake and cattle trough) were observed. Therefore, the proposed development at the Hagar site (including the grading and trenching in

the utility corridor and storm drain alignment) is unlikely to affect any known prehistoric or historic-period archaeological resources.

However, the earthmoving activities associated with the proposed project could expose previously undiscovered buried archaeological resources, including human remains. The 2005 LRDP EIR sets forth LRDP Mitigations CULT-1G, CULT-4B, and CULT-4C to address potential impacts to resources encountered during construction. The proposed project would implement these measures, which would reduce the impact to a less than significant level.

However, should any grading occur within 200 feet of the recorded margin of CA-SCR-142, undiscovered resources associated with those sites could be affected. To address this potential impact, the Campus will implement **SHW Mitigation CULT-2A**. Pursuant to this measure, in the event that any grading is proposed within 200 feet of the recorded margin of either site, an archaeologist will monitor initial grading. Furthermore, as discussed in **Section 4.12, Tribal Cultural Resources**, the Campus has conducted consultation with Native American tribes for this project pursuant to AB 52, and based on input from the tribe consulted, the Campus has developed **SHW Mitigations CULT-2B** and **-2C** which provide for a Native American monitor to be present when grading occurs within 200 feet of a known or previously unknown site, and for an additional pedestrian survey of the Hagar site, once the site vegetation is cleared and prior to commencement of construction. If human remains are uncovered and are determined to be of Native American origin, the Campus will implement the procedures set forth in LRDP Mitigation CULT-4C for protection of the remains, documentation, and respectful treatment in consultation with a Native American Most Likely Descendant. The implementation of these mitigation measures will reduce the potential impact to a less-than-significant level.

Mitigation Measures:

SHW Mitigation CULT-2A: If any grading is proposed within 200 feet of the known margin of CA-SCR-142, the Campus will retain a qualified archaeologist to monitor the grading and to determine whether intact deposits are present.

If archaeological materials are exposed by grading, the Campus shall implement LRDP Mitigation CULT-1G and LRDP Mitigation CULT-4B. If human remains are exposed and the County Sheriff-Coroner determines them to be of Native American origin, the Campus shall implement LRDP Mitigation CULT-4C.

SHW Mitigation CULT-2B: A Native American monitor of the Amah Mutsun Tribal Band will be provided an opportunity to monitor during ground disturbance within

200 feet of a known prehistoric deposit. In addition, if a previously unknown prehistoric deposit is uncovered during construction, a native American monitor of the Amah Mutsun Tribal Band will be provided the opportunity to monitor grading within 200 feet of the find.

SHW Mitigation CULT-2C: Once the vegetation on the Hagar site is removed and before any grading for project construction is undertaken, another intensive pedestrian survey of the site will be conducted by a qualified archaeologist.

Significance after Mitigation: Less than significant

SHW Impact CULT-3: The proposed project would not adversely affect paleontological resources or unique geologic resources. (*Less than Significant*)

As noted earlier in this section, there are only three formations on the campus that have the potential to contain paleontological resources. These formations have limited distribution on the campus and have not yet yielded any fossils. The Heller site is located on schist, which is not considered sensitive for paleontological resources. With respect to the Hagar site, which is underlain by marble, there are no Quaternary doline fill deposits where construction will occur, so the likelihood of encountering unknown fossils is low (UCSC 2006). No construction would occur near the sinkhole in the Hagar site. Therefore, the potential to affect paleontological resources at the Hagar site is also considered low. Furthermore, the proposed project is required to implement LRDP Mitigations CULT-5A through CULT-5D. Implementation of these mitigation measures would reduce the impact to a less than significant level.

Neither the Heller nor the Hagar sites contain any geologic features that would be considered unique. Limestone caves in the Cave Gulch/Wilder Creek area are the only known unique geological resources identified on campus. These features are rare, and as such, of high scientific interest geologically and potentially paleontologically. These caves lie approximately 500 feet west of the Heller site and they would not be affected by the proposed project. The proposed project would not alter the immediate setting or internal environment of the caves. Development under the proposed project has the potential to affect these resources as a result of incidental damage related to increased visitation. However, pursuant to LRDP Mitigation BIO-8, UC Santa Cruz will continue to limit activity near the caves in the Campus Natural Resource (CNR), and will post appropriate signs informing visitors of the values represented by the caves and informing visitors of prohibitions against, fire, littering or removal of materials (UCSC 2006). The Campus will also ensure that similar information, along with the results of scientific studies

regarding the caves, are also included in other interpretive materials developed by the campus. With the implementation of these measures, which are included in the proposed project, the impact would be less than significant.

Mitigation Measures: No mitigation is required.

4.4.8 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

The Porter and Rachel Carson dining facilities expansion project would be located adjacent to the existing dining facilities at both colleges. While most of the improvements would be made within the existing developed areas, should the existing dining areas be expanded, some undeveloped land adjacent to the existing buildings would be disturbed during construction and as a result of development.

Impacts and Mitigation Measures

DT Impact CULT-1: The implementation of the proposed dining facilities expansion project would not cause a substantial adverse change in the significance of prehistoric or historic period archaeological resources, human remains, or paleontological resources. (*Less than Significant*)

Historical Resources

The dining hall at Rachel Carson College is of recent construction and based on its age, would not qualify as a historical resource. Therefore, changes to the Rachel Carson College dining facilities would not result in a significant impact on a historical resource. Porter College was constructed in 1969-70, and it would be approximately 49-50 years in age at the time that alterations and additions to the dining hall would be constructed. It is anticipated that in compliance with LRDP Mitigations CULT-2B through 2D, the Campus will evaluate the affected structure and if the building is determined to be a historic resource, the Campus will appropriately design the addition to avoid a significant impact. Therefore, with LRDP mitigation, the impact on historical resources would be less than significant.

Archaeological Resources

The areas that would be disturbed to construct the proposed dining facilities are generally considered unlikely to contain archeological resources due to their locations and the previous disturbance that occurred in the area in conjunction with the construction of the existing college facilities. Nonetheless, consistent with LRDP Mitigation CULT-1A, previous survey coverage of the areas would be assessed. In the event that the areas have not been previously surveyed, consistent with LRDP Mitigation CULT-1B, a survey of the sites would be conducted. Furthermore, the project would be required to comply with LRDP mitigation measures for protection of resources from inadvertent damage during construction. This would ensure that impacts to archaeological resources would be less than significant.

Paleontological Resources

Undiscovered paleontological resources could also be present and could potentially be damaged during project construction. The project sites are located on schist, which is not considered sensitive for paleontological resources. Nevertheless, implementation of LRDP Mitigations CULT-5A through 5D would ensure that impacts to paleontological resources would be less than significant.

Human Remains

Although unlikely, unknown human remains could occur on the project sites and they could be inadvertently affected by grading and excavation activities. Implementation of LRDP Mitigation CULT-4C would reduce the impact to a less than significant level.

Mitigation Measures: No mitigation is required.

4.4.9 CUMULATIVE IMPACTS AND MITIGATION MEASURES

SHW Impact C-CULT-1: Implementation of the proposed project would not result in significant cumulative cultural resource impacts. (*Less than Significant*)

The cumulative impact of campus development under the 2005 LRDP along with other development in the City of Santa Cruz on historical resources and human remains is analyzed in the 2005 LRDP EIR under LRDP Impact CULT-7 and is determined to be less than significant because campus projects would be required to implement appropriate LRDP mitigation measures to avoid or minimize impacts to significant resources (UCSC 2006). The cumulative impact of campus development under the 2005 LRDP along with other development in the City of Santa Cruz on paleontological resources is evaluated under

LRDP Impact CULT-8 and is also determined to be less than significant due to the mitigation measures set forth in the 2005 LRDP EIR (UCSC 2006). As set forth above, the proposed SHW project would also implement the LRDP mitigation measures as well as project-specific measures to avoid and minimize impacts. Furthermore, the proposed project is within the scope of the previous cumulative analysis and no further evaluation of cumulative impacts is required.

Mitigation Measures: No mitigation is required.

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4.5 GEOLOGY AND SOILS

4.5.1 INTRODUCTION

This section evaluates the potential impacts related to geology and soils from the implementation of the proposed Student Housing West (SHW) project. It also presents potential impacts related to geology and soils from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and the existing colleges (see **Section 4.5.5** below).

The analysis in this section is tiered from the geology and soils impact analysis contained in the 2005 LRDP EIR, supplemented by project-specific information, including a geotechnical report prepared for the site of the Family Student Housing (FSH) complex in 2010.

4.5.2 ENVIRONMENTAL SETTING

4.5.2.1 Site Description

The UC Santa Cruz campus is situated atop a series of marine terraces that rise northwest from the City of Santa Cruz. The Heller site is located along the western border of the campus, directly east of Empire Grade Road, at an elevation of approximately 700 feet above mean seal level (msl). Directly west lies Cave Gulch, a major campus drainage running north-south across the southern two-thirds of campus. Many of the caves on the campus are along Cave Gulch, due the marble/schist substrate fracturing and hollowing over time, as a result of the dissolution of the marble bedrock by groundwater. Most of the Heller site is underlain with schist, although the southern portion of the site may be underlain by marble at depth with potential for localized doline fill.

The Hagar site is located at the southern end of the campus, northeast of the intersection of Hagar Drive and Glenn Coolidge Drive. It sits at an elevation of approximately 400 feet msl. The Hagar site is largely underlain by marble, with a patch of doline fill beneath the southeastern corner, where a sinkhole is located.

4.5.2.2 Regional Geologic Overview

Geology

The campus is situated in the central portion of the Coast Ranges Physiographic Province, which parallels the coastline from the California/Oregon border down to Santa Barbara. The Ben Lomond Mountain, part of the Santa Cruz Mountains, lies northeast of the campus and is one of the northwest-southeast-trending

coastal mountain ranges that characterize the province. The ranges are primarily controlled by faulting along the San Andreas Fault System. The area is underlain by metamorphic rocks such as quartz-mica schist and limestone marble, which are surrounded and intruded by igneous rocks, predominantly quartz diorite (UCSC 2006).

Much of the bedrock beneath the campus is composed of marble that is dense and solid in some areas and highly fractured in others. The fractures have been eroded in geologic time by groundwater flowing through the jointed areas and dissolving the marble. The result is cavities and surface expressions of these cavities, where soil and overlying rock have collapsed or washed into the voids in the bedrock, causing sinkholes. There are at least 30 sinkholes on the campus, with the majority of them in the lower and central campus. Ravines, drainages, and cave systems are also developed due to karst geology. There are also three major campus drainages, Cave Gulch, Moore Creek, and Jordan Gulch, which run through the southern portion of campus in a north-south direction (Pacific Crest Engineering 2010).

Seismicity

The coastal areas of Northern California are seismically active, and the campus can be expected to experience periodic minor earthquakes and possibly a major earthquake (Moment magnitude 7 or greater) on one of the nearby active faults during the life of the proposed project. The seismicity in the site vicinity is related to activity on the San Andreas Fault system (UCSC 2006).

Beneath the UC Santa Cruz campus are two main fracture systems, trending approximately north-south and east-west, as well as a secondary set of fractures trending northwest-southeast, and many small fractures with no particular trending pattern. The Ben Lomond fault runs vertically along the eastern boundary of campus and is the nearest large fault. While it is in the immediate vicinity of the campus, it is a bedrock fault that is not known to be active. The San Andreas fault, a major active strike-slip fault, lies approximately 20 miles north of the campus and its branches, the Hayward, Calaveras, and San Gregorio faults, are also active and in the vicinity. The Zayante-Vergeles fault and the Sargent fault are in the area as well and are believed to be potentially active (UCSC 2006). These and other faults of the region are shown on Figure 4.6-3 in the 2005 LRDP EIR.

Since 1800, three major earthquakes have been recorded on the San Andreas Fault system. In 1836 an earthquake with an estimated magnitude intensity of VII on the Modified Mercalli (MM) scale and an estimated Moment magnitude (M_w) of 6.25 occurred east of Monterey Bay on the San Andreas fault. In 1838, an earthquake with an estimated intensity of approximately VII-IX on the MM scale and an M_w of 7.5 also occurred on the San Andreas fault. The third major earthquake on the San Andreas fault occurred in 1906. The San Francisco earthquake of 1906 had a maximum intensity of XI (MM), an M_w of 7.9 and caused the most significant damage in the history of the Bay Area in terms of loss of lives and property

damage. The Loma Prieta earthquake of 1989, which also occurred on the San Andreas Fault system, with its epicenter located in the Santa Cruz Mountains and an M_w of 6.9, affected the greater Bay Area.

In 2014, the Working Group on California Earthquake Probabilities (WGCEP) at the U.S. Geologic Survey predicted a 30-year probability of a magnitude 6.7 or greater earthquake to occur in the San Francisco Region, which includes the UC Santa Cruz campus, to be about 93 percent. According to WGCEP estimates, there is a 7.4 percent chance that a magnitude 6.7 or greater earthquake would occur on the Calaveras fault within 30 years and a 9.9 percent chance of a major earthquake on the San Andreas fault in the San Francisco region (WGCEP 2015).

4.5.2.3 Project Site Geology

Seismicity

Fault Rupture

The Heller and Hagar sites are not located within an Alquist-Priolo Earthquake Fault Zone. No active faults or extensions of active faults are mapped on either site. The nearest mapped potentially active fault to the project sites is the Monterey Bay-Tularcitos fault, approximately 6.1 miles southwest of the Heller site and 5.1 miles southwest of the Hagar site. Other faults in the area include the Zayante- Vergeles fault, about 7.9 and 8.9 miles northeast of the Heller and Hagar sites, respectively, and the San Gregorio fault 8.5 and 7.5 miles southwest of the Heller and Hagar sites, respectively. The San Andreas fault, which is a major seismic hazard in northern California, is about 11.5 and 11 miles northeast of the Heller and Hagar sites, respectively (CCCarto 2017). As there are no active faults at either project site, the potential for fault rupture at the project sites is low.

Seismic Hazards

Strong ground shaking caused by large earthquakes can induce ground failures, such as liquefaction,¹ lateral spreading,² and cyclic densification.³ A site's susceptibility to these hazards relates to the site topography, soil conditions, and/or depth to groundwater (NRCS 2017). Based on the soils present on

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- 1 Liquefaction is a phenomenon in which saturated, cohesionless soil experiences a temporary loss of strength due to the buildup of excess pore water pressure, especially during cyclic loading such as that induced by earthquakes. Soil most susceptible to liquefaction is loose, clean, saturated, uniformly graded, fine-grained sand; however, low plasticity silts and clay can also liquefy.
 - 2 Lateral spreading is a phenomenon in which surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. Upon reaching mobilization, the surficial blocks are transported downslope or in the direction of a free face by earthquake and gravitational forces.
 - 3 Cyclic densification is a phenomenon in which non-saturated, cohesionless soil is densified by earthquake vibrations, causing ground surface settlement.

both sites and the depth to groundwater, the potential for liquefaction, seismically induced differential settlement, and lateral spreading to occur at these sites is considered low.

Landslides

Potential hazards from landslides occur in areas with steep slopes topped with colluvium and soil. There are a few landslide deposits in the vicinity of the Heller site near Cave Gulch, directly west of the Heller site. However, the metamorphic rock that underlies the Heller site is stable and unlikely to experience landslides (Pacific Crest Engineering 2010). Conditions at the Hagar site are not conducive to landslides and no landslide deposits have been discovered in the vicinity of the site (UCSC 2006).

Project Site Geology

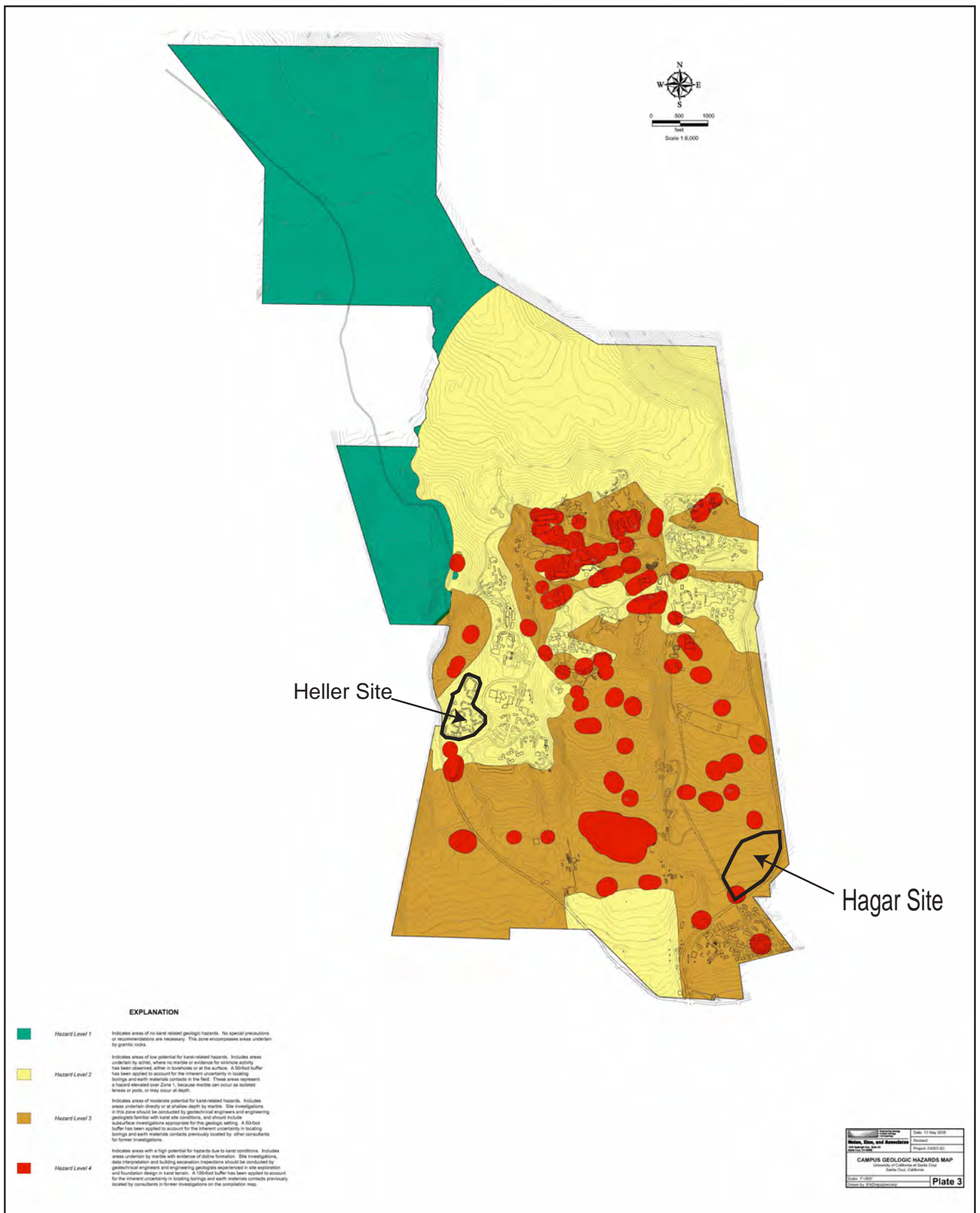
Heller Site

The Heller site is primarily located in an area underlain by schist bedrock and designated as Karst Hazard Level 2, which is an area with a low potential for karst-related hazards. The southern end of the Heller site touches upon an area designated as Karst Hazard Level 3, which is defined as having a moderate karst hazard potential (**Figure 4.5-1, Karst Hazard Levels at the Project Sites**).

The schist bedrock portion of the site is composed of three predominant types of earth materials – soil, weathered schist bedrock and schist bedrock. The soil is derived from a mix of weathering products derived from the underlying weathered schist bedrock and possibly marine terrace deposits from a fossil marine terrace that has been completely dissected and degraded from hundreds of thousands of years of erosion. The soil transitions at depth to a layer of weathered schist that has remnant bedrock structure but is weathered to the point that it verges on being soil. The weathered schist bedrock transitions at depth to schist bedrock that is very strong, massive, fresh, and intensely to moderately fractured.

The top of the unweathered schist occurs at between 28 and 60 feet below ground surface. The thickness of the unweathered schist bedrock is unknown, since the bottom of that unit was not encountered during exploration.

Although no large voids were encountered during the drilling program by Pacific Crest Engineering, two distinct dolines have been identified as lying within the southern portion of the development area. Relatively soft soil was found between about 20 and 50 feet below the ground surface in borings (2018) SD-2 and (2010) B-10 for one doline and between 35 and 44 feet below the ground surface in boring (2018) SD-1 in the other doline. The depth to “intact” marble bedrock ranged between 30 feet and deeper than 50 feet below the ground surface in the few borings advanced within the dolines. Based upon this evidence, it is likely that two dolines, filled with some relatively soft soil, underlies the development area. Hazards



SOURCE: UCSC, 2017

FIGURE 4.5-1

Karst Hazard Levels at the Project Sites

associated with the soft sediment zones within the doline include subsidence of the ground surface due to settlement of doline fill on top of marble bedrock and downward movement of materials into any cavities that were not detected during the investigation.

Hagar Site

The Hagar site is located within areas designated Karst Hazard Levels 3 and 4, which respectively have moderate and high potentials of being affected by karst-related hazards (**Figure 4.5-1**). There would be no construction within Level 4 at the Hagar site. The potential karst-related hazards to the proposed Hagar site concern the presence of dolines and zones of soft soil within the development area. No large voids have been encountered thus far in the geotechnical engineering and geophysical investigation. However, some relatively soft soil zones have been encountered near the contact between the marble bedrock and overlying soil in the borings. The depth to “intact” marble bedrock ranged between 12 and 38 feet below the ground surface for the widely spaced borings. It is likely that the development site is underlain by some relatively soft soil. Hazards associated with the soft sediment zones include subsidence of the ground surface due to settlement of the soil on top of marble bedrock and downward movement of materials into any cavities that were not detected during the geotechnical engineering or geophysical investigation.

Project Site Soils

The soil at the Heller site is composed of a mix of Lompico-Felton complex, Watsonville loam, Tierra-Watsonville complex, as well as small amounts of Elkhorn sandy loam and Aptos loam towards the southern end of the site. Lompico-Felton complex is found on the foot-slopes and near ridgetops and is composed of material weathered from sandstone, shale, siltstone, or schist. It has moderate permeability but a very high erosion hazard. Watsonville loam is found on coastal terraces and formed in alluvium. It has low permeability and slight to moderate erosion potential. The Tierra-Watsonville complex is composed of alluvium derived from sedimentary rock and is moderately permeable and has severe erosion potential. Elkhorn sandy loam is found on old alluvial fans and has moderate-low permeability and a slight- moderate erosion hazard. Similarly, Aptos loam has moderate erosion potential and permeability, but comes from the weathering of siltstone, shale, and sandstone (UCSC 2006).

Expansive soils shrink or swell with changes in moisture content. Clay mineralogy, clay content, and porosity of the soil influence the change in volume. The shrinking and swelling caused by expansive clay-rich soil can result in damage to overlying structures. Tierra-Watsonville complex soils have a high shrink-swell potential at depths greater than 14 inches (UCSC 2006), and according to the preliminary geotechnical recommendations for this site, the Heller site soils are considered moderate to highly expansive.

The Hagar site is composed of Danville loam and Elkhorn sandy loam. Danville loam is formed in alluvium and is common on fans and terraces. Similar to Elkhorn sandy loam, Danville Loam has slight to moderate potential for erosion and low permeability. With regards to soil expansion, Elkhorn loam has low to moderate shrink-swell potential and Danville loam generally has moderate shrink-swell potential. However, at depths between 17 to 29 inches, Danville loam has high shrink-swell potential (UCSC 2006).

4.5.3 REGULATORY CONSIDERATIONS

4.5.3.1 Federal Laws and Regulations

Clean Water Act

The Federal Water Pollution Control Act of 1972, often referred to as the Clean Water Act, empowers the US Environmental Protection Agency (US EPA) with regulation of wastewater and stormwater discharges into surface waters by using National Pollutant Discharge Elimination System (NPDES) permits and pretreatment standards. At the state level, these permits are issued by the Regional Water Quality Control Boards, but the US EPA may retain jurisdiction at its discretion. The Clean Water Act's primary relevance for geology and soils is with respect to the control of soil erosion during construction.

4.5.3.2 State Laws and Regulations

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (California Public Resources Code Section 25523(a); 20 CCR 1752(b) and (c); 1972 [amended 1994]) was passed in 1972 to regulate development on or near active fault traces to reduce the hazards associated with surface faulting. The Alquist-Priolo Earthquake Fault Zoning Act's main purpose is to ensure public safety by prohibiting the construction of most structures used for human occupancy across traces of active faults that constitute a potential hazard to structures from surface faulting or fault creep. For projects proposed within Alquist-Priolo Earthquake Fault Zones, site-specific geologic investigations must be performed prior to permitting, and must demonstrate that a proposed building would not be constructed across active faults. If an active fault is found, any structures for human occupancy must be set back from the fault, generally 25 to 50 feet.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act addresses seismically induced hazards, including liquefaction and landsliding (slope instability). Seismic hazard zones, which show areas where there is potential for ground shaking, liquefaction, landsliding, and other types of ground failure, have been developed to better regulate development in hazard-prone areas. For sites located within a seismic hazard zone,

geotechnical investigations must be conducted to assess if a hazard exists, and the investigations must provide options for mitigation if any hazards are identified. Geotechnical investigations within seismic hazard zones should be conducted following guidelines specified by California Geological Survey (CGS) Special Publication 117, “Guidelines for Evaluating and Mitigating Seismic Hazards.” The California Public Resources Code Chapter 7.8, 1990 Seismic Hazards Mapping Act, allows the lead agency to withhold permits until geologic investigations are conducted and mitigation measures are incorporated into plans.

California Building Standards Code

The State of California’s minimum standards for structural design and construction are given in the 2016 California Building Standards Code (CBSC) (CCR Title 24). The CBSC is based on the federal Uniform Building Code (International Code Council 2015), which is used widely throughout United States (generally adopted on a state-by-state or district-by-district basis) and has been modified for California conditions with numerous, more detailed or more stringent regulations. The CBSC provides standards for various aspects of construction, including but not limited to: excavation, grading, and earthwork construction; fills and embankments; expansive soils, foundation investigations, and liquefaction potential; and soil strength loss.

4.5.4 IMPACTS AND MITIGATION MEASURES

4.5.4.1 Significance Criteria

The impacts on geology from the implementation of the proposed project would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the State CEQA Guidelines, the UC CEQA Handbook, and the 2005 LRDP EIR:

- expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving
 - rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault;
 - strong seismic ground shaking;
 - seismic-related ground failure, including liquefaction; and
 - landslides;
- result in substantial soil erosion or the loss of topsoil;

- be located on a geologic unit or soil that is unstable or 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, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property; or
- have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

4.5.4.2 CEQA Checklist Items Adequately Analyzed at the 2005 LRDP Level or Not Applicable to the Project

Although redevelopment of the FSH complex on the Heller site was evaluated in the 2005 LRDP EIR, the currently proposed Heller site housing is substantially different from the previous proposal. The Hagar site was not envisioned for any development under the 2005 LRDP. Therefore, although the analysis below uses the prior LRDP level analysis to the extent appropriate, none of the CEQA checklist items listed above under Significance Criteria are scoped out; all of the items are addressed in the project-level analysis below.

4.5.4.3 Methodology

The following resources were reviewed to assess the potential for impacts associated with site geologic conditions.

- Prior geotechnical investigations conducted for campus construction projects
- Prior environmental review documents for the campus
- Regional and state data related to geologic, seismic, and soils conditions (e.g., seismic hazard mapping prepared by the US Geological Survey and California Geographical Society [CGS])
- Relevant federal and state regulations

The analysis compares identified impacts to the standards of significance stated above and determines the impact's level of significance under CEQA. If the impact is determined to be significant, the analysis identifies feasible mitigation measures to eliminate the impact or reduce it to a less than significant level. If the impact cannot be reduced to a less than significant level after implementation of all feasible mitigation measures, then the impact is identified as significant and unavoidable. The project's potential contribution to cumulative impacts is also identified.

4.5.4.4 2005 LRDP EIR Mitigation Measures Included in the Proposed Project

Table 4.5-1, 2005 LRDP EIR Mitigation Measures, presents the mitigation measures in the 2005 LRDP EIR that are applicable to the proposed project. Since these previously adopted mitigation measures are already being carried out as part of implementation of the 2005 LRDP, they are included in and are a part of the proposed project and will not be readopted. Implementation of these mitigation measures is assumed as part of the project impact analysis.

Table 4.5-1
2005 LRDP EIR Mitigation Measures

Mitigation Measure	Description
GEO-1	Where existing information is not adequate, detailed geotechnical studies shall be performed for areas that will support buildings or foundations. Recommendations of the geotechnical investigations will be incorporated into project design.

Source: UC Santa Cruz 2006

4.5.4.5 Project Impacts and Mitigation Measures

SHW Impact GEO-1: The proposed project would not expose people and structures to substantial adverse effects related to fault rupture, seismic ground shaking, and/or seismic-related ground failure. (*Less than Significant*)

The proposed project is not located within an Alquist-Priolo Fault Zone and there are no known active, potentially active, or inactive faults that transect either project site. The potential for fault rupture is considered to be low and the impact related to fault rupture would be less than significant.

Strong ground shaking caused by large earthquakes can induce ground failures, such as liquefaction, lateral spreading, and cyclic densification. Because the potential for liquefaction to occur at the sites is low, the potential for ground failures associated with liquefaction (i.e., post-liquefaction reconsolidation and loss of bearing support) is also low. However, areas containing expansive soils were discovered on both sites and could pose a significant threat to life and property. As required by the CBC and UC policy, and consistent with LRDP Mitigation GEO-1, the Campus would ensure that further detailed geotechnical investigations would be carried out on additional areas on the project sites that would support pavement or foundations, to provide geological information where investigations have not previously been completed. A site-specific evaluation of the Heller site was performed in 2010 in order to assess and minimize the risk from construction on expansive soils through appropriate engineering.

Compliance with the recommendations of the site-specific geotechnical reports as well as with the CBC would ensure that this impact would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact GEO-2: The proposed project would not result in substantial soil erosion or the loss of topsoil. (*Less than Significant*)

The proposed project would require grading and earthwork leaving bare earth that could result in soil erosion and loss of topsoil on both project sites. Although Tierra-Watsonville complex and Lompico-Felton complex have a high erosion potential, most of the soils at the sites have low to moderate erosion potential and do not present a substantial threat regarding soil erosion. Furthermore, UC Santa Cruz has developed a set of erosion control standards that are based substantially on Chapter 16.22 of the Santa Cruz County Code (Erosion Control Ordinance) and would be adhered to throughout the development of the proposed project.

As discussed in **Section 4.7, Hydrology and Water Quality**, the contractor is required to prepare a Storm Water Pollution Prevention Plan (SWPPP) in accordance with the National Pollution Discharge Elimination System (NPDES). The SWPPP shall be prepared by a Qualified Storm Water Pollution Prevention Plan Developer (QSD) and include both construction-phase erosion control measures and permanent erosion control measures for the proposed subdivision per the requirements of the California State Water Resources Control Board (SWRCB) adopted in accordance with the General Construction Activity Storm Water Permit. As the proposed project would be in accordance with Campus erosion control standards and would include the development and implementation of an SWPPP, the impact related to erosion and sedimentation would be less than significant and no mitigation is required.

Mitigation Measures: No mitigation is required.

SHW Impact GEO-3: The proposed project would result in construction of facilities in an area underlain by karst features, which could lead to settlement or collapse beneath the structures. (*Potentially Significant; Less than Significant with Mitigation*)

Heller Site

The Heller site is primarily located in an area designated as Karst Hazard Level 2, which is an area with a low potential for karst-related hazards. The southern end of the Heller site touches upon an area designated as Karst Hazard Level 3, which is defined as having a moderate karst hazard potential. Although no large voids were encountered during the drilling program completed on the Heller site by Pacific Crest Engineering, two distinct dolines⁴ have been identified as lying within the southern portion of the development footprint. Relatively soft soil was found between about 20 and 50 feet below the ground surface in two borings extended in the first doline and between 35 and 44 feet below the ground surface in a boring made in the second doline. The depth to “intact” marble bedrock ranged between 30 feet and deeper than 50 feet below the ground surface in the few borings advanced within the dolines.

Based on this evidence, it is likely that two dolines, filled with some relatively soft soil, underlie the southern portion of the development area on the Heller site. Hazards associated with the soft sediment zones within the doline include subsidence of the ground surface due to settlement of doline fill on top of marble bedrock and downward movement of materials into any cavities that were not detected during the investigation.

Another concern would be the potential for site storm water runoff that is discharged into an infiltration well to result in the formation of one or more sinkholes, which could in turn affect nearby utility infrastructure and roads. There would also be a public safety concern from the formation of new sinkholes. However, as discussed in **SHW Impact HYD-2**, the proposed infiltration well would be located within the soil layer over the weathered schist bedrock, and would not be located in the portion of the site that is underlain by karst where it could lead to sinkhole formation. There would be no impact related to discharge of stormwater by an infiltration well.

Hagar Site

The Hagar site is located within areas designated Karst Hazard Levels 3 and 4, which respectively have moderate and high potentials of being affected by karst-related hazards. An area designated Karst Hazard Level 4 is located in the southeastern corner of the Hagar site where a sink hole is also present. There would be no construction within Karst Hazard Level 4 area at the Hagar site. With regard to the rest of the site which is Level 3, the potential karst-related hazards at the proposed Hagar site concern the presence of dolines and zones of soft soil within the building footprints. No large voids were encountered thus far in the geotechnical engineering and geophysical investigation of the site. However, some

⁴ Doline refers to a basin- or funnel-shaped hollow in marble, ranging in width from a few meters to a kilometer and in depth from few to several hundred meters.

relatively soft soil zones were encountered near the contact between the marble bedrock and overlying soil in the borings. The depth to “intact” marble bedrock ranged between 12 and 38 feet below the ground surface for the widely spaced borings. It is likely that the development site is underlain by some relatively soft soil. Hazards associated with the soft sediment zones include subsidence of the ground surface due to settlement of the soil on top of marble bedrock and downward movement of materials into any cavities that were not detected during the geotechnical engineering or geophysical investigation.

Based on this information, construction of the proposed housing on the Hagar site and in the southern portion of the Heller site would have the potential to expose the buildings to hazards related to settlement or collapse. The impact would be potentially significant.

As with all development on the campus under the 2005 LRDP, the project will implement LRDP Mitigation GEO-1 which requires collection of additional site specific information (as needed) and implementation of the recommendations of the final geotechnical report. Based on the other projects completed on the campus in karst hazard areas and the geological data for both sites to date, it is anticipated that the final geotechnical reports for both sites will recommend that the buildings that are located within karst hazard areas be constructed on a concrete mat foundation that is supported by lime-treated compacted fill. The final geotechnical report will also further recommend that the mat should be designed to span a void appearing anywhere beneath the mat with a diameter of 10 feet. With the implementation of the recommendations of the geotechnical reports at the time of project design and construction, the potential for significant settlement or collapse impacts would be reduced. Additional mitigation measures are set forth to address the contingency that a void that is larger than the specified design void may exist under the building footprints. If such a void exists, and if soil washes or collapses into it after the building has been constructed, the structure may be damaged, a potentially significant adverse impact.

Given its location, site storm water runoff that is discharged from the Hagar site via a storm drain and a dissipation structure into Jordan Gulch would have the potential to result in the formation of one or more sinkholes, which could in turn affect nearby utility infrastructure and road. The impact related to potential sinkhole formation from site runoff would be potentially significant. However, this impact would be mitigated by **SHW Mitigations HYD-2C and -2D**, which require the runoff to be metered and also that a 60-foot buffer be maintained between the infiltration location and the existing utilities and roadways in the area.

Mitigation Measures:

SHW Mitigation GEO-3A: The project geotechnical engineer shall develop an assumed adequate design void span acceptable for the proposed building or development loads with respect to the underlying dolines. The intent of the design void span is to protect the proposed buildings and infrastructure against collapse if said design void occurs under them.

SHW Mitigation GEO-3B: At the time of the building foundation excavation in areas underlain by dolines, the excavation shall be examined by the project geologist and geotechnical engineer, prior to backfilling of the excavation. A geologic map portraying the distribution of rock and soil shall be prepared by the project geologist, particularly showing the geometry of the exposed marble bedrock. If previously unidentified dolines in excess of the design void span are mapped in the excavation, the project shall be redesigned to span those voids, or further subsurface work shall be performed to adequately characterize the hazard and attendant risks related to karst processes.

SHW Mitigation GEO-3C: Implement **SHW Mitigations HYD-2C and -2D**.

Significance after Mitigation: Implementation of the recommendation of the final geotechnical report per LRDP Mitigation GEO-1, and **SHW Mitigations GEO-3A, -3B, and -3C** would reduce the impact related to karst hazard to a less than significant level.

SHW Impact GEO-4: **The proposed project would not be located on expansive soils or a geologic unit that could become unstable as a result of the project. (*Less than Significant*)**

As described in **Section 4.6.2** under **Project Site Geology**, soils on the Heller site are moderately to highly expansive. Expansive soils, which shrink and swell cyclically as they are wetted and dried by seasonal rains or irrigation, can result in substantial damage to improperly designed or constructed structures over time. However, as discussed above, UC policy requires compliance with the CBC, which includes provisions for foundation design and construction in areas with expansive soils. Depending on site conditions and the nature of a project, a variety of approaches are possible, including overexcavation and replacement of native soils with non-expansive fills, amendment (such as lime treated engineered fill)

and on-site use of native soils, and implementation of specialized foundation designs, such as structural mat foundations and pier and grade beam foundations where needed due to high structural loads.

Site-specific geotechnical investigations are being prepared as part of the project, which will identify appropriate foundation design recommendations consistent with the CBC and current geotechnical engineering practices. LRDP Mitigation GEO-1 also includes the completion of a geotechnical investigation and would reduce the potential impact of development on expansive soils to a less than significant level.

Mitigation Measures: No mitigation is required.

SHW Impact GEO-5: The proposed project would not be located on soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems.
(*Less than Significant*)

The use of septic tanks is not proposed as part of this project. Therefore, there would be no impact associated with the use of septic tanks.

However, an alternative wastewater treatment system that utilizes a membrane bioreactor to treat wastewater is proposed for the Heller Site. This system would generate recycled water which would be used for toilet and urinal flushing and irrigation, and would not require disposal to any surface waters or to the City's wastewater collection system, although a pipeline connection to the sanitary sewer main located in Heller Drive will be constructed to allow an emergency discharge into the sanitary sewer system in case of system upset. Some of the recycled water that would be generated would be used within the Heller site development for toilet and urinal flushing, as well as landscape irrigation. Unused recycled water would be discharged onsite via drywells in the soil overlying the schist bedrock and within the weathered schist bedrock at locations with soils capable of receiving infiltration. The impacts from the infiltration of recycled water via dry wells as well as disposal of stormwater via dry wells and near-surface infiltration are addressed in **Section 4.7, Hydrology and Water Quality**, and are determined to be less than significant. Note that, as discussed in **Section 7.1, LRDP Water Supply Impact Assessment**, the Campus will evaluate the feasibility of using the excess recycled water in Porter and Kresge Colleges and at the Arboretum.

Mitigation Measures: No mitigation is required.

4.5.5 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

The proposed dining facilities expansion project would add to existing facilities on the west side of Rachel Carson College and to the southern end of Porter College. In both instances, the facilities would be located above or adjacent to existing buildings, or would replace the existing buildings with larger buildings. The areas where the improvements would be constructed are classified as Hazard Level 2 areas on the UC Santa Cruz's karst hazards map, based on previous geotechnical studies. Such areas have a low potential for karst-related hazards.

Impacts and Mitigation Measures

DF Impact GEO-1: **The proposed dining facilities expansion project would not expose people and structures to substantial adverse effects related to fault rupture, seismic ground shaking, seismic-related ground failure, landslides and cut slopes, or existing geologic conditions. Project implementation would also not result in substantial soil erosion or involve soils incapable of adequately supporting the use of septic tanks. (*Less than Significant*)**

Fault Rupture and Seismic-Related Ground Failure

The proposed dining facilities expansion project is not located within an Alquist-Priolo Fault Zone and there are no known active, potentially active, or inactive faults that transect the campus. The potential for fault rupture is considered to be low and the impact would be less than significant. The potential for liquefaction and seismic-related ground failure to occur is also considered low. Furthermore, the project will be required to implement LRDP Mitigation GEO-1, which requires the completion of a site-specific geotechnical investigation and the implementation of the investigation's recommendations. Therefore the impact related to ground failure due to seismic ground shaking would be less than significant.

Erosion

The areas to be disturbed to construct the proposed improvements are small and previously graded in conjunction with the existing development at both colleges. Furthermore, the project will be required to implement a Storm Water Pollution Prevention Plan, or, if the project would disturb less than an acre of land, an Erosion and Sediment Control Plan would be required to comply with Campus Standards, to

minimize erosion and sedimentation during construction. Therefore, erosion impacts would be less than significant.

Landslides

The proposed improvements are not within an area where landslides are likely to occur.

Unstable Geologic Unit

The proposed project will be required to implement LRDP Mitigation GEO-1 which requires a geotechnical investigation of the sites and implementation of the recommendations of the geotechnical investigation during project design and construction. As a result, if construction on expansive soils or units that could become unstable is proposed as part of the project, the building sites would be made stable by way of compaction and placement of engineered fill, including lime-treated fill if needed, and the foundations would be designed appropriately. Therefore the impact related to expansive soils and unstable geologic units would be less than significant.

Septic Tanks

There would be no septic tank use associated with the dining facilities expansion project. Therefore, there would be no impacts with regards to septic tanks.

Mitigation Measures: No mitigation is required.

4.5.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

SHW Impact C-GEO-1: Implementation of the proposed SHW project would not result in significant cumulative impacts related to geology and soils. (*Less than Significant*)

As stated in the 2005 LRDP EIR, most impacts related to geology and soils tend to be site specific and do not cumulate. The EIR did evaluate the cumulative impact of the campus development under the 2005 LRDP as well as other reasonably foreseeable development in the region (LRDP Impact GEO-6) from exposing people and structures to adverse effects from seismic ground shaking and determined that compliance with the CBC would render the cumulative impact less than significant. As stated in the impact analysis above, as an element of the planned development under the 2005 LRDP, the proposed project would implement applicable mitigation measures from the 2005 LRDP EIR as well as comply with the CBC, and therefore would not result in new or greater impacts than previously analyzed in the 2005

LRDP EIR. The cumulative impact of the proposed project is adequately addressed by the analysis in the 2005 LRDP EIR, and would be less than significant.

Mitigation Measures: No mitigation is required.

4.5.7 REFERENCES

- CCCarto. 2017. Monterey Bay Faults, Santa Cruz Fault Map. Available online at: https://www.cccarto.com/faults/sc_faults/, accessed November 18.
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4.6 GREENHOUSE GAS EMISSIONS

4.6.1 INTRODUCTION

This section discusses the existing global, national, and statewide conditions related to greenhouse gases (GHG) and global climate change and evaluates the potential impacts on global climate from the implementation of the proposed UC Santa Cruz Student Housing West project (“SWH project” or “proposed project”). In addition, the section provides a discussion of the applicable federal, state, regional, and local agencies that regulate, monitor, and control GHG emissions.

The section also presents potential GHG impacts from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and the existing colleges (see **Section 4.6.5** below).

Data used to prepare this section were taken from various sources, including the Monterey Bay Unified Air Pollution Control District’s *Guidelines for Implementing the California Environmental Quality Act*, published in 2016, and technical analyses conducted for the project by Illingworth & Rodkin (I&R). The technical memorandum documenting the I&R analysis is presented in **Appendix 4.2** of this EIR.

The project is located within the air basin that is under the jurisdiction of the Monterey Bay Air Resources District (MBARD), formerly known as the Monterey Bay Unified Air Pollution Control District (MBUAPCD). To avoid confusion, the prior name of the District is not used in this section; the phrase “Air District” or the acronym “MBARD” is used throughout the section to refer to the Air District. Although the District’s CEQA guidance related to GHG emissions was prepared when the Air District was called MBUAPCD, the guidelines are referred to as the MBARD 2016 guidelines.

4.6.2 ENVIRONMENTAL SETTING

4.6.1 Background

Global climate change refers to any significant change in climate measurements, such as temperature, precipitation, or wind, lasting for an extended period (i.e., decades or longer) (US EPA 2013). Climate change may result from:

- Natural factors, such as changes in the sun’s intensity or slow changes in the Earth’s orbit around the sun;
- Natural processes within the climate system (e.g., changes in ocean circulation, reduction in sunlight from the addition of GHG and other gases to the atmosphere from volcanic eruptions); and

- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification).

The primary effect of global climate change has been a rise in the average global tropospheric temperature of 0.2 degree Celsius (°C) per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling using 2000 emission rates shows that further warming is likely to occur, which would induce further changes in the global climate system during the current century (IPCC 2007). Changes to the global climate system and ecosystems, and to California, could include:

- Declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures (IPCC 2007);
- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets. Along most of the California coast, the average values for future sea level rise are projected to be approximately 6 inches by 2030, 12 inches by 2050, and 36 inches by 2100 (NRC 2012);
- Changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones (IPCC 2007);
- Declining Sierra snowpack levels, which account for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years (Cal EPA 2006);
- Increasing the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas located in the Southern California area and the San Joaquin Valley by the end of the 21st century (Cal EPA 2006);
- Increasing the potential for erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Delta and associated levee systems due to the rise in sea level (Cal EPA 2006);
- Increasing pest infestation, making California more susceptible to forest fires (Cal EPA 2006);
- Increasing the demand for electricity by 1 to 3 percent by 2020 due to rising temperatures resulting in hundreds of millions of dollars in extra expenditures (Cal EPA 2006); and
- Summer warming projections in the first 30 years of the 21st century ranging from about 0.5 to 2 °C (0.9 to 3.6 °F) and by the last 30 years of the 21st century, from about 1.5 to 5.8 °C (2.7 to 10.5 °F) (Cal EPA 2006).

The natural process through which heat is retained in the troposphere¹ is called the “greenhouse effect.” Various gases in the Earth’s atmosphere, classified as atmospheric greenhouse gases (GHGs), play a critical role in determining the Earth’s surface temperature. Solar radiation enters Earth’s atmosphere as short wave radiation. It travels through the atmosphere without warming it and is absorbed by the Earth’s surface. When the Earth re-emits this radiation back toward space, the radiation changes to long wave radiation. GHGs are transparent to incoming short wave solar radiation but absorb outgoing long wave radiation. As a result, radiation that otherwise would escape back into space is now retained, warming the atmosphere. This phenomenon is known as the greenhouse effect.

4.6.2.2 Greenhouse Gases

State law defines GHGs to include the following six compounds:

- **Carbon Dioxide** (CO₂) is released to the atmosphere when solid waste, fossil fuels (oil, natural gas, and coal), and wood and wood products are burned. CO₂ emissions from motor vehicles occur during operation of vehicles and operation of air conditioning systems. CO₂ comprises over 80 percent of GHG emissions in California (Cal EPA 2014).
- **Methane** (CH₄) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from the decomposition of organic waste in solid waste landfills, raising livestock, natural gas and petroleum systems, stationary and mobile combustion, and wastewater treatment. Methane makes up 8.3 percent of all GHGs, and mobile sources and general fuel combustion represent 0.69 percent of overall methane emissions (Cal EPA 2014).
- **Nitrous Oxide** (N₂O) is emitted during agricultural and industrial activities, as well as during combustion of solid waste and fossil fuels. Mobile sources represent about 12 percent of N₂O emissions (US EIA 2011). N₂O emissions from motor vehicles generally occur directly from operation of vehicles.
- **Hydrofluorocarbons** (HFCs) are one of several high global warming potential (GWP) gases that are not naturally occurring and are generated from industrial processes. HFC (refrigerant) emissions from vehicle air conditioning systems occur due to leakage, losses during recharging, or release from scrapping vehicles at end of their useful life.

¹ The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth’s surface from 6 to 7 miles).

- **Perfluorocarbons** (PFCs) are another high GWP gas that are not naturally occurring and are generated in a variety of industrial processes. Emissions of PFCs from motor vehicles are generally negligible.
- **Sulfur Hexafluoride** (SF₆) is another high GWP gas that is not naturally occurring and is generated in a variety of industrial processes. Emissions of SF₆ from motor vehicles are generally negligible.

While water vapor and carbon dioxide (CO₂) are the most abundant GHGs, other trace GHGs have a greater ability to absorb and re-radiate long-wave radiation. To gauge the potency of GHGs, scientists have established a Global Warming Potential (GWP) for each GHG based on its ability to absorb and re-emit long-wave radiation over a specific period. The GWP of a gas is determined using CO₂ as the reference gas, which has a GWP of 1 over 100 years (IPCC 2007).² For example, a gas with a GWP of 10 is 10 times more potent than CO₂ over 100 years. The use of GWP allows GHG emissions to be reported using CO₂ as a baseline. The sum of each GHG multiplied by its associated GWP is referred to as “carbon dioxide equivalents” (CO₂e). 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 CO₂. As illustrated in **Table 4.6-1, Global Warming Potential For Greenhouse Gases**, the other GHGs are less abundant but have higher GWP than CO₂. To account for this higher potential, emissions of other GHGs are frequently expressed in the equivalent mass of CO₂, denoted as CO₂e. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO₂ were being emitted. High GWP gases such as HFCs, PFCs, and SF₆ are the most heat-absorbent.

Table 4.6-1
Global Warming Potential for Greenhouse Gases

Greenhouse Gas	Global Warming Potential Factor (100-Year)
Carbon Dioxide (CO ₂)	1
Methane (CH ₄)	25
Nitrous Oxide (N ₂ O)	298
Perfluorocarbons (PFCs)	7,390-12,200
Hydrofluorocarbons (HFCs)	124-14,800
Sulfur Hexafluoride (SF ₆)	22,800
Source: Southern California Association of Governments, Draft Program EIR for 2016 RTP/SCS. November 24, 2015.	

² All Global Warming Potentials are given as 100-year values.

Greenhouse Gas	Global Warming Potential Factor (100-Year)
<i>Note: Global warming potential measures how much heat a GHG traps in the atmosphere, in this case, over a 100-year period.</i>	

4.6.2.3 GHG Emissions Classification

To achieve consistency in reporting across different geographies, the GHG Protocol established by the World Research Institute, developed a GHG emissions classification system that classifies GHG emissions into three categories based on the nature and source of the emissions. This classification system is listed in the University of California Sustainable Practices Policy and is used by the University to gather data on its annual GHG emissions for reporting to the Climate Registry.

- 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 vehicle fleets, and fugitive emissions of gases used for refrigeration and scientific research. Fugitive gases include hydrofluorocarbon gases, perfluorocarbon gases, and sulfur hexafluoride (SF6).
- 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, including GHG emissions from employee commuting, business air and ground travel, electricity transmission and distribution losses, off-site wastewater treatment, and off-site municipal solid waste disposal.

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 must be addressed in a CEQA document. In addition, CEQA requires that the estimate of a project's emissions include emissions from the supply, treatment and distribution of water used by the project.

4.6.3 REGULATORY CONSIDERATIONS

4.6.3.1 International Laws and Regulations

Kyoto Protocol

In 1988, the United Nations established the Intergovernmental Panel on Climate Change to evaluate the impacts of global warming and to develop strategies that nations could implement to curtail global

climate change. In 1992, the United States (the “U.S.”) joined other countries around the world in signing the United Nations’ Framework Convention on Climate Change (UNFCCC) agreement with the goal of controlling greenhouse gas emissions. As a result, the Climate Change Action Plan was developed to address the reduction of GHG emissions in the U.S. The plan currently consists of more than 50 voluntary programs for member nations to adopt. The Kyoto Protocol (the “Protocol”) is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. Notably, while the U.S. is a signatory to the Kyoto protocol, Congress has not ratified the Protocol and the U.S. is not bound by the Protocol’s commitments. The major feature of the Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions. The major distinction between the Protocol and the UNFCCC is that while the UNFCCC encouraged industrialized countries to stabilize GHG emissions, the Protocol commits them to do so. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of “common but differentiated responsibilities.”

On December 12, 2015, a Conference of the Parties to the UNFCCC and the 11th session of the Kyoto Protocol negotiated an agreement in Paris that would keep the rise of temperature below 2 degrees Celsius. While 186 countries published their action plans detailing how they plan to reduce their GHG emissions, these reductions would still result in up to 3 degrees Celsius of global warming. The Paris agreement asks all countries to review their plans every five years from 2020, acknowledges that \$100 billion is needed each year to enable countries to adapt to climate change. The agreement was signed into law on April 22, 2016. However, in May 2017, President Donald Trump announced that the U.S. would withdraw from the agreement.

The Western Regional Climate Action Initiative (WCI)

The Western Regional Climate Action Initiative (WCI) is a partnership among seven states, including California, and four Canadian provinces to implement a regional, economy-wide cap-and-trade system to reduce global warming pollution. The WCI will cap GHG emissions from the region’s electricity, industrial, and transportation sectors with the goal to reduce the heat trapping emissions that cause global warming to 15 percent below 2005 levels by 2020. When the WCI adopted this goal in 2007, it estimated that this would require 2007 levels to be reduced worldwide between 50 percent and 85 percent by 2050. California is working closely with the other states and provinces to design a regional GHG reduction program that includes a cap-and-trade approach. The California Air Resources Board’s (CARB) planned cap and-trade program, discussed below, is also intended to link California and the other member states and provinces.

4.6.3.2 Federal Laws and Regulations

The USEPA has historically not regulated GHG emissions because it determined the Clean Air Act did not authorize it to regulate emissions that addressed climate change. In 2007, the U.S Supreme Court found that GHG emissions could be considered within the Clean Air Act's definition of a pollutant (*Massachusetts v. EPA et al*, 2007). In December 2009, USEPA issued an endangerment finding for GHG emissions under the Clean Air Act, setting the stage for future regulation. In September 2009, the National Highway Traffic Safety Administration (NHTSA) and USEPA announced a joint rule that would tie fuel economy to GHG emission reduction requirements. By 2016, this could equate to an overall light-duty vehicle fleet average fuel economy of 35.5 miles per gallon.

In June 2013, President Obama announced a Climate Action Plan that calls for a number of initiatives, including funding \$8 billion in advanced fossil energy efficiency projects, calls for federal agencies to develop new emission standards for power plants, invests in renewable energy sources, calling for adaptation programs, and leading international efforts to address climate change. There have been numerous executive actions, proposed and finalized agency regulations, investment strategies, budget requests, and international bilateral agreements. This includes a final rule for the Clean Power Plan in August 2015, which will cut carbon emissions from existing power plants 32 percent below 2005 levels by 2030.

Vehicle Standards

Other regulations have been adopted to address vehicle standards including the USEPA and the NHTSA joint rulemaking for vehicle standards.

- On March 30, 2009, the NHTSA issued a final rule for model year 2011 (NHSTA 2009).
- On May 7, 2010, the USEPA and the NHTSA issued a final rule regulating fuel efficiency and GHG emissions pollution from motor vehicles for cars and light-duty trucks for model years 2012–2016 (US EPA 2010).
- On August 9, 2011, USEPA and NHTSA issued a Supplemental Notice of Intent announcing plans to propose stringent, coordinated federal GHG emissions and fuel economy standards for model year 2017-2025 light-duty vehicles (US EPA and NHTSA 2011).
- NHSTA intends to set standards for model years 2022-2025 in a future rulemaking (NHSTA 2012).

- In addition to the regulations applicable to cars and light-duty trucks, on August 9, 2011, the USEPA and the NHTSA announced fuel economy and GHG emissions standards for medium- and heavy-duty trucks that applies to vehicles from model year 2014–2018 (US EPA 2011).
- Energy Independence and Security Act (the “EISA”)
- Among other key measures, the EISA would do the following, which would aid in the reduction of national GHG emissions, both mobile and non-mobile:
- Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
- Prescribe or revise standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

While superseded by NHTSA and USEPA actions described above, EISA also set miles per gallon targets for cars and light trucks and directed the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.

Additional provisions of the EISA address energy savings in government and public institutions, promoting research for alternative energy, additional research in carbon capture, international energy programs, and the creation of “green jobs.”

4.6.3.3 State Laws and Regulations

Assembly Bill 1493

California has adopted a series of laws and programs to reduce emissions of GHGs into the atmosphere. Assembly Bill (AB) 1493 by then-Assembly member Fran Pavley was enacted in September 2003 and requires regulations to achieve “the maximum feasible reduction of greenhouse gases” emitted by vehicles used for personal transportation.

Executive Order S-3-05

On June 1, 2005, Governor Schwarzenegger issued Executive Order S-3-05, which set the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels. The

California Environmental Protection Agency (Cal EPA) formed a Climate Action Team (“CAT”) that recommended strategies that can be implemented by state agencies to meet GHG emissions targets. The Team reported several recommendations and strategies for reducing GHG emissions and reaching the targets established in the Executive Order (CAT 2006). Furthermore, the report provided to Governor Schwarzenegger in 2006 indicated that smart land use and increased transit availability should be a priority in the State of California (CAT 2006). According to the California Climate Action Team, smart land use is an umbrella term for strategies that integrate transportation and land-use decisions. Such strategies generally encourage jobs/housing proximity, promote transit-oriented development (TOD), and encourage high-density residential/commercial development along transit corridors. These strategies develop more efficient land-use patterns within each jurisdiction or region to match population increases, workforce, and socioeconomic needs for the full spectrum of the population.

Executive Order B-30-15

On April 29, 2015, Governor Brown issued an executive order setting a Statewide GHG reduction target of 40 percent below 1990 levels by 2030. This action aligns the State’s GHG targets with those set in October 2014 by the European Union and is intended to help the State meet its target of reducing GHG emissions 80 percent below 1990 levels by 2050. The measure calls on State agencies to implement measures accordingly and directs the CARB to update the Climate Change Scoping Plan.

Assembly Bill 32

In September 2006, AB 32 was signed into law by Governor Arnold Schwarzenegger, focusing on achieving GHG emissions equivalent to statewide levels in 1990 by 2020. It mandates that the CARB establish a quantified emissions cap, institute a schedule to meet the cap, implement regulations to reduce statewide GHG emissions from stationary sources, and develop tracking, reporting, and enforcement mechanisms to ensure that reductions are achieved.

CARB developed an AB 32 Scoping Plan that contains strategies to achieve the 2020 emissions cap. This Scoping Plan, which was developed by CARB in coordination with the CAT, was first published in October 2008 (the “2008 Scoping Plan”). The 2008 Scoping Plan proposed a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce the state’s dependence on oil, diversify the state’s energy sources, save energy, create new jobs, and enhance public health. It accommodated the State’s projected population growth. Moreover, it expressly encouraged called for coordinated planning of growth, including the location of dense residential projects near transportation infrastructure, including public transit.

On May 22, 2014, CARB approved its first update to the AB 32 Scoping Plan, recalculating 1990 GHG emissions using IPCC Fourth Assessment Report (AR4) released in 2007. It states that based on the AR4 global warming potentials, the 427 MMTCO_{2e} 1990 emissions level would be slightly higher than identified in the original Scoping Plan, at 431 MMTCO_{2e}. Based on the revised estimates of expected 2020 emissions identified in the 2011 supplement to the FED and updated 1990 emissions levels identified in the draft first update to the Scoping Plan, achieving the 1990 emission level would require a reduction of 76 MMTCO_{2e} or a reduction by approximately 15.3 percent (down from 28.4 percent) to achieve in 2020 emissions levels in the BAU condition. CARB's First Update "lays the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050," and many of the emission reduction strategies recommended by CARB would serve to reduce the project's post-2020 emissions level to the extent applicable by law by focusing on reductions from several sectors (CARB 2014). CARB will be doing a second update to the Scoping Plan to reflect the 2030 targets set by Executive Order B-30-15 and codified by SB 32.

Nearly all reductions are to come from sources that are controlled at the statewide level by State agencies, including the CARB, Public Utilities Commission, High Speed Rail Authority, and California Energy Commission. The few actions that are directly or indirectly associated with local government control are in the Transportation sector. Of these actions, only one (GHG reductions through coordinated planning) specifically identifies local governments as the responsible agency.

Cap-and-Trade Program

CARB adopted a California Cap-and-Trade Program pursuant to its authority under AB 32. The Cap-and-Trade Program is designed to reduce GHG emissions from major sources (deemed "covered entities") by setting a firm cap on statewide GHG emissions and employing market mechanisms to achieve AB 32's emission-reduction mandate of returning to 1990 levels of emissions by 2020. The statewide cap for GHG emissions from the capped sectors (e.g., electricity generation, petroleum refining, and cement production) commenced in 2013 and declines over time, achieving GHG emission reductions throughout the program's duration.

As of January 1, 2015, the Cap-and-Trade Program covered approximately 85 percent of California's GHG emissions. The Cap-and-Trade Program covers the GHG emissions associated with electricity consumed in California, whether generated in-state or imported. Accordingly, GHG emissions associated with CEQA projects' electricity usage are covered by the Cap-and-Trade Program.

On July 25, 2017, the Governor signed AB 398 into law, extending the Cap-and-Trade Program to 2030. AB 398 calls for half of emissions offsets to be generated in California and prohibits CARB and air districts from regulating CO₂ from sources under the Cap-and-Trade program.

Senate Bill 1368

Senate Bill (SB) 1368 requires the California Public Utilities Commission and the California Energy Commission to establish GHG emissions performance standards for the generation of electricity. These standards will also apply to power that is generated outside of California and imported into the state.

SB 97 & CEQA Guidelines

In August 2007, the California State Legislature adopted Senate Bill 97 (SB 97), requiring the Governor's Office of Planning and Research (OPR) to prepare and transmit new CEQA guidelines for the mitigation of GHG emissions or the effects of GHG emissions. In response to SB 97, the California Natural Resources Agency (CNRA) adopted amendments to the State CEQA Guidelines that require evaluation of GHG emissions or the effects of GHG emissions. The amendments, in Section 15064.4, provide that:

- (a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in Section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate, or estimate the amount of greenhouse gas emissions resulting from a project.
- (b) A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:
 - (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
 - (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;
 - (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions.

The amendments also add Section 15126.4(c), Mitigation Measures Related to Greenhouse Gas Emissions. Generally, this State CEQA Guidelines section requires lead agencies to consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant

effects of GHG emissions. Potential measures to mitigate the significant effects of GHG emissions are identified, including those outlined in Appendix F, Energy Conservation, of the State CEQA Guidelines.

State Bill 375

On September 30, 2008, SB 375 was instituted to help achieve AB 32 goals through regulation of cars and light trucks. SB 375 aligns three policy areas of importance to local government: (1) regional long-range transportation plans and investments; (2) regional allocation of the obligation for cities and counties to zone for housing; and (3) a process to achieve GHG emissions reductions targets for the transportation sector. It establishes a process for CARB to develop GHG emissions reductions targets for each region (as opposed to individual local governments or households). SB 375 also requires Metropolitan Planning Organizations (“MPOs”) to prepare a Sustainable Communities Strategy (SCS) within the Regional Transportation Plan (RTP) that guides growth while taking into account the transportation, housing, environmental, and economic needs of the region. SB 375 uses CEQA streamlining as an incentive to encourage residential projects, which help achieve AB 32 goals to reduce GHG emissions.

In October 2017, CARB released its final report recommending updates to the SB 375 GHG emission reduction targets across the State (CARB 2017). This addresses several statutory, technological, and policy factors that have changed since the original 2010 targets. The original SB 375 2020 targets for the AMBAG region were a zero percent reduction, while the proposed 2035 target could increase from a 5 percent to a 6 percent reduction.

Executive Order B-30-15

In April 2015, Governor Brown signed Executive Order B-30-15 that provides the state a mid-term target. The executive order establishes a target for the state to reduce its GHG emissions such that the state’s 2030 emissions are 40 percent of the 1990 emissions. According to the state, California is on track to meet or exceed the current target of reducing GHG emissions to 1990 levels by 2020, as established in AB 32. The new emission reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the ultimate goal of reducing emissions 80 percent under 1990 levels by 2050, established by Executive Order S-3-05.

Senate Bill 350

On October 7, 2015, Senate Bill 350: Clean Energy and Pollution Reduction Act (SB 350) was signed into law, establishing new clean energy, clean air and greenhouse gas reduction goals for 2030 and beyond. Building off of AB 32, SB 350 established California’s 2030 greenhouse gas reduction target of 40 percent below 1990 levels. To achieve this goal, SB 350 set ambitious 2030 targets for energy efficiency and

renewable electricity, among other actions aimed at reducing greenhouse gas emissions. SB 350 increases California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. This will increase the use of Renewables Portfolio Standard (RPS) eligible resources, including solar, wind, biomass, geothermal, and others. In addition, SB 350 requires the state to double statewide energy efficiency savings in electricity and natural gas end uses by 2030.

Senate Bill 32

Senate Bill 32 (SB 32) was signed into law on August 31, 2016. This bill requires CARB to adopt rules and regulations to ensure that statewide GHG emissions are reduced to 40 percent below the 1990 level by 2030.

Assembly Bill 197

On September 8, 2016, Assembly Bill 197 (AB 197) was signed into law. This bill requires CARB to make available the emissions of greenhouse gases, criteria pollutants, and toxic air contaminants for each facility that reports to the state board and air districts. In addition, this bill requires that CARB make available the emissions of greenhouse gases, criteria pollutants, and toxic air contaminants throughout the state, broken down to a local and sub-county level for stationary sources and to at least a county level for mobile sources, as specified.

Title 24 Energy Efficiency Standards

California's Energy Efficiency Standards for Residential and Nonresidential Buildings, located at Title 24, Part 6 of the California Code of Regulations and commonly referred to as "Title 24," were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.

California Green Building Standards

The California Green Building Standards Code, which is Part 11 of the California Code of Regulations (the "CCR"), is commonly referred to as the *CALGreen* Code. *CALGreen* was added to Title 24 to represent base standards for reducing water use, recycling construction waste, and reducing polluting materials in new buildings. In contrast, Title 24 focuses on promoting more energy-efficient buildings and considers the building envelope, heating and cooling, water heating, and lighting restrictions. The current 2016 *CALGreen* Code became effective January 1, 2017.

4.6.3.4 Regional

MBARD Guidelines for Implementing the California Environmental Quality Act

MBARD revised its 1996 *Guidelines for Implementing CEQA* in February of 2016. The revision included significance criteria for stationary source greenhouse gas emissions to be used when the Air District is the Lead Agency. MBARD has not adopted guidance for CEQA projects under other lead agencies. According to the 2016 guidelines, “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/yr) CO₂e, 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)].”

The 2016 guidelines define stationary source projects to include “equipment, processes and operations that require an Air District permit to operate.” The guidelines also state that “Project GHG emissions include direct and indirect sources emissions. Direct emissions occur as a result of onsite equipment, and also offsite sources directly related to the project such as emissions from worker commute trips and haul truck trips. Indirect emissions occur as a result of a project’s actions but are produced from sources not owned or controlled by the project such as offsite emissions from electricity generation, water conveyance, and waste disposal.”

AMBAG 2035 Metropolitan Transportation Plan/Sustainable Communities Strategy

In June, 2014, AMBAG adopted its 2035 Metropolitan Transportation Plan Sustainable Communities Strategy (the “RTP/SCS”), calling for a continuation of integrated planning for land use and transportation that will help achieve the State’s goal of reducing per capita GHG emissions by eight percent by 2020 compared to 2005 levels, by 18 percent by 2035, and 21 percent by 2040. The Plan calls for public transportation improvements and land use planning that would cut emissions from passenger vehicles to nearly six percent below 2005 levels.

The RTP/SCS also includes a number of mitigation measures designed to reduce the potential of development to conflict with AB 32 or any other plan designed to reduce GHG. These mitigation

measures are particularly important where streamlining mechanisms under SB 375 are utilized. Examples of GHG emissions reduction mitigation measures include the following:

- **MM-GHG-1:** The project sponsor shall ensure that applicable GHG-reducing diesel particulate and NO_x emissions measures for off-road construction vehicles are implemented during construction. The measures shall be noted on all construction plans and the project sponsor shall perform periodic site inspections. Applicable GHG reducing measures include the following.
 - Use of diesel construction equipment meeting CARB's Tier 2 certified engines or cleaner off-road heavy-duty diesel engines, and comply with the State Off-Road Regulation;
 - Use of on-road heavy-duty trucks that meet the CARB's 2007 or cleaner certification standard for on-road heavy-duty diesel engines, and comply with the State On-Road Regulation;
 - All on and off-road diesel equipment shall not idle for more than 5 minutes. Signs shall be posted in the designated queuing areas and or job sites to remind drivers and operators of the 5 minute idling limit;
 - Use of electric powered equipment in place of diesel powered equipment when feasible;
 - Substitute gasoline-powered in place of diesel-powered equipment, where feasible;
 - Use of alternatively fueled construction equipment, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane or biodiesel, in place of diesel powered equipment for 15 percent of the fleet;
 - Use of materials sourced from local suppliers; and
 - Recycling of at least 50 percent of construction waste materials.

Climate Action Compact (CAC)

In 2007 UC Santa Cruz became a founding signatory to the CAC, a Monterey Bay regional compact to collectively address GHG emissions. The charter statement of the CAC is: "to develop effective collaborative solutions for the reduction of greenhouse gas emissions from our communities, municipal services, transportation infrastructure, business and energy providers necessitates active collaboration among groups and aggressive steps taken towards a low carbon future." This compact will reduce the Monterey Bay Region's contribution to climate change and benefit members by:

1. Providing a neutral forum for city and county government agencies and special districts to learn from each other and from others about climate protection programs.
2. Establishing a dialog among members that will lead to innovative solutions to current hurdles and reduce the need of individual members to research all areas of climate mitigation and adaptation.
3. Supporting members who take actions to address GHG emissions and support the success of those actions throughout the region.
4. Helping address funding and other resource limitation as necessary for all members to achieve their reduction goals.

The CAC is important to UC Santa Cruz for fostering community relations, meeting sustainability and climate change commitments, and participating in collaborative approaches to addressing regional and global challenges.

4.6.3.5 Local

University of California Sustainable Practices Policy

The University of California Sustainable Practices Policy (“Policy”), most recently updated in September 2016, is a system-wide commitment to minimize the University’s impact on the environment and reduce its dependence on non-renewable energy sources. The Policy states that “The University of California (“University”) is committed to responsible stewardship of resources and to demonstrating leadership in sustainable business practices. The University’s locations should be living laboratories for sustainability, contributing to the research and educational mission of the University, consistent with available funding and safe operational practices.”

The Policy establishes goals in 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. Portions of the Policy applicable to the proposed project are listed below:

Green Building Design

- All new building projects shall be designed, constructed, and commissioned to outperform the CBC energy-efficiency standards by at least 20 percent or meet the whole-building energy performance targets listed in the Sustainable Practices Policy, Table 1 of Section V.A.3. The University will strive to design, construct, and commission buildings that outperform CBC

energy efficiency standards by 30 percent or more, or meet the stretch whole-building energy performance targets listed in Table 1 of Section V.A.3, 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 provide a justification as described in Section V.A.4.

Clean Energy

In support of the climate neutrality goals outlined in Section C of this policy, the University of California is committed to reducing its greenhouse gas emissions by reducing energy use and switching to clean energy supplies.

- **Energy Efficiency:** Each campus and medical center will implement energy efficiency actions in buildings and infrastructure systems to reduce their energy use intensity by at least 2 percent year over year.
- **On-campus Electricity:** Campuses will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of campus carbon goals.
- **Off-campus Electricity:** By 2025, the University will rely on 100 percent clean electricity supplies. Locations served directly by UC's own Electricity Services Provider will implement clean-electricity supplies starting in 2017 and transition to clean-electricity supplies by 2021.
- **On-site Combustion:** By 2025, at least 40 percent of the fuel used for on-site combustion will be low-carbon biogas.

Climate Protection

Each campus and the UC Office of the President will develop strategies for meeting the following UC goals:

- Climate neutrality from Scope 1 and 2 sources by 2025³
- Climate neutrality from specific Scope 3 sources (as defined by the American College and University Presidents' Climate Commitment (ACUPCC) by 2050 or sooner

And at minimum, meet these following intermediate goals in pursuit of climate neutrality:

- Reducing GHG emissions to 1990 levels by 2020, pursuant to the California Global Warming Solutions Act of 2006.

³ For definitions of Scopes 1, 2 and 3 emissions, see **Section 4.6.2.3** above.

Sustainable Transportation

The University recognizes that single-occupant vehicle (SOV) commuting is a primary contributor to commute GHG emissions and localized transportation impacts and sets the following goals:

- 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 40 percent of its employees and no more than 30 percent of all employees and students commuting to the location by SOV.

Recycling and Waste Management

The University's goal for diverting municipal solid waste from landfills is as follows:

- 50 percent as of June 30, 2008
- 75 percent as of June 30, 2012
- Ultimate goal of zero waste by 2020

American College and University Presidents Climate Commitment

The University of California 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 climate neutrality as soon as possible. The commitment also includes specific interim actions, including requiring that new campus construction will be built to at least the US Green Building Council's LEED Silver standard or equivalent; purchasing Energy Star appliances; offsetting greenhouse gas emissions generated by institutional air travel; encouraging and providing access to public transportation; purchasing or producing at least 15 percent of the institution's electricity consumption from renewable sources; supporting climate and sustainability shareholder proposals at companies where the institution's endowment is invested; and adopting measures to reduce waste.

UC Santa Cruz Climate and Energy Strategy

The UC Santa Cruz Climate and Energy Strategy (CES) was prepared in 2016. The CES report resulted from an 18-month process led by campus staff in partnership with a team of consultants to develop a detailed plan for achieving UC Santa Cruz's two climate and energy goals:

- Achieve carbon neutrality by 2025 for Scopes 1 and 2 emissions, and

- Mitigate the impacts of the Cap and Trade regulation.

Through a series of desktop and onsite energy audits of fifty of the campus' most energy-intensive buildings and an evaluation of the campus' potential for development of solar photovoltaic and solar thermal projects, several hundred energy efficiency measures and nearly a dozen renewable energy projects were developed, providing detailed cost information on metrics such as energy and utility savings, labor and materials costs.

All energy measures were input into a custom-built techno-economic scenario analysis tool (CES Tool) developed specifically to support the CES. The CES Tool generates comprehensive metrics such as emissions savings, net present value, savings-to-investment ratio, cash flow and cost/metric ton of carbon dioxide equivalent (MTCO₂e) through 2055 for various combinations of project implementation, capital buildout and procurement strategies. The CES Team developed 50+ scenarios that considered several variables including;

- Energy efficiency and renewable project implementation,
- Energy efficiency in new construction (using the Ten Year Capital Financial Plan as a baseline),
- Procurement of greenhouse gas mitigation and reduction instruments,
- Financing, and
- Timeframe for implementation.

The CES Team then analyzed the results and used the findings to inform the development of preferred strategies, recommendations, and next steps for implementation. Energy savings, GHG emissions savings, and financial returns *were* estimated for hundreds of projects, which are grouped into Tier 1 (high priority) and Tier 2 (longer term planning) projects based on their energy savings and financial payback. The CES project list is intended to be regularly updated to evaluate the feasibility of additional energy-saving measures, and is intended to be dynamic and updated as market conditions change and best practices evolve.

The findings of the analysis show that carbon neutrality at UC Santa Cruz could be achieved with a positive net-present-value due to the projected savings from onsite renewable energy and energy efficiency projects being greater than the additional costs of purchasing biogas, offsets and compliance instruments to achieve carbon neutrality, as defined by the initiative, and addressing regulatory requirements.

Similar to the CAPs for the all UC campuses, the CES provided recommendations, with a series of possible paths to meeting the UC Sustainable Practices Policy requirements, but does not create performance requirements that every project must comply with. However, most relevant to campus building projects is the recommendation that the Campus adopt a policy of net zero emissions for new buildings (Scope 1 and 2, so includes purchased electricity and on-site combustion). This would be accomplished by developing all electric buildings with (in order of preference):

- On-site renewable power generation
- All purchased electricity from renewable sources
- RECs for purchased electricity from non-renewable sources
- Offsets for on-site combustion sources

The CES has not been adopted; nor has it been used to develop an updated Climate Action Plan for the campus. However, many of the strategies identified in the CES have been incorporated into the Campus Sustainability Plan.

UC Santa Cruz Transportation Demand Management

UC Santa Cruz employs an aggressive Transportation Demand Management (TDM) program that includes an extensive shuttle system, among other alternative transportation opportunities. Based on a Spring 2016 modal mix survey of the campus, about 66 percent of all passenger trips to the campus are made by means other than driving alone (UCSC 2017). Key components of UC Santa Cruz's existing TDM program include the following which are described in further detail in **Section 4.11, Traffic and Transportation:**

- Parking Demand Management
- Transit program
- Bicycle Shuttle Program
- Commuter Vanpool Program
- Emergency Ride Home Program

4.6.4 IMPACTS AND MITIGATION MEASURES

4.6.4.1 Significance Criteria

The impacts related to GHG emissions resulting from the implementation of the proposed project would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the State CEQA Guidelines and the UC CEQA Handbook:

- Generate greenhouse gas emissions, 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 greenhouse gases.

The State CEQA Guidelines include Section 15064.4, which states that, when making a determination with respect to the significance of a project's GHG emissions, a lead agency shall have discretion to determine whether to: (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use; and/or (2) Rely on a qualitative analysis or performance-based standards. Section 15064.4 also states that a lead agency should consider the following factors when assessing the significance of the impact of GHG emissions on the environment: (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting; (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

Thresholds for Evaluation of Impacts under the First Criterion

The proposed project would result in GHG emissions both during construction and operations. A project's operational GHG emissions can result from two types of sources: (1) stationary sources such as generators, and (2) non-stationary sources which include area sources such as fireplaces, boilers and other combustion sources; mobile sources such as vehicles used by residents and employees associated with a project; the consumption of electricity and water; and the generation of wastewater and solid waste. Thresholds used in this EIR to evaluate the impact from these categories of sources are described below.

Threshold for Operational Emissions from Stationary Sources

As noted earlier in this section, MBARD has set forth an operational GHG emissions significance threshold for stationary sources in its 2016 *Guidelines for Implementing the California Environmental Quality Act*. As noted in the guidelines, a proposed stationary source project will not have a significant GHG impact, if operation of the project will emit less than 10,000 metric tons per year (MT/year) CO₂e.

Threshold for Operational Emissions from Non-Stationary Sources

MBARD has not set forth significance thresholds for the evaluation of the GHG impact of projects that do not require a permit to operate from the Air District. Thus, per the practice of the Campus and the recommendation of MBARD (UCSC 2016), the following two of the three thresholds⁴ that are set forth by the neighboring San Luis Obispo County Air Pollution Control District (SLOAPCD) are used in this EIR to evaluate the significance of the operational GHG emissions associated with the proposed project:

- A bright-line threshold of 1,150 MTCO₂e/year, or
- An efficiency threshold of 4.9 MTCO₂e/service person/year (where service persons are residents plus employees).

The SLOAPCD efficiency threshold is designed to reduce GHG emissions such that the AB 32 goal that 2020 emissions equal 1990 emissions is met. In 2015 and 2016, SB 350 and SB 32 were signed into law, which provided a mid-term target that the state's 2030 emissions be 40 percent below 1990 levels. Based on the current schedule, while the first phase of the project would be completed by 2019, the majority of the proposed housing would be constructed and occupied in 2022. Because the project's emissions would essentially occur in the years after 2022, in order to evaluate the project's impact, UC Santa Cruz conservatively developed a new efficiency threshold that is consistent with the direction provided by SB 350 and SB 32. Using the existing efficiency threshold of 4.9 MTCO₂e/person/year and the relationship between the targets set forth in AB 32 and SB 32/350, an efficiency metric for year 2025 was calculated at 3.9 MTCO₂e/service person/year. In addition to the SLOAPCD efficiency threshold, this threshold was also used to evaluate the significance of the impact associated with the project's operational emissions.

4 The SLOAPCD guidelines set forth three thresholds. Two are reported above and used in this EIR; the third threshold is non quantitative and requires demonstration of compliance with a GHG reduction plan. The SLOAPCD guidelines state "Lead agencies may use any of the three options above to determine the significance of a project's GHG emission impact to a level of certainty."

Threshold for Emissions from Construction Activities

There are no thresholds put forth by the MBARD or SLOAPCD for evaluating the significance of a project's construction-phase GHG emissions (MBUAPCD 2016; SLOAPCD 2012). However, the South Coast Air Quality Management District (SCAQMD) has adopted an approach for assessing construction emissions that includes amortizing construction emissions over the life span of the project, defined as 30 years, then adding those emissions to the operational emissions (SCAQMD 2008). As stated below, that approach is used in this EIR and the impact of the project's total emissions (construction and operations) is evaluated using the efficiency threshold described above.

Thresholds for Evaluation of Impact under the Second Criterion

A project's impact relative to the second Appendix G criterion may be evaluated by demonstrating compliance with plans, policies, or regulations adopted by local governments to curb GHG emissions. As noted above in **Section 4.6.3.4**, MBARD's 2016 guidelines include the following threshold for evaluating a stationary source project's impact: "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)]." The threshold is set forth by the Air District specifically for evaluating a stationary source project's emissions relative to the second criterion under CEQA and does not apply to a non-stationary source project such as the SHW project.

Per the practice of the Campus, the project's compliance with campus plans and policies for controlling GHG emissions is evaluated below.

4.2.4.2 CEQA Checklist Items Adequately Addressed in the 2005 LRDP EIR or not Applicable to the Project

As the 2005 LRDP EIR predates AB 32 which initiated the practice of evaluating a project's GHG emissions impacts, GHG impacts are not evaluated in the 2005 LRDP EIR. Both the CEQA checklist items listed above as significance criteria are addressed in the following analysis.

4.6.4.3 Methodology

As noted above, CEQA guidelines require that the impact from a project's GHG emissions, emitted directly or indirectly, be evaluated. Direct emissions are those that are emitted on a project site whereas indirect emissions are those that are emitted off-site, such as those associated with vehicular traffic,

electricity generation, etc. The Office of Planning and Research has noted that lead agencies “should make a good-faith effort, based on available information, to calculate, model, or estimate... GHG emissions from a project, including the emissions associated with vehicular traffic, energy consumption, water usage and construction activities” (OPR 2017). Therefore, direct and indirect emissions were calculated for the project. Both construction phase and operational emissions were calculated.

GHG emissions were quantified using the California Emissions Estimator Model (CalEEMod). CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from a variety of land use projects. The model is considered by the MBARD to be an accurate and comprehensive tool for quantifying air quality and GHG impacts from land use projects throughout California (CalEEMod 2018). As set forth in greater detail in **Section 4.2, Air Quality**, the project land use types and size, construction schedule, assumptions of construction equipment usage and truck trips, were input to CalEEMod.

4.2.4.4 LRDP EIR Mitigation Measures included in the Proposed Project

There are no LRDP EIR mitigation measures specifically focused on reducing GHG impacts from growth and development on the campus. However, as noted in **Section 4.2, Air Quality**, the 2005 LRDP EIR sets forth LRDP Mitigation AIR-6 to minimize construction emissions, and LRDP Mitigations AIR-2, and -7 to minimize operational emissions from all types of sources, including mobile, stationary, and area sources (see **Table 4.2-6** in **Section 4.2**). The proposed project would implement all of these mitigation measures, which would not only reduce the project’s criteria pollutant and TAC emissions but would also reduce the project’s GHG emissions.

4.6.4.5 Project Impacts and Mitigation Measures

SHW Impact GHG-1: Project construction and operation would generate greenhouse gas emissions, either directly or indirectly, that would not have a significant impact on the environment. (*Less than Significant*)

Construction GHG Emissions

Emissions associated with construction at the Hagar site would occur between Fall 2018 and Fall 2019. Emissions associated with construction at the Heller would occur from Fall 2019 into Fall 2022. Project construction activities include demolition, site preparation, grading, building construction, pavement and asphalt installation, landscaping and hardscaping, and architectural coatings. Based on the result of

CalEEMod modeling, approximately 5,456 MTCO₂e of GHG emissions would be emitted during the 4-year project construction period.

Neither the University nor any of the air districts, including MBARD, has set forth quantitative thresholds for the evaluation of construction-phase GHG emissions. However, the South Coast Air Quality Management District has adopted an approach for assessing construction emissions that includes amortizing construction emissions over the life span of the project, defined as 30 years, then adding those emissions to the operational emissions (SCAQMD 2008). Using this approach, the project's construction emissions were amortized over the 30-year life of the proposed project and added to the non-stationary source operational emissions below for purposes of impact evaluation.

Non-Stationary Source Operational GHG Emissions

Non-stationary sources of operational emissions associated with the proposed SHW project include (1) area sources (use of consumer products, etc. by the residents of the project), (2) water conveyance and treatment, (3) solid waste hauling and disposal; and (4) electricity consumption. Because the project is predicted to result in a reduction of traffic generated by the school campus, operational emissions do not include mobile sources. GHG emissions would also be associated with the operation of the MBR plant to treat wastewater on site. However, because wastewater would be treated on site and would not be discharged into the sanitary sewer system for treatment at the City's wastewater treatment plant, the emissions associated with the MBR plant would be lower than those that would result from off-site conveyance and treatment. Furthermore, the use of recycled water on site (and related reduction in use of potable water) would also reduce GHG emissions associated with the treatment and pumping of potable water.

Table 4.6-2, Annual Project GHG Emissions (Metric Tons), presents the results of the CalEEMod model analysis in terms of annual MTCO₂e. As shown in **Table 4.6-2** below, operation of the project would generate approximately 1,714 MTCO₂e/year at the Heller and Hagar sites combined. The daily service population associated with the proposed project would be approximately 2,789 persons. The per capita emissions would be 0.61 MTCO₂e/per capita/year, which would be well below the threshold of 3.9 MTCO₂e/capita/year used in this EIR to evaluate the project's GHG impact.

Table 4.6-2
Annual Project GHG Emissions (Metric Tons)

Scenario	Year	Project Emissions (MTCO ₂ e/year)
Operational Emissions	2022	1,532
Amortized Construction Emissions		182
Total		1,714
Per Capita Emissions		0.61 MT/capita/year
Current SLOAPCD Efficiency Threshold		4.9 MT/capita/year
Estimated 2025 Efficiency Threshold:		3.9 MT/capita/year
<i>Exceed Threshold?</i>		No
<i>Source: Illingworth & Rodkin, 2018.</i>		

Stationary Source Operational Emissions

In addition to the emissions from non-stationary sources noted above, the project would result in GHG emissions from the routine testing and maintenance of seven emergency generators located in each building of the Heller site that would be included in the project. Pursuant to LRDP Mitigation AIR-5A, the Campus limits the testing of all generators on the campus to 15 minutes of testing every 6 weeks. Based on this frequency of testing, generator emissions were computed to be 1 MTCO₂e/year. Although the emergency generators do not qualify as stationary sources per the MBARD 2016 guidelines because no permits to operate are required for these generators, nonetheless, if the testing emissions from the generators are compared to the MBARD's significance threshold of 10,000 MT/year for stationary sources, the emissions would be substantially below the threshold and therefore less than significant.

In summary, both the construction-phase and operational GHG emissions that would result from project implementation would not exceed applicable significance thresholds, and the impact would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact GHG-2: The proposed project would not conflict with state law, UC Policy on Sustainable Practices, or the UC Santa Cruz Climate Action Plan. (*Less than Significant*)

EO S-3-05, AB 32, SB 350, and SB 32

AB 32 established the goal for the reduction of California's GHG emissions to 1990 levels by 2020. Prior to that, Executive Order S-3-05 established the goal of reducing California's emissions 80 percent under 1990 levels by 2050. In 2015 and 2016, SB 350 and SB 32 were signed into law, establishing the state's mid-term target for 2030 emissions to be 40 percent below the 1990 emissions.

Following the passage of AB 32, some of regional air districts in the state, such as the SLOAPCD and the Bay Area Air Quality Management District, based their planning and regulations on the requirements of AB 32, which included a reduction of GHG emissions to 1990 levels by 2020. As noted earlier in this section, MBARD has not put forth planning guidance for lead agencies within the NCCAB to use to evaluate a project's GHG impact based on consistency with AB 32. However, MBARD has recommended the use of thresholds and guidance provided by the neighboring SLOAPCD. The SLOAPCD set forth the GHG significance thresholds specifically to meet AB 32 requirements within its jurisdiction, and so plans and projects that meet those thresholds can be assumed to meet the requirements of AB 32. The per capita GHG emissions from the proposed project of 0.61 MTCO₂e/per capita/year would be below the SLOAPCD efficiency threshold of 4.9 MTCO₂e/per capita/year that applies to projects through 2020. Therefore the proposed project would not conflict with AB 32.

As the SLOAPCD efficiency threshold described above was designed to assist that air district attain the 2020 target pursuant to AB 32, and was not designed to assist achieve the new mid-term target for 2030 emissions set forth by SB 350 and SB 32, as discussed above under **SHW Impact GHG-1**, UC Santa Cruz conservatively developed a 2025 efficiency threshold that is aligned with the mid-term target. As the analysis above shows, the project's per capita emissions would also be well below the 2025 threshold of 3.9 MTCO₂e/per capita/year, and the project would not be in conflict with the future GHG reduction goals per SB 350 and SB 32.

UC Sustainable Practices Policy

The UC Sustainable Practices Policy requires each campus to develop strategies for meeting the University's goals in nine areas of sustainable practices. These goals apply to UC Santa Cruz as a whole, and UC Policy does not require each new project to meet the goals. Nonetheless, the proposed project would not conflict with goals set forth in the Policy.

The University requires all UC projects to achieve a minimum of a Silver rating under United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) Building Design and Construction (BD+C) v4.0 Green Building Rating System (the "LEED Rating System"). The project is targeting to achieve a LEED Platinum certification. The proposed project would include the following sustainable features for each site that would provide greater energy, water and wastewater efficiencies than factored into the calculation of the reported GHG emissions:

Heller Site

- All buildings would be designed and constructed to be energy efficient. The exterior envelope would be optimized to improve thermal isolation. The exterior walls and roofs would have enhanced insulating qualities. High-performance glass would be used to promote daylighting and passive solar heat gain in the winter without excessive use of glazing. Horizontal sun shades at south-facing elevations, and vertical sun shades at unshaded west-facing elevations would be installed to reduce solar heat gains during the summer and allow passive solar heating during winter months.
- The general lighting in the buildings would be accomplished through a combination of daylighting and general artificial lighting. In areas of special function, specialty lighting would be utilized. Light fixtures and lighting system would be selected based on performance and aesthetics.
- The student housing units would be provided with heating-only mechanical systems. Ventilation would be provided by unit exhaust with makeup air through trickle vents in the exterior wall. The units would also be provided with operable windows to provide natural ventilating and passive cooling whenever conditions are appropriate. Cooling would be provided only for certain spaces such as main electrical rooms.
- All space and water heating systems would operate on electricity. To minimize greenhouse gas emissions, no natural gas would be utilized on the project site except as fuel in emergency generators.
- Roof-top photovoltaics would be included in Buildings 1 through 5 to provide electricity to the project.
- Wastewater would be treated in an on-site membrane bioreactor (MBR) plant to generate recycled water to be used for toilet flushing and irrigation, thereby minimizing the project's

demand for potable water and eliminating wastewater conveyance and treatment at the City's wastewater treatment plant.

- High efficiency electrical and water fixtures and appliances would be included in the proposed housing.
- The project would include adequate facilities to encourage recycling and composting, and minimization of solid waste that would need landfill disposal.
- A minimal amount of vehicle parking would be provided to discourage use of personal vehicles by the residents.
- Bicycle parking would be provided throughout the project site to encourage bicycle use.

Hagar Site

- The street network will be designed to encourage multi-modal circulation.
- Climate-appropriate plant materials that require less irrigation will be used.
- The project will also seek to utilize renewable sources of energy including solar PVs, sewer heat recovery, and water recycling.
- Low-flow water fixtures, energy star appliances, high-efficiency irrigation systems, high-performance exterior building envelopes, insulated glazing, LED lighting, and natural ventilation will also be utilized.

The buildings would meet the energy performance targets required by the UC Sustainable Practices Policy and include many features to minimize energy use and minimize Scope 1, 2, and 3 emissions. Furthermore, the proposed project would not result in substantial emissions from the use of automobiles. This is because students living in the proposed on-campus housing would walk, ride a bike or take a UC Santa Cruz shuttle to travel between the project site, classes, and other campus facilities. In addition, the project would reduce daily trips compared to existing conditions as well as the no project scenario because students who would otherwise live off campus and make trips to the campus would instead live on campus. Additionally, wastewater treated at the proposed MBR plant would be pumped into a recycled water main and distribution system ("purple" pipes) and conveyed throughout the Heller site development to provide water for toilet flushing and landscape irrigation. Use of this recycled water system would minimize potable water usage. The project would also include adequate facilities to encourage recycling and composting, and minimization of solid waste that would need landfill disposal.

UC Santa Cruz Climate and Energy Strategy

The UC Santa Cruz CES is the Campus' equivalent of a Climate Action Plan (CAP). Similar to the CAPs for the all UC campuses, the CES provided recommendations, with a series of possible paths to meeting the UC Sustainable Practices Policy requirements, but does not create performance requirements that every project must comply with. However, most relevant to campus building projects, such as SHW project, is the recommendation that the Campus adopt a policy of net zero emissions for new buildings (Scope 1 and 2, so includes purchased electricity and on-site combustion). As noted above, this would be accomplished by developing all electric buildings with either on-site renewable power generation; or all purchased electricity from renewable sources; or RECs for purchased electricity from non-renewable sources; or offsets for on-site combustion sources.

The proposed project has been designed to meet the minimum of LEED silver certification and is actually targeting to achieve LEED Platinum certification. Therefore, the buildings are being designed to be highly energy efficient. In addition, at both sites, the proposed housing includes on-site renewable power generation using photovoltaic panels. Therefore, the project would not conflict with the UC Santa Cruz CES.

In summary, the proposed project would not conflict with the applicable laws, plans and policies adopted for the purpose of reducing the emissions of GHG emissions. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

4.6.5 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

The area for the dining facilities expansion is currently undeveloped land and there are no existing sources of GHG emissions on the expansion area.

Impacts and Mitigation Measures

DF Impact GHG-1: The proposed dining facilities project would not generate greenhouse gas emissions, either directly or indirectly, that would have a significant impact on the environment, nor would the proposed trail conflict with any applicable

plans or policies for reducing greenhouse gas emissions. (*Less than Significant*)

GHG Emissions

As discussed in **Section 3.0, Project Description**, the proposed improvement at the Porter College Dining Hall is an expansion of the seating area to the south of the existing dining area, over an approximately 0.12-acre area. The proposed improvements at Rachel Carson Dining Hall include a new kitchen, servery, and additional seating. The additional seating may be provided in a second floor dining area above the existing dining area or by extending the existing dining area to the south. The dining facilities expansion project would involve minimal grading and excavation. All cut and fill material would be balanced on-site and no additional haul trips would be required. Given the scale and nature of the construction activities, and the small number of construction equipment and vehicles that would be used, construction would result in minimal GHG emissions, which would not be substantial enough to result in a significant GHG impact.

The dining facilities expansion project would expand dining areas and a kitchen, adding less than 10,000 square feet of building space. It would not increase the campus population and therefore would not increase vehicle trips. The project's emissions would not, by themselves or in combination with the GHG emissions of the SHW project, exceed the threshold for non-stationary source emissions set forth above. The impact from GHG emissions from project operations would be less than significant.

Conflict with Plans and Regulations

Construction and operation of the dining facilities would not generate substantial GHG emissions and thus, the proposed dining facilities project would not conflict with AB 32 or other state laws and regulations, as well as the UC Sustainable Practices Policy related to GHG emissions. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

4.6.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

Impact C-GHG-1: **The proposed project would not result in a significant cumulative GHG impact. (*Less than Significant*)**

As the impact from a project's GHG emissions is essentially a cumulative impact, and the methodologies and standards applied in the analysis presented above are designed to assess the cumulative significance of the project's GHG emissions, the analysis presented above provides an adequate analysis of the proposed project's cumulative impact related to GHG emissions. Based on the analysis above, the proposed project would result in a less than significant cumulative impact.

Mitigation Measures: No mitigation is required.

4.6.7 REFERENCES

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4.7 HYDROLOGY AND WATER QUALITY

4.7.1 INTRODUCTION

This section of the EIR describes the existing hydrology and water quality conditions on the UC Santa Cruz campus and analyzes the potential for the proposed Student Housing West (SHW) project to affect water quality, result in substantial siltation or erosion or flooding due to the alteration of drainage patterns, and deplete groundwater supplies or interfere with groundwater recharge.

The section also presents the potential hydrology and water quality impacts from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and existing colleges (see **Section 4.7.5** below).

The information in this section is based on information in the conceptual post-construction storm water management plans prepared for each site and previous environmental documentation prepared for the UC Santa Cruz campus, including the 2005 LRDP EIR.

4.7.2 ENVIRONMENTAL SETTING

4.7.2.1 Campus Hydrology

UC Santa Cruz campus is located on a series of upward sloping marine terraces from an elevation of 300 feet at its southern boundary to about 1,200 feet along its northwest boundary. The northern one-third of campus is composed of weathered schist and granitic rocks with some overlay of Santa Margarita sandstone. Surface flows in these areas are dispersed and the geology of the area encourages percolation of precipitation before eventually gathering in well-defined drainages. The southern two-thirds of the campus consist of marble 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 campus is cut by several steep-walled north-south flowing streams, 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 a surface stream goes underground). Most storm water on campus eventually reaches the karst aquifer, where it flows through a complex system of fractures. Some of the runoff reappears at the surface in springs at lower elevations to the east, south, and west of the campus (UCSC 2006).

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 (UCSC 2006).

There is no campus-wide storm drain system. Within the developed portions of the 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.

Surface Water Hydrology

Campus Drainages and Watersheds

The UC Santa Cruz campus is located within the Big Basin Hydrologic Unit. Multiple watersheds drain the campus, but the main drainages are Cave Gulch, Moore Creek, and Jordan Gulch, which drain approximately 1,100 acres of the approximately 2,020-acre campus. Cave Gulch drains most of the northwestern portions of the campus and joins Wilder Creek immediately west of the campus. Moore Creek drains the central part of the campus, flowing in a southwesterly direction before draining into Antonelli pond, approximately 1.6 miles south of the campus. Jordan Gulch drains the central and eastern portions of the campus before flowing down along Bay Street as a spring-fed channel. Due to the karst geomorphology of the campus, many tributaries discharge into in-stream swallow holes, which intercept most of the surface water flow and divide the campus drainages into more than 50 sub-watersheds. Therefore, surface runoff is relatively low when compared to other locations with similar rainfall. Other watersheds on the campus are the Wilder Creek, Arroyo Seco, High Street, Kalkar Quarry, and the San Lorenzo River watershed (UCSC 2006).

Erosion

As discussed above, on account of the 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 lower campus. Furthermore, erosion on campus has increased with the addition of impervious surfaces as the campus has developed over the years. Sedimentation from channel incision and other sources can affect the capacity of campus sinkholes to accommodate storm water flows, resulting in increased discharge to downstream channels from sinkhole overflows. Other contributing factors include repeated disturbance of channel beds and banks by bicycles and foot traffic on undesignated trails along the drainages, roadway runoff, activities that disturb banks and increase runoff, burrowing animals, and naturally occurring erosive soils. Since 2005, the Campus has been implementing a phased infrastructure

improvement program to address erosion conditions in the drainages, by redirecting runoff, constructing detention basins and other detention structures, and in-channel improvements.

Flooding

As noted above, 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. Detention basins and settling tanks serve 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 campus (UCSC 2006). The UC Santa Cruz campus is not located within a 100-year flood zone (FEMA 2012).

Groundwater

UC Santa Cruz is not within a designated groundwater basin (DWR 2016). It is bordered to the east and immediately to the south by the West Santa Cruz Terrace basin. Lands to the west and immediately north are also not within a designated groundwater basin but the Santa Margarita Basin lies approximately 2.5 miles north of the campus. The campus itself is roughly divided into two hydrogeologic systems, upper/north campus and central/lower campus. These two hydrogeologic systems are closely associated with campus geology (i.e., rock types, faults, and fracture zones) (UCSC 2006).

Upper/North Campus

The upper/north campus hydrogeologic system lies north of McLaughlin Drive and includes shallow-water bearing zones of moderate permeability consisting of Santa Margarita sandstone, weathered schist and granitic rocks, which overlie relatively impermeable unweathered schist and granitic rocks. Groundwater occurs in portions of thin (5- to 30-foot) eroded remnants of Santa Margarita sandstone as well as within the upper portions of weathered and fractured schist and granitic basement complex rocks (UCSC 2006).

This portion of the 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. Due to the shallow groundwater table and the moderate permeability of the near-surface materials, the north campus area has a high density of springs and seeps. These features generally occur where topography becomes steeper and the shallow groundwater table intersects the land surface (UCSC 2006).

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 for the long-term (UCSC 2006).

Central/Lower Campus

The lower two-thirds of the campus are largely underlain by marble and schist. The marble allows for the presence 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 swallows. More than 50 sinkholes are located throughout the marble-underlain area on the campus and these features are estimated to capture up to 40 percent of campus runoff (UCSC 2006).

Within the marble is an extensive underground drainage network of subterranean caverns and channels formed by the dissolution of limestone and marble by groundwater. The locations of these channels are predominantly governed by 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, because unlike sandstone, for example, it does not have space between grains (inter-granular porosity) that would allow water penetration in any appreciable amounts. The two main underground channels on the 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. In addition, there are several east-west fractures in the central and southern portions of the campus (UCSC 2006).

The marble aquifer system on this portion of the campus has the greatest potential for groundwater supply on the campus as a substantial portion of (about 40 percent) of the surface runoff enters the system. However, as the Campus receives water from the City for domestic and irrigation purposes, groundwater on campus is not extracted at this time (UCSC 2006).

Hydrologic Monitoring

Spring and Stream Flow Monitoring

UC Santa Cruz monitors spring and stream flow as well as water levels in three wells in Jordan Gulch; a total of 16 stations are monitored. Generally spring and stream flow measurements are collected at the

end of the winter wet season and at the end of the summer/fall dry season. 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 2017b).

Surface Water and Groundwater Quality

UC Santa Cruz monitors water quality at nine spring and surface locations on the campus. Samples are taken from nine locations to test the water quality of groundwater, spring water, and surface water. Samples taken at these locations are tested for general mineral, physical, and inorganic content and semi-to non-volatile range hydrocarbons (diesel-kerosene-motor oil range) are compared against performance criteria (e.g., water quality standards, guidelines, and benchmarks). An analysis of historic and recent sampling does not show an increase in urban runoff pollutants over time (Weber, Hayes and Associates 2017a).

4.7.2.3 Project Site Hydrology

Heller Site

The approximately 13-acre Heller site is currently developed with the Family Student Housing complex and the campus childcare center. Most of the storm water generated within the developed site is collected by storm drains that discharge into a storm drain that leaves the site via a culvert to discharge into the College Eight detention basin located to the east of Heller Drive.

The Heller site is located substantially within Moore Creek watershed, although a small northwesterly portion of the site is within the Cave Gulch watershed. The Moore Creek watershed covers approximately 920 acres above Antonelli pond, which is located in the city of Santa Cruz. Approximately 320 acres of the drainage area is located on the campus. The Moore Creek drainage system consists of the main stem and several tributaries. The head of the main stem (also referred to as the East Fork) is located near University House. The creek flows south to the East Dam and then into the Arboretum Pond. The College Eight detention basin discharges to the West Entrance Fork, which originates just south of the west entrance to the campus, and flows in a southerly direction down to the West Dam. A sinkhole is present in this channel just upstream of the dam (UCSC 2006). Significant erosion conditions exist in the West Entrance Fork. Most flow in the West Entrance Fork is detained behind the West Dam, which rarely overflows. Overflow from the West Dam flows to the Arboretum Pond. Below the Arboretum Dam, Moore Creek flows off campus and under Empire Grade. About 500 feet south of Empire Grade, where Moore Creek flows under Highview Drive, localized flooding has occurred as a result of an undersized culvert. Since the adoption of the LRDP in 2005, the Campus has made a number of in-channel and

source area improvements to the East Fork and West Entrance Fork of Moore Creek, including the clean-out of the College Eight detention basin to enable it to function as originally designed.

The Cave Gulch watershed covers approximately 336 acres and drains most of the northwestern part of the campus. The Cave Gulch stream channel is aligned north-south and is a tributary basin to the Wilder Creek watershed, flowing into Wilder Creek immediately west of the campus. The two main tributaries to Cave Gulch are the Porter Tributary and the Pump Station Tributary. The Porter Tributary flows west of the Family Housing complex and two sinkholes near the complex capture runoff in the area. There are some existing erosion conditions within the watershed, associated mainly with the Pump Station Tributary and the Porter Tributary (UCSC 2006).

Hagar Site

The approximately 15-acre Hagar site is currently an undeveloped hillside that generally slopes in a south southeasterly direction towards Glenn Coolidge Drive. Runoff from the site flows into a closed depression in the southwestern corner of the site. The Campus constructed a detention basin at this location in 1991 to detain runoff from Glenn Coolidge Drive, via a concrete ditch that parallels the road, and from Hagar Drive. The detention basin was designed to discharge to a new piped storm drain system which discharges to Kalkar Quarry (see below), south of the project site. A sinkhole formed in the detention basin in 2001. The Campus made repairs to the sinkhole in 2001 and again in 2006. However, runoff to the detention basin currently flows to the sinkhole without being detained rather than to the piped storm drain system via the detention basin outlet structure.

The Hagar site is located within the Kalkar Quarry watershed, which is a subarea of the Jordan Gulch/Neary Lagoon watershed. The Kalkar Quarry watershed covers a total of 60 acres, 90 percent of which are located on the southeastern portion of the campus and the remainder off campus. Kalkar Quarry is an old marble quarry located southeast of the Hagar site across Glenn Coolidge Drive. A pond has developed in the quarry that is fed by an underlying spring emanating from the karst aquifer and by a series of culverts that drain the southeastern portion of the campus (UCSC 2006). The Kalkar Quarry watershed within the campus is mainly undeveloped, with an estimated one acre of impervious surfaces present in this watershed under existing conditions.

4.7.3 REGULATORY CONSIDERATIONS

4.7.3.1 Federal Laws and Regulations

Clean Water Act

In 1972, the Federal Water Pollution Control Act—also known as and hereafter referred to as the Clean Water Act (CWA)—was amended to require National Pollutant Discharge Elimination System (NPDES) permits for discharge of pollutants into the “waters of the United States” that include oceans, bays, rivers, streams, lakes, ponds, and wetlands from any point source. In 1987, the CWA was amended to require that the US EPA establish regulations for permitting under the NPDES permit program of municipal and industrial storm water discharges. The US EPA published final regulations regarding storm water discharges on November 16, 1990. The regulations require that municipal separate storm sewer system (MS4) discharges to surface waters be regulated by an NPDES permit.

In addition, the CWA requires the states to adopt water quality standards for water bodies and have those standards approved by the US EPA. Water quality standards consist of designated beneficial uses—e.g., wildlife habitat, agricultural supply, fishing, etc.—for a particular water body, along with water quality criteria necessary to support those uses. Water quality criteria are prescribed concentrations or levels of constituents—such as lead, suspended sediment, and fecal coliform bacteria—or narrative statements that represent the quality of water that supports a particular use. Because California has not established a complete list of acceptable water quality criteria, the US EPA established numeric water quality criteria for certain toxic constituents in the form of the California Toxics Rule (40 CFR 131.38).

Water bodies not meeting water quality standards are deemed “impaired” and, under CWA Section 303(d), are placed on a list of impaired waters for which a Total Maximum Daily Load (TMDL) must be developed for the impairing pollutant(s). A TMDL is an estimate of the total load of pollutants from point, nonpoint, and natural sources that a water body may receive without exceeding applicable water quality standards (with a “factor of safety” included). Once established, the TMDL is allocated among current and future pollutant sources discharging to the water body.

CWA Permits for Discharge to Surface Waters

CWA Sections 401 and 402 contain requirements for discharges to surface waters through the NPDES program, administered by the US EPA. In California, State Water Resources Control Board (SWRCB) is authorized by the US EPA to oversee the NPDES program through the RWQCBs (see related discussion under **Porter-Cologne Water Quality Control Act**, below). The NPDES program provides for both

general permits (those that cover a number of similar or related activities) and individual permits. The permit contains requirements of allowable concentrations of contaminants contained in the discharge.

General Construction Permit

The SWRCB administers the NPDES *General Permit for Discharges of Storm Water Runoff Associated with Construction Activity* (General Construction Permit). In order to cover a construction project disturbing 1 acre or more of land under the General Construction Permit, the entity responsible for the project must submit a Notice of Intent to the State Board prior to the beginning of construction. Effective July 1, 2010, all dischargers are required to obtain coverage under the Construction General Permit Order 2009-0009-DWQ adopted on September 2, 2009, as amended by 2010-0014-DWQ and 2012-006-DWQ.

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 documents required to register the project under the Construction General Permit include a site map which shows storm water collection and discharge points, general topography both before and after construction, drainage patterns across the project site and “best management practices” (BMPs) to be followed during construction to minimize pollutant discharge. The permit registration documents also include a risk assessment, which determines the BMPs and the level of monitoring required during construction. The risk level is based on the potential for sediment transport and whether the project is in the watershed of a sediment-impaired water body. The SWPPP must list Best Management Practices (BMPs) the discharger will use 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 (PCRs) is also required for registration under the Construction General Permit.

Municipal Separate Storm Sewer System Permit

In 1987, in recognition that diffuse, or non-point, sources were significantly impairing surface water quality, Congress amended the CWA to address non-point source storm water runoff pollution in a phased program requiring NPDES permits for operators of MS4s, construction projects, and industrial facilities. Phase I, promulgated in 1990, required permits for facilities of these types generally serving populations over 100,000, construction permits for projects five acres or greater, and industrial permits

for certain industries. The Phase II program expanded on the Phase I program by requiring operators of small MS4s in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted storm water runoff. Phase II is intended to reduce these adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of storm water discharges. Under Phase II of the NPDES program, SWRCB has issued three general permits: (1) Municipal permits – required for operators of small MS4s, including universities, (2) Construction permits – required for projects involving one acre or more of construction activity, and (3) Industrial permits. The municipal permit requires development and implementation of a guidance document identifying all permit requirements and the Campus plan for implementation. The Campus has developed a guidance document, or Storm Water Management Program (SWMP) The purpose of the SWMP is: (1) to identify pollutant sources potentially affecting the quality and quantity of storm water discharges; (2) to provide BMPs for municipal and small construction activities implemented by University staff and contractors; and (3) to provide measurable goals for the implementation of the SWMP to reduce the discharge of the identified pollutants into the storm drain system and associated water ways. The goal of the SWMP is to reduce the discharge of pollutants to the Maximum Extent Practicable (MEP), 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.

Safe Drinking Water Act and Underground Injection Control Regulations

The Safe Drinking Water Act (SDWA) establishes requirements and provisions for the Underground Injection Control (UIC) program. The UIC program is regulated by the US EPA.

The federal regulations for the UIC program are found in Title 40 of the Code of Federal Regulations. 40 CFR Part 144 provides minimum requirements for the UIC program promulgated under the SDWA. The criteria and standards for various classes of injection wells are set forth in 40 CFR Part 146. State UIC program requirements are set forth in 40 CFR Part 145; and include the procedures for US EPA to approve, revise, and withdraw UIC Programs that have been delegated to the states (US EPA 2018).

The UIC program consists of six classes of injection wells (Class I to Class VI). Each well class is based on the type and depth of the injection activity, and the potential for that injection activity to result in endangerment of an underground source of drinking water. Class V wells are used to inject non-hazardous fluids underground. Most Class V wells are used to dispose of wastes into or above underground sources of drinking water. As this disposal can pose a threat to ground water quality if not managed properly, the construction, operation, permitting and closure of Class V wells is regulated by the US EPA (US EPA 2018). The administration of the UIC program related to Class V wells is not

delegated to the state of California, although the US EPA provides the well application information to the pertinent Regional Water Quality Control Board and the State Water Resources Control Board and the Regional Water Quality Control Boards in California can prescribe requirements for discharges into California waters, including groundwater.

The US EPA has no design requirements for Class V wells; that responsibility is left to local authorities. However, the following design practices are encouraged (OEHHA 2014):

- Should not be constructed deeper than the seasonal high water table.
- Follow local guidelines for setback distances from the dry well bottom to the water table.
- Go through a thorough site evaluation to prevent the spread of contaminants.
- Utilize pre-treatment to remove sediment and the pollutants that they frequently carry.
- Use backfill to improve dry well column stability.

The US EPA has also set forth the following minimum requirements for Class V wells (OEHHA 2014):

- Register injection wells at www.epa.gov/region09/water/groundwater/injection-wells-register.html
- Operate injection wells in a way that will not endanger underground sources of drinking water (USDW).
- Abandoned Class V wells should be properly destroyed, with notification to the US EPA, to prevent movement of contaminated fluids into USDW.

4.7.3.2 State Laws and Regulations

State law pertaining to surface and groundwater quality is set forth in the Porter-Cologne Act. State statutes and regulations pertaining to the use of recycled water in California can be found in the California Water Code (CWC), California Code of Regulations (CCR), and California Health and Safety Code. Relevant laws and regulations are briefly summarized below.

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.

California Water Code

The use of water in the State is governed by the California Water Code or Title 23 of the California Code of Regulations. Title 23 requires that water resources must be put to beneficial use to the fullest extent of which they are capable, and that the waste, unreasonable use, or unreasonable method of use of water is illegal. The conservation of water is encouraged as a reasonable and beneficial use in the interest of the people and for the public welfare.

State Water Resources Control Board Recycled Water Policy

The State Water Resources Control Board (State Water Board) has encouraged the safe use of recycled water in California to supplement surface and groundwater supplies since passage of the Porter-Cologne Act in 1969. Since that time, the state has been active in developing legislation, issuing resolutions and policies, setting goals for recycled water use, and funding recycled water projects. The Policy for Water Quality Control for Recycled Water (Recycled Water Policy) is an important element of the overall effort to encourage the safe use of recycled water in a manner that is protective of public health and the environment (SWRCB 2017).

The Recycled Water Policy includes goals for recycled water use, criteria for streamlined permitting of projects that use recycled water for landscape irrigation, criteria for permitting projects that use recycled water for groundwater recharge, requirements for monitoring recycled water for constituents of emerging concern (CECs), and a requirement to convene a Science Advisory Panel every five years to guide future actions relating to CECs. The Recycled Water Policy also includes guidelines and a process to encourage stakeholders to collaborate with the RWQCB staff to prepare salt and nutrient management plans for groundwater basins and sub-basins throughout California. Salt and nutrient management planning was incorporated into the policy to address potential cumulative impacts to groundwater quality that may be associated with use of recycled water, considering all sources of salts and nutrients in groundwater basins throughout the state (SWRCB 2017).

Recycled water use is regulated under the California Code of Regulations, Title 22 (Title 22), which sets forth the treatment criteria and allowed uses for treated municipal wastewater. The regulations in Title 22 focus on protection of public health and include specific requirements for control of pathogens, limitations on recycled water use based on the level of treatment of the water, and monitoring and reporting requirements. The Recycled Water Policy supplements the requirements in Title 22 by providing guidance for use of recycled water that considers protection of surface water and groundwater (SWRCB 2017).

California Code of Regulations, Title 22

California Code of Regulations, Title 22, Division 4, Chapter 3, Sections 60301 through 60355 (commonly referred to as “Title 22”) specifies treatment requirements for reuse of water. **Table 4.7-1** sets forth the water quality criteria for the four types of recycled water as defined by Title 22. **Table 4.7-2** sets forth the allowable non-potable uses for each recycled water type.

Table 4.7-1
Water Quality Standards for Various Water Recycling Sites

Water Type ^{a,b}	Parameter	Quality Criteria ^{d,e}
Disinfected Tertiary ^{c,f} (recycled water that has been oxidized, filtered and disinfected)	Total Coliform	<ul style="list-style-type: none"> • Median concentration must not exceed 2.2 MPN/ 100 mL using the last 7 days analyses were completed • Must not exceed 23 MPN/ 100 mL in more than one sample in any 30 day period • Must not exceed 240 MPN/ 100 mL at any time
	Turbidity for Filtration Using Natural Undisturbed Soils or a Filter Bed	<ul style="list-style-type: none"> • Must not exceed average turbidity of 2 NTU within a 24-hour period • Must not exceed 5 NTU more than 5

4.7 Hydrology and Water Quality

Water Type ^{a,b}	Parameter	Quality Criteria ^{d,e}
		percent of the time within a 24-hour period • Must not exceed 10 NTU at any time
	Turbidity for Filtration Using Microfiltration, Ultrafiltration, Nanofiltration or Reverse Osmosis	• Must not exceed 0.2 NTU more than 5 percent of the time within a 24-hour period • Must not exceed 0.5 NTU at any time
Disinfected Secondary- 2.2 (recycled water that has been oxidized and disinfected)	Total Coliform	• Median concentration must not exceed 2.2 MPN/ 100 mL using the last 7 days analyses were completed • Must not exceed 23 MPN/ 100 mL in more than one sample in any 30 day period
Disinfected Secondary- 23 (recycled water that has been oxidized and disinfected)	Total Coliform	• Median concentration must not exceed 23 MPN/ 100 mL using the last 7 days analyses were completed • Must not exceed 240 MPN/ 100 mL in more than one sample in any 30 day period
Un-disinfected Secondary (recycled water that has been oxidized but not disinfected)	---	---
<p>Source: Brown and Caldwell, 2011</p> <p>Notes:</p> <p>a. Water type based on requirements for recycled water as defined by the State of California Department of Public and Title 22 of the California Administrative Code.</p> <p>b. "Oxidized" refers to a wastewater in which the organic matter has been stabilized, is nonputrescible and contains dissolved oxygen.</p> <p>c. The filtered wastewater must be disinfected using:</p> <ol style="list-style-type: none"> 1. A process that provided a CT (product of total chlorine residual and modal contact time measured at the same point) or not less than 450 mg-min/L at all times with a modal contact time of at least 90 minutes based on peak dry weather flow; or 2. A process that, when combined with filtration, has been demonstrated to inactivate and/or remove 99.999 percent of plaque forming units of F-specific bacteriophage MS2, or polio virus in the wastewater. A virus that is at least as resistant to disinfection as polio virus may be used for demonstration <p>d. MPN/100 mL is a bacterial count in most probable number per 100 milliliters.</p> <p>e. NTU is Nephelometric turbidity units.</p> <p>f. Disinfected Tertiary effluent is sometimes referred to as "Title 22 Unrestricted" or "Title 22 Unrestricted Access."</p>		

Table 4.7-2
Allowable Non- Potable Uses based on Title 22 Treatment Level

Type of Recycled Water Use	Recycled Water Treatment Level			
	Disinfected Tertiary	Disinfected Secondary- 2.2	Disinfected Secondary- 2.3	Undisinfected Secondary
Agricultural Irrigation Uses				
Food crops, including all edible root crops, where the recycled water comes into contact with the edible portion of the crop	X			

Type of Recycled Water Use	Recycled Water Treatment Level			
	Disinfected Tertiary	Disinfected Secondary- 2.2	Disinfected Secondary- 2.3	Undisinfected Secondary
Food crops where the edible portion is produced above ground and not contacted by the recycled water	X	X		
Food crops that must undergo commercial pathogen-destroying processing before being consumed by humans	X	X	X	X
Orchards where the recycled water does not come into contact with the edible portion of the crop	X	X	X	X
Vineyards where the recycled water does not come into contact with the edible portion of the crop	X	X	X	X
Non-food bearing trees (Christmas trees are included provided no irrigation with recycled water occurs for a period of 14 days prior to harvesting or allowing access to the general public	X	X	X	X
Fodder and fiber crops and pasture animals not producing milk for human consumption	X	X	X	X
Seed crops not eaten by humans	X	X	X	X
Ornamental nursery stock and sod farms where access by the general public is not restricted	X	X	X	
Pasture for animals producing milk for human consumption	X	X	X	
Any nonedible vegetation where access is controlled so that the irrigated area cannot be used as if it were part of a park, playground or school yard	X	X	X	
Ornamental nursery stock and sod farms provided no irrigation with recycled water occurs for a period of 14 days prior to harvesting, retail sale, or allowing access to the general public	X	X	X	X
Urban Irrigation Uses				
Parks and Playgrounds	X			
Schoolyards	X			
Residential Landscaping	X			
Unrestricted Access Golf Courses	X			
Cemeteries	X	X	X	
Freeway Landscaping	X	X	X	
Restricted Access Golf Courses	X	X	X	
Impoundment Uses				
Source of water supply for non-restricted recreational impoundments	X ^a			

Type of Recycled Water Use	Recycled Water Treatment Level			
	Disinfected Tertiary	Disinfected Secondary- 2.2	Disinfected Secondary- 2.3	Undisinfected Secondary
Source of water supply for restricted recreational impoundments	X	X		
Publicly accessible impoundments at fish hatcheries	X	X		
Landscape impoundments that do not utilize decorative fountains	X	X	X	
Cooling Water Uses				
Industrial or commercial cooling or air conditioning that involves the use of a cooling tower, evaporative condenser, spraying or any mechanism that creates a mist	X ^b			
Industrial or commercial cooling or air conditioning that does not involve the use of a cooling tower, evaporative condenser, spraying or any mechanism that creates a mist	X	X	X	
Other Uses				
Flushing Toilets and Urinals	X			
Priming Drain Traps	X			
Industrial Process Water that May Come into Contact with Workers	X			
Structural Fire Fighting	X			
Decorative Fountains	X			
Commercial Laundries	X			
Consolidation of Backfill Around Potable Water Pipelines	X			
Artificial Snow-making for Commercial Outdoor Use	X			
Commercial car washes including hand washes if recycled water is not heated, where the general public is excluded from the washing process	X			
Industrial Boiler Feed	X	X	X	
Nonstructural Fire Fighting	X	X	X	
Backfill Consolidation Around Non-potable Piping	X	X	X	
Soil Compaction	X	X	X	
Mixing Concrete	X	X	X	
Dust Control on Roads and Streets	X	X	X	
Cleaning Roads, Sidewalks, and Outdoor Work Areas	X	X	X	
Industrial Process Water that Will Not Come into Contact with Workers	X	X	X	
Flushing Water for Sanitary Sewers	X	X	X	X

Type of Recycled Water Use	Recycled Water Treatment Level			
	Disinfected Tertiary	Disinfected Secondary- 2.2	Disinfected Secondary- 2.3	Undisinfected Secondary
<p>Source: Brown and Caldwell, 2011</p> <p>Notes:</p> <p>a. Requires conventional treatment where conventional treatment utilizes a sedimentation unit between coagulation and filtration and produces an effluent that meets the definition of disinfected tertiary recycle. If conventional treatment is not used, the recycled water must be monitored for pathogens in accordance with section 60305(b) of Title 22.</p> <p>b. If a cooling tower is used or if a mist is created that could into contact with employees or the public, the cooling system shall have a drift eliminator whenever the cooling system is in operation and a chlorine or other biocide shall be used to treat the cooling tower recirculation water to minimize the growth of <i>Legionella</i> and other microorganisms.</p>				

For recycled water to be used for toilet flushing and landscape irrigation, it must meet State of California Title 22 Level 4 treatment standards, specifically the disinfected tertiary recycled water standard (the most stringent level of treatment required in California). Title 22 Level 4 standards require specific treatment parameters including total coliform and turbidity as well as scheduled testing and reporting requirements to ensure ongoing water quality performance and regulatory compliance. Title 22 of California's Water Recycling Criteria refers to California state guidelines for how treated and recycled water is discharged and used. Title 22 also includes standards from state's Department of Health Services to water and bacteriological treatment standards for water recycling and reuse.

4.7.3.3 Regional and Local Plans

Central Coast Basin Plan

The UC Santa Cruz campus is within the jurisdiction of the Central Coast RWQCB (Region 3). The CCRWQCB 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 CQA and the state Porter-Cologne Water Quality Control Act. **Table 4.7-3, Beneficial Uses of Surface Water Bodies on or near UC Santa Cruz**, lists the beneficial uses of creeks and other water bodies on or near the campus. 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 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 4.7-3
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
<p><i>Source: Central Coast RWQCB 2017</i></p> <p>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).</p>	

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.

UC Santa Cruz Storm Water Management Plan

The UC Santa Cruz Storm Water Management Plan (SWMP) was developed in 2004 to comply with US EPA Phase II NPDES requirements and was last updated in 2009. The purpose of the SWMP is: (1) to identify potential contaminant sources and other water quality issues of concern potentially affecting the quality and quantity of storm water discharges; (2) to provide BMPs to be implemented by UC Santa Cruz students, faculty, administration, staff and contractors and; (3) provide measurable goals for the implementation of the BMPs. The intent of the SWMP is to facilitate comprehensive management of storm water quality and to subsequently enhance UC Santa Cruz's environmental stewardship. The SWMP covers all UC Santa Cruz sites, identifies constituents of concern (COC), sources or activities that would have the potential to discharge a COC into runoff, and best management practices to be implemented to address the COC.

UC Santa Cruz Post-Construction Storm Water Management Requirements

In 2014, the Campus prepared the UC Santa Cruz Post-Construction Stormwater Management Requirements (PCRs), a document for use on the campus to ensure that the Campus is reducing pollutant discharges to the MEP and preventing storm water discharges from causing or contributing to a violation of receiving water quality standards. The PCRs are incorporated into the Stormwater Management Plan. The document was last updated in March 2017. The document divides the campus into four watershed management zones based on geologic conditions, slope, and other factors; defines regulated projects as include 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 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 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 which watershed management zone the project site is located in.

The Heller site is located within Watershed Management Zone 9, while the Hagar site is located within Watershed Management Zone 3. Generally, development in all watershed management zones 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. For both sites, all runoff from the 85th percentile 24-hour rainfall event must be retained on site; compliance must be achieved 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 24-hour storms. Some exceptions, with alternative compliance options, may be made where some of the primary compliance requirements cannot be met due for technical reasons.

4.7.4 IMPACTS AND MITIGATION MEASURES

4.7.4.1 Significance Criteria

The impacts with respect to hydrology and water quality from the implementation of the proposed project would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the State CEQA Guidelines, the UC CEQA Handbook, and the 2005 LRDP EIR:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on site or off site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on site or off site;
- Create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- Inundation by seiche, tsunami, or mudflow.

4.7.4.2 CEQA Checklist Items Adequately Analyzed at the 2005 LRDP Level or Not Applicable to the Project

- Violate any water quality standards or waste discharge requirements

Wastewater on the campus is discharged into the City of Santa Cruz sewer system and treated at the City's wastewater treatment plant. The analysis in Section 4.8 of the 2005 LRDP EIR found that campus development under the 2005 LRDP would not result in wastewater that would violate wastewater

discharge requirements as the City's existing wastewater treatment plant has sufficient capacity to handle the expected increase in flow due to campus growth under the 2005 LRDP in combination with other city growth through 2020 (UCSC 2006). The proposed SHW project would not increase enrollment at UC Santa Cruz or the regional population levels. Furthermore, the SHW project will include an on-site wastewater treatment facility and wastewater from the Heller site development will not discharge to the City's collection and treatment system. Therefore the proposed SHW project would not increase the amount of wastewater generated on the campus that was previously evaluated, and impacts with respect to waste discharge requirements would not be greater than those discussed in the 2005 LRDP EIR. This impact is adequately addressed in the 2005 LRDP EIR and the project's impact is considered less than significant.

- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map; or place within a 100-year flood hazard area structures which would impede or redirect flood flows.

The analysis in the Initial Study prepared for the 2005 LRDP EIR found that campus development under the 2005 LRDP would not place housing or any other structures within a 100-year flood hazard area (UCSC 2006). As both the Heller and Hagar sites are located within campus boundaries and the latest flood map prepared by FEMA confirms that the campus is not located within a 100 year flood zone, the proposed SHW project would also not place housing or any other structures within a 100-year flood hazard area. This impact was adequately addressed in the 2005 LRDP EIR and no project impacts would occur.

- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

The analysis in the Initial Study prepared for the 2005 LRDP EIR found that campus development under the 2005 LRDP would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam as the campus is not within an area that could be inundated due to the failure of a nearby dam (UCSC 2006). As both the Heller and Hagar sites are located within campus boundaries, the proposed SHW project would also not expose people or structures to risks involving flooding due to the failure of a levee or dam. This impact was adequately addressed in the 2005 LRDP EIR and no project impact would occur.

- Inundation by seiche, tsunami, or mudflow.

The analysis in the Initial Study prepared for the 2005 LRDP EIR found that campus development under the 2005 LRDP would not be subject to inundation by seiche, tsunami, or mudflow (UCSC 2006). As both the Heller and Hagar sites are located within campus boundaries, the proposed SHW project would also not be subject to inundation by seiche, tsunami, or mudflow. This impact was adequately addressed in the 2005 LRDP EIR and no project impact would occur.

4.7.4.3 Methodology

This section analyzes the potential hydrologic and water quality impacts associated with the proposed project based on conceptual post-construction storm water control plans prepared for each of the two project sites, by comparing the proposed plans to Campus requirements for post-construction storm water management and control. The potential for the proposed project to affect groundwater quality is also evaluated.

4.7.4.4 2005 LRDP EIR Mitigation Measures Included in the Proposed Project

Table 4.7-4, 2005 LRDP EIR Mitigation Measures, presents the mitigation measures in the 2005 LRDP EIR that are applicable to the proposed project. Since these previously adopted mitigation measures are already being carried out as part of implementation of the 2005 LRDP, they are included in and are a part of the proposed project and will not be readopted. Implementation of these mitigation measures is assumed as part of the project impact analysis.

Table 4.7-4
2005 LRDP EIR Mitigation Measures

Mitigation Measure	Description
HYD-2B	No grading shall be conducted on hillsides (sites with slopes greater than 10 percent) during the wet season (October 1 through May 31) unless controls that prevent sediment from leaving the site are implemented. Erosion control measures, such as erosion control blankets, seeding or other stabilizing mechanisms shall be applied to graded hillside prior to predicted storm events.
HYD-3C	Each new capital project proposed under the 2005 LRDP that creates new impervious surface shall include design measures to ensure that post-development peak flows from 2-, 5- and 10-year storms do not exceed the 2-, 5-, and 10-year pre-development peak flows and that post-development peak flows from a 25-year storm do not exceed the pre-development peak flow from a 10-year storm. Each new capital project shall also include design measures to avoid or minimize the increase in the volume of runoff discharged from the site to the maximum extent feasible.
HYD-3D	The Campus shall incorporate measures into project designs under the 2005 LRDP that maximize infiltration of runoff. Infiltration shall be achieved preferably near the area where new runoff is generated.
HYD-5B	For projects involving construction on karst, if: (a) groundwater is encountered beneath the building site during the geotechnical investigation, and (b) the proposed foundation type would require pressure grouting, the Campus will follow the procedures outlined below: <ul style="list-style-type: none"> Perform a dye tracing study to determine if there is a potential for pressure grouting to affect water quality in springs and seeps around the UC Santa Cruz campus. If a potential impact is indicated, alternative building foundation plans will be considered.

Mitigation Measure	Description
	<ul style="list-style-type: none"> As an alternative, the Campus may conduct a preliminary hydrogeological study to evaluate whether the groundwater zone encountered during the geotechnical investigation is hydraulically connected to the karst aquifer. If the hydrogeological study indicates that the groundwater zone is hydraulically independent of the karst aquifer, such that there is no potential for grout injected during construction to affect karst water quality, a dye tracing study need not be performed. If results of the hydrogeological study indicate hydraulic connectivity between the groundwater encountered beneath the site and the karst aquifer, the Campus shall conduct a dye tracing study as described above.
Source: UC Santa Cruz 2006	

4.7.4.5 Project Impacts and Mitigation Measures

SHW Impact HYD-1: Construction activities associated with the proposed SHW project would not substantially degrade surface or groundwater quality. (*Less than Significant*)

Heller Site

Construction on the Heller site would involve construction activities such as grading and excavation, which could cause increases in erosion during storm events and result in the discharge of sediment into surface waters. Other pollutants such as fuels, paints, and cleansers could be accidentally released at the site and could also enter surface waters. These pollutants could adversely affect water quality and other beneficial uses of the campus creeks and drainages as well as downstream receiving waters, including the Monterey Bay.

The disturbance footprint of the Heller site would exceed the 1-acre threshold that triggers the NPDES requirement to prepare and implement a SWPPP. In compliance with the NPDES requirements, appropriate erosion-and sediment-control measures would be incorporated into the SWPPP for the site and implemented during site grading and construction. These measures would include, but are not limited to, control of surface flows over exposed soils and use of sediment traps. Therefore, the impact to surface water quality from erosion and sedimentation during project construction would be less than significant.

In addition, according to the 2005 LRDP EIR, the use of pressure grouting to stabilize building sites in some locations on the campus could negatively affect groundwater quality if groundwater is present. The Heller site is underlain mostly by schist. However, the geotechnical investigation has identified areas of likely doline fill on top of marble bedrock in the southern portion of the site. Although at this time it is anticipated that the soft soil areas would be stabilized by excavating the soft materials and replacing with

lime-treated engineered fill, construction in these areas may involve pressure grouting to densify and stabilize soft soils. However, no groundwater water was encountered in the small-diameter borings advanced within the dolines on the site. As a result, pressure grouting, if required, would not result in a groundwater quality impact at the Heller site.

Hagar Site

Construction on the Hagar site would also involve construction activities such as grading and excavation, which could cause increases in erosion during storm events and result in the discharge of sediment into surface waters. Other pollutants such as fuels, paints, and cleansers could also be accidentally released at site and could also enter surface waters. However, with preparation and implementation of a SWPPP, the potential for construction activities to cause erosion and other water quality impacts is low. In addition, as the slopes on the site are greater than 10 percent, no grading would occur on the site during the wet season (October 1 through May 31) unless controls that prevent sediment from leaving the site are implemented as required by LRDP Mitigation HYD-2B. Therefore, the impact related to erosion and sedimentation during project construction would be less than significant.

According to a preliminary geotechnical study, the Hagar site is underlain by marble, and some relatively soft soils have been encountered near the contact between the marble bedrock and overlying soil in the soil borings. Although the Campus has used pressure grouting to fill cavities and densify earth materials underlying other project sites located on karst, according to the preliminary geotechnical report, given the site conditions and the nature of the project proposed for this site, pressure grouting is not anticipated and the project can be developed by stabilizing soft soil areas by excavating the soft materials and replacing with lime-treated engineered fill and appropriate mat foundations. In addition, no groundwater has been encountered in the soil borings on the site. Therefore, should pressure grouting be proposed as part of this project, it not have the potential to affect groundwater quality via the inadvertent discharge of grout into groundwater.

Mitigation Measures: No mitigation is required.

SHW Impact HYD-2: Project occupancy and operations would have the potential to substantially degrade surface or groundwater quality. (Potentially Significant; Less than Significant with Mitigation)

Heller Site

The proposed storm drain system would collect stormwater runoff within bio-retention areas distributed throughout the site. The bioretention areas would be sized and designed to treat the runoff to standards as defined the UC Santa Cruz Post-Construction Storm Water Management Requirements (volume of runoff generated by the 85th percentile 24-hour storm event). The bioretention areas would be designed to remove urban pollutants and to allow on-site infiltration of some runoff. Overflow from the bioretention areas would be directed toward a storm drain main located within the proposed road on site. Two options are being considered for disposal of the discharge from the storm drain main. Under the first option, the storm drain main would discharge to an infiltration well, within the soil layer over the weathered schist bedrock. Subsurface detention pipes would meter the storm water discharge to the infiltration/dry well at a rate that would not exceed the infiltration capacity of the well. The intent of this method is to infiltrate the water into the soil layer, allowing it to slowly percolate downward into the fractures that cut the underlying weathered schist and schist bedrock. The proposed infiltration/dry well will be classified as a Class V UIC well. The construction, use, and maintenance of the infiltration/dry well would be regulated under the US EPA regulations related to Class V UIC wells. Water discharged to UICs generally require compliance with the Safe Drinking Water Act standards to ensure that potential sources of drinking water are protected. Class V UIC wells are authorized by rule and specific treatment requirements are defined on a case-by-case basis based on the water quality of the injected water and geological and hydrogeological characteristics of the soil. As the water would be treated in bioswales, the injection of this water into the well would not adversely affect the quality of groundwater underneath the site.

Under the second option, the storm water runoff would be detained on-site and discharged at a metered rate to an existing detention basin on the east side of Heller Drive, to which most of the runoff from the existing development on the Heller site currently discharges. The existing outflow structure of the basin would be modified to provide the infiltration volume as required by the PCRs. If the basin outflow structure modification isn't sufficient to meet the retention requirements then infiltration wells may be used in conjunction to meet the PCRs for infiltration. Peak flows will be managed by either the detention system on site or by use of the infiltration wells.

Furthermore, similar to other existing colleges and facilities on the campus, the Heller site housing development would be required to comply with the MS4 permit. Therefore the impact from site runoff on surface water quality and groundwater quality would be less than significant.

As discussed in **Chapter 3.0, Project Description**, the proposed project at the Heller site includes a membrane bioreactor (MBR) plant located on the southwestern portion of the site, where the wastewater generated would be treated to Title 22 standards and the recycled water that would be produced would be used on site for toilet flushing and irrigation. Based on current estimates, the plant would generate about 15 MGY of excess recycled water, which if not used at other locations on the campus, would be disposed of by via of an injection well located in the on-site schist. The recycled water produced at the plant would meet Title 22 Level 4 treatment standards, specifically the disinfected tertiary recycled water standard, which is the most stringent level of treatment required in California. Title 22 Level 4 standards require specific treatment parameters, including total coliform and turbidity as well as scheduled testing and reporting requirements to ensure ongoing water quality performance and regulatory compliance. Title 22 allows Level 4 recycled water to be used for all types of irrigation and to be infiltrated into the ground using UIC well(s).

As noted above, UIC wells are governed by the US EPA UIC program and administrated and enforced by the State of California. Water discharged to UICs generally requires compliance with the Safe Drinking Water Act standards to ensure that potential sources of drinking water are protected as though the sources are currently used for drinking water. The proposed UIC will be classified as a Class V well. Class V UIC wells are authorized by rule and specific treatment requirements are defined on a case-by-case basis based on the water quality of the injected water and geological and hydrogeological characteristics of the soil. As the water would be treated to a level that allows irrigation use, the injection of this water into the well would not adversely affect the quality of groundwater underneath the site. For these reasons, recycled water generated during occupancy and operation of the proposed project would not adversely affect surface or groundwater quality, and this impact would be less than significant.

Hagar Site

Development on the Hagar site would also generate urban runoff after construction that would have the potential to contain pollutants, including sediment, which could adversely affect water quality. However, erosion potential after development would be low as the site would be under buildings, pavement, and landscaping.

The site geology does not allow for localized infiltration, therefore all site runoff would be directed to pipes or lined bioswales. Treatment to remove urban pollutants would be accomplished in the bioswales

and, if necessary, using engineered treatment systems. The bioswales would also serve to slow runoff, but underground detention pipes would be used detain runoff to reduce peak flows as required by the Post-Construction Requirements. The treated and metered runoff, as well as run-on from the grasslands above the site, would be discharged to two locations, in order to limit the impact to the existing detention basin at the intersection of Hagar and Glenn Coolidge Drives. Some of the treated and metered runoff may be discharged to this detention basin. The remainder of the runoff would be piped beneath Hagar Drive and the undeveloped meadow area and would be discharged through a dissipation structure to Jordan Gulch.

As discussed in **Section 4.6, Geology and Soils**, the Hagar site is underlain by marble, including some likely filled dolines, or sinkholes. Furthermore, a sinkhole has formed in the existing detention basin on the site, which was constructed in 1991 and accepts runoff from Glenn Coolidge Drive and Hagar Drive as well as the project site. An increase in the amount of runoff, or the flow rate, to this basin has the potential to result in expansion of the sinkhole. This could result in an increase in sediment deposition in the karst fracture system to which the sinkhole is connected, which could impact the springs fed by the karst aquifer. This is a potentially significant impact. The impact would be mitigated to a less-than-significant level with implementation of **SHW Mitigations HYD-2A** through **HYD-2D**. Potential impacts of sinkhole formation to infrastructure such as roads and underground utilities are analyzed in **Section 4.6, Geology and Soils (SHW Impact GEO-3)**.

Mitigation Measures:

- SHW Mitigation HYD-2A:** The volume of runoff flowing to the existing detention basin at the intersection of Glenn Coolidge Drive and Heller Drive shall be reduced compared to existing conditions, by directing the remainder of the runoff toward Jordan Gulch.
- SHW Mitigation HYD-2B:** The existing detention basin/sinkhole shall be modified to include a graded filter.¹
- SHW Mitigation HYD-2C:** Runoff discharged to Jordan Gulch and to the existing basin at the intersection of Glenn Coolidge Drive and Heller Drive shall be treated to the standard required in the Post-Construction Requirements prior to discharge, and the rate of discharge to the ground surface shall be

¹ Graded filters are a method of sinkhole repair that allow for downward seepage of water while retaining the soil so as to prevent any further sinkhole collapse. The sinkhole area is excavated to the throat of the sinkhole at the bedrock surface. The excavation is then filled with graded sand and gravel, which may be surrounded by a geotextile to prevent raveling of the sand and gravel.

metered consistent with the peak flow specifications in the Post-Construction Requirements.

SHW Mitigation HYD-2D: A minimum 60-foot buffer shall be established between infiltration areas and critical structures, existing or planned, such as buildings, roadways, and life/safety infrastructure.

Significance after Mitigation: Implementation of the mitigation measures set forth above would reduce the impact on surface and groundwater quality to a less than significant level.

SHW Impact HYD-3: Implementation of the proposed SHW project would alter drainage patterns on both the Heller and Hagar sites and increase the rate or amount of surface runoff. However, the increase in rate or amount of surface runoff would not result in substantial siltation or erosion or flooding on or off site. (*Less than Significant*)

Heller Site

The Heller site is currently developed with the Family Student Housing (FSH) complex. This complex includes 199 housing units, a child care facility, recreation field, parking, utilities, roads and pedestrian infrastructure. The Heller site is underlain by schist and currently, all site runoff is collected in storm drains that eventually discharge to the College Eight detention basin located across Heller Drive to the west.

Approximately 6.0 acres, or 46 percent, of the 13-acre site currently consist of impervious surface area. The proposed project includes the demolition of the existing FSH complex and the construction of six residence halls for undergraduate students and two apartment buildings for graduate students, parking, and other support spaces. About 7.9 acres, or 61 percent, of the 13-acre site would consist of impervious surface area after construction, an increase of 32 percent over existing conditions. Consequently, there would be an increase in the total volume of storm water runoff that would be generated on the project site.

The proposed drainage system on the Heller site would collect storm water runoff within bio-filtration basins located adjacent to the proposed buildings and then direct it to a storm water main located on site. Storm water from this main would then be metered and sent to an infiltration well or to the College Eight detention basin located across Heller Drive from the site (UCSC 2018a). This design of the storm water

drainage system on the Heller site would ensure that post-development peak flows do not exceed pre-development peak flows from 2 to 10-year storms in compliance with LRDP Mitigation HYD-3C and the Campus's Post Construction Requirements (UCSC 2018a). The proposed infiltration well would maximize infiltration of runoff near where the runoff is generated, as required by LRDP Mitigation HYD-3D and the Post Construction Requirements. For these reasons, despite a 32 percent increase in impervious surface area on the site with implementation of control measures included in the proposed project, the rate or amount of surface runoff leaving the site would not increase, and thus would not exacerbate severe in-channel conditions (i.e., erosion) along the West Entrance Fork of Moore Creek. This design would also avoid adding flows to the West Entrance Fork of Moore Creek so that instances of overflow from the West Dam are minimized and the project would not contribute additional flow to lower portions of Moore Creek, including the segment at the Highview Drive crossing.

In addition, storm water runoff leaving the site would not drain into caves on- or off-campus as these features are located in Cave Gulch and Wilder Creek Canyons, which are located to the north of the Heller site. Therefore, operation of the proposed project would not alter drainage patterns or increase runoff such that substantial erosion, siltation or flooding would occur off-site. This impact is considered less than significant.

Hagar Site

The Hagar site is presently undeveloped and covered with grasslands. The site is underlain by karst and a drainage ditch is present along the east side of the site adjacent to Glenn Coolidge Drive, and a detention basin in which a sinkhole has formed is present in the southwestern corner of the site. No impervious surfaces are present on the 15-acre site. Storm water on the site either percolates into the surface soils or in larger storm events runs off in the southwesterly direction to enter the detention basin, and the underlying karst system.

The proposed project would result in the construction of 148 housing units, a childcare facility, recreation and open space, parking, roads, and pedestrian infrastructure. Approximately 7.1 acres, or 47 percent, of the 15-acre site would consist of impervious surfaces after project construction.

As described above, all site runoff would be directed to pipes or lined bioswales. Treatment to remove urban pollutants would be accomplished in the bioswales and, if necessary, using engineered treatment systems. The bioswales would also serve to slow runoff, but underground detention pipes would be used detain runoff to reduce peak flows as required by the Post-Construction Requirements. The treated and metered runoff, as well as run-on from the grasslands above the site, would be discharged to two locations, in order to limit the impact to the existing sinkhole at the intersection of Hagar and Glenn

Coolidge Drives. Some of the treated and metered runoff may be discharged to this detention basin. The remainder of the runoff would be piped beneath Hagar Drive and the undeveloped meadow area and would be discharged through a dissipation structure to Jordan Gulch (**Figure 3.0-6b** in **Chapter 3.0**).

Similar to the storm water system at the Heller site, the storm water system on the Hagar site must be designed so that post-development peak flows do not exceed pre-development peak flows from 2 to 10-year storms as required by LRDP Mitigation HYD-3D and the Campus's Post Construction Requirements (UCSC 2018b). In addition, there would be no surface runoff discharged from the site to receiving surface waters. Runoff would be treated and metered as required by the Campus's Post Construction Requirements prior to discharge to the existing detention basin and to Jordan Gulch, which terminates at a sinkhole before leaving the campus.

Given the complexity of the underlying karst system, it is difficult to predict how much of the site runoff directed to Jordan Gulch or the detention basin would discharge to the Kalkar Quarry pond or other off-springs fed by the karst aquifer. The runoff would be metered to pre-project levels and treated to remove pollutants before discharge to the ground surface. In addition, **SHW Mitigations HYD-2A through -2D** would be implemented to ensure that the discharge does not result in exacerbation of the existing sinkholes such that sediment would be deposited in the karst fracture zone. Therefore, operation of the proposed project would not result in an increased downstream discharge of storm water that could lead to substantial off-site flooding or other changes. The impact is considered less than significant.

Mitigation Measures:

SHW Mitigation HYD-3: Implement **SHW Mitigations HYD-2A through -2D**.

Significance after Mitigation: Measures listed in **SHW Mitigations HYD-2A through -2D** would ensure that the discharge does not result in exacerbation of the existing sinkholes such that sediment would be deposited in the karst fracture zone. Therefore the impact from stormwater runoff would be reduced to less than significant.

SHW Impact HYD-4: Implementation of the proposed SHW project would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. (*Less than Significant*)

Heller Site

As discussed above, the proposed project would result in a 32 percent increase in impervious surface area on the Heller site compared to existing conditions. However, a substantial reduction in groundwater recharge would not occur because bio-infiltration areas are included in the project to infiltrate some of the new storm water generated on the site and an infiltration well is proposed as part of the project where storm water that has been previously treated in the bioswales would be infiltrated into the underlying aquifer. A second option would include modification of the College Eight detention basin outlet to allow the basin to hold water longer, thereby increasing opportunities for infiltration within the basin.

In addition to the impact discussed above, the 2005 LRDP EIR identified another potential manner in which recharge of the karst aquifer could potentially be reduced. According to the 2005 LRDP EIR, it is possible that increased runoff from new campus impervious surfaces within the Moore Creek watershed could result in the filling of sinkholes with sediment, and thus runoff would no longer enter the karst system and would instead leave the campus as stream discharge. Some reduction in karst aquifer recharge could occur under these circumstances (UCSC 2006). However, as discussed above in **SHW Impact HYD-2**, erosion and sedimentation of sinkholes would be reduced as the storm water drainage system has been designed to include detention and metering of storm water flows, such that they do not cause downstream erosion and sedimentation.

For these reasons, the addition of impervious surfaces on the Heller site would not interfere substantially with groundwater recharge directly or indirectly within the Moore Creek watershed, and this impact is considered less than significant.

Hagar Site

As discussed above, approximately half the Hagar site would consist of impervious surfaces after project construction. However, a substantial reduction in groundwater recharge would not occur because all runoff would still be infiltrated into the karst aquifer. Therefore, even though the rate and volume of runoff from the site would increase due to new impervious surfaces, most runoff would still enter the karst system by way of infiltration. For these reasons, the addition of impervious surface area on the Hagar site would not interfere substantially with groundwater recharge within the Kalkar Quarry watershed, and this impact is considered less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact HYD-5: Implementation of the proposed SHW project would not substantially deplete groundwater supplies such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. (*Less than Significant*)

No groundwater extraction wells are proposed as part of the SHW project. Groundwater would not be extracted on the project site or at the existing campus well to serve the proposed SHW project's water needs. Therefore, there would be no impact of the proposed project on the local aquifer or a lowering of the groundwater table at the project site or on the campus. There would no impact on any off-campus wells, including wells in the Bonny Doon area.

The project's potable water demand would be served by water that is supplied to the campus by the City of Santa Cruz and is obtained primarily from surface water sources with about 5 percent of the supply provided by groundwater wells. The water that would be needed at the two project sites was estimated and included in the estimate of total Campus water demand under the 2005 LRDP and was analyzed for its impact on available supplies from the City. That analysis, which is presented in **Section 7.1, LRDP Water Supply Assessment**, shows that the Campus's annual water demand, including the water demand associated with the proposed SHW project, would be lower than previously projected in the 2005 LRDP EIR, and would be served by existing supply sources under normal water years. Thus, during normal water years, the proposed project would not require the City to increase its withdrawal of groundwater above levels anticipated by the City in its 2015 Urban Water Management Plan (UWMP).

During periods of prolonged drought, as is current practice and as projected in the 2015 UWMP, the City's use of groundwater would increase. However, as discussed in **Section 7.1**, the City is actively evaluating the feasibility of developing a new source of water that would be used under drought conditions to augment supplies and reduce the City's reliance on existing sources, including groundwater wells in order to reduce impacts on the groundwater aquifer. The City is also evaluating the feasibility of in lieu water transfers and aquifer storage and recovery (ASR) in order to recharge the groundwater basin and bank groundwater for use during dry years. Although until such time that these new sources are developed, groundwater withdrawal from city wells could potentially increase, the proposed project would make a negligible contribution to the City's need for the additional groundwater pumping during periods of drought. Furthermore, all UC Santa Cruz facilities, including the SHW project, would be required to curtail water use in drought periods in compliance with the commitment that UC Santa Cruz has made to the City in the 2008 Settlement Agreement. Therefore, the project's impact on the City's groundwater supplies would be less than significant.

Mitigation Measures: No mitigation is required.

4.7.5 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

The proposed dining facilities expansion project would add to existing facilities on the west side of Rachel Carson College and to the southern end of Porter College. In both instances, the facilities would be located above or adjacent to existing buildings, or would replace existing buildings with larger buildings.

Impacts and Mitigation Measures

DF Impact HYD-1: **The implementation of the proposed dining facilities expansion project would not have a significant impact related to water quality; siltation, erosion or flooding due to the alternation of drainage patterns; and groundwater recharge. (*Less than Significant*)**

Water Quality

The proposed dining facilities expansion project would be required to implement a SWPPP (if more than 1 acre of disturbance) or, if less than 1 acre, an Erosion and Sediment Control Plan (per Campus Standards and the Storm Water Management Plan) to minimize erosion and sedimentation during construction. In addition, the design and operation of each facility would adhere to campus post-construction requirements. For these reasons, the impact of the proposed dining facilities expansion project on water quality would be less than significant.

Siltation or Erosion or Flooding

The sites of the proposed dining facilities expansion project are located within the Moore Creek watershed. The area to be developed by each facility would be small and the additional storm water generated on each site would not be substantial. These projects will be required to comply with the PCRs and therefore provide water quality, runoff reduction, and peak management. Therefore, the project's impacts associated with the addition of impervious surface would be less than significant.

Groundwater Recharge

The small increase in impervious surfaces on the dining facilities project sites would not be substantial enough to interfere with groundwater aquifer recharge. Furthermore, the increased runoff generated by

the proposed dining facilities expansion project would be required to meet the runoff retention and peak flow standards in the Campus's post-construction requirements and therefore would not result in erosion or siltation that could filling sinkholes with the Moore Creek watershed with sediment, and thus reduce aquifer recharge. This impact is less than significant.

Groundwater Supply

As the dining facilities expansion project would not increase enrollment at UC Santa Cruz or the regional population levels, demand for potable and non-potable water would not increase above levels that were previously analyzed in the 2005 LRDP EIR and now reevaluated in **Section 7.1**. Thus, the impact of the proposed dining facilities expansion project on groundwater supplies in the City's service area would be less than significant.

Mitigation Measures: No mitigation measure is required.

4.7.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

SHW Impact C-HYD-1: Implementation of the proposed project would not result in significant cumulative impacts with respect to hydrology and water quality. (*Less than Significant*)

The cumulative impact of campus development under the 2005 LRDP along with other development in the region, including in the City of Santa Cruz, with respect to off-site runoff and water quality is analyzed in the 2005 LRDP EIR under LRDP Impact HYD-7. The analysis in the 2005 LRDP EIR found that cumulative growth in the study area, including the UC Santa Cruz campus, would increase impervious surface coverage in study area watersheds and increase storm water runoff, but would not result in substantial sources of runoff in off-campus watersheds, and therefore would not have a substantial adverse effect on receiving water quality (UCSC 2006). As discussed above, the storm water drainage systems for the proposed SHW project as well as the related dining facilities expansion project would be designed to provide water quality treatment, infiltration and peak management and thus implementation of these projects would not result in erosion within off-campus watersheds. For this reasons, the proposed project would not alter the previously evaluated cumulative impact. The project's cumulative impact with respect to hydrology and water quality would be less than significant.

The cumulative impact of campus development under the 2005 LRDP along with other development in the region, including in the City of Santa Cruz, with respect to groundwater extraction during drought

periods is analyzed in the 2005 LRDP EIR under LRDP Impact HYD-8. The analysis in the 2005 LRDP EIR found that cumulative growth in the study area would not contribute to a net deficit in the regional aquifer volume or a lowering of the local groundwater table. The proposed SHW project as well as the related dining facilities expansion project would not increase enrollment at UC Santa Cruz or the regional population levels, and thus not increase demand for water over what was previously analyzed in the 2005 LRDP EIR (in fact as shown in **Section 7.1**, the campus's water demand at full development under the 2005 LRDP along with the water demand associated with other UC Santa Cruz facilities, would be substantially lower than the previous estimate in the 2005 LRDP EIR). As a result, the proposed project would not alter the previously evaluated cumulative impact. The project's cumulative impact related to groundwater extraction would be less than significant.

Mitigation Measures: No mitigation is required.

4.7.7 REFERENCES

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4.7 Hydrology and Water Quality

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4.8 LAND USE AND PLANNING

4.8.1 INTRODUCTION

This section describes existing land uses on the UC Santa Cruz campus and analyzes the potential for implementation of the proposed Student Housing West (SHW) project to result in impacts with respect to land use and planning. It also presents potential land use impacts from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and the existing colleges (see **Section 4.8.5** below).

The analysis in this section is tiered from the land use and planning impact analysis contained in the 2005 LRDP EIR, supplemented by project-specific analysis. Information used in the preparation of this section was obtained from various sources, including the 2005 LRDP EIR and the Final 2005 LRDP.

4.8.2 ENVIRONMENTAL SETTING

4.8.2.1 On-Campus Land Uses

Approximately half of the 2,030-acre UC Santa Cruz campus is located within the boundaries of the City of Santa Cruz with the remainder located in unincorporated Santa Cruz County. The 2005 LRDP designated 10 land use types on the campus, based on the characteristics of various areas. As described in the 2005 LRDP, the campus is comprised of 132 acres of Academic Core (AC), 85 acres of Campus Support (CS), 228 acres of College and Student Housing (CSH), 69 acres of Employee Housing (EH), 86 acres of Physical Education and Recreation (PE), 335 acres of undeveloped Campus Resource Land (CRL), 410 acres of Campus Natural Reserve (CNR), 154 acres designated for Site Research and Support (SRS), 505 acres of Protected Landscape (PL), and approximately 25.5 acres designated as Habitat Reserve (HAB) (UCSC 2006). To accommodate the Recycling Yard Project, in 2016, the UC President approved a minor amendment of the 2005 LRDP to change the designation of 1.6 acres of PL and 2.1 acres of SRS to the CS land use designation. Campus Land Use Designations, as defined by the 2005 LRDP, are briefly described below.

Academic Core (AC)

AC is largely located in the center of campus and is comprised of facilities utilized for instruction and research, academic support, libraries, and student and public services.

Campus Support (CS)	CS covers nine separate areas utilized for visitor and student services, commercial and retail facilities, utility plants, the Fire Station, Cowell Student Health facility, and the Recycling Yard.
College and Student Housing (CSH)	CSH land forms an arc around the AC and provides student and family housing, as well as recreational amenities and housing-related parking.
Employee Housing (EH)	EH provides housing for faculty and staff, childcare facilities, and related accessory buildings.
Physical Education and Recreation (PE)	PE represents land planned for or currently maintaining recreational facilities, playing fields, and athletic courts.
Campus Resource Land (CRL)	CRL is undeveloped land that is not planned for development under the 2005 LRDP.
Campus Natural Reserve (CNR)	CNR is intended to protect the campus's natural features and planned to remain in its natural state to be utilized for teaching and research.
Site Research and Support (SRS)	SRS land is utilized primarily for Social Sciences, Physical and Biological Sciences, Student Services, and Public Services, and maintains programs such as the Center for Agroecology and Sustainable Food Systems (CASFS) and the Arboretum.
Protected Landscape (PL)	PL is natural landscape maintained for its scenic value and importance to special vegetation and wildlife continuity zones.
Habitat Reserve (HAB)	HAB consists of two areas on campus that are designated as a reserve to manage and preserve special interest species.

A large portion of the UC Santa Cruz campus is undeveloped. HAB and PL areas cover most of southern and southwestern portions of the campus, on which development is limited and must retain the visual quality of the area. At the center of the campus lies the campus core (designated AC), consisting of

academic and administrative buildings. Student services such as the McHenry Library, Student Union, and Cowell Student Health Center are also located in the campus core and are easily accessible to the entire campus community. To the northeast of the campus core lie the East Colleges, which include the oldest colleges on the campus, as well as a gallery, library, printing press, event center, and the Fire Station. The Chadwick Garden, a part of the Center for Agroecology and Sustainable Food Systems, is also in this area and contains greenhouses and hundreds of plant species. To the southwest of the campus core lie the West Colleges and Family Student Housing (FSH) complex.

McLaughlin Drive runs east-west through the highly developed part of campus, connecting the East Colleges to the campus core and the West Colleges (UCSC 2006). Glenn Coolidge Drive runs generally north-south in the eastern portion of the campus, connecting the Main Entrance to the East Colleges area. Heller Drive runs generally north-south in the western portion of the campus, connecting the West Entrance to the West Colleges area. Hagar Drive is another major north-south roadway that extends between Glenn Coolidge Drive and McLaughlin Drive and provides access to the campus core.

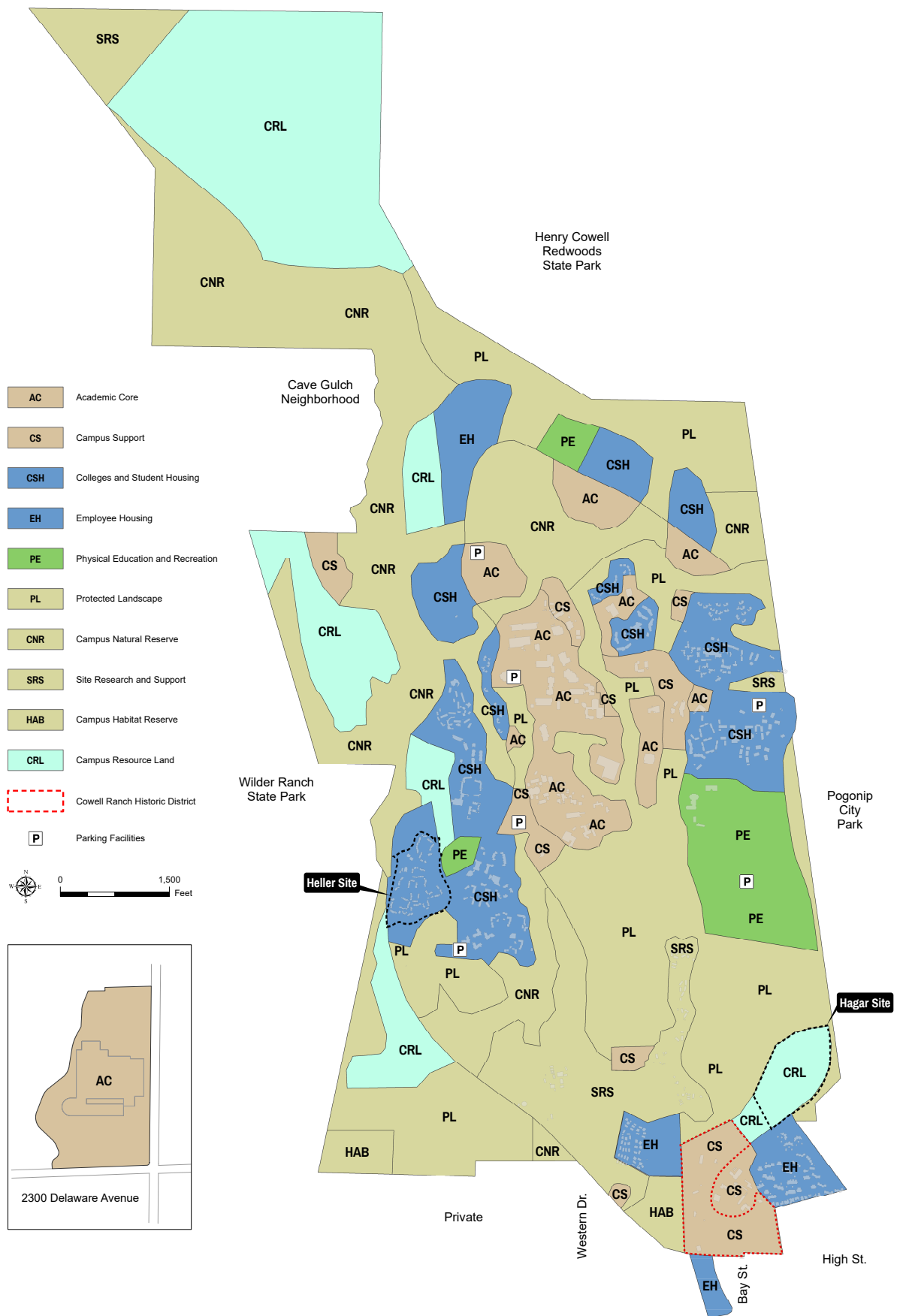
4.8.2.2 Existing Land Uses

Heller Site

The Heller site is currently occupied by the FSH complex. The 13-acre development includes 199 housing units, a child care facility, parking, utilities, roads and pedestrian infrastructure. A recreation field is located to the south of the development. The Heller site is designated CSH with the recreation field designated as PL (see **Figure 4.8-1, LRDP Land Use Designations**). Heller site includes 42 buildings connected by natural and paved pathways and narrow roads with intervening open space areas. The apartment buildings are two stories high and are partially screened by mature trees along the southern and eastern sides of the site, when viewed from Heller Drive.

Hagar Site

The Hagar site is located at the northeastern corner of the intersection of Glenn Coolidge Drive and Hagar Drive and is designated CRL (see **Figure 4.8-1**). The Hagar site is located on an undeveloped portion of the campus that is known as the East Meadow and lies on a hillside that slopes south toward Glenn Coolidge Drive. The approximately 15-acre site is covered with annual grasslands and a sinkhole is located in the southeastern corner of the site.



SOURCE: UCSC, 2017

FIGURE 4.8-1

4.8.2.3 Existing Adjacent Land Uses

Land uses surrounding the campus are primarily open space and parkland, with three residential neighborhoods located in the City of Santa Cruz to the south. Henry Cowell Redwoods State Park lies to the north of the campus and is connected to it via a 1-mile long multi-use trail (UCSC 2006). Additionally, parts of the woodland north of the campus, in unincorporated Santa Cruz County, are privately owned and managed. Pogonip City Park is located directly to the east of the campus and is composed of 640 acres of woodlands, open meadows, and creeks, threaded with 8 miles of hiking trails (UCSC 2006).

Wilder Ranch State Park and the Cave Gulch neighborhood are to the west of the campus. In general, lands west of Empire Grade Road are included in the California Coastal Zone, a designation laid out by the California Coastal Act as a valuable resource that warrants special protections against human development.

The neighborhoods to the south of the campus are commonly referred to as the “upper west side” (UCSC 2006). Bay Drive and High Street are main roads in the area and provide access to the campus. Bay Drive becomes Glenn Coolidge Drive as it enters the campus, and High Street becomes Empire Grade Road at the city boundary, adjacent to the campus. Most of the homes in the area are single-family residences intermixed with Westlake and University Terrace Parks, Westlake Elementary School, Bay Street Reservoir, and several churches. The rest of the City of Santa Cruz lies further south and southwest.

Heller Site

The Heller site is located in the southwestern portion of the campus. Land uses surrounding the Heller site are depicted on **Figure 3.0-3, Project Vicinity - Heller Site**. The Rachel Carson College sits directly east of the Heller site and consists of athletic courts, gardens, six apartment buildings, and eight Residence Hall buildings, dining hall, and a housing office. Other facilities east of the Heller site include the West Field House and athletic courts. Immediately south of Rachel Carson College are the Oakes College buildings, which consist of a series of residence halls, apartments, a café, and academic facilities. Both colleges are designated CSH on the 2005 LRDP land use diagram.

Lands to the north and west of the Heller site are undeveloped. Porter Meadow, an open area consisting of rolling grassland with some scattered trees and shrubs, lies immediately north of the site and is designated CRL. The meadow contains multiple dirt roads and paths that are used for informal recreation and also connect the FSH complex with Kresge and Porter Colleges to the northeast. The mixed evergreen and oak forest of Wilder Ranch State Park lie to the west of the Heller site, outside of the campus across Empire Grade Road. On the eastern side of Empire Grade Road, campus land between the

roadway and the Heller site is also heavily wooded and is designated CNR. Finally, grassy, undeveloped campus lands lie to the south of the Heller site and are designated CRL.

Hagar Site

Land uses surrounding the Heller site are depicted on **Figure 3.0-4, Project Vicinity - Hagar Site**. The East Meadow extends to the north of the Hagar site and is designated as PL. Approximately 0.4 miles north of the Hagar site, at the top of the East Meadow, is the East Remote parking lot and areas that are temporarily being used for construction staging and Campus bus parking. To the east of the Hagar site is Glenn Coolidge Drive and grasslands designated as PL that extend onto Pogonip City Park in the City of Santa Cruz.

A meadow is located directly southeast of the Hagar site across Hagar Drive and is designated CRL. About 0.12 miles further west is the UC Santa Cruz Center for Agroecology and Sustainable Food Systems (CAFSE), which is designated SRS, and the Cowell Lime Works Historic District, which is designated CS and occupied by Campus support facilities. Finally, open space consisting of an abandoned quarry, is located directly south of the Hagar site. This area contains trees, rock outcroppings, grassy areas, and a small body of water. Adjacent to the west of the open space area is a residential neighborhood designated as EH that contains staff and faculty housing.

4.8.3 REGULATORY CONSIDERATIONS

4.8.3.1 Federal and State Laws and Regulations

There are no federal laws related to land use and planning that are applicable to the proposed project. However, the California Coastal Act is applicable to the University and is summarized below.

California Coastal Act

The California Coastal Act was enacted in 1976, in recognition of the importance of the California Coastal Zone as a unique ecosystem and resource. The Act established policies for the permanent management and preservation of the Zone, as well as setting five goals for future protection. The goals promote public access and recreation, uphold private property rights, and coordinate with local governments that will ultimately hold the authority to enforce the Act. The Act has been incorporated into the General Plans for both the City and County of Santa Cruz.

Although, as a state agency, UC Santa Cruz is not included in either General Plan, main campus land west of Empire Grade Road is located in the Coastal Zone and UC Santa Cruz must independently comply with the requirements of the Coastal Act.

4.8.3.2 Regional and Local Plans

UC Santa Cruz is part of the University of California, 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 University is not subject to municipal regulations of surrounding local governments, such as the general plans and land use ordinances of the City of Santa Cruz and Santa Cruz County for uses on property owned or controlled by the University that are in furtherance of the University’s education purposes. The land use plan applicable to the proposed project is the UC Santa Cruz 2005 LRDP. Pertinent planning principles from the 2005 LRDP are summarized below.

UC Santa Cruz may consider, for coordination purposes, aspects of local plans and policies for the communities surrounding the campus, but it is not bound by those plans and policies in its planning efforts. The Campus seeks to maintain an ongoing exchange of ideas and information and to pursue mutually acceptable solutions for issues that confront both the campus and the community. To foster this process, UC Santa Cruz participates in, and communicates with, City and community organizations and sponsors various meetings and briefings to keep local organizations, associations, and elected representatives apprised of ongoing planning efforts.

Although the University is not subject to local plans of cities and counties, nevertheless, such plans and policies are of interest or concern because the campus and local development are coincident. It is University policy to seek consistency with regional and local plans and policies, where feasible. Therefore, a summary of the City’s General Plan is also presented in this EIR. (The County of Santa Cruz General Plan is not described in this section because the proposed project would be located in the portion of the campus that is within the City of Santa Cruz and not in the northern portion of the campus which is located in unincorporated Santa Cruz County.)

UC Santa Cruz 2005 Long Range Development Plan (LRDP)

The 2005 LRDP includes Physical Planning Principles and Guidelines to maintain the unique character of the UC Santa Cruz campus. The following planning principles relate to land use patterns and are pertinent to the proposed project:

- Respect the natural environment and preserve open space as much as possible: Development will rely on careful infill and clustering of new facilities to promote efficient land use, retain valuable visual and environmental features, and encourage a pedestrian-friendly campus. Within the overall context of infill and clustering, sites will include a reasonable "buffer" between new buildings and major roads where possible.
- Integrate the natural and built environment: New development will respond to the aesthetic qualities of UC Santa Cruz’s unique natural environment through siting, development patterns

and architecture that are sensitive to the natural setting. In forested areas, buildings generally should not protrude above the surrounding tree canopy; in visually sensitive areas, interruption of prime viewsheds and viewpoints will be minimized.

- Maintain UC Santa Cruz's core configuration: Development will follow UC Santa Cruz's traditional land-use pattern, which is a core of academic and administrative buildings surrounded by the residential colleges and other housing and support facilities. This pattern facilitates pedestrian and bicycle travel and maximizes interaction among members of the campus community. New colleges will be located as close to the core as possible without compromising sites for future academic and research facilities.
- Encourage sustainability and efficiency in building layouts: Buildings shall be configured simply, to balance programmatic goals with sensitivity to the natural and/or built context. Efforts will be made to reduce building footprints and increase building height, where feasible.

City of Santa Cruz General Plan

The City's 2030 General Plan was adopted in 2012. The Land Use chapter of the 2030 General Plan highlights legal requirements and existing conditions of land use development in Santa Cruz to shape future physical developments in a way that preserves and enhances the community's quality of life.

Land Use Designations

The central and southern portions of the campus, which contain a majority of campus development, are located within the limits of the City of Santa Cruz. The City's General Plan designates the campus as "UCSC lands." This designation applies to land that is owned by the University of California, including the UC Santa Cruz campus and the University's off-campus research facilities.

Policies

Long-term land use policy is set forth by the City's General Plan. Land uses policies that pertain to UC Santa Cruz include the following:

- Policy LU 2.2, which relates to expansion of the city's Sphere of Influence and annexation, and the associated Action LU 2.2.2 which requires that the city's Sphere of Influence be amended to add approximately 374 acres of the north campus area pursuant to the UC Santa Cruz /City Comprehensive Settlement Agreement,
- Policy LU 2.3, which relates to the preservation of open space and agricultural land uses at the edge of the city, and the associated Action LU 2.3.4 which encourages the continued preservation of portions of the UC Santa Cruz campus as open space uses pursuant to the UC Santa Cruz 2005 LRDP.
- Policy CD 1.3, which requires that the scale, bulk, and setbacks of new development preserve important public scenic views and vistas, also pertains to UC Santa Cruz, and the associated

Action CD 1.3.1 which encourages UC Santa Cruz development to blend in with the natural landscape and maintain natural ridgelines as seen from the city.

Habitat Conservation Plan

Pursuant to an Implementing Agreement and Habitat Conservation Plan (HCP) that was approved by the University in July 2005 in conjunction with an Incidental Take Permit issued by the U.S. Fish and Wildlife Service, the University committed to protect two areas as habitat for the California red-legged frog and Ohlone tiger beetle. The parcels are designated as Campus Habitat Reserve on the 2005 LRDP land use map. One is a 13-acre parcel adjacent to Wilder Creek, in the southwestern corner of the campus. The second is a 12.5-acre parcel along the University's southern border, just west of the main entrance (UCSC 2006).

4.8.4 IMPACTS AND MITIGATION MEASURES

4.8.4.1 Significance Criteria

The impacts on land use and planning from the implementation of the proposed SHW project would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the State CEQA Guidelines, the UC CEQA Handbook, and the 2005 LRDP EIR:

- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect;
- result in development of land uses that are substantially incompatible with existing adjacent land uses or with planned uses; or
- conflict with any applicable habitat conservation plan or natural community conservation plan.

4.8.4.2 CEQA Checklist Items Adequately Analyzed at the 2005 LRDP Level or Not Applicable to the Project

Although redevelopment of the FSH complex on the Heller site was evaluated in the 2005 LRDP EIR, the currently proposed Heller site housing is substantially different from the previous proposal. The Hagar site was not envisioned for development under the 2005 LRDP. Therefore, although the analysis below uses the prior LRDP level analysis to the extent appropriate, none of the CEQA checklist items listed above under Significance Criteria are scoped out; all of the items are addressed in the project-level analysis below.

4.8.4.3 Methodology

To determine the potential for the proposed project to result in conflicts with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect, the proposed project's consistency with the applicable plans and policies was evaluated. In addition, proposed land uses were compared with existing and planned adjacent land uses both on- and off-campus to see if they would be compatible with existing or planned land uses. Finally, the HCP covering portions of the UC Santa Cruz campus was reviewed to determine if the proposed project is located within the boundaries of the plan.

4.8.4.4 2005 LRDP EIR Impacts and Mitigation Measures

The 2005 LRDP EIR included no mitigation measures for land use and planning. Accordingly, no mitigation measures have been incorporated into this analysis.

4.8.4.5 Project Impacts and Mitigation Measures

SHW Impact LU-1: The proposed project would not conflict with the UC Santa Cruz 2005 LRDP once amended. (*Less than Significant*)

As noted above, the land use plan applicable to the proposed project is the UC Santa Cruz 2005 LRDP. The potential for the proposed project to conflict with the 2005 LRDP is evaluated below in terms of the consistency with LRDP principles as well as conflict with the LRDP land use designations.

Conflict with LRDP Principles

The potential for the proposed project to conflict with LRDP principles related to land use patterns is evaluated below.

Respect the natural environment and preserve open space as much as possible

Development that would occur at the Heller site would be at the same location as the current FSH complex and would therefore respect the natural environment and not reduce the amount of open space on the campus. Although new development on the Heller site would be denser and the buildings containing the housing units would be taller, the new student housing has been designed and clustered to remain almost completely within the boundary of existing development and not exceed the height of the existing tree line of the forests to the west of the proposed housing. Development on the Hagar site would transform about 15 acres of open space to developed land and therefore it would alter approximately 20 percent of the East Meadow. However, the new development would be clustered

adjacent to existing housing and two roadways and would leave the vast majority of the East Meadow undisturbed. For these reasons, the proposed project would not conflict with this principle.

Integrate the natural and built environment

Development of the proposed project would adhere to design standards listed in the Campus Standards Handbook with respect to lighting and landscape design and planting. All development would incorporate earth tones and textures, building heights that do not extend beyond the tree line, and climate adaptive landscaping, comprising low-growing native plants, climate adaptive ornamental shrubs, and groundcovers. In addition, the Heller site would contain two dispersal areas for the California red-legged frog, planted with native shrubs and grasses. See **Section 4.1, Aesthetics**, for a discussion of prime viewsheds and viewpoints. For these reasons, the proposed project would not conflict with this principle.

Maintain UC Santa Cruz's core configuration

UC Santa Cruz has been designed with a central core of academic and administrative buildings surrounded by residential colleges and housing. Development on both the Heller and Hagar sites would not alter this configuration. In addition, the Heller site is currently developed with housing that is near the central core, and thus the project would not develop a site that was set aside for future academic and research facilities. Development of the Hagar site would also not reduce the area set aside on the campus for future academic and research facilities as it is located well outside the campus core. For these reasons, the proposed project would not conflict with this principle.

Encourage sustainability and efficiency in building layouts

The proposed project has been designed to comply with the University of California Sustainable Practices Policy, which require UC projects to aim towards achievement of Triple Net Zero (Net Zero Energy, Net Zero Water and Net Zero Waste). The University also requires all UC projects to achieve a minimum of a Silver rating under United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) Building Design and Construction (BD+C) v4.0 Green Building Rating System (the "LEED Rating System"). The project has been designed to achieve a Silver rating and is in fact targeting to achieve a LEED Platinum certification, which is two levels above the Silver rating. As a result, the proposed project would not conflict with this principle.

Conflict with 2005 LRDP Land Use Designations

As development at the Heller site would occur within the footprint of the current FSH complex which is already designated CSH on the 2005 LRDP land use diagram, there would be no change in land use in that area and no conflict with the underlying land use designation.

However, the development of the new Family Student Housing complex and childcare center at the Hagar site would require an amendment to the 2005 LRDP because the project would be located within a 20-acre area which is currently designated CRL. As noted in the 2005 LRDP, the CRL designation was assigned to lands that were not envisioned to be developed under the 2005 LRDP although they were expected to be used for development in the long run. Consequently, the development of CRL lands was not evaluated in the 2005 LRDP EIR for its environmental impacts. As part of the proposed SHW project, the University would re-designate the entire 20-acre area to the north of Hagar Drive from CRL to CSH. Although the proposed development at the Hagar site would be located on about 15 acres and the remaining re-designated area would not be developed, it would be used for grassland mitigation, maintenance of visual buffer, etc. The environmental impacts from this re-designation the 20-acre area to CSH and developing the site with family student housing are analyzed throughout this EIR, and the analysis shows that, with the exception of aesthetics, all impacts of the proposed land use designation change would be either less than significant or would be reduced to less than significant with mitigation.

The environmental impacts from the proposed LRDP amendment to redesignate the 20-acre area, including the significant and unavoidable visual impacts, would be put before the UC decision makers (i.e., the Regents) to consider and decide whether the benefits of the proposed project, including the proposed LRDP amendment, would outweigh the project's significant and unavoidable impacts. In the event that the Regents approve the proposed LRDP amendment, the proposed project would not conflict with the amended UC Santa Cruz 2005 LRDP, and this impact would be less than significant.

Conflict with California Coastal Act

The portion of the main campus that lies within the coastal zone is located west of Empire Grade Road. Both project sites are not located in the coastal zone and therefore the proposed project is not subject to the California Coastal Act requirements. There would be no conflict and therefore no impact.

Mitigation Measures: No mitigation is required.

SHW Impact LU-2: Implementation of the proposed project would not result in development of land uses that are substantially incompatible with existing or planned adjacent land uses. (*Less than Significant*)

Heller Site

Lands to the east of the Heller site are occupied by Rachel Carson and Oakes Colleges and are designated CSH. Land to the north of the Heller site consists of a meadow associated with Porter College and is designated CRL, while land to the west of the site consists of undeveloped woodland and is designated CNR. Finally, lands to the south of the Heller site consist of undeveloped grasslands, which are designated CRL. The proposed project would result in the demolition of the existing FSH complex and the construction of undergraduate and graduate housing. The proposed project would replace 199 two-bedroom townhouses located in 42 two-story buildings with 725 undergraduate units in five apartment buildings ranging in height from five to nine stories, and 146 graduate units in two buildings that would be four stories high.

The Heller site is designated CSH and would retain that designation after implementation of the proposed project. Furthermore, placement of additional student housing on this site would be compatible with the existing academic and student housing uses located to the east and northeast which are also designated as CSH. The Heller site is surrounded to the north, west and south by open space and undeveloped land, and there is no potential for any land use conflict. The nearest off-campus residential development is located 0.7 miles to the southeast. The project would be too distant from this area to result in any conflicts. For this reason, implementation of the proposed project would not result in development of land uses that are substantially incompatible with existing land uses adjacent to the Heller site, and this impact is less than significant.

Hagar Site

The Hagar site is presently designated CRL. Lands to the north and east of the Hagar site consist of grasslands and are designated PL. Land to the west of the Hagar site consists of a meadow, which is designated CRL, and the CAFSFS and the Cowell Lime Works Historic District and campus support facilities, which are designated SRS and CS, respectively. Lands to the south of the Hagar site are developed with employee housing and are designated EH.

The proposed project would construct 148 family units located in approximately 37 two-story townhouse buildings. Other elements of the housing complex to be constructed include community open spaces; playgrounds located centrally on the site; a 2,000 sf community building located on the east side of the site near Glenn Coolidge Drive; and a 2,500 sf service and maintenance building located at the northern

end of the complex. The project would also construct a childcare center to replace the existing childcare center at the Heller site which would be displaced by the proposed development on that site. The 2005 LRDP would need to be amended to develop the site with the proposed family student housing and childcare facility.

The proposed development on the Hagar site would not conflict with the existing land uses that surround the site. Lands to the north, east, and west of the site are undeveloped and other than cattle grazing and passive recreational use of trails, no uses occur on those lands and the proposed project would not affect those activities. The proposed project would also not interfere with agricultural activities on the CAFSF as it is located approximately 0.12 miles from the CAFSF site. The nearest on-campus residences are within 220 feet to the south of the Hagar site, and the nearest off-campus residential development is located approximately 300 feet to the southeast. The proposed family student housing and childcare facility would be compatible with existing employee housing to the south and residential development in the City to the southeast as the uses are similar.

The proposed project would also not result in any conflicts with the planned land uses in the area. The Hagar site is surrounded to the north and east by open space and undeveloped land that are designated PL. This land use designation is defined in the 2005 LRDP to include natural landscape that will be maintained for its scenic value and importance to special vegetation and wildlife continuity zones. No development would occur on these lands under the 2005 LRDP. With respect to the meadow across Hagar Drive to the west of the project site, that area is designated CRL and would not be developed under the 2005 LRDP, although it may be developed in the future. However, because no use is identified at the present time, the potential for the proposed project to conflict with a future use cannot be evaluated. Other surrounding lands are already developed and no new land uses are planned.

With regard to concerns that the proposed project would place development pressure on the surrounding lands, it would be reasonable to assume that the meadow area west of Hagar Drive that is currently designated CRL would be developed sometime in the future. This is on account of both its land use designation which does not protect the land from development and its location adjacent to existing facilities as well as the proposed project. With respect to PL lands to the north and east of the Hagar site, it is unlikely that these lands would be developed because these lands are valued by the Campus for their scenic value and are protected lands. Changing the land use designation to develop any portion of these lands would require a major LRDP amendment, which would require concurrence and approval from the Regents. Furthermore, the lands are underlain by marble and are mapped as karst hazard level 3, with pockets that are karst hazard level 4, which impose constraints on the type of development that may be placed on these lands and increases the cost of projects.

For reasons stated above, implementation of the proposed project would not result in development of land uses that are substantially incompatible with existing and planned adjacent land uses adjacent to the two project sites, and this impact is less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact LU-3: Implementation of the proposed project would not conflict with any applicable habitat conservation plan or natural community conservation plan. (No Impact)

As noted in **Section 4.3, Biological Resources**, no Natural Community Conservation Plans are applicable to the main campus. Although two areas on the main campus are protected under an HCP, the proposed project site is not on or adjacent to lands that are protected under the HCP. For this reason the proposed project would not conflict with any applicable habitat conservation plan or natural community conservation plan. No impact would occur.

Mitigation Measures: No mitigation is required.

4.8.5 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

The proposed dining facilities expansion project would add to existing facilities on the west side of Rachel Carson College and to the southern end of Porter College. In both instances, the facilities would be located above or adjacent to existing buildings, or would replace the existing buildings with larger buildings. The areas where the improvements would be constructed are either currently developed or immediately adjacent to existing development. A portion of the expansion site for the Porter dining facility is covered by a cluster of trees.

Impacts and Mitigation Measures

DF Impact LU-1: The proposed dining facilities expansion project would not conflict with the 2005 LRDP or with plans, policies, and regulations. In addition, implementation of the proposed dining expansion facilities project would not result in incompatible land uses nor would it conflict with an applicable

habitat conservation plan or natural community conservation plan. (*Less than Significant*)

Conflict with Local Plans, Policies, and Regulations

The proposed dining facilities expansion project is the expansion of existing dining facilities. As development of these facilities would occur within the development footprint of the Porter and Rachel Carson Colleges and is considered infill, there would be no change in land use nor would a change in land use designation be needed to implement the proposed project. In addition, the proposed dining facilities expansion project would not conflict with LRDP principles related to land use patterns. For example, as an infill project, the expansion of the dining facilities would not substantially affect existing open space areas and would not affect the campus's core configuration. For these reasons, the proposed dining facilities expansion project would not conflict with the 2005 LRDP, and this impact is less than significant. Porter and Rachel Carson Colleges are not located in the coastal zone and thus the proposed dining facilities expansion project does not need to comply with Coastal Act requirements.

Land Use Compatibility

The proposed dining facilities project is the expansion of existing dining facilities, and thus would be compatible with adjacent academic and housing uses. The proposed dining facilities are also located in the interior of the campus, and thus would not have the potential to conflict with existing adjacent land uses that are off-campus. For this reason, implementation of the proposed dining facilities expansion project would not result in development of land uses that are substantially incompatible with existing adjacent land uses on- and off-campus, and this impact is less than significant.

Habitat Conservation Plan

No Natural Community Conservation Plans are applicable to the main campus. The proposed dining facilities expansion project would not be located on or adjacent to lands that are protected under an HCP. For this reason the proposed project would not conflict with any applicable habitat conservation plan or natural community conservation plan. No impact would occur.

Mitigation Measures: No mitigation is required.

4.8.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

SHW Impact C-LU-1: Implementation of the proposed project would not result in significant cumulative impacts with respect to land use. (*Less than Significant*)

The cumulative impact of campus development under the 2005 LRDP with respect to conflicts with local land use plans, policies and regulations is analyzed in the 2005 LRDP EIR under LRDP Impact LU-1. The cumulative impact of campus development under the 2005 LRDP with respect to compatibility with existing adjacent or planned land uses within the campus or at its periphery is analyzed in the 2005 LRDP EIR under LRDP Impact LU-2. Finally, the cumulative impact of campus development under the 2005 LRDP with respect to conflicts with an applicable Habitat Conservation Plan or Natural Community Conservation Plan is analyzed in the 2005 LRDP EIR under LRDP Impact LU-3. The analysis in the 2005 LRDP EIR found that the campus development would generally conform to local plans, policies and regulations. In addition, new campus development would also be compatible with existing land uses on- and off-campus and would not conflict with the HCP that governs two small parcels on the campus. As a result, development on the campus under the 2005 LRDP would result in less-than-significant cumulative impacts with respect to land use and planning (UCSC 2006). As discussed above, the proposed SHW project and the related dining facilities expansion project would also not conflict with the 2005 LRDP and local plans, policies and regulations. In addition, the proposed housing and dining facilities projects would also not conflict with existing land uses on- and off-site nor would they conflict with the HCP that governs two small parcels on campus. For these reason, the proposed project would not alter the previously evaluated cumulative impact. The project's cumulative impacts related to land use and planning would be less than significant.

Mitigation Measures: No mitigation is required.

4.8.7 REFERENCES

University of California, Santa Cruz (UCSC). 2006. UC Santa Cruz Long Range Development Plan 2005-2020 Environmental Impact Report, SCH No. 2005012113.

UCSC. 2006. UC Santa Cruz Long Range Development Plan 2005-2020. September.

4.9.1 INTRODUCTION

This section presents existing noise conditions on the UC Santa Cruz campus, including the project sites, and analyzes the potential noise impacts, both temporary (i.e., construction) and long term (i.e., operational), from the implementation of the proposed Student Housing West (SHW) project. As discussed in **Chapter 3, Project Description**, the proposed housing would be constructed on two sites. Approximately 2,852 student beds would be provided in seven buildings that would be located on a site off Heller Drive (Heller site) and about 148 student beds would be provided in a complex of townhomes that would be located on Hagar Drive (Hagar site) in the eastern portion of the campus. Noise impacts are analyzed below for both sites.

This section also presents potential noise impacts from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and the existing colleges (see **Section 4.9.5** below).

The analysis in this section is tiered from the noise analysis contained in the 2005 LRDP EIR, supplemented by project-specific analysis prepared by Illingworth & Rodkin. The technical memorandum prepared by Illingworth & Rodkin is included in **Appendix 4.9** of this Draft EIR.

4.9.2 ENVIRONMENTAL SETTING

4.9.2.1 Characteristics of Noise

Noise is usually defined as unwanted sound that is disturbing or annoying. It is an undesirable by-product of society's normal day-to-day activities. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm, and/or when it has adverse effects on health. The objectionable nature of sound may be caused by its pitch, its loudness, or both. Pitch is the height or depth of a tone or sound, depending on the relative rapidity (i.e., frequency) of the vibrations by which it is produced. Higher-pitched signals sound louder to humans than sounds with a lower pitch. Loudness is the amplitude of sound waves combined with the reception characteristics of the ear. Amplitude may be compared with the height of an ocean wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A decibel (dB) is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis.

An increase of 10 decibels represents a tenfold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its decibel level. Each 10-decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms for noise are defined in **Table 4.9-1, Definitions of Acoustical Terms**.

Table 4.9-1
Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dB(A)	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, Leq	The average A-weighted noise level during the measurement period. The hourly Leq used for this report is denoted as dB(A) Leq[h].
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 PM to 10:00 PM and after addition of 10 decibels to sound levels in the night between 10:00 PM and 7:00 AM.
Day/Night Noise Level, Ldn	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 PM and 7:00 AM.
L01, L10, L50, L90	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

There are several methods of characterizing sound. The most common in California is the A-weighted sound level, referenced in units of dB(A).¹ This method is used because sound pressure level alone is not a reliable indicator of loudness, as the human ear does not respond uniformly to sounds at all

¹ All sound levels discussed in this section use the A-weighting scale.

frequencies. For example, it is less sensitive to low and high frequencies than to the medium frequencies that more closely correspond to human speech. The A-weighted noise level was developed to better correspond with peoples' subjective judgment of sound levels. In general, changes in community noise levels of less than 3 dB(A) are not typically noticed by the human ear (FHA 1980). Changes from 3 to 5 dB(A) may be noticed by some individuals who are especially sensitive to changes in noise. An increase greater than 5 dB(A) is readily noticeable, while, as noted above, the human ear perceives a 10 dB(A) increase in sound level to be a doubling of sound volume. A doubling of sound wave energy (for example, from doubling the volume of traffic on a roadway) would result in a 3 dB increase in sound, a barely perceptible change in sound level.

Noise sources occur in two forms: (1) point sources, such as stationary equipment or individual motor vehicles; and (2) line sources, such as a roadway with a large number of point sources (motor vehicles). Sound generated by a point source typically diminishes (attenuates) at a rate of 6.0 dB(A) for each doubling of distance from the source to the receptor at acoustically "hard" sites and 7.5 dB at acoustically "soft" sites.² For example, a 60 dB(A) noise level measured at 50 feet from a point source at an acoustically hard site would be 54 dB(A) at 100 feet from the source and 48 dB(A) at 200 feet from the source. Sound generated by a line source typically attenuates at a rate of 3.0 dB(A) and 4.5 dB(A) for each doubling of distance from the source to the receptor for hard and soft sites, respectively. Sound levels can also be attenuated by man-made or natural barriers (e.g., sound walls, berms, ridges), as well as elevation differences. In addition, noise attenuates as a result of building construction. The minimum noise attenuation provided by typical building construction in California is provided in **Table 4.9-2, Outside to Inside Noise Attenuation**.

Table 4.9-2
Outside to Inside Noise Attenuation (dB(A))

Building Type	Open Windows	Closed Windows
Residences	17	25
Schools	17	25
Churches	20	30
Hospitals/Convalescent Homes	17	25
Offices	17	25
Theaters	20	30
Hotels/Motels	17	25

² Examples of "hard" or reflective sites include asphalt, concrete, and hard and sparsely vegetated soils. Examples of acoustically "soft" or absorptive sites include soft sand, plowed farmland, grass, crops, or heavy ground cover.

Building Type	Open Windows	Closed Windows
Source: Transportation Research Board, National Research Council, <i>Highway Noise: A Design Guide for Highway Engineers</i> , National Cooperative Highway Research Program Report 117.		

When assessing community reaction to noise, there is an obvious need for a scale that averages varying noise exposures over time and that quantifies the result in terms of a single number descriptor. Several scales have been developed that address community noise level. Those that are applicable to this analysis are the Equivalent Noise Level (L_{eq}), the Day-Night Noise Level (L_{dn}), and the Community Noise Equivalent Level (CNEL).

- L_{eq} is the average A-weighted sound level measured over a given time interval. L_{eq} can be measured over any period, but is typically measured for 1-minute, 15-minute, 1-hour, or 24-hour periods.
- L_{dn} is a 24-hour L_{eq} with a “penalty” of 10 dB added during the nighttime hours (10:00 PM to 7:00 AM), which is typically sleeping time.
- CNEL is another average A-weighted sound level measured over a 24-hour period. However, the CNEL noise scale is adjusted to account for some individuals’ increased sensitivity to noise levels during the evening as well as the nighttime hours. A CNEL noise measurement is obtained after adding a “penalty” of 5 dB to sound levels occurring during the evening from 7:00 PM to 10:00 PM, and 10 dB to sound levels occurring during the nighttime from 10:00 PM to 7:00 AM.³

4.9.2.2 Characteristics of Vibration

Vibration is minute variation in pressure through structures and the earth, whereas noise is minute variation in pressure through air. Thus, vibration is felt rather than heard. Some vibration effects can be caused by noise, e.g., the rattling of windows from truck pass-bys. This phenomenon is related to the production of acoustic energy at frequencies that are close to the resonant frequency of the material being vibrated. Groundborne vibration attenuates rapidly as distance from the source of the vibration increases.

Peak particle velocity (PPV) is used to describe vibration impacts to both buildings and humans. PPV represents the maximum instantaneous peak of a vibration signal, and it is usually measured in inches

³ The logarithmic effect of adding these penalties to the peak-hour L_{eq} measurement results in a CNEL measurement that is within approximately 3 dB(A) (plus or minus) of the peak-hour L_{eq} . California Department of Transportation, *Technical Noise Supplement; A Technical Supplement to the Traffic Noise Analysis Protocol*, October 1998, pp. N51-N54.

per second.⁴ For damage to structures, the California Department of Transportation recommends a vibration limit of 0.5 inches/second, peak particle velocity (in/sec PPV) for buildings structurally sound and designed to modern engineering standards, 0.3 in/sec PPV for older residential buildings, and 0.25 for historic and some old buildings. Groundborne vibrations in excess of 0.1 in/sec PPV, produced by continuous/frequent intermittent sources of vibration, are considered strongly perceptible and capable of causing human annoyance.

4.9.2.3 Noise-Sensitive Land Uses Within and Adjacent to the Campus

The nearest existing noise-sensitive residential land uses in the vicinity of the Heller site and the associated utility corridor include the Rachel Carson College about 350 feet to the east of the project site and Porter/Kresge residences within approximately 200 feet of the utility corridor.⁵

The nearest sensitive receptors near the Hagar site include UC Santa Cruz employee housing within 220 feet to the southeast and 320 feet to the southwest of the project site. Sensitive receptors near the associated utility corridor include residential housing within 200 feet to the south of the utility corridor, and UC Santa Cruz Barn (which houses administrative functions) within 270 feet of the utility corridor.⁶

4.9.2.4 Existing Noise Levels

An ambient noise level survey was conducted for the 2005 LRDP EIR on February 22, February 23, April 14, and April 15, 2005. The noise survey was conducted at selected sites in the project area, including the Family Student Housing residences at what is the Heller project site. Other off-site measurements were conducted, including a long-term measurement at 955 High Street and a short-term measurement that was conducted at the intersection of High and Cardiff Streets, which are the nearest monitoring locations to the Hagar site.

**Table 4.9-3
Noise Measurement Data Summary**

Measurement Location	Long-Term CNEL (dBA)	Short-Term Leq (dBA)
Family Student Housing (Heller site)	58.0	55.5
Residences along High Street between Cardiff Place and Moore Street (near	70.0	66.0

⁴ California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, September 2013b.

⁵ Illingworth & Rodkin, Inc., *UC Santa Cruz Student Housing West, Santa Cruz, CA – Noise and Vibration Levels associated with Construction Activities*. December 2017.

⁶ Ibid.

Measurement Location	Long-Term CNEL (dBA)	Short-Term Leq (dBA)
Hagar site)		
<i>Source: 2005 UCSC LRDP Final EIR.</i>		

4.9.3 REGULATORY CONSIDERATIONS

4.9.3.1 Federal Laws and Regulations

There are no federal noise standards that are applicable to the UC Santa Cruz campus.

4.9.3.2 State Laws and Regulations

Title 24 of the California Code of Regulations codifies Sound Transmission Control requirements, which establish uniform minimum noise insulation performance standards for new hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family dwellings. Specifically, Title 24 states that interior noise levels attributable to exterior sources shall not exceed 45 dB(A) CNEL in any habitable room of new dwellings. Dwellings are to be designed so that interior noise levels will meet this standard for at least 10 years from the time of building permit application. This standard applies to all new student housing developed on the UC Santa Cruz campus.

4.9.4 PROJECT IMPACTS AND MITIGATION MEASURES

4.9.4.1 Significance Criteria

The impacts related to noise from the implementation of the proposed project would be considered significant if they would exceed the following standards of significance, in accordance with Appendix G of the State CEQA Guidelines, the UC CEQA Handbook, and the 2005 LRDP EIR:

- expose persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinances, or applicable standards of other agencies;

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

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

- cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

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

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

- cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

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

- 80 dBA $L_{eq(8h)}$ ⁷ daytime (defined as 7:00 AM to 7:00 PM)
- 80 dBA $L_{eq(8h)}$ evening (defined as 7:00 PM to 10:00 PM)
- 70 dBA $L_{eq(8h)}$ nighttime (defined as 10:00 PM to 7:00 AM)

- expose persons to or generation of excessive groundborne vibration or groundborne noise levels;

For evaluating the potential for groundborne vibrations to result in significant impacts related to damage to nearby buildings or cause substantial human annoyance, the following criteria were used:

- For damage to structures, vibration levels greater than 0.5 inches/second, peak particle velocity (in/sec PPV) for structurally sound buildings designed to modern engineering standards, 0.3 in/sec PPV for older residential buildings, and 0.25 in/sec PPV for historic and some old buildings.
- For vibrations to cause human annoyance, vibration levels greater than 0.1 in/sec PPV, produced by continuous/frequent intermittent sources of construction vibration.

More information regarding the thresholds of significance set forth above is provided in the 2005 LRDP EIR. Note that all impacts were estimated and evaluated not at the source of noise but at the site where the nearest noise-sensitive receptor is located.

⁷ $L_{eq(8h)}$ is an average measurement over an eight-hour period.

4.9.4.2 Impacts Adequately Analyzed at the 2005 LRDP Level or Not Applicable to the Project

- for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airstrip, expose people residing or working in the project area to excessive noise levels; or for a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

The analysis in the 2005 LRDP Initial Study that accompanied the 2005 LRDP EIR concluded that the campus is not located within an airport land use plan, is not within 2 miles of public airport or public use airport, and is not located within 2 miles of a private airstrip. People living and working within the project area, including the Heller and Hagar sites, would not be exposed to excessive aircraft noise levels; therefore, no impact would occur and no additional project-level analysis is needed.

4.9.4.3 Methodology

The primary sources of noise and vibration associated with the proposed project would be construction activities. Noise levels associated with anticipated construction activities were estimated for locations in the vicinity of the proposed construction where sensitive receptors are located, using the Federal Highway Administration's Road Construction Noise Model (RCNM) and project-specific data on types of equipment that would be used and the durations of use for each piece of equipment. Vibration levels were calculated using Federal Transit Administration (FTA) reference vibration levels, and then attenuating these levels with increasing distance at the rate of $(D_{\text{ref}}/D)^{1.1}$, where D is the distance from the source in feet, and D_{ref} is the reference distance of 25 feet.⁸ Noise and vibration levels were calculated from the center of the project site to the nearest receptors as these would be representative of average noise and vibrations conditions that would be experienced at the receptors. Noise and vibration levels that would be received at the nearest receptors when construction occurs the closest to the receptor were also calculated. The estimated levels were compared with adopted standards to determine whether significant noise and vibration impacts would occur during project construction.

With respect to noise from project operations, the proposed residential development would not include any stationary noise sources and therefore no analysis of impacts from stationary noise sources is required. Potential increases in noise levels due to traffic are not anticipated because as the analysis in **Section 4.10, Transportation and Traffic** shows, the proposed project would reduce both daily and peak hour traffic compared to the no project condition and compared to current conditions. Because the project

⁸ These levels are based on calculations assuming normal propagation conditions, using a standard equation of $PPV_{\text{eqmt}} = PPV_{\text{ref}} * (25/D)^{1.1}$. Reference vibration levels are from the FTA *Transit Noise and Vibration Impact Assessment*, May 2006.

would not increase traffic to and from the campus, it would have no potential to increase on-and off-campus traffic-related noise levels. However, because the proposed project would place housing and a childcare facility near the intersection of Glenn Coolidge and Hagar Drives, the project may cause a small increase in the traffic volumes near that intersection compared to existing conditions. Therefore the analysis below examines the effect of changed traffic near that intersection on existing receptors located in the UC Santa Cruz employee housing to the south of the Hagar site.

Although CEQA does not require an evaluation of the impacts of the environment on the project, the 2005 LRDP EIR included an evaluation of the effect of ambient noise levels on future residents on the campus. Consistent with the 2005 LRDP EIR, this EIR also estimates and reports noise levels that future residents of the proposed housing would be exposed to from existing traffic noise sources in the project vicinity.

4.9.4.4 2005 LRDP EIR Mitigation Measures Included in the Proposed Project

Table 4.9-4, 2005 LRDP EIR Mitigation Measures, presents the mitigation measures in the 2005 LRDP EIR that are applicable to the proposed project. Since these previously adopted mitigation measures are already being carried out as part of implementation of the 2005 LRDP, they are included in and are a part of the proposed project and will not be readopted. Implementation of these mitigation measures is assumed as part of the project impact analysis.

Table 4.9-4
2005 LRDP EIR Mitigation Measures

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

Mitigation Measure	Description
	Loud construction activity within 100 feet of an academic building shall be scheduled to the extent feasible on weekends.
Source: UC Santa Cruz 2006	

4.9.4.4 Project Impacts and Mitigation Measures

SHW Impact NOIS-1: Implementation of the proposed project would not expose project residents to noise levels in excess of applicable standards. (*Less than Significant*)

The 2005 LRDP EIR included an evaluation of the effect of ambient noise levels on future residents on the campus. Although based on direction provided by the courts in the last few years, CEQA no longer requires an evaluation of the impact of the environment on the proposed project except under certain circumstances, consistent with the 2005 LRDP EIR, this EIR also estimates and reports noise levels that future residents of the proposed housing would be exposed to from existing noise sources in the project vicinity.

Heller Site

The 2005 LRDP EIR included an evaluation of whether new student housing on the central campus, including the redevelopment of the FSH complex along Heller Drive in the western portion of the campus, would expose the future residents to excessive noise levels from traffic on campus streets. The analysis reported the ambient noise levels as well as projected noise levels in 2020 that would result as traffic on campus roadways increases as a result of campus enrollment and employment growth under the 2005 LRDP. With the increase in traffic along Heller Drive as a result of campus growth under the 2005 LRDP, the noise levels at the Heller site were estimated to increase to about 58 dBA CNEL by 2020 (UCSC 2006). As the estimated CNEL was well below 65 dBA CNEL, the 2005 LRDP EIR concluded that the impact on future residents of the redeveloped FSH site would be less than significant.

This prior analysis is applicable to the proposed project because the Heller site development under the proposed project would be located no closer to Heller Drive than the previously proposed FSH redevelopment project. Furthermore, this estimate is considered conservative because, based on periodic gateway counts at the campus entrances, the current trip generation rate for the campus is lower than the trip generation rate that was used in the 2005 LRDP EIR. In addition, as demonstrated by the data in **Section 4.11, Transportation and Traffic**, the proposed project (and other reasonably foreseeable campus housing projects) would reduce the number of daily trips to the campus compared to the number of trips analyzed in the 2005 LRDP EIR. Therefore, the new receptors at the Heller site would not be exposed to noise levels exceeding 58 CNEL due to traffic on Heller Drive and the impact would be less than significant.

Hagar Site

A similar analysis was not included in the 2005 LRDP EIR for the Hagar site because the 2005 LRDP did not envision that housing would be developed on the Hagar site. Therefore, current and projected traffic volumes near the intersection of Glenn Coolidge and Hagar Drives were obtained from the traffic study prepared for the Hagar site, and traffic noise levels were estimated using the Federal Highway Administration's Traffic Noise Model Version 2.5 (TNM2.5). **Table 4.9-5, Calculated Traffic Noise Levels for Project Site Receptors**, below, shows the estimated noise levels at the proposed housing and the childcare center with and without the proposed project.

Table 4.9-5
Calculated Traffic Noise Levels for Project Site Receptors

Roadway Segment/Receptor	Estimated dBA, CNEL			
	Existing Conditions (2017)	Future Without Project (2020)	Future With Project (2020)	Increase from Future Without Project to Future with Project
Coolidge Drive from Hagar Drive Eastbound (Hagar Student Housing)	53.0	53.5	53.8	0.3
Hagar Drive from Coolidge Drive Northbound (Childcare Center)	60.6	61.1	61.7	0.6
Source: TNM2.5 outputs modeled by Impact Sciences.				

The analysis demonstrates that receptors at the Hagar site would not be exposed to noise levels in excess of 65 dBA CNEL due to traffic on Glenn Coolidge and Hagar Drives.

In summary, the proposed project would not expose the project residents to traffic noise levels in excess of applicable standards. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact NOIS-2: Implementation of the proposed project would not cause a substantial permanent increase in noise levels existing without the project. (*Less than Significant*)

Heller Site

As discussed above, the proposed project (and other reasonably foreseeable campus housing projects) would reduce the number of daily trips to the campus compared to the number of trips analyzed in the 2005 LRDP EIR. However, compared to existing (2017) conditions, there would be an increase in traffic on Heller Drive under both without and with project conditions. Traffic volumes are anticipated to increase by 12.57 percent under the 2023 Without Project scenario, and 9.81 percent under the 2023 With Project scenario. Traffic noise levels increase by approximately 3 dBA for every doubling of traffic on a given roadway. Based on this general rule and using a formula provided by Caltrans,⁹ sound level increases under the 2023 Without Project scenario and the 2023 With Project scenario are calculated to be approximately 0.5 dBA and 0.4 dBA, respectively. Both of these sound level increases would be below the threshold of 5 decibel increase in areas where ambient levels are between 50 and 65 dBA CNEL. Therefore, the existing receptors on Heller Drive (primarily residents of Rachel Carson College) would not be exposed to a substantial permanent increase in noise levels that would exist in the area without the project.

Hagar Site

The potential for the Hagar site traffic to affect existing sensitive receptors living in the employee housing south of Glenn Coolidge Drive was evaluated. As **Table 4.9-6, Calculated Traffic Noise Levels for Nearest Off-site Receptors**, below shows, these receptors would experience an approximately 0.3 dBA increase in traffic noise levels due to the project, which is not considered an audible increase, and is well below the threshold of a 5 decibel increase in areas where the ambient levels are between 50 and 65 dBA CNEL.

⁹ The sound level increase due to traffic can be calculated using the formula $SPL_{Total} = SPL_1 + 10\log_{10}(N)$, where SPL_1 is the sound pressure level from one source and N is the number of identical sources to be added to the sound level (California Department of Transportation 2013a). For example, $N = 2$ would represent a doubling in traffic, and would increase noise levels by approximately 3 dBA. Using this formula, $N = 1.1257$ under the No Project scenario and 1.0981 under the With Project Scenario. This results in sound level increases of approximately 0.5 dBA and 0.4 dBA, respectively.

Table 4.9-6
Calculated Traffic Noise Levels for Nearest Off-site Receptors

Roadway Segment/Receptor	Estimated dBA, CNEL			
	Existing Conditions (2017)	Future Without Project (2020)	Future With Project (2020)	Increase from Future Without Project to Future with Project
Hagar Drive from Coolidge Drive Southbound (Employee Housing)	63.0	63.6	63.9	0.3
Source: TNM2.5 outputs modeled by Impact Sciences.				

In summary, the traffic associated with the proposed project would not result in a substantial permanent increase in noise levels above those that would exist without the project. The project's impact would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact NOIS-3: Construction associated with the proposed project would not cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. (*Less than Significant*)

Heller Site

Construction activities planned at the Heller site are anticipated to begin in Fall 2019 and end in Fall 2022, lasting approximately 3 years. Project construction phases would include demolition and site preparation, grading, building construction, paving, and architectural coating. **Figure 4.9-1** shows the project site, utility corridor, and the nearest sensitive receptors. Construction activities would occur on the 13-acre site in phases with work underway in different portions of the site at different points in time over the construction period. Consequently, construction noise levels received at the nearby receptors would vary depending on the noise producing activity underway and its location relative to the receptors. To analyze both the typical or average noise exposure as well as worst-case noise exposure during project construction, two scenarios were modeled. The typical/average noise exposure scenario included modeling noise levels that would be received at the nearest receptor assuming that all noise producing equipment is located in the center of the 13-acre site, whereas under the worst-case noise

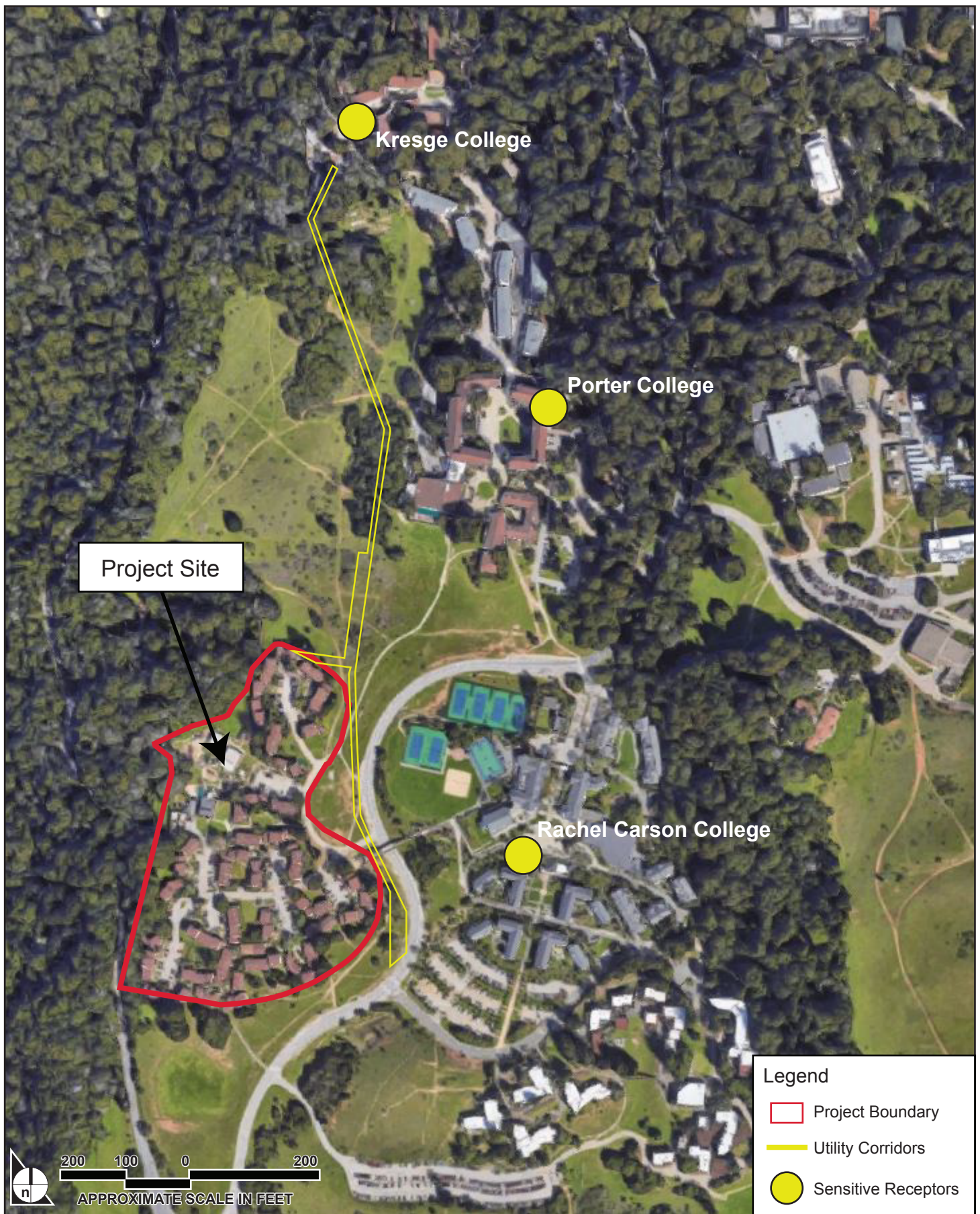


FIGURE 4.9-1

Heller Site - Sensitive Receptors

exposure scenario, noise levels were modeled assuming that the noise producing equipment is located near the perimeter of the Heller site closest to the receptors.

Anticipated typical construction noise levels, by construction activity and phase, are summarized in **Table 4.9-7, Calculated Typical Construction Noise Levels at Nearest Receptors – Heller Site**. The predicted typical construction noise levels resulting from construction activities at distances ranging from 400 feet to 650 feet from the nearest sensitive receptors (i.e., residences at Porter, Kresge, and Rachel Carson Colleges) would not exceed the significance thresholds of 80 dBA L_{eq} (8-hour) during daytime and evening periods.

Table 4.9-7
Calculated Typical Construction Noise Levels at Nearest Receptors -Heller Site

Construction Phase	Average Equivalent Noise Level (dBA, L_{eq})	
	Utility Corridor	Heller Development
	Porter/Kresge College Residences (400 feet)	Rachel Carson College Residences (650 feet)
Site Preparation	NA	67
Grading	74	70
Building Construction	NA	69
Paving	NA	64
Architectural Coatings	NA	65
Overall Range of Construction Noise Levels	74	64-70
Source: Illingworth & Rodkin, Inc. 2017.		

The worst-case noise levels are reported in **Table 4.9-8, Calculated Worst Case Construction Noise Levels at Nearest Receptors – Heller Site**. As the results show, during the brief periods when construction would occur at the closest point to the nearby Porter/Kresge College residences (approximately 200 feet), construction noise levels would be up to but would not exceed 80 dBA L_{eq} . Construction noise levels could potentially exceed 70 dBA L_{eq} (8-hour) during nighttime; however, the proposed project is required to implement applicable LRDP mitigation measures. LRDP Mitigation NOIS-1 restricts loud construction activities within 100 feet of a residential receptor to the hours between 7:30 AM and 7:30 PM, Monday through Saturday. Although in the case of Heller site construction, the nearest receptor would be more than 200 feet from the site perimeter, nonetheless, the project includes LRDP Mitigation NOIS-1 and will comply with the hours of construction noted above. Therefore, the impact from construction noise at the Heller site would be less than significant.

Table 4.9-8
Calculated Worst-Case Construction Noise at Nearest Receptors - Heller Site

Construction Phase	Average Equivalent Noise Level (dBA, Leq)	
	Utility Corridor	Heller Development
	Porter/Kresge College Residences (200 feet)	Rachel Carson College Residences (350 feet)
Site Preparation	NA	72
Grading	80	75
Building Construction	NA	74
Paving	NA	69
Architectural Coatings	NA	70
Overall Range of Construction Noise Levels	80	69-75
Source: Illingworth & Rodkin, Inc. 2017.		

Hagar Site

Construction activities planned at the Hagar site are anticipated to begin in Fall 2018 and end in Fall 2019, lasting approximately 12 months. Project construction phases would include site preparation, grading, building construction, paving, and architectural coating. Off-site construction activities would include trenching, placement of utility lines, backfilling, and restoring the disturbed area. **Figure 4.9-2** shows the Hagar site and associated utility corridor and the locations of the nearest sensitive receptors. Construction activities would occur on the 15-acre site in phases with work underway in different portions of the site at different points in time over the construction period. Consequently, construction noise levels received at the nearby receptors would vary depending on the noise producing activity underway and its location relative to the receptors. As with the Heller site analysis, two scenarios were also modeled for the Hagar site. The typical/average noise exposure scenario included modeling noise levels that would be received at the nearest receptor assuming that all noise producing equipment is located in the center of the Hagar site, whereas under the worst-case noise exposure scenario, noise levels were modeled assuming that the noise producing equipment is located near the perimeter of the Hagar site closest to the receptors.

Anticipated construction noise levels, by construction activity and phase, for the typical conditions are summarized in **Table 4.9-9, Calculated Typical Construction Noise Levels at Nearest Receptors – Hagar Site**. The typical levels are used to compare to the noise thresholds established above. The predicted typical construction noise levels resulting from construction activities at distances ranging from 350 feet



SOURCE: Google Maps, 2018

FIGURE 4.9-2

to 700 feet from the nearest sensitive receptors (i.e., residences to the south) would not exceed the significance thresholds of 80 dBA L_{eq} (8-hour) during daytime and evening periods.

Table 4.9-9
Calculated Typical Construction Noise Levels at Nearest Receptors - Hagar Site

Construction Phase	Average Equivalent Noise Level (dBA, L_{eq})		
	Utility Corridor	Hagar Development	
	Southern Residence (Hagar Meadow) (350 feet)	Southeast Residence (Rockridge Lane) (650 feet)	Southwest Residence (Hagar Meadow) (700 feet)
Site Preparation	NA	65	64
Grading	74	69	68
Building Construction	NA	60	59
Paving	NA	62	61
Architectural Coatings	NA	46	45
Overall Range of Construction Noise Levels	74	46-69	45-68
Source: Illingworth & Rodkin, Inc. 2017.			

The worst case noise levels are reported in **Table 4.9-10, Calculated Worst Case Construction Noise Levels at Nearest Receptors – Hagar Site**, below. As the results show, during the brief periods when utility construction would occur at the closest point to the nearby southern residences (approximately 200 feet), construction noise levels would be up to 79 dBA L_{eq} . Construction noise levels could potentially exceed 70 dBA L_{eq} (8-hour) during nighttime; however, the proposed project is required to implement applicable LRDP mitigation measures. LRDP Mitigation NOIS-1 restricts loud construction activities within 100 feet of a residential receptor to the hours between 7:30 AM and 7:30 PM, Monday through Saturday. Although in the case of Hagar site construction, the nearest receptor would be more than 200 feet from the site perimeter, nonetheless, the project includes LRDP Mitigation NOIS-1 and will comply with the hours of construction noted above. Therefore, the noise impact due to project construction would be less than significant.

Table 4.9-10
Calculated Worst-Case Construction Noise Levels at Nearest Receptors - Hagar Site

Construction Phase	Average Equivalent Noise Level (dBA, L_{eq})		
	Utility Corridor	Hagar Development	
	Southern Residence (Hagar Meadow) (200 feet)	Southeast Residence (Rockridge Lane) (220 feet)	Southwest Residence (Hagar Meadow) (320 feet)
Site	NA	74	71

Construction Phase	Average Equivalent Noise Level (dBA, L _{eq})		
	Utility Corridor	Hagar Development	
	Southern Residence (Hagar Meadow) (200 feet)	Southeast Residence (Rockridge Lane) (220 feet)	Southwest Residence (Hagar Meadow) (320 feet)
Preparation			
Grading	79	78	75
Building Construction	NA	69	66
Paving	NA	71	68
Architectural Coatings	NA	55	52
Overall Range of Construction Noise Levels	79	55-78	52-75
Source: Illingworth & Rodkin, Inc. 2017.			

Mitigation Measures: No mitigation is required.

SHW Impact NOIS-4: Construction associated with the proposed project would not generate and expose nearby receptors and buildings to excessive groundborne vibration or groundborne vibrations. (*Less than Significant*)

The LRDP EIR determined that construction of future projects on the campus would not expose sensitive receptors to excessive groundborne vibration or groundborne noise because construction techniques having the potential of yielding relatively high vibration levels, such as pile driving or blasting, were not anticipated. Nonetheless, an evaluation was conducted to confirm that the construction activities associated with the proposed project would not result in excessive groundborne vibrations.

Table 4.9-11, Vibration Levels for Construction Equipment, below, presents typical vibration levels that could be expected from construction equipment at 25 feet. Vibration levels are highest close to the source, and then attenuate with increasing distance at the rate $(D_{ref}/D)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet.¹⁰ Vibration levels produced by a vibratory roller (0.210 in/sec PPV at 25 feet) would represent a credible worst-case scenario for proposed construction activities, because as **Table 4.9-11** below shows, of the equipment that would be used, a vibratory roller would produce the highest vibrations. Therefore, that piece of equipment was used to calculate worse-case off-site vibrations and the assumption was made that the equipment would be operating near the perimeter

¹⁰ These levels are based on calculations assuming normal propagation conditions, using a standard equation of $PPV_{eqmt} = PPV_{ref} * (25/D)^{1.1}$.

of the site, closest to the nearest receptors. Note that off-site vibrations were calculated to analyze two potential effects: the potential for construction vibrations to cause damage to nearby buildings and the potential for construction vibrations to cause human annoyance. As noted earlier in this section, the threshold for damage to structures is vibration levels greater than 0.5 inches/second, peak particle velocity (in/sec PPV) for structurally sound buildings designed to modern engineering standards, 0.3 in/sec PPV for older residential buildings, and 0.25 in/sec PPV for historic and some old buildings. For vibrations to cause human annoyance, vibration levels produced by continuous/frequent intermittent sources of construction vibration must exceed 0.1 in/sec PPV at the receptors.

Table 4.9-11
Vibration Levels for Construction Equipment

Equipment		Vibration Levels at Representative Distances			
		PPV at 25 feet (in/sec)	PPV at 200 feet (in/sec)	PPV at 220 feet (in/sec)	PPV at 350 feet (in/sec)
Clam Shovel Drop		0.202	0.021	0.018	0.011
Hydromill	In soil	0.008	0.001	0.001	0.000
	In rock	0.017	0.002	0.002	0.001
Vibratory Roller		0.210	0.021	0.019	0.012
Hoe Ram		0.089	0.009	0.008	0.005
Large Bulldozer		0.089	0.009	0.008	0.005
Caisson Drilling		0.089	0.009	0.008	0.005
Loaded trucks		0.076	0.008	0.007	0.004
Jackhammer		0.035	0.004	0.003	0.002
Small Bulldozer		0.003	0.000	0.000	0.000
<i>Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment. May 2006.</i>					

Heller Site

Using the attenuation rate above, a vibratory roller would produce vibration levels of 0.021 in/sec PPV at Porter and Kresge Colleges which would be within 200 feet of the utility corridor for the Heller site. At the Rachel Carson College residences about 350 feet east of the Heller site, vibration levels would be about 0.012 in/sec PPV threshold. There would be no potential for damage to the buildings in the vicinity of the project site as these levels would be well below the applicable thresholds.

Groundborne vibration levels resulting from proposed construction equipment could be perceptible at times. A vibration limit of 0.1 in/sec PPV, produced by continuous/frequent intermittent sources of construction vibration would be strongly perceptible and would cause human annoyance. As reported

above, the vibration levels at Porter and Kresge Colleges would be 0.021 in/sec PPV, and at the Rachel Carson College would be 0.012 in/sec PPV, both well below the threshold and therefore would not result in human annoyance.

Hagar Site

Similarly, a vibratory roller operating near the perimeter of the Hagar site would produce vibration levels of 0.019 in/sec PPV at the nearest residences which are 220 feet south of the Hagar site, and vibration levels would be 0.021 in/sec PPV when construction in the utility corridor occurs near the receptors to the south of the corridor. These vibration levels would not exceed applicable thresholds for damage to structures and also would not produce human annoyance.

The impact from construction phase vibrations at both sites would be less than significant.

Mitigation Measures: No mitigation is required.

4.9.5 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

The proposed dining facilities expansion project would add to existing facilities on the west side of Rachel Carson College and to the southern end of Porter College. In both instances, the facilities would be located above or adjacent to existing buildings, or would replace the existing buildings with larger buildings. The ambient noise levels near Rachel Carson dining hall are affected by traffic on Heller Drive and activities within the college including the use of nearby sports facilities. The area where the Porter dining facilities would be expanded is relatively quieter as it is away from roadways and other noise sources.

Impacts and Mitigation Measures

DF Impact NOI-1: Construction activities associated with the dining facilities expansion project would substantially increase noise levels at residential uses in the vicinity but would not expose persons to excessive groundborne vibration. The proposed project would not increase traffic-related noise levels. (*Significant; Significant and Unavoidable*)

Permanent Increase in Noise Levels

The operation of the expanded dining facilities would not raise ambient noise levels in the vicinity of Rachel Carson and Porter Colleges as the activities would take place inside buildings. Due to the nature of the dining facilities expansion project, it would not result in an increase in daily traffic to and from the campus. As a result there would be no permanent increase in traffic-related noise on campus and city roadways due to the project. There would be no impact.

Construction Noise

Construction activities for the proposed dining facilities expansion project would involve adding a second story to existing buildings or an expansion of an existing building. If the former, construction would not involve grading or laying of foundations, whereas if the latter, there would be some ground disturbing activities such as grading and laying of foundations followed by building erection. Construction activities would occur within less than 100 feet of student residences and learning facilities, and the nearby students living and studying in Porter and Rachel Carson Colleges would be exposed to noise levels in excess of thresholds set forth in the 2005 LRDP EIR (exceed 80 dBA Leq (8h) daytime; 80 dBA Leq (8h) evening; 70 dBA Leq (8h) nighttime). Although LRDP Mitigation NOIS-1 would be implemented as part of the dining facilities expansion project, it is likely that noise levels would not be adequately controlled to stay below the threshold for daytime noise. Therefore, the noise impact would be expected to be significant and unavoidable.

The potential for construction noise associated with infill development that would be close to existing receptors on the campus was analyzed in the 2005 LRDP EIR and was found to be significant and unavoidable. This impact was adequately analyzed in the 2003 LRDP EIR and was fully addressed in the Findings and Statement of Overriding Considerations adopted by The Regents in connection with its approval of the 2005 LRDP. No conditions have changed and no new information has become available since certification of the 2005 LRDP EIR that would alter this previous analysis.

Groundborne Vibration

Table 4.9-7 above reports the types of construction equipment that produce vibrations. Most of the equipment would not be used for the dining facilities expansion project and it is anticipated that of these pieces, only jackhammers, load trucks and small bulldozers would be used, all of which produce low vibrations. Although the existing Rachel Carson and Porter College buildings are immediately adjacent to the construction sites, because these buildings are of recent construction and structurally sound, the low vibrations produced by the intermittent use of this equipment would not result in building damage. Although there would be some potential for vibrations to result in human annoyance, LRDP Mitigation

NOIS-1 will be a part of the project which limits the time of the day when construction may occur near campus receptors. Therefore, the proposed dining facilities expansion project would be unlikely to result in a significant impact related to vibration. The impact would be less than significant.

Mitigation Measures: No further mitigation is feasible.

Significance after Mitigation: The impact from construction noise would be significant and unavoidable.

4.9.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

SHW Impact C-NOIS-1: Implementation of the proposed project would not result in significant cumulative noise impacts. (*Less than Significant*)

Long Term Cumulative Operational Traffic Noise Impacts

The cumulative operational traffic noise impacts of campus development under the 2005 LRDP are analyzed in the 2005 LRDP EIR under LRDP Impact NOIS-2. That impact evaluates the increase in noise in 2020 under two scenarios: a Without Project scenario that estimates the increase in noise levels along city streets as a result of 2020 background traffic volumes, and a With Project scenario that adds 2005 LRDP-related traffic volumes to 2020 background traffic volumes and then estimates the increased noise levels. The analysis presented under LRDP Impact NOIS-2, therefore, presents the cumulative noise impacts in the study area and finds that the traffic added to city streets as a result of campus growth under the 2005 LRDP would not increase noise levels substantially to result in significant cumulative noise impacts (UCSC 2006). As discussed above, the proposed SHW project (along with other reasonably foreseeable student housing projects) would decrease the total amount of daily and peak hour traffic to and from the campus. Therefore, the proposed project will not contribute to the previously evaluated cumulative noise impact and would, in fact, reduce the severity of the previously analyzed cumulative traffic noise impact.

Near Term Cumulative Construction Phase Impacts

With respect to cumulative construction noise and vibration impacts, those would occur if other projects were to be under construction at the same time as the proposed project, and if these concurrent projects would be in close proximity of the same sensitive receptor. **Table 4.0-1** (in **Section 4.0**) present the other reasonably foreseeable campus projects that would be under construction during the same time period as the proposed project. The potential for construction phase cumulative noise impacts is discussed below.

Heller Site

Construction of the proposed housing on the Heller site would occur between 2019 and 2022 over a period of about 3 years. Construction of the dining facilities at Rachel Carson and Porter College and the construction of the Kresge College improvements would also occur during this time period. However, students living in Kresge College would not be exposed to a cumulative construction noise impact because the Heller site is too distant from Kresge College to affect the receptors there, and as far as the Heller site utility corridor activities are concerned, those would be completed in 2019 before construction at Kresge College commences. There would be no construction-phase cumulative impact at the Kresge receptors.

With respect to receptors in Porter and Rachel Carson Colleges, those would be exposed to noise from both the ongoing construction of the dining facilities as well as construction of the SHW project. As noted above, construction noise from the SHW project would not exceed the construction noise threshold at the receptors at either college. Furthermore, although the SHW construction noise would combine with the noise from the construction of the dining facilities expansion project, it would only cause a marginal, inaudible increase in ambient noise levels. This combined noise level would not cause the ambient noise levels to be audibly higher than they would be due to the construction of the dining facilities alone. Therefore, the SHW project would not significantly contribute to a cumulative noise impact at the receptors (the significant impact at the college receptors would be solely due to the dining facilities expansion project).

Hagar Site

With the exception of one project, none of the reasonably foreseeable campus projects are in the vicinity of the Hagar site, and therefore there is no potential for the proposed project to result in a cumulative construction noise impact on nearby receptors. With respect to Ranch View Terrace Phase 2, the construction schedule for that project is not known at this time and it is considered unlikely that that project would be constructed in 2018-19, the same time as the project construction on the Hagar site. There would be no construction-phase cumulative impact at the nearby receptors.

Mitigation Measures: No mitigation is required.

4.9.7 REFERENCES

California Department of Transportation. 2013a. *Technical Noise Supplement: A Technical Supplement to the Traffic Noise Analysis Protocol*, September, pp. 2-11 to 2-15.

California Department of Transportation. 2013b. *Transportation and Construction Vibration Guidance Manual*, September.

Federal Transit Administration. 2006. *Transit Noise and Vibration Impact Assessment*, May.

Illingworth & Rodkin, Inc. 2017. *UC Santa Cruz Student Housing West, Santa Cruz, CA – Noise and Vibration Levels associated with Construction Activities*. December.

Transportation Research Board, National Research Council. 1971. *Highway Noise: A Design Guide for Highway Engineers*, National Cooperative Highway Research Program Report 117.

University of California, Santa Cruz (UCSC). 2006. 2005-2020 Long Range Development Plan Final Environmental Impact Report. SCH No. 2005012113.

4.10 PUBLIC SERVICES AND RECREATION

4.10.1 INTRODUCTION

This section of the EIR describes the existing conditions related to fire and police services, schools, libraries, and parks and recreational facilities that serve the UC Santa Cruz campus, and analyzes the potential for the proposed Student Housing West (SHW) project to result in substantial adverse physical impacts associated with the provision of new or physically altered public service and recreational facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for these public services.

The section also presents potential impacts to public services and recreation from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and the existing colleges (see **Section 4.10.5** below).

The analysis in this section is tiered from the public services impact analysis contained in the 2005 LRDP EIR, supplemented by project-specific analysis. The information in this section is based on consultation with the City of Santa Cruz Fire and Police Departments, the UC Santa Cruz Office of Emergency Services, UC Santa Cruz Police Department, and Santa Cruz City Schools District, and City of Santa Cruz and Santa Cruz County parks departments.

4.10.2 ENVIRONMENTAL SETTING

4.10.2.1 Fire Protection

UC Santa Cruz operated its own Fire Department from 1973 to 2014. In 2014, the fire and Emergency Medical Service (EMS) response services were contracted to the City of Santa Cruz via an Agreement for Fire Protection and Emergency Services between the City of Santa Cruz and the University. The campus fire station remains a university-owned building but is leased to the City and designated as SCFD Fire Station No. 4. The fire engines previously owned by UC Santa Cruz (Engine 3114 and Engine 3134) remain at the fire station although their ownership has been transferred to the City of Santa Cruz (UCSC 2017a).

As a public university, UC Santa Cruz must abide by the California Fire Code, usually enforced by the California Office of the State Fire Marshal (OSFM). However, the UC system maintains a memorandum of understanding (MOU) with the OSFM, which allows UC personnel to serve as local campus fire marshals, deputy marshals, and inspectors. The Campus Fire Marshal and Deputy Fire Marshal are

employed within the UC Santa Cruz Office of Emergency Services (OES) and are trained and certified through OSFM's Designated Campus Fire Marshal (DCFM) program (UCSC 2017b).

City of Santa Cruz Fire Department

The Santa Cruz Fire Department (SCFD) began as a volunteer organization in 1857 and now consists of over 60 paid staff members, including firefighters, paramedics, captains, battalion chiefs, fire prevention staff, training staff, and administrative staff, as well as an additional 70 seasonal lifeguards. The SCFD includes four fire stations, and is equipped with four engines, one Type 3 engine, and one truck. Each station has at least 15 firefighters on duty at all times, allowing the SCFD to respond to nearly 8,000 emergency calls per year (City of Santa Cruz 2017a).

SCFD Fire Station No. 1 is located at 711 Center Street in the downtown area. Fire Station No. 2 is located at 1103 Soquel Avenue in the eastern portion of Santa Cruz, and Fire Station No. 3 is located at 335 Younglove Avenue in Santa Cruz's Westside. Fire Station No. 4 (campus fire station) is located in the northeastern portion of the campus, east of Chiquapin Road. Station No. 4 houses a Type 1 fire engine and a Type 3 wildland fire engine, which is utilized in the undeveloped areas of the campus as well as throughout the county. Staff at Station No. 4 consists of one captain, one engineer, and one firefighter/paramedic. SCFD has a response goal of 8 minutes or less, which is met, on average, 77.3 percent of the time. The majority of the calls not met within the desired response time are "code-2" or non-emergency responses, where lights and sirens are not used. The average response time for the last reporting period was six minutes and sixteen seconds, well under the 8 minute response goal (Kumec 2017).

Office of Emergency Services

In 2014, the University created the UC Santa Cruz OES to manage the newly formed contract between UC Santa Cruz and the SCFD. Under the Associate Vice Chancellor of Risk and Safety Services, the OES houses many of the services previously managed by the UC Santa Cruz Fire Department, such as the campus fire marshal, emergency management, public education, and on-campus mass notification (CruzAlert). The Director of Emergency Management is principally in charge of the oversight within the office and is the primary liaison to local, state, and federal emergency planning groups, such as the Santa Cruz County OES and the SCFD, maintaining responsibility for the fire services contract (UCSC 2017b).

Environmental Health and Safety

OES is responsible for the majority of fire prevention, protection engineering, and safety. However, campus Environmental Health and Safety (EH&S) hosts a variety of free safety training courses,

including a two-part fire safety training. The lesson consists of a classroom presentation that addresses general fire safety and hands-on fire extinguisher training. The goal of the safety training classes is to help departments meet the standards set forth by UC Santa Cruz's Injury and Illness Prevention Program (IIPP). The IIPP is required for every employer by the California Division of Occupational Safety and Health (Title 8, section 3203) to ensure a safe and healthful work environment (UCSC 2017c).

California Department of Forestry and Fire Protection (CAL FIRE)

CAL FIRE responds to all wildland fires within unincorporated Santa Cruz County, which includes the upper and northern portion of the UC Santa Cruz Campus. CAL FIRE is also called in to assist with incidents throughout the campus when emergencies require more effort than the SCFD can handle.

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 manned with volunteer staff.

4.10.2.2 Police Services

UC Santa Cruz Police

The UC Santa Cruz Police Department is responsible for providing police services on the campus. The Department is located within the Emergency Response Center (ERC) at 1156 High Street, at the southern end of the campus. As of 2017, the Department employed 21 sworn officers, nine dispatchers, five professional staff, and five parking enforcement officers. All UC Santa Cruz police officers are sworn peace officers under section 830.2(b) of the California Penal Code and possess the same authority as municipal police officers (UCSC 2017d). As the total student population in 2016-2017 was 18,063 students, the campus currently has a ratio of 1.16 sworn officers per 1,000 students, which does not meet the recommended average for universities of 1.4 officers per 1,000 students (Oweis 2017).

The emergency response time for the UC Santa Cruz Police Department is usually between 4 and 6 minutes. The Department's non-emergency response time, under normal circumstances, is usually between 8 and 10 minutes (Oweis 2017).

City of Santa Cruz Police Department

The City of Santa Cruz Police Department (SCPD) serves University-owned and leased off-campus facilities, as well as providing additional support to UC Santa Cruz Police Department as needed. The SCPD is located at 155 Center Street, approximately 2 miles southeast of the campus. In 2016, the department employed 94 sworn officers. With an estimated citywide population of approximately 64,465 people (US Census 2016), the SCPD had a ratio of 1.46 sworn officers per 1,000 residents. The SCPD currently meets or exceeds the response time goals outlined in the City of Santa Cruz General Plan: 4.5 minutes for in-progress/emergency calls, 7.5 minutes for recent/just occurred calls, and 9 minutes for cold calls (City of Santa Cruz 2017b)

County of Santa Cruz Sheriff's Office

The Santa Cruz County Sheriff's Office is located at 5200 Soquel Avenue in the City of Santa Cruz, approximately 4 miles east of the campus. The office has 162 sworn positions, 119 corrections positions, and 68 non-sworn civilian positions (SCSD 2016). Like the SCPD, the County Sheriff's Office does not patrol the UC Santa Cruz campus. The Sheriff's Office instead assists the UC Santa Cruz Police Department upon request. Such assistance usually consists of crime investigation support, crowd control, and coroner's duties (UCSC 2006).

4.10.2.3 Schools

The proposed project is located within the boundaries of the Santa Cruz City Schools District (SCSD), which is divided into an Elementary District (grades K-6) and a High School District (grades 7-12). During the 2016-2017 school year, the Elementary District had an enrollment of 2,206 students while the High School District had an enrollment of 4,582 (CDE 2017a; CDE 2017b).

The SCSD operates four elementary schools, two middle schools, and three high schools, as well as four small/specialty schools and an adult school. The project site is located within the area served by Westlake Elementary School, Mission Hill Middle School, and Santa Cruz High School.

Westlake Elementary School is located near the campus' main entrance at 1000 High Street and in 2016-17 had an enrollment of 569 students. Mission Hill Middle School is located about 1 mile southeast of the campus and in 2016-17 had an enrollment of 594 students. Finally, Santa Cruz High School is located approximately 1.2 miles southeast of the campus at 415 Walnut Ave and in 2016-17 had an enrollment of 1,027 students. According to the SCSD's Facilities Master Plan (2016), enrollment at all of the schools serving the UC Santa Cruz campus is expected to decline by 2025. Enrollment at Westlake Elementary in 2025 is forecast to be 493 students, which is a decrease of approximately seven percent compared to

current enrollment. Enrollment at Mission Hill Middle School in 2025 is forecast to be 529 students, which is a decrease of about 11 percent compared to current enrollment. Finally, enrollment at Santa Cruz High School in 2025 is forecast to be 878 students, which is a decrease of about 15 percent compared to current enrollment (SCSD 2016).

4.10.2.4 Libraries

The University Library primarily serves UC Santa Cruz students, faculty and staff; however, its collections are also made available to the general public through the Friends of the Library program. The University Library is composed of two facilities: McHenry Library and the Science and Engineering Library. The McHenry Library is a four-story facility that houses the Arts, Humanities, and Social Science collections. The Science and Engineering Library houses the campus's natural sciences and engineering collections. Additionally, four of the campus's residential colleges have their own smaller libraries that serve affiliates of those colleges.

4.10.2.5 Parks and Recreation

UC Santa Cruz offers facilities for organized recreation activities, including playing fields, athletic courts, and a swimming pool. Informal recreational areas are also available and consist of trails, paths, and undeveloped open spaces, which are open to the public during daylight hours. Parks and recreational facilities in the vicinity of the proposed project off campus are provided by the City of Santa Cruz Parks and Recreation Department and the Santa Cruz County Department of Parks, Open Space, and Cultural Services. A discussion of each park system is provided below.

UC Santa Cruz Office of Physical Education, Recreation, and Sports

The UC Santa Cruz Office of Physical Education, Recreation, and Sports (OPERS) manages the recreational and athletic facilities on the campus, including intramural sports, sports clubs, and intercollegiate athletics. It also provides an array of recreational activities for UC Santa Cruz and the surrounding community such as rock climbing, surfing, and mountain biking. A majority of recreational facilities are located in the vicinity of the East Field House, south of Cowell College. The East Field complex includes a gymnasium, racquetball and basketball courts, martial arts and dance studios, a swimming pool, tennis and volleyball courts, the Wellness Center, East Field, and East Remote Field. Another smaller complex is located near Rachel Carson College at the West Field Playing House and a third small playing field is located south of the current Family Student Housing (FSH) complex. The public may purchase a variety of passes for access to the campus formal recreation facilities (UCSC 2017e).

City of Santa Cruz Parks and Recreation Department

The City of Santa Cruz Parks and Recreation Department manages 29 parks neighborhood and community parks, five regional parks, municipal beaches, two city museums, two community centers, a civic auditorium and a golf course (City of Santa Cruz 2017b). The nearest city facility is Pogonip City Park, located adjacent to the eastern border of the campus. Other nearby City parks include University Terrace, located 0.2 miles south of the campus, and Westlake Park, located 0.4 miles southeast of the campus. The City of Santa Cruz Parks and Recreation Department strives to provide 4.5 acres of parks per 1,000 residents. As of 2017, the City is approximately 45 acres below this standard. However, the acreage standards do not consider regional and state parks, open space, beaches, or larger recreational facilities (Downing 2017).

Santa Cruz County Department of Parks, Open Space, and Cultural Services

Santa Cruz County maintains approximately 1,388 acres of land for parks and recreation purposes, which include neighborhood, community and regional parks. Amenities at these facilities include beaches, athletic fields and courts, skate parks, and swimming pools, and coastal access points. There are no County parks within 1 mile of the UC Santa Cruz campus. The nearest County facility is the Graham Hill Showgrounds, and equestrian facility that is located approximately 1.5 miles northeast of the campus. Santa Cruz County strives to provide 2-3 acres of usable recreational facilities and parkland per 1,000 residents. Based on a service population of approximately 162,000 residents, the County currently provides approximately 8.5 acres of parkland per 1,000 residents (Fourt 2017).

4.10.3 REGULATORY CONSIDERATIONS

4.10.3.1 Federal Laws and Regulations

There are no federal laws that control or regulate public services and recreation.

4.10.3.2 State Laws and Regulations

California Fire Code

The California Fire Code (Title 24 CCR, Part 9) establishes minimum requirements to safeguard public health, safety, and general welfare from the hazards of fire, explosion, or dangerous conditions in new and existing buildings. Chapter 33 of CCR contains requirements for fire safety during construction and demolition.

Senate Bill 50

The Leroy F. Greene School Facilities Act of 1998, or Senate Bill 50 (SB 50), restricts the ability of a local agency to deny project approvals on the basis that public school facilities (classrooms, auditoriums, etc.) are inadequate. School impact fees are collected at the time building permits are issued. These fees are used by the local schools to accommodate the new students added by the project, thereby reducing potential impacts on schools to a less-than-significant impact. Payment of school fees is required by SB 50 for all new residential development projects and is considered full and complete mitigation of school impacts.

Quimby Act

California Government Code Section 66477, Subdivision Map Act, referred to as the Quimby Act, permits local jurisdictions to require the dedication of land and/or the payment of in-lieu fees solely for park and recreation purposes. The required dedication and/or fee are based on the residential density, parkland cost, and other factors. Land dedicated and fees collected pursuant to the Quimby Act may only be used for developing new, or rehabilitating existing, park or recreational facilities. The maximum dedication and/or fee allowed under current state law is equivalent to providing 3 acres of park land per 1,000 persons, unless the park acreage of a municipality exceeds that standard, in which case the maximum dedication is 5 acres per 1,000 residents.

4.10.3.3 Local Plans and Policies

None of the City and County plans and policies related to public services and recreation are applicable to campus projects.

4.10.4 IMPACTS AND MITIGATION MEASURES

4.10.4.1 Significance Criteria

The impacts on public services and recreation from the implementation of the proposed project would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the State CEQA Guidelines, the UC CEQA Handbook, and the 2005 LRDP EIR:

- Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks, or other facilities.

- 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.
- Propose the construction of recreation facilities or require the expansion of recreation facilities that might have an adverse physical effect on the environment.

4.10.4.2 CEQA Checklist Items Adequately Analyzed at the 2005 LRDP Level or Not Applicable to the Project

- Result in substantial adverse physical impacts associated with the provision of new or physically altered police facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for police protection.

The analysis in Section 4.12 of the 2005 LRDP EIR found that campus development under the 2005 LRDP would not result in any significant environmental impacts as a result of new or altered facilities needed to maintain the UC Santa Cruz Police Department's service objectives through 2020. In addition, the analysis in Section 4.12 of the 2005 LRDP EIR found that there would be no significant environmental impacts associated with City police or County Sheriff's facilities as a result of campus growth under the 2005 LRDP (UCSC 2006). As the proposed SHW project would not increase enrollment at UC Santa Cruz or the regional population levels, impacts to police services would not be greater than those discussed in the 2005 LRDP EIR. This impact is adequately addressed in the 2005 LRDP EIR and the project's impact is considered less than significant.

- Result in substantial adverse physical impacts associated with the provision of new or physically altered schools, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for schools.

The analysis in Section 4.12 of the 2005 LRDP EIR found that the campus development under the 2005 LRDP would not result in any significant environmental impacts as a result of new or altered school facilities as enrollment was projected to decline through the SCSD and no new school facilities would be needed (UCSC 2006). The analysis in the 2005 LRDP EIR projected that an additional 201 family student housing units would be built on the FSH site and about 125 on-campus employee housing units would be constructed on the campus by 2020 for a total of 326 units. Based on a student generation rate of 0.261 student per unit provided by the SCSD at the time that the 2005 LRDP EIR was prepared, these units combined would generate approximately 85 K-12 students, with 51 of these students associated with the FSH complex expansion.

While the proposed SHW project would result in the demolition of 199 units in the existing FSH complex, only about 90 of these units are presently occupied by families with children. The new FSH complex at the Hagar site would include 148 units, but the Campus anticipates that some of these would be occupied

by couples without school-age children, and other types of families. However, the project could potentially accommodate, in the future, up to 61 additional families with children over existing conditions, and based on the student generation rate used in the 2005 LRDP EIR, these new units would generate a total of 16 K-12 students. To confirm that the student generation rate used in the 2005 LRDP EIR is still valid, SCSD's latest Fee Justification Study prepared in 2015 was reviewed. According to the student generation rates found in the study, these new units would also generate a total of 16 K-12 students,¹ which is consistent with the previous rate. As the number of new students generated by the proposed SHW project would be well below the number of new students generated by the previous FSH project, impacts to schools would not be greater than those discussed in the 2005 LRDP EIR. This impact was adequately addressed in the 2005 LRDP EIR and the project's impact is considered less than significant.

- Result in substantial adverse physical impacts associated with the provision of new or physically altered library facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for libraries.

The analysis in Section 4.12 of the 2005 LRDP EIR found that impacts resulting from the expansion of libraries on campus to serve campus growth under the 2005 LRDP would be less than significant as the expansions would occur as infill development. In addition, the analysis in Section 4.12 of the 2005 LRDP EIR found that although regional population growth may result in the need for new or expanded libraries in the City or the County of Santa Cruz, the growth associated with the 2005 LRDP would not contribute to the need for library facilities (UCSC 2006). As the proposed SHW project would not increase enrollment at UC Santa Cruz or the regional population levels, impacts to libraries on the campus or in the surrounding community would not be greater than those discussed in the 2005 LRDP EIR. This impact was adequately addressed in the 2005 LRDP EIR and the project's impact is considered less than significant.

- Propose the construction of recreation facilities or require the expansion of recreation facilities that might have an adverse physical effect on the environment.

The analysis in Section 4.13 of the 2005 LRDP EIR found that while campus development under the 2005 LRDP would result in increased demand for recreational facilities on the campus, which would require the construction of new facilities, the construction of these facilities would not result in significant environmental impacts as all environmental impacts would be reduced to a less-than-significant level with the implementation of 2005 LRDP EIR mitigation measures. With respect to City of Santa Cruz

¹ (61 family student units X 0.147 elementary students per unit) + (61 family student units X 0.030 middle school students per unit) + (61 family student units X 0.087 high school students per unit)

recreational facilities, the analysis in Section 4.13 of the 2005 LRDP EIR found that because adequate recreational facilities are available on the campus, and new campus facilities would be added as the on-campus daytime and residential population grows under the 2005 LRDP, the on-campus population is not expected to contribute to the need for new recreational facilities in the city (UCSC 2006). As the proposed SHW project and the related dining facilities expansion project would not increase enrollment at UC Santa Cruz or the regional population levels, environmental impacts due to the construction of recreational facilities on the campus would not be greater than those discussed in the 2005 LRDP EIR. This impact was adequately addressed in the 2005 LRDP EIR and the project's impact is considered less than significant.

- 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.

The analysis in Section 4.13 of the 2005 LRDP EIR found that campus development under the 2005 LRDP would result in increased use of recreational facilities on the campus and in the city of Santa Cruz, which could result in the deterioration of these facilities. However, with implementation of mitigation found in the 2005 LRDP EIR this impact would be reduced to a less than significant level (UCSC 2006). As the proposed SHW project and the related dining facilities expansion project would not increase enrollment at UC Santa Cruz or the regional population levels, impacts to recreational facilities on the campus or in the surrounding community would not be greater than those discussed in the 2005 LRDP EIR. This impact was adequately addressed in the 2005 LRDP EIR and the project's impact is considered less than significant.

4.10.4.3 Methodology

Public service providers serving the campus were contacted to determine existing operational service levels. Then details of the proposed project were provided to the service providers, and the service providers determined whether there would be a need to construct new or physically altered public facilities in order to maintain acceptable service ratios and serve the proposed project.

4.10.4.4 2005 LRDP EIR Mitigation Measures included in the Proposed Project

According to the analysis in the 2005 LRDP EIR, all potential impacts to public services as a result of implementation of the 2005 LRDP would be less than significant. No mitigation measures were determined to be necessary. Therefore no mitigation measures are included in the proposed project.

4.10.4.5 Project Impacts and Mitigation Measures

SHW Impact PS-1: **Implementation of the proposed SHW project would not result in significant environmental impacts associated with the provision of new or altered fire protection facilities to maintain applicable service levels. (*Less than Significant*)**

The impact of campus growth under the 2005 LRDP on fire services were analyzed in the 2005 LRDP EIR. The analysis in Section 4.12 of the 2005 LRDP EIR found that in order to maintain existing service levels as the campus grows under the 2005 LRDP, the UC Santa Cruz Fire Department would need to increase staffing by five persons, and expand the existing fire station to include an additional fire engine bay. As discussed above, since 2014, the SCFD has provided fire and EMS response services to the campus and operates the fire station located on the campus. The SCFD was contacted by UC Santa Cruz planning staff to determine whether the fire department had adequate personnel and equipment to serve the proposed SHW project, including the tall buildings at the Heller site, one of which would be up to 10 stories high. The SCFD indicated that the high density of development at the Heller site would result in an increase in the volume of calls (fire, medical emergency, and rescue) and therefore the project could not be served at the existing level of service without increasing staffing levels. In addition, the existing ladder truck cannot serve buildings with more than 7 stories. Therefore, the project could result in the need for the fire department to acquire a new ladder truck. The existing City fire stations (including the one on campus and the ones off campus) could not house the new fire truck, so remodeling of an existing fire station would be required. The SCFD indicated that the remodel would likely be at one of the fire stations located in the city rather than the fire station on the campus (Hajduk 2018).

It is unlikely that the fire station remodeling project to add or extend a bay for the new ladder truck would be implemented at Station No.1 due to lack of land for expansion on that site. The remodel would likely be undertaken at Station No. 2 or No. 3. The construction of an expanded or a new bay at either of these stations would not result in significant environmental impacts. This is because at both locations, there are existing paved areas either on the fire station site or in an adjacent parking lot that could be used for this purpose. Furthermore, the fire stations are within developed neighborhoods and sensitive resources are not present on or near the sites that could be adversely affected by the remodel projects. The potential environmental impacts associated with expanding one of the existing fire stations in Santa Cruz would be less than significant (this conclusion is consistent with the conclusion reached by the City of Santa Cruz in the Downtown Plan Amendments EIR [City of Santa Cruz 2017]).

Mitigation Measures: No mitigation is required.

4.10.5 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACT AND MITIGATION MEASURES

Environmental Setting

The proposed dining facilities expansion project would add to existing facilities on the west side of Rachel Carson College and to the southern end of Porter College. The proposed facilities would serve existing and future students that are accounted for in the growth projections contained in the 2005 LRDP and analyzed in the 2005 LRDP EIR.

Impacts and Mitigation Measures

DF Impact PS-1: The implementation of the proposed dining facilities expansion project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police, schools, and parks. In addition, implementation of the proposed dining expansion facilities project would not 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. (*Less than Significant*)

Fire

As discussed above under **SHW Impact PS-1**, the analysis in Section 4.12 of the 2005 LRDP EIR found that in order to maintain existing service levels as the campus grows under the 2005 LRDP, the UC Santa Cruz Fire Department would need to increase staffing and expand the existing fire station to include an additional fire engine bay. With the incorporation of mitigation discussed in the 2005 LRDP EIR, and due to the relatively small area that would be disturbed by the construction of one engine bay, the expansion of the fire department would not result in significant environmental impacts. As the related dining facilities expansion project would not increase enrollment at UC Santa Cruz or the regional population levels, impacts to fire protection services would not be greater than those discussed in the 2005 LRDP EIR.

Schools, Police, and Parks

The analysis in Sections 4.12 and 4.13 of the 2005 LRDP EIR found that while campus development under the 2005 LRDP would result in increased demand for police services, schools and recreational facilities on and off campus, new facilities would not be needed and the impacts would be less than significant (UCSC 2006). As the related dining facilities expansion project would not increase enrollment at UC Santa Cruz or the regional population levels, environmental impacts on police, schools, and parks would not be greater than those discussed in the 2005 LRDP EIR. This impact was adequately addressed in the 2005 LRDP EIR and the project's impact is considered less than significant.

Mitigation Measures: No mitigation is required.

4.10.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

SHW Impact C-PS-1: Implementation of the proposed project would not result in a significant cumulative public service impacts. (*Less than Significant*)

The cumulative impact of campus development under the 2005 LRDP along with other development in the region, including in the City of Santa Cruz, with respect to the provision of fire services is analyzed in the 2005 LRDP EIR under LRDP Impact PB-5. The analysis in the 2005 LRDP EIR found that cumulative growth in the study area, including 2005 LRDP-related off-campus population, would result in demand for new or expanded fire service facilities. However, the construction of these facilities would not result in significant adverse environmental impacts (UCSC 2006). As discussed above, the proposed SHW project as well as the related dining facilities expansion project would not increase enrollment at UC Santa Cruz or the regional population levels. For these reasons, the proposed project would not alter the previously evaluated cumulative impact. The project's cumulative impact related to fire services would be less than significant.

For the same reasons presented above, the proposed SHW project and the related dining facilities expansion project would not change the conclusions of the analysis of other cumulative impacts on other public services including police, schools and parks analyzed in the 2005 LRDP EIR. The project's cumulative impacts would be less than significant.

Mitigation Measures: No mitigation is required.

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4.11 TRANSPORTATION AND TRAFFIC

4.11.1 INTRODUCTION

This section of the EIR describes the existing transportation and traffic conditions at the UC Santa Cruz campus and analyzes the potential for implementation of the proposed SHW project to result in traffic and transportation impacts. This section also addresses the potential traffic impacts from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and the existing colleges (see **Section 4.11.5** below).

The analysis in this section is tiered from the transportation and traffic impact analysis contained in the 2005 LRDP EIR, supplemented by project-specific analysis. The information in this section is based on trip generation estimates prepared by UC Santa Cruz Transportation and Parking Services (TAPS) Office, and a traffic analysis for the Hagar site prepared by Fehr & Peers, both of which are included in **Appendix 4.11** of this document.

4.11.2 ENVIRONMENTAL SETTING

4.11.2.1 Project Study Area

The 2005 LRDP EIR evaluated the traffic impacts of campus growth and defined the study area for traffic and transportation analyses to include the main campus and the City of Santa Cruz, including all roadways surrounding the campus. As noted in the 2005 LRDP Final EIR, the study area for the traffic analysis includes intersections along the following corridors:

- Campus Loop – Heller Drive, McLaughlin Drive, Hagar Drive, and Glenn Coolidge Drive
- Bay Street/Bay Drive– High Street to West Cliff Drive
- Mission Street – Western Drive to Front Street
- Chestnut Street – Mission Street to Laurel Street
- Lincoln Street / Soquel Avenue – Mission Street to Capitola Road
- Water Street – Mission Street to Morrissey Boulevard
- San Lorenzo Boulevard / East Cliff Drive / Murray Street
- Other city streets, including Delaware Avenue and Western Drive

The 2005 LRDP EIR also analyzed traffic impacts on study area freeways.

The proposed project would add housing to the campus and thereby reduce the percentage of enrolled students who would live off campus, compared to existing conditions as well as the conditions analyzed in the 2005 LRDP Final EIR. Therefore, the proposed project would reduce and not add new daily and peak hour trips to the area roadways. For this reason, the study area for the proposed SHW project is defined to include only those roadways that provide access to the two project sites, namely Heller Drive that provides access to the Heller site and Hagar and Glenn Coolidge Drives which provide access to the Hagar site.

4.11.2.2 Study Area Roadways

The main campus is served by two roadway entrances: the main entrance at Bay and High Street intersection and the west entrance at Empire Grade Road and Heller Drive. The three roadways that serve the project sites are described below.

- Glenn 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 terminate at McLaughlin Drive, a campus roadway. Glenn Coolidge Drive is a two-lane street with bike lanes on each side and no on-street parking. The speed limit near the central campus is 25 miles per hour (mph). Between Hagar Drive and McLaughlin Drive the speed limit is 40 mph.
- Hagar Drive is a north-south roadway from Glenn Coolidge Drive to McLaughlin Drive. Hagar Drive is a two-lane road with bike lanes and a pedestrian path from Glenn Coolidge Drive to the entrance to the East Remote parking lot and no on-street parking.
- Heller Drive is a two-lane street that extends north-northeast from the west campus entrance at the Empire Grade Road intersection. The street experiences high volumes of pedestrian crossings and transit vehicles in the vicinity of Rachel Carson College and Porter College. Sidewalks on Heller Drive are sidewalks but are supplemented by a series of off-street paths that parallel Heller Drive, or connect Heller Drive to other parts of the campus. On-street parking is not permitted on Heller Drive (UCSC 2006).

4.11.2.3 Project Study Intersections

Two existing on-campus intersections are relevant to the proposed project.

Glenn Coolidge and Hagar Drive Intersection

The proposed Hagar site family student housing would be located at the northern corner of the Glenn Coolidge and Hagar Drive intersection. This is a four-way, signalized intersection with left turn pockets on Glenn Coolidge Drive.

Heller and Koshland Way Intersection

The Heller site student housing would be located on Heller Drive west of the intersection of Heller Drive and Koshland Way, which is currently a T-intersection with stop signs on all three approaches. Koshland Way provides access to Rachel Carson College facilities, including the parking lots.

4.11.2.4 Intersection Operations

Level of service (LOS) is a measure of the quality of the overall operating characteristics of a street or highway. It is defined in terms of control delay, which considers vehicle waiting time in intersections and travel delays along streets as a gauge of travel time, traffic conflicts and interruptions, freedom to maneuver and driving convenience and comfort. Level of service is dependent upon traffic volume and composition of traffic.

LOS is a measure of congestion that ranges from LOS A (free-flow condition) to LOS F (highly congested condition). The LOS calculations utilize the 2000 Highway Capacity Manual methodology (Transportation Research Board 2000, Chapter 10) for signalized intersections. **Table 4.11-1** summarizes the relationship between the level of service rating for signalized intersections and the average control delay per vehicle.

Table 4.11-1
Signalized Intersection LOS Criteria

LOS	Description	Delay (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle length.	< 15.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 15.0 to 25.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 25.0 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	> 55.0 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80.0
Source: Highway Capacity Manual (Transportation Research Board, 2000)		

The evaluation of unsignalized intersections also relies on the operations method of the 2000 Highway Capacity Manual. For two-way stop-controlled intersections, the average control delay for the worst approach is reported. For all-way stop-controlled intersections, the weighted average delay¹ for the entire intersection is reported. The LOS definitions used for unsignalized intersections are summarized in **Table 4.11-2**.

Table 4.11-2
Unsignalized Intersection LOS Criteria

LOS	Description	Delay (Seconds)
A	Little or no delays	< 10.0
B	Short traffic delays	> 10.0 to 15.0
C	Average traffic delays	> 15.0 to 25.0
D	Long traffic delays	> 25.0 to 35.0
E	Very long traffic delays	> 35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded	> 50.0
<i>Source: Highway Capacity Manual (Transportation Research Board, 2000)</i>		

As noted in the 2005 LRDP Final EIR, the on-campus intersections are subject to the campus LOS standards. These standards reflect the different characters of the lower campus and central campus areas. The lower campus features traffic speeds between 25 and 35 mph or more, and minimal pedestrian activity. The central campus roadways feature numerous stop-controlled intersections, traffic speeds of 25 mph or less, and significant numbers of pedestrians. The lower campus is predominately rural in character, with roadways functioning like arterials connecting to the central campus. In contrast, the central campus is predominately pedestrian in character, with roadways serving to convey vehicles to parking lots and buildings. This difference in character supports the application of a lower minimum acceptable LOS standard in the central campus, compared to the minimum acceptable LOS standard applied in the lower campus. The minimum acceptable LOS standard is LOS D at the following intersections in the lower campus: Glenn Coolidge Drive/Campus Facilities, Glenn Coolidge Drive/Hagar Drive, and Hagar Drive/East Remote parking lot. In contrast, the standard is LOS E at the following intersections in the central campus: Heller Drive/McLaughlin Drive, Heller Drive/Meyer Drive, McLaughlin Drive/Chinquapin Drive and Hagar Drive/McLaughlin Drive (UCSC 2006).

¹ Weighted average is defined as the average vehicle delay experienced at each intersection approach. The average is weighted by the volume of traffic using each approach.

4.11.2.5 Campus Transit Services

TAPS operates Campus Transit buses that serve the main campus and other UC Santa Cruz facilities in the city of Santa Cruz. It also works closely with the Santa Cruz Metropolitan Transit District (SCMTD) or “Metro” to coordinate services. Transit service to the main campus is described below.

Campus Transit is the campus shuttle bus system operated by TAPS to serve the entire main campus. All Campus Transit routes are wheelchair accessible. UC Santa Cruz Campus Transit provides two daytime routes on campus, the Loop and the Upper Campus. Both routes operate Monday through Friday from 7:30 AM to 7:45 PM. The Loop route runs buses on 7-minute frequencies in both directions through the main campus. The Upper Campus route provides access between the East Remote and West Remote parking lots while serving residential and academic facilities adjoining Hagar, McLaughlin and Heller Drives.

Campus Transit also provides nighttime on-campus transit service with Loop, East Night Core and West Night Core route. Loop routes operate every 10-20 minutes until 11:30 PM weeknights and from 6:00 PM until 11:30 PM weekends. The East and West Night Core routes operate every 30 minutes from 7:00 PM until 12:00 AM weeknights, and from 6:30 PM until 12:00 AM weekends.

TAPS Disability Van Service provides off-route door-to-door on-campus paratransit services for those with permanent or temporary disabilities. This service is available to staff, faculty, students, and visitors. No fare is required for the service, but service must be arranged in advance.

4.11.2.6 Campus Transportation Demand Management Program

UC Santa Cruz manages a variety of TDM programs, which are detailed below.

Parking Management

Like all UC campuses, UC Santa Cruz has established a parking management program to control the use of campus parking facilities. The parking management program is composed 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. Measures and programs are described below and under the transit and bicycle sections of this report.
- Parking Neighborhoods – The campus is divided into 13 neighborhoods for purposes of monitoring and managing demand for specific geographic areas of the campus. Demand management is achieved through variations in fees and the use of parking permits.

- Parking Permits – UC Santa Cruz manages parking demand through issuance of a variety of types of parking permits, for commuters, residential parking, faculty/staff, graduate students, undergraduate students, reserved and disabled parking. Residential students with freshman or sophomore academic status are prohibited from purchasing a parking permit.
- Use of Remote Lots – The East and West Remote Lots provide parking supply for commuters and reduce demand for close-in parking in the campus core. The remote lots are served by Campus Transit.

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 Bus Pass. Under this agreement, the University pays SCMTD a negotiated monthly amount..

Rideshare Programs

Zimride and Zipcar services are available on the UCSC campus. Zimride is a private rideshare service that allows UCSC students and employees to find rides on and off- campus with others heading the same direction. Users with vehicles get to split the cost of driving by filling empty seats with those looking for a ride. Zipcar allows members to quickly rent vehicles for any desired amount of time at a reasonable price, which includes insurance, gas, and other vehicle fees. Students, faculty, and staff over 18 years of age can reserve a car, locate on or near campus, and drive away, utilizing a special key that comes with membership to the service.

Late-Night and Emergency Ride Services

For the safety and convenience of UCSC students and staff, anyone with a valid UCSC ID can utilize the Night Owl Bus Service, which runs every 20 minutes between the UCSC campus and downtown Santa Cruz. Buses run between 11:30 PM and 2:10 AM to enable students to fully utilize the Santa Cruz community without having to worry about getting home at the end of the night. UCSC also offers an Emergency Ride Home program for UCSC employees who choose an alternative to driving alone at least once a week. Vouchers, valid for one free cab ride home, can be used for emergency purposes for program participants.

Bike Shuttle Program

The TAPS Bike Shuttle provides campus bicycle commuters a ride up the hill from the vicinity of the Mission/Bay Street intersection through the campus. Besides promoting bicycle use among campus commuters, this program reduces on-campus parking demand and campus-related vehicle traffic (UCSC 2006).

Commuter Vanpool Program

This program provides a commute alternative for faculty, staff, and students. TAPS operates 14 vanpools originating from Aptos, Campbell, Monterey, San Jose, and Watsonville. Approximately a dozen parking spaces in heavily utilized parking areas have been reserved for vanpool drivers.

Emergency Ride Home Program

Thanks to a service arrangement with Ecology Action, UC Santa Cruz faculty and staff who commute once or more per week via transportation alternatives — carpool, vanpool, transit, or bicycle — are eligible to participate in the Emergency Ride Home program. Commuters who enroll in this program receive a voucher for a free taxi ride home if an emergency requires the need to leave campus unexpectedly (UCSC 2006).

4.11.2.7 Bicycle/Pedestrian Facilities

Bicycle Lanes and Routes

The campus provides bike lanes on three of the primary access roads serving the campus. Bicycle lanes, continuous from Bay Drive, are provided on Glenn Coolidge Drive from High Street to McLaughlin Drive, and on Hagar Drive from Glenn Coolidge Drive to the entrance of the East Field House Office of Physical Education, Recreation and Sports (OPERS). A bicycle lane was added on Heller Drive in the uphill direction from Empire Grade to McLaughlin. A Class I bike path connects Glenn Coolidge Drive to Meyer Drive through the Great Meadow. Additional off-street paths are located throughout the campus, including unpaved fire roads and the U-Con trail in the north part of the campus which are used recreationally. Once bicyclists reach the ends of the bike lanes on Heller, Glenn Coolidge, and Hagar Drives, they are required to share the road with vehicles. At many locations, campus roadways have narrow or no shoulders, and there are substantial uphill grades from both campus entrances. Bicyclists generally require more width riding uphill. The narrower roadway sections are difficult for bicyclists to negotiate (UCSC 2006).

Bicycle Parking

Bike racks are located at transit stops on campus, at residential colleges and housing, and near most other major buildings.

Bike Shuttle

Because there are steep uphill grades up to and through the campus, TAPS operates a bike shuttle service from Olive Street/Mission Street to the campus on weekday mornings to encourage bicycle use as an alternative to motorized vehicles. The shuttle van has a trailer on which 16 bicycles can be loaded, as well as a rack on the front of the shuttle that can carry three bicycles. The shuttle has two drop-off points on campus: the Physical Plant transit stop near the main entrance and the Engineering 2 Circle on the central campus. During the Fall, Winter, and Spring quarters, the bike shuttle operates on 15-minute frequencies between 7:00 AM and 11:30 AM. During the Summer quarter and breaks makes eight trips between 7:10 AM and 9:40 AM.

Bicycles on Buses

Campus Transit allows bikes to be loaded onto Loop shuttles' front-loading bike racks that carry three bicycles at a time; bikes are not allowed inside buses. Bikes can be loaded and unloaded at stops throughout the Loop route.

Santa Cruz METRO buses have also front-loading bicycle racks that carry three bicycles at a time.

4.11.2.8 Traffic Data Collection

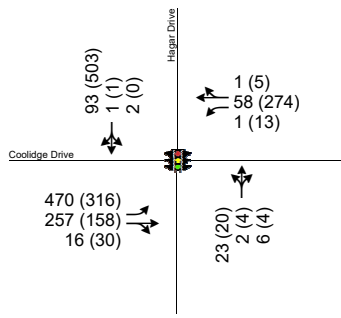
Intersection traffic counts were collected at the Glenn Coolidge/Hagar Drive intersection on December 7, 2017 from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. The existing lane configurations at the time the traffic data was collected and the traffic volumes are shown on **Figure 4.11-1, Glenn Coolidge/Hagar Drive Intersection Configurations and Volumes**.

4.11.2.9 2008 Comprehensive Settlement Agreement

As noted in **Chapter 1.0, Introduction**, the certification of the 2005 LRDP Final EIR was challenged in 2007 by several entities, including the City of Santa Cruz. A ruling by the Santa Cruz County Superior Court concluded that additional analyses relating to water supply, housing, and traffic mitigation were required. Specifically regarding traffic, the Court ruled that "Mitigation Measure TRA-2 does not constitute a feasible enforceable measure for ensuring the University's payment of fair share contributions to transportation improvements under the control of the City of Santa Cruz." In August

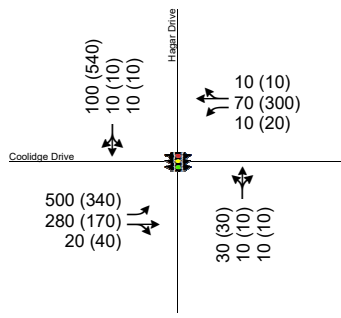
Existing Conditions

1. Hagar Drive/Coolidge Drive



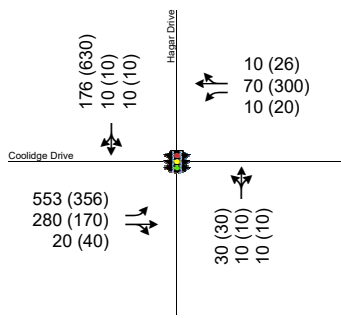
2020 without Project Conditions

1. Hagar Drive/Coolidge Drive

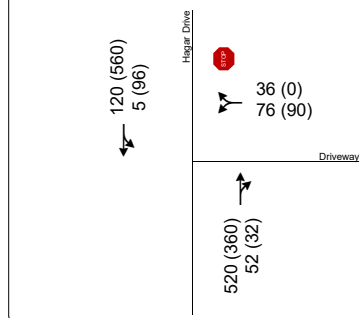


2020 With Project Conditions

1. Hagar Drive/Coolidge Drive



2. Hagar Drive/Driveway



LEGEND

- # Study Intersection
- AM (PM) Peak Hour Traffic Volume
- ↔ Lane Configuration
- 🚦 Signalized



SOURCE: Fehr and Peers 2017

FIGURE 4.11-1

2008, a Comprehensive Settlement Agreement was executed by all parties to resolve the lawsuits. The provisions in the 2008 Settlement Agreement related to traffic are as listed in **Table 4.11-3, Traffic related Terms in the 2008 Settlement Agreement**, below.

Table 4.11-3
Traffic-related Terms in the 2008 Settlement Agreement

Settlement Provision	
4.1	<p>UCSC agrees to not exceed 28,700 ADT to the main campus (24,800 ADT 2005 LRDP baseline + 3,900 new ADT) for as long as the 2005 LRDP is in effect. Compliance will be monitored by arriving at an ADT through weekday (Monday – Friday) traffic volume counts at the two campus entrances for at least two weeks beginning on the fourth week of Fall and Spring quarter (when school is in session for the entire week) of each corresponding calendar year.</p> <p>a. The parties agree that the traffic commitment in Section 4.1 will be increased by 1,300 ADT to a total of 30,000 ADT and that the penalty provisions of Section 1.4 will not apply in the event UCSC is prohibited from developing the North Campus area as identified in the attached map (e.g., a final judicial determination prohibits North Campus development) or the City fails to amend its Sphere of Influence. UCSC agrees to make additional ADT payments associated with an ADT increase of 1,300 under this section based on the citywide TIF fee schedule then in effect (currently \$377/trip). The parties acknowledge and agree that 30,000 main campus ADT is 100 ADT lower than estimated by the City for UCSC in its current TIF program.</p> <p>b. The parties further agree that UCSC will not be in violation of the applicable traffic commitment or subject to the penalty provisions in Section 1.4 in the event of, and for the time period of, one of more of the following:</p> <p>i. a legal action, or inaction by an agency with approval or permit authority necessary to construct the housing project delays a proposal by UCSC to timely fulfill its housing commitment pursuant to Section 2.1. UCSC commits to make reasonable efforts to expeditiously resolve the litigation;</p> <p>ii. Implementation of an ADT reducing project not identified in this Agreement is delayed as a result of a legal action or inaction by an agency with approval or permit authority necessary to construct the ADT reducing project, upon the concurrence of the City.</p> <p>c. The parties agree that UCSC's ability to meet the applicable traffic commitment in this Section 4.1 requires the City, County and SCMTD to continue existing services and provide transportation enhancements.</p> <p>d. Should temporary conditions arise that result in anomalous or erroneous weekday ADT measurements (i.e., bus strike, hose counter failure, etc.), as described in 4.1, then efforts will be made to recollect reliable and appropriate data within one month of the initial traffic counts.</p> <p>e. Should SCMTD transit service to the main campus (excluding Supplemental services provided under the "guaranteed cost" clause of the UCSC/SCMTD contract) be reduced from 2007-08 service hours or capacity, then the commitment in 4.1 will be suspended until regular transit service levels to the main campus are restored.</p> <p>f. In the event UCSC's traffic commitment is suspended as provided for in Sections 4.1(b) and 4.1(e), UCSC will provide written notification within 30 days to the City and County that (1) identifies the date on which the suspension commenced, and (2) the reason(s) for the suspension. On an annual basis following the initial notice of suspension and for as long as the suspension is in effect, UCSC will provide a report identifying the status of the suspension and any efforts by UCSC to end the suspension. Further, UCSC will provide notification within 30 days of termination of the suspension period.</p> <p>g. Should SCMTD transit service to the main campus (excluding Supplemental services provided under the "guaranteed cost" clause of the UCSC/SCMTD contract) not increase in proportion to campus population growth such that it accommodates at least 25% of all trips to and from UCSC (reflective of 2007-2008 conditions) and UCSC continues to pay the cost of its SCMTD ridership, the applicable ADT commitment will be increased by applying an ADT credit. The ADT credit will be equivalent to 50% of the difference between a calculated 25% UCSC SCMTD mode split (measured in person trips) and the actual UCSC SCMTD mode split (measured in person trips).</p> <p>h. The parties acknowledge and agree that alternative transportation modes and/or transit services may change over time as a result of technological, financial or other conditions, and to the extent such changes result in a significant shift in current modes, and as such the parties agree that elements of this proposal, by written notice by any party to this agreement, will be revisited and revised, as necessary, and subject to the mutual agreement of the City and UCSC. The parties will attempt to resolve disputes arising pursuant to this section by mediation.</p> <p>i. The parties agree that the commitments in Section 4.1 are made for the sole and exclusive purpose of settlement and in recognition of access constraints unique to the UCSC main campus. These constraints include: campus access dependence upon two arterial roadways (Bay Street and Empire Grade) and two collector roads (High Street and Western Drive) traversing residential neighborhoods; an incomplete roadway network as envisioned in the original campus planning; the absence of any direct campus access route from State Route 9 or Highway 1; reliance on only two entrance gates to the</p>

	campus; State and City parklands and open space adjacency that surrounds the main campus on three sides; and the geographic and topographic distance of the main campus from commercial service areas within the City.
4.2	<p>Within three months from the approval of this Agreement, UCSC agrees to contribute funds in an amount equal to the City's TIF in three consecutive annual payments for off-site traffic improvements for the 3,900 new ADT in 4.1, above. UCSC acknowledges that the TIF is revised annually on July 1, based on the Engineering News Record Cost of Construction index, and that as a result, each annual payment will be calculated by the current TIF rate at the time of payment. At its discretion, UCSC may make a one-time payment of \$1,427,400 within 15 days of entry of the Agreement as a final judgment as provided for in Section 7.1. Funds contributed to the City under this section will constitute UCSC's share of the cost of improvements to the Bay Corridor between Mission and High, including improvements to the Bay/Mission and Bay/Escalona intersections and any other intersections identified in the City's TIF program to which UCSC contributes traffic. UCSC's payment is based on the City's 2007-2008 TIF and traffic model. $3,900 \text{ ADT} \times \\$366/\text{trip} = \\$1,427,400$</p> <p>Within three months of executing this Agreement, the City and UCSC will meet to identify TIF projects for immediate implementation. Identified and agreed upon improvements will be initiated by the City within one year.</p>
4.3	The parties agree that UCSC's payment as set forth in sections 4.2 fulfills UCSC's "fair share" commitment in 2005 LRDP mitigation measure TRA-2A and the portion of TRA-5A that relies on TRA-2A for off-campus traffic impacts associated with campus ADT of 28,700.
4.4	<p>UCSC agrees to make additional ADT payments associated with UCSC's 2300 Delaware property based on the City's methodology (20 trips per 1000 building gross square feet based on office use) and citywide TIF fee schedule (currently \$366 per trip). UCSC's payment for existing occupied gross square footage (gsf) at 2300 Delaware (Buildings A and B) is based on the City's 2007-2008 TIF and traffic model as represented by the following calculation: $57,223 \text{ gsf} @ 20 \text{ ADT}/1,000 \text{ sf} = 1,144.45 \text{ ADT} \times \\$366/\text{ADT} = \\$418,868.70$</p> <p>If UCSC converts Buildings A and B to non-office uses resulting in a higher trips per square foot rate, a further ADT payment will be made by UCSC provided that UCSC receives a credit for the above-payment towards any additional calculated TIF associated with the change in use. Payment for buildings A & B will be in addition to, and paid at the same time as, the amount to be paid in 4.2, above. Payment for ADT associated with building C or any other development on the 2300 Delaware site will be paid based on the City's methodology and citywide TIF fee schedule in effect at the time of occupancy. The City's TIF accounts for 2,068 total ADT from 2300 Delaware and UCSC's CEQA documentation for the project projected 1,780 total ADT at full build-out and occupancy of buildings A, B, and C.</p>
4.5	UCSC agrees to make additional ADT payments associated with UCSC development at the Marine Science Campus, based on the City's methodology and citywide TIF fee schedule in effect at the time new development receives all required approvals. The City's TIF accounts for 3,120 total ADT from the Marine Science Campus and the University's CEQA documentation projected 2,600 total ADT at full implementation of the CLRDP. UCSC does not anticipate the first major trip generating project to be occupied until 2012.
4.6	<p>The parties agree to the following to reduce peak hour traffic impacts and to reduce overall traffic volumes:</p> <ol style="list-style-type: none"> The City and UCSC will continue to work cooperatively with other Bus Rapid Transit Task Force members to develop BRT improvements and other alternative transit systems that have the greatest feasibility of reducing peak hour impacts and greatest potential to be funded and implemented. UCSC further agrees to: <ol style="list-style-type: none"> Continue to fund the current study of BRT opportunities between the campus and downtown Pacific Station, existing study to be completed in Fall 2008. This study will provide the information to prepare the operational analysis portion of an FTA application by SCMTD for "Very Small Starts" funding corridor improvements. Commit to include its share of development and construction costs of an on-campus transit hub and related on-campus BRT improvements when calculating the total share/match for the FTA "Very Small Starts" application. UCSC and the City will begin work immediately to mitigate existing and future peak hour traffic demand from UCSC facilities including signal synchronization studies and implementation, to be funded pursuant to 4.14, below. UCSC will continue to work with the City and SCMTD to expand and enhance existing public transit service to UCSC facilities in advance of the BRT process (described in (a), above). Enhancements may include pilot projects, evaluated regularly for their effectiveness, such as: <ol style="list-style-type: none"> "Limited Express" SCMTD service to the campus from downtown and outlying areas of Santa Cruz County funded under UCSC's "guaranteed cost" agreement with SCMTD; Implementation of electronic boarding passes for UCSC affiliates using SCMTD transit; On-going GIS analysis of UCSC residential patterns to identify opportunities for new or expanded SCMTD transit routes to and from the campus; Working with Caltrans to coordinate signal synchronization improvements to the Bay and Mission corridors. UCSC will continue to implement and expand its existing Transportation Demand Management programs with the objective of increasing sustainable transportation modes (use of modes other than single-occupant vehicles) above 55% and to reduce peak hour traffic volumes and address increases in traffic overall.
4.7	UCSC will work cooperatively with the City to review, revise and maintain the City's traffic model following completion of the City's General Plan update. Based on the traffic model adopted as part of the City's General Plan update, UCSC's trip

	generation rates and distribution will be updated every three years. UCSC agrees to, at intervals of no more than three years or increments of no more than 1,000 students in enrollment growth (whichever occurs first), conduct traffic counts at a mutually agreed number of intersections for the purpose of updating the City's traffic model and Traffic Impact Fee, because the model and additional TIF specified projects are required to accommodate the projected traffic demand.
4.8	UCSC agrees to contribute to the cost of implementing an Off-Campus Parking Permit Program (Upper Westside or potential programs on the lower Westside) in an amount up to \$50,000 per year for a period of three years for a pilot period of 3 years, to be continued, revised, or reallocated by mutual consent.
4.9	UCSC has contributed \$216,500 to the Mission Street widening project and agrees to contribute an additional \$107,500 to the City, which has been in dispute. Payment will be made within 90 days of execution of this Agreement and the parties agree that the University's obligation under University Assistance Measure 7 is satisfied with this payment.
4.10	UCSC will pay 100% of the cost of Heller/Empire Grade Intersection Improvements at the UCSC west entrance. If UCSC develops an additional entrance/exit to/from the campus along Empire Grade, related intersection improvements will be funded 100% by UCSC. The scope of those improvements will be informed by the project and a CEQA analysis of the associated traffic impacts.
4.11	UCSC will pay 40% of the bid costs of Bay Street Repair project. If, during the term of the 2005 LRDP, Bay Street requires re-surfacing (asphalt over-lay) in addition to the repair described above according to industry standards, UCSC agrees to pay 40% of the re-surfacing costs only. Either party may initiate a study and propose an alternate percentage.
4.12	UCSC will pay 100% of the cost of improvements to the Marine Science Campus entrance at the intersection of Shaffer Road and Delaware Avenue, as well as improvements to Shaffer Road on UCSC property up to the new driveway to Upper Terrace development zone when development occurs in that zone. As identified in implementation measure 5.1.7 of the Marine Science Campus Coastal Long Range Development Plan, UCSC "will collaborate with the City of Santa Cruz on the construction of an emergency grade crossing" over the tracks.
4.13	<p>Within ninety days of execution of this Agreement, the City and UCSC will meet to identify for immediate implementation transportation improvements that are not included in the City's current TIF program, or an integrated sequence of transportation studies to explore alternative transportation solutions. Identified and agreed upon improvements will be initiated, and studies will be commissioned, by the City within one year. For purposes of this Section, UCSC and the City will each commits up to \$500,000 (over a 3 year period) for a total of \$1,000,000. Specific milestones and deliverables with which the phasing of funding will be tied will be agreed to by the City and UCSC. Study funds are to be used for appropriate consultant(s) to assist in defining realistic transportation solutions and trip reduction improvements. The City and UCSC have identified the following projects for implementation/study as a starting point for discussion:</p> <ul style="list-style-type: none"> a. A signal timing analysis and plan for Bay/Mission corridors; b. Integration of signal pre-emption for SCMTD to allow SCMTD buses to move more quickly through intersections; c. Expand SCMTD service to the campus including Express Bus service; d. On-going GIS analysis of UCSC residential patterns to identify opportunities for new or expanded SCMTD transit routes to and from the campus; e. Locate "Park and Ride" opportunities around/within City of Santa Cruz for UCSC Commuters; f. Locate Long-term "storage" parking areas for UCSC students; and g. Expand existing ZipCar carshare programs.
4.14	UCSC and the City and CLUE shall make their best effort to jointly plan and implement a public transportation system capable of reducing the use of City streets and traffic congestion on City streets. Specific tasks of this planning effort (as far as financially feasible with available funds under this Section) will include, but not be limited to, identification of preferred technologies, routes and rights of way, and identification of probable ridership and financing. UCSC and the City will each commit \$50,000 towards this effort.
1.4	If the traffic commitment in Section 4.1 is exceeded, the commitment will be enforced by requiring UCSC to reduce ADT by one or more of the following measures: adjusting enrollment, adjusting on-campus workforce, or through implementation of ADT reducing measure(s). The choice will be determined from this list by The Regents or its delegate. When UCSC main campus trips are within 1,500 of the applicable traffic commitment in Section 4.1, UCSC will hold a meeting to solicit public input regarding the choices listed above for the reduction of ADT. Within 90 days of the meeting, UCSC will initiate the process necessary to gain approval from The Regents or its delegate of its selected choice(s) for reduction of ADT. In addition, to further effectuate compliance and enforce the traffic commitment in Section 4.1, UCSC agrees to a penalty payment in an amount equal to three times the City's citywide Traffic Impact Fee (TIF) then in effect for every average daily trip (ADT) in excess of the commitment (i.e., if the City's current citywide TIF were applied the penalty amount would be \$1,098 per trip (3x \$366)). Penalty payments will be made annually until such time as the ADT is equal to or below the traffic commitment in this Agreement. For purposes of calculating the penalty, ADT will be measured per 4.1 below. Penalty funds will be deposited into a dedicated account for use by the City and UCSC to reduce ADT to UCSC. UCSC and the City will work cooperatively to identify appropriate and effective trip reduction programs, including, but not limited to, increased SCMTD transit service to the UCSC campus, with the expenditure of funds being subject to the approval by the City

Source: UCSC Comprehensive Settlement Agreement 2008

The Campus has been in compliance with the Settlement Agreement since 2008. As of the 2016-17, the Campus generated 22,859 average daily trips, which is below the trip cap (28, 859) in the Settlement Agreement. The Campus made a payment to the City in September 2008 to cover the traffic impact fee (TIF) equivalent for 3,900 new ADT above the baseline of 24,800 ADT. The Campus has also been paying TIF-equivalent payments for redevelopment of 2300 Delaware Avenue and the Coastal Science Campus as individual projects that support an increase in occupancy are completed. The Campus and the City have met to discuss projects to be included in the TIF program and have identified an improvement to the Bay Street/High Street intersection. The Campus has continued to implement a variety of transportation demand management programs (van pools, carpools, car share, transit programs, bike shuttle); as a result, 60 to 62 percent of trips to Campus have been made using alternative modes of transportation, exceeding the objective of maintaining an alternative mode share of more than 55 percent. The Campus has also been in compliance with other commitments in the Settlement Agreement, including expansion of public transit service, coordination with the City on non-TIF projects, and implementing long-term off-campus parking by permit.

4.11.3 REGULATORY CONSIDERATIONS

4.11.3.1 Federal and State Laws and Regulations

There are no federal or State transportation regulations applicable to the proposed project.

4.11.3.2 Local Plans and Policies

There are no local plans and policies related to traffic and transportation that are applicable to the proposed project.

4.11.4 IMPACTS AND MITIGATION MEASURES

4.11.4.1 Significance Criteria

The impacts on transportation and traffic from the implementation of the proposed project would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the State CEQA Guidelines, the UC CEQA Handbook:²

² The first two CEQA checklist questions under Transportation and Traffic were revised since the preparation of the 2005 LRDP Final EIR. This EIR uses the current wording from the checklist and not the wording that was included in the 2005 LRDP Final EIR.

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

The 2005 LRDP EIR set forth the thresholds of significance that UC Santa Cruz determined it would use to evaluate the significance of LOS impacts at campus intersections. As noted in the 2005 LRDP EIR, LOS D is the minimum acceptable LOS for intersections in the lower campus and LOS E is the minimum acceptable LOS for intersections in the central and north campus. These thresholds are used in this EIR to evaluate the project traffic's impacts at campus intersections.

As the proposed project would not increase traffic at any of the off-campus intersections, LOS thresholds used by the City of Santa Cruz are not reiterated in this EIR, although those are identified in the 2005 LRDP EIR.

4.11.4.2 CEQA Checklist Items Adequately Analyzed at the 2005 LRDP Level or Not Applicable to the Project

- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks

The 2005 LRDP Final EIR concluded that campus growth and development under the 2005 LRDP would have no potential to affect air traffic patterns, and that the main campus was not within an air safety zone that would require restrictions on development. No impact would occur.

4.11.4.3 Methodology

As noted above, the proposed project would add housing to the campus and thereby reduce the percentage of enrolled students who would live off campus, compared to existing conditions as well as the conditions analyzed in the 2005 LRDP Final EIR. Therefore, the proposed SHW project is expected to reduce rather than increase daily and peak hour vehicle trips both on and off campus. Furthermore, it is within the scope of campus development under the 2005 LRDP. Therefore, the traffic analysis for the proposed project is tiered from the traffic impact analysis in the 2005 LRDP EIR, supplemented by a project-level analysis of traffic impacts on on-campus intersections.

Approach to Tiered Analysis under the 2005 LRDP EIR

Because the 2005 LRDP is a long-range plan to guide campus development between 2005 and 2020, the 2005 LRDP Final EIR analyzed the programmatic impacts of the 2005 LRDP for the year 2020, the planning horizon year by which the 2005 LRDP anticipates that the projected 19,500 student enrollment would be reached. The 2005 LRDP's programmatic impacts were analyzed by adding traffic from the full development of the campus under the 2005 LRDP to projected future traffic volumes in the study area in 2020, and determining the change in 2020 traffic conditions as a result of the additional 2005 LRDP-related traffic.

The 2005 LRDP included goals to house 50 percent of undergraduate students and 25 percent of graduate students in on-campus housing. Thus, the 2005 LRDP Final EIR evaluated the addition of 2,300 student beds to the inventory of 6,891 beds existing in fall 2004, for a total of 9,190 beds by 2020. As part of the 2008 Comprehensive Settlement Agreement, the University agreed to provide housing to accommodate 67 percent of new-student enrollment above 15,000 FTE within four years of reaching that enrollment. At a total enrollment of 19,500, UC Santa Cruz would need to provide on-campus or University controlled housing for 10,125 students, which would be 935 more beds than analyzed in the 2005 LRDP Final EIR. The Campus proposes to add 3,000 beds under the SHW project and about 207 beds in Kresge and Crown Colleges for a total of 3,207 new beds, while removing approximately 1,094 aging or overflow beds (including the 196 beds in the existing FSH complex), such that by 2023,³ there would be 2,113 additional student beds on the campus compared to 2017 conditions. The total on-campus housing would be about 11,382 student beds and the total campus-controlled housing would be approximately 11,512 beds (including 130 off-campus beds). The total campus-controlled housing would be about 2,322 more beds

³ Although the construction of the SHW project would commence in 2019 within the time horizon of the 2005 LRDP, it would be completed by 2022. Similarly, the construction of Kresge College project would commence in 2019 but it would be completed in 2023 and the new student beds would be added by 2023. Therefore year 2023 was selected as the analysis year to provide a complete picture of the effects of new housing on the campus.

than planned originally under the 2005 LRDP, and about 1,387 more beds than required to satisfy the Settlement Agreement. Therefore, the proposed project would add substantially more student housing to the campus than previously planned.

While the number of beds to be added by the proposed project exceeds the 2005 LRDP bed estimate, the proposed SHW project is, nonetheless, within the scope of the campus development under the 2005 LRDP because the building space that would be added by the project is within the building space projections in the 2005 LRDP. Furthermore, the proposed housing would serve the projected enrollment growth projected under the 2005 LRDP. The Campus will remain below an enrollment level of 19,500 FTE students until such time that a new LRDP is adopted.

As the provision of on-campus student housing is expected to reduce rather than increase vehicle trips to the campus, as a first step, a trip generation analysis was conducted for the proposed project. The purpose of the analysis was to confirm that with the provision of the additional housing on the campus, the total daily and peak hour trips to the campus would be comparable to or less than the trips previously estimated for the campus at full development under 2005 LRDP, i.e., 2020 conditions in the 2005 LRDP EIR. In the event that a higher number of trips were identified, additional transportation impact analyses would be required in order to comply with the California Environmental Quality Act (CEQA).

Scenarios for Trip Generation Analysis

Using the number of on-campus student housing beds, student enrollment, and faculty/staff estimates presented in **Table 4.11-4** below, trip generation estimates for the following scenarios were developed:

- *Existing Conditions* – Spring 2017 conditions
- *Year 2020 Conditions (2005 LRDP FEIR)* – Year 2020 student and faculty growth per the 2005 LRDP FEIR
- *Year 2020 without Project Conditions* – Currently projected maximum student and faculty growth to Year 2020 with existing on-campus bed total

- *Year 2023 with Project Conditions* – Maximum student and faculty growth to Year 2020 and 2,113 net-added beds. This scenario assumes full occupancy of the Student Housing West Project and other new beds by 2023.⁴

As the table indicates, current student enrollment projections for 2020 (without Project) are unchanged from the projections for 2020 in the 2005 LRDP Final EIR and the 2008 Comprehensive Settlement Agreement. However, current faculty and staff projections for 2020 (without Project) are lower than the projections for 2020 in the 2005 LRDP Final EIR. Projections for the other daily populations (non-UC campus employees, construction workers, and visitors) are also lower. Projections of these populations in 2023 under with-Project conditions are the same as projections of these populations in 2020 under without-Project conditions.

Table 4.11-4
On-Campus Student Housing and Population Summary

Scenario	Student Beds	Campus Population			
		Students ¹	Faculty and Staff	Other Daily Population ²	Campus Total
Existing (2017)	9,269	17,870	3,996	556	22,422
Year 2020 Conditions (from the 2005 LRDP FEIR)	9,190	19,500	4,499	750	24,749
Year 2020 without Project Conditions	9,269	19,500	3,994	640	24,134
Year 2023 with Project Conditions ³	11,382	19,500	3,994	640	24,134
<p><i>Source: UCSC and Fehr & Peers, 2017.</i></p> <p><i>Notes:</i></p> <ol style="list-style-type: none"> <i>The on-campus student population increases from Existing Conditions to 2023 with Project (Full Occupancy) Conditions.</i> <i>Other daily population includes non-UC employees working on campus, construction workers, and visitors.</i> <i>Student housing projection for Year 2023 with Project Conditions includes the addition of the 3,000 beds in the SHW project, 185 net new beds in Kresge College, 22 net new beds in Crown College, and the removal of 1,094 existing beds on campus.</i> 					

⁴ The 2005 LRDP, adopted in 2006, was developed to guide the Campus's growth to an enrollment level of 19,500 FTE students, which was projected to be attained by 2020-21. Therefore the 2005 LRDP EIR, which was certified in 2006, evaluated the impacts of campus growth between approximately 2003-04 (which was used as the baseline year in the EIR) and 2020-21. The 2005 LRDP is unchanged with regard to the maximum enrollment level of 19,500 FTE students and at this point in time it is still projected that this enrollment level would be attained by 2020-21. However, the new housing that would be constructed under the 2005 LRDP to serve this enrollment level will not be completed until 2023. Therefore, year 2023 is used in this section to analyze the effect the SHW project and other proposed housing would have with respect to traffic.

Spring 2017 traffic counts at the campus's gateways were used to establish existing trip generation estimates for the campus. These counts were used, in conjunction with travel survey data from Spring 2016 and Spring 2017, to develop campus vehicle trip rates for students and other campus users.

Trip Generation Estimates

Trip generation estimates for existing conditions from the campus gateway counts and for 2020 Conditions from the 2005 LRDP Final EIR are presented in **Table 4.11-5**. New projections for the following scenarios are also included:

- *Year 2020 without Project Conditions* – Trip generation with the existing 9,269 beds and the 2020-2021 campus student and faculty/staff projections.
- *Year 2023 with Project Conditions* – Cumulative trip generation with the proposed housing projects and the 2020-2021 enrollment and faculty/staff projections. This scenario includes the demolition and replacement of 1,094 existing beds on-campus and 2,113 additional beds on-campus.

Table 4.11-5
UCSC Campus Vehicle Trip Generation Estimates

Scenario	Daily	AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out
Existing Conditions Gateway Counts							
Existing (2017)	22,765	1,457	1,115	364	2,049	797	1,252
2005 LRDP EIR Trip Estimates							
2020 Conditions ¹ [A]	32,044	1,886	1,473	414	2,595	1,038	1,558
Updated Trip Estimates (with and without Project)							
2020 without Project Conditions ²	25,626	1,640	1,256	410	2,306	897	1,409
Net New Beds On-Campus	-628	-40	-31	-10	-56	-22	-34
2023 with Project Conditions [B]	24,998	1,600	1,225	400	2,250	875	1,375
Difference between 2005 LRDP EIR Trip Estimates and Updated Estimates with Project							
Vehicle Trip Change [B-A]	-7,046	-286	-248	-14	-345	-163	-183
Percent Change [(B-A)/A]	-22%	-15.2%	-16.8%	3.4%	-13.3%	-15.7%	-11.7%
<div>Source: UCSC TAPS 2018.</div> <div>Notes:</div> <div>1. Total daily vehicle trip generation and the peak hour trip generation estimates per the 2005 LRDP FEIR (Table 2-7).</div> <div>2. This analysis assumes the 2020-2021 enrollment and faculty/staff projections are the same in 2023-2024.</div> <div>3. The With Project Conditions in this table include the addition of 185 new beds at Kresge College and 22 new beds at Crown College by 2023.</div>							

As the table above shows, under the 2023 with Project (Full Occupancy) Conditions, the total daily vehicle trips would be 7,046 trips lower than the trips estimated and analyzed in the 2005 LRDP Final EIR. The total AM and PM peak hour vehicle trip generation estimates would be 286 and 345 trips lower,

respectively. This lower trip generation is due to an increase in the number of students living on-campus, a reduced average campus trip generation rate for all campus-related populations, and lower non-student population projections.

Approach to Analysis of Localized Traffic Impacts

As noted above, the total number of daily and peak hour trips to and from the campus would be fewer than previously analyzed. Therefore, an analysis of the project's impacts to intersections at the two campus gateways or at any other on-campus intersection is not warranted. However, development on the Hagar site was not contemplated under the 2005 LRDP, and thus an LOS analysis of the proposed project's impact to the adjacent intersection of Hagar Drive/Glenn Coolidge Drive was prepared in addition to an LOS analysis of operations at the project driveway located 500 feet north on the intersection on Hagar Drive, to determine whether the proposed project could result in increased congestion or hazardous conditions at these two locations.

An analysis of the intersection of Koshland Way with Heller Drive near the Heller site was not conducted because the project would add a residential population of about 2,852 students, it would not produce substantial commute traffic. Furthermore, the developer would be required to make all necessary improvements to ensure that it operates acceptably.

4.11.4.4 2005 LRDP EIR Mitigation Measures Included in the Proposed Project

Table 4.11-6, 2005 LRDP EIR Mitigation Measures, presents the mitigation measures in the 2005 LRDP EIR that are applicable to the proposed project. Since these previously adopted mitigation measures are already being carried out as part of implementation of the 2005 LRDP, they are included in and are a part of the proposed project and will not be readopted. Implementation of these mitigation measures is assumed as part of the project impact analysis.

**Table 4.11-6
2005 LRDP EIR Mitigation Measures**

Mitigation Measure	Description
TRA-1	The Campus shall monitor the level of service at two intersections (Hagar Drive/McLaughlin Drive and Heller Drive/Meyer Drive) every three years beginning in 2007, and implement intersection improvements or signalization as needed to maintain an acceptable level of service.
TRA-2A	In addition to any project- level traffic analyses required by CEQA, UC Santa Cruz shall, at intervals of no more than three years or increments of no more than 1,000 students in enrollment growth (whichever occurs first), conduct traffic counts at the identified intersections to determine if the additional traffic generated by Campus growth or a specific project would trigger the need for the specific intersection improvements listed in Table 4.14-18, or other improvements to achieve the City's level of service standards. If the analysis indicates that, with the traffic contribution of campus growth or of a specific proposed project, the levels of service would degrade to

Mitigation Measure	Description
	unacceptable levels, the Campus shall inform the City of this conclusion, and contribute its "fair share" (as defined below) of the cost of the needed improvements.
TRA-2B	UC Santa Cruz shall continue to implement and will expand its existing Transportation Demand Management programs with the objectives of increasing sustainable transportation modes (use of modes other than single-occupant vehicles) above 55 percent during the planning horizon of the 2005 LRDP and reducing peak hour traffic volumes. Potential measures that the Campus will consider for achieving this objective are listed in Table 4.14-19.
TRA-4A	UC Santa Cruz shall monitor campus and Metro transit service and other alternative modes of transportation on an annual basis, to assess the need for improvements in campus circulation to accommodate changes in campus-related circulation demands.
TRA-4B	Based on results of LRDP Mitigation TRA 4A, the Campus shall improve the operational efficiency and capacity of the campus transit system as needed to maintain transit cycle time, and shall work with SCMTD and other agencies to maintain and improve efficiency and capacity of the public transit system serving University facilities.
TRA-4C	Based on the results of LRDP Mitigation TRA-4A, the Campus shall implement measures, physical and operational improvements, that will ensure that transit travel times between the two most widely-separated colleges does not exceed the time interval between class periods. These measures may include, but are not limited to; channelization of pedestrian crossings, installation of signal-controlled pedestrian crossings, and grade-separated pedestrian crossings where appropriate.
TRA-4D	The Campus shall coordinate implementation of needed campus roadway and circulation improvements identified in the 2005 LRDP with the pace of campus development.
TRA-4E	Based on the results of LRDP Mitigation TRA-4A, the Campus shall implement the bicycle circulation elements of the 2005 LRDP as needed to maintain and enhance the effectiveness of bicycles as a transportation mode.
TRA-4F	The Campus shall implement integrated transit, bicycle and pedestrian way-finding systems on the main campus.
TRA-6A	The Campus shall implement LRDP Mitigation TRA-2B.
TRA-6B	UC Santa Cruz shall contribute its fair share of the local cost of the needed improvements as identified by the state at the five significantly affected freeway facilities, based on the cost of the needed improvements less the value of grants, regional, state and federal funds identified for each improvement.
<i>Source: UC Santa Cruz 2006</i>	

4.10.4.5 Project Impacts and Mitigation Measures

SHW Impact TRA-1: Implementation of the proposed project would not increase traffic volumes and degrade off-campus intersection levels of service under 2020 or 2023 conditions. (No Impact)

The 2005 LRDP Final EIR analyzed the traffic impacts from campus growth and development under the 2005 LRDP on off-campus intersections, roadways, and freeways (LRDP Impacts TRA-2 and TRA 6). The Final EIR analyzed traffic conditions that would exist in 2020 without the 2005 LRDP growth, and the conditions that would exist with the addition of traffic generated by campus growth under the 2005 LRDP. The analysis of off-campus intersections revealed that 10 off-campus intersections would operate unacceptably with the addition of campus-related traffic growth. The Final EIR set forth mitigation measures to mitigate the significant impacts. Pursuant to LRDP Mitigation TRA-2A, the Campus has

made payments to the City to compensate for impacts on city intersections. Furthermore in compliance with LRDP Mitigation TRA-2B, the Campus continues to implement UC Santa Cruz's TDM programs to help mitigate traffic volumes to/from campus. In 2016-17, the Commuter Vanpool program operated on 18 routes using 12-passenger vans serving more than 140 participants. The Zipcar car-sharing program, completing its 11th year at UC Santa Cruz, had 19 on-campus cars accommodating approximately 2,155 active members and average 24/7 utilization exceeding 31 percent during the 2016-17 academic year. The Spring 2017 Mode Split Study indicates that 61.3 percent of all person-trips to/from the campus are made via alternative transportation modes. Single-occupant autos account for only 35.3 percent of all person-trips. The remaining 3.4 percent of trips were generated by UC Service, construction and delivery vehicles, and motorcycles.

As the project's trip generation analysis above shows, based on recent traffic counts at the campus entrances, the average trip generation rate per person for the campus is lower than the rate used in the 2005 LRDP Final EIR trip generation estimate. Secondly, the Campus is now projecting a smaller increase in faculty, staff, and other daily populations than previously assumed in developing the 2005 LRDP Final EIR trip generation estimate. Lastly, about 2,322 more student beds are projected to be added on campus compared to the number of beds used in the 2005 LRDP Final EIR trip generation estimate. As a result, the total number of daily trips to the campus by 2020 would be 20 percent lower (6,418 fewer daily trips) than previously projected for that year, and once all the proposed housing is constructed and occupied by 2023, the daily trips would be as much as 22 percent lower (7,046 fewer daily trips) than the 2005 LRDP Final EIR estimates.

With regard to change in traffic to and from the campus between 2017 and when the SHW project and other housing projects would be completed and occupied in 2023, the estimates in **Table 4.11-5** show that the total number of daily trips to the campus would increase due to remaining enrollment growth between 2017 and 2020 prior to the implementation of the project (the analysis assumes to an enrollment level of 19,500 FTE students). The increase in daily trips between 2017 and 2020 would be approximately 2,861 additional trips (an increase of about 12.6 percent over 2017 trips). However once the proposed housing is built and occupied in 2023, the increase in the number of daily trips compared to 2017 trips would be reduced to about 2,233 (an increase of 9.8 percent over 2017 trips). If the SHW project (and other housing projects) were not approved, the number of trips in 2023 would remain at approximately the level shown in **Table 4.11-5** for "2020 Without Project Conditions." Thus the proposed housing would result in an approximately 3 percent reduction in daily trips compared to the No Project condition.

As the proposed project would reduce rather than increase daily and peak hour trips, it would not result in new or more severe traffic impacts than previously analyzed in the 2005 LRDP Final EIR. In fact, it

would have the beneficial effect of reducing the severity of the previously analyzed significant impacts. No impact would occur on off-campus intersections and freeways as a result of the proposed project.

Mitigation Measures: No mitigation is required.

SHW Impact TRA-2: Implementation of the proposed project would not increase traffic volumes and degrade existing on-campus intersection levels of service under 2020 conditions but would result in a significant impact at a new intersection. (Potentially Significant; Less than Significant with Mitigation)

The 2005 LRDP Final EIR analyzed the traffic impacts from campus growth and development under the 2005 LRDP on on-campus intersections. The analysis of on-campus intersections revealed that two on-campus intersections (Hagar/McLaughlin and Heller/Meyer intersections) would operate unacceptably with the addition of campus-related traffic growth. The Final EIR set forth mitigation measures to mitigate the significant impacts. In compliance with the 2005 LRDP Final EIR Mitigation Monitoring Program, turning movement counts were conducted by the Campus at Hagar/McLaughlin and Heller/Meyer intersections during Fall 2010. However, because the average daily number of weekday vehicle trips to/from campus was lower in 2016-17 than the LRDP EIR baseline (2003-04), no further improvements at these intersections were determined to be needed.

By providing on-campus housing, the proposed project would reduce the total daily and peak hour traffic on campus roadways because students who would otherwise live off campus and make trips to the campus would instead live on campus. Furthermore, as limited parking is available for undergraduates on the central campus, the students living in the proposed on-campus housing would generally walk, ride a bike or take a UC Santa Cruz shuttle or Santa Cruz Metro buses to travel between the project sites and the classes. Therefore, the proposed project would not have the potential to degrade operations at any of the on-campus intersections.

However, the project would construct approximately 148 housing units for students with families at the intersection of Hagar and Glenn Coolidge Drives, as well as locate an expanded child care center at this location to serve not only the student families living in the new housing complex but also faculty and staff living both on and off-campus. The Hagar site development would have the potential to add traffic to the Hagar/Glenn Coolidge Drive intersection such that a significant impact could potentially occur. Therefore, a LOS analysis for this intersection and the project driveway on Hagar Drive was conducted using 2017 traffic count data. The complete analysis, including the trip generation methodology and estimate, is presented in **Appendix 4.11**. The results are summarized below.

Intersection levels of service (LOS) were calculated for the intersection of Hagar Drive/Glenn Coolidge Drive as well as for the new intersection of Hagar Drive with the project driveway under 2020 without Project conditions and 2020 with Project conditions, and are summarized in **Table 4.11-7, 2020 Without Project Conditions and With Project Conditions Intersection Level of Service**. The LOS results for the Hagar Drive/Glenn Coolidge Drive intersection from the 2005 LRDP EIR are also presented alongside the results of the new analysis based on the 2017 counts (referred to as the '2018 Analysis' in the table below).

Table 4.11-7
2020 without Project Conditions and with Project Conditions Intersection Level of Service

Intersection ¹	Peak Hour	2020 without SHW Project				2020 with SHW Project			
		2005 LRDP EIR		2018 Analysis		2005 LRDP EIR		2018 Analysis	
		Average Delay ²	LOS	Average Delay ²	LOS	Average Delay ²	LOS	Average Delay ²	LOS
1. Hagar Drive and Glenn Coolidge Drive	AM PM	9.9 10.8	A B	10.1 16.1	B B	11.5 14.5	B B	11.9 19.6	B B
2. Hagar Drive and Project Driveway	AM PM	N/A	N/A	N/A	N/A	N/A	N/A	17.2 51.5	C F

Source: Source: Fehr & Peers, January 2018.

1. Hagar Drive/Coolidge Drive is signalized, and Hagar Drive/Driveway is side-street stop controlled.

2. Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections.

3. An LOS of D is the UC Santa Cruz LOS standard for intersections on the lower campus.

According to the 2005 LRDP EIR, an LOS of D is the minimum acceptable LOS for intersections on the lower campus. As shown in **Table 4.11-7**, the existing signalized intersection will perform at acceptable levels under 2020 without Project and 2020 with Project conditions. The results for the signalized study intersection are consistent with the 2005 LRDP EIR results, with minor differences in average delay and LOS calculations. The impact of the proposed project on intersection operations at the Hagar and Glenn Coolidge intersection would be less than significant.

The side-street stop controlled Project driveway on Hagar Drive is projected to operate unacceptably (LOS F) in the evening peak hour, with vehicles exiting the driveway unable to exit on to Hagar Drive without substantial delay due to the traffic on Hagar Drive. This represents a significant impact. This intersection does not meet peak hour signal warrants. Other mitigation measures are set forth below to address this significant impact.

With respect to the intersection of Heller Drive and Koshland Way near the Heller site, the project would alter that intersection from a T-intersection to a four-way intersection. As discussed above under **Approach to Analysis of Localized Impacts**, the Heller site housing would not produce substantial

commute traffic, and the developer would be required to make all necessary improvements to ensure that it operates acceptably. Therefore, degradation of intersection operations is not anticipated.

In summary, the proposed project would result in less than significant traffic impacts at existing on-campus intersections, and a potentially significant impact at the new project driveway intersection on Hagar Drive.

Mitigation Measures:

SHW Mitigation TRA-2: Implement one of the following options:

Option 1. Provide a second driveway to the Hagar site on Glenn Coolidge Drive. Construct right-in-right-out (i.e. no left turns permitted) driveways on both Hagar Drive and Glenn Coolidge Drive.

Option 2. Construct two driveway access points on Hagar Drive.

Option 3. Construct a separate southbound left turn on Hagar Drive to the project driveway.

Significance after Mitigation: Options 1 and 2 would improve intersection operations to an acceptable LOS B. Option 3 would result in only a slight improvement in the driveway operations. The intersection would operate at LOS E.

SHW Impact TRA-3: Construction period traffic could temporarily impact traffic conditions along roadways serving the project sites, including potential effect on emergency vehicle access. *(Potentially Significant; Less than Significant with Mitigation)*

Construction at the Hagar site would extend over approximately 13 months whereas construction at the Heller site would entail about 3 years. Construction would involve the removal of demolition debris, grading, and/or excavation of sites, import of about 40,000 cubic yards of earth materials (for the Heller site), as well as delivery of construction materials and trips associated with construction workers and equipment. Construction vehicle traffic associated with the proposed project would have the potential to result in a temporary and intermittent lessening of the capacities of area roadways because of the slower movements and larger turning radii of construction trucks compared to passenger vehicles. Although construction traffic would be the heaviest in the early phases of the project when Heller site construction is first mobilized and materials are delivered to the sites, there would, nonetheless, be other periods

during the course of construction when roadway capacity on Heller Drive could be affected. Furthermore, project construction could require temporary closure of traffic lanes or roadway segments on the campus to permit the delivery of construction materials to both sites, and building elements that would be delivered to the Hagar site for just-in-time use in the project construction sequence, which could result in traffic congestion as well as have the potential to affect emergency vehicle access in the project vicinity.

Construction activities could also result in temporary closure of on-campus pedestrian sidewalks and bike paths or the provision of temporary pedestrian routes on the campus. The arrival or departure of construction vehicles and delivery of construction materials could intermittently disrupt pedestrian travel along pedestrian routes adjacent to construction sites.

The impact on vehicular and pedestrian circulation, although temporary and short-term, would be potentially significant. To address this potentially significant impact, a project specific mitigation measure (**SHW Mitigation TRA-3**) is proposed that requires the Project Developer to prepare and implement a Construction Traffic Management Plan (CTMP) to manage the movement of construction vehicles in a safe and effective manner. The CTMP would include information such as the number and size of trucks per day, times of the day when truck movement is allowed, truck circulation patterns, location of staging areas, location/amount of construction employee parking, and the proposed use of traffic control/partial street closures on public streets. The CTMP would also include both vehicular and pedestrian way-finding signage. The overall goal of the CTMP would be to minimize traffic impacts to campus and public streets and maintain a high level of safety for all vehicles and pedestrians.

Mitigation Measures:

SHW Mitigation TRA-3: The University shall require the Project Developer to prepare and implement a Construction Traffic Management Plan that will include, but will not necessarily be limited to, the following elements:

- Identify proposed truck routes to be used.
- Specify construction hours, including limits on the number of truck trips during the AM and PM peak traffic periods (7:00 – 9:00 AM and 4:00 – 6:00 PM), if conditions demonstrate the need.
- Include a parking management plan for ensuring that construction worker parking results in minimal disruption to surrounding uses.

- Include a public information and signage plan to inform student, faculty and staff of the planned construction activities, roadway changes/closures, and parking changes.
- Store construction materials only in designated areas that minimize impacts to nearby roadways.
- Limit the number of lane closures during peak hours to the extent possible. At no time will more than one lane on any roadway be closed. Inform the Campus at least two weeks before any partial road closure.
- Use California Department of Transportation (Caltrans) certified flag persons for any temporary lane closures to minimize impacts to traffic flow, and to ensure safe access into and out of the project sites.
- Install traffic control devices as specified in the California Department of Transportation Manual of Traffic Controls for Construction and Maintenance Work Zones.
- When a pedestrian/bicycle path is to be closed, detour signs will be installed to clearly designate an alternative route. Temporary fencing or other indicators of pedestrian and bicycle hazards will be provided.
- To minimize disruption of emergency vehicle access, affected jurisdictions (Campus Police, City Police, County Sheriff, and City Fire Department) will be consulted to identify detours for emergency vehicles, which will then be posted by the construction contractor.
- Ensure that access to fire hydrants remains available at all times.
- Coordinate with local transit agencies for temporary relocation of routes or bus stops in works zones, as necessary.
- Coordinate with other projects under construction in the immediate vicinity, so an integrated approach to construction-related traffic is developed and implemented.

Significance after Mitigation: Implementation of this mitigation measure would reduce the project's construction traffic impact to a less than significant level.

SHW Impact TRA-4: Implementation of the proposed project would not result in hazards due to design features or land use incompatibilities. (*Less than Significant*)

New driveways would be constructed at the entrances to both project sites. The driveway at the Heller site would be across from Koshland Way and would turn that T-intersection into a 4-way intersection. As only a limited amount of parking would be provided on the Heller site, it is anticipated that the four-way intersection would remain a stop-controlled intersection, with a stop sign on each approach. This configuration would not result in a hazard at this location.

The proposed driveway at the Hagar site would be off of Hagar Drive, approximately 500 feet north of the Hagar and Glenn Coolidge Drive intersection. As noted under **SHW Impact TRA-2**, the proposed driveway is estimated to operate acceptably during the AM and PM peak hours under 2020 Conditions. Furthermore, the vehicle gap analysis shows that there would be adequate gaps in traffic on Hagar Drive for vehicles exiting or entering the driveway. The sight lines from the project driveway north and south along Hagar Road would be unobstructed. For these reasons, the proposed driveway would not result in a hazard at this location.

In addition, as discussed in **SHW Impact LU-1** (in **Section 4.7, Land Use and Planning**) implementation of the proposed project would not result in land use incompatibilities with either on-campus or off-campus land uses. Thus, no traffic hazards related to land use incompatibilities related to new development or redevelopment at the project sites would result.

Mitigation Measures: No mitigation is required.

SHW Impact TRA-5: The proposed project would not impair emergency access in the long-term. (*No Impact*)

Construction activities associated with the proposed project could require temporary closure of traffic lanes or roadway segments, which could result in impaired emergency access in the short-term. The impact during project construction is discussed under **SHW Impact TRA-3** above and would be mitigated by the mitigation measure set forth under that impact.

With respect to the proposed project's long term impact on emergency access, no impact would result from the development at the Heller site as project development would not alter or close any existing roadways in that portion of the campus and emergency vehicle access to all portions of the Heller site development would be available via the roadways included in the project. With regard to the Hagar site, that development would also not make any alterations to Hagar or Glenn Coolidge Drives such that emergency access to other parts of the campus could be affected. The proposed site plan for the Hagar site includes a loop road that would allow emergency vehicles to access all parts of the site. There would be no impact to emergency access as a result of the proposed project.

Mitigation Measures: No mitigation is required.

SHW Impact TRA-6: **The proposed project would conflict with UC Santa Cruz policies related to alternative transportation. (*Potentially Significant; Less than Significant with Mitigation*)**

The 2005 LRDP Final EIR concluded under LRDP Impact TRA-4 that campus growth under the 2005 LRDP would result in increases in circulation volumes (numbers of pedestrians, bicycles, and transit and other motor vehicles) that would conflict with and reduce the effectiveness of alternative modes of transportation, including transit, bicycle and pedestrian travel. The analysis found that due to increases in pedestrian volumes at certain key intersections on the campus, transit service would experience delays. The EIR also concluded that increases in bicycle, pedestrian, and vehicular travel under the proposed 2005 LRDP would result in an increase in potential conflicts among these modes, particularly along Hagar and Heller Drives and on internal streets within the campus core, including McLaughlin Drive and Steinhart Way. The Final EIR set forth a series of mitigation measures (LRDP Mitigations TRA-4A through -4F) to address various alternative transportation modes that could be affected by the projected growth. The Campus has been implementing those mitigation measures.

The proposed project would not conflict with any of the campus programs related to alternative transportation. A minimal amount of vehicle parking would be provided to discourage use of personal vehicles by the residents. Bicycle parking would be provided throughout the project sites to encourage bicycle use. Although the proposed project would increase the on-campus resident population and thereby reduce the need for transit or other transportation modes to bring students from off-campus locations, students living on the project site would make transit trips for jobs, shopping and entertainment, and the use of transit services could increase substantially compared to existing conditions. It is anticipated that residents of the new housing would use the bus stop on the east side of

Heller Drive north of Oakes Road frequently to travel to the central campus. Although there is an existing pedestrian overcrossing across Heller Drive near the existing FSH complex which would be maintained and would continue to be used by the residents to cross Heller Drive, the pedestrian bridge does not provide a clear path of travel to the bus stop, and the number of at-grade crossings would likely increase with the project. This could result in transit delays and would be a potentially significant impact. Mitigation is set forth below to address this impact.

The proposed project would also bring 148 student families and a childcare center to the Hagar site that is currently not developed with any housing or any other facilities. This would have the potential to increase pedestrian activity near this site. Pedestrian trips to the Hagar site would primarily be trips from the bus stops west of the Hagar Drive/Glenn Coolidge Drive intersection on both sides of Glenn Coolidge Drive. To access the site, pedestrians would travel east on the south side of Glenn Coolidge Drive from the bus stop then north on Hagar Drive. Currently, there are paved paths on the east side of Hagar Drive north of the study intersection and on the south side of Glenn Coolidge Drive west of the intersection; therefore, direct pedestrian access from the project site to transit is only available to the stop on the south side of Glenn Coolidge Drive. To access the bus stop on the north side of Glenn Coolidge Drive, pedestrians would continue along the path on the south side of Glenn Coolidge Drive, utilize the crosswalk along the eastern leg of the Ranch View Road/Glenn Coolidge Drive intersection, and then walk approximately 150 feet east to the stop. As a result, pedestrian access is available to all bus stops in the area. However, while access is available, the travel path is not direct and therefore inconsistent with University policies promoting safe, convenient access to transit. Furthermore, the existing dirt footpath formed on the north side of Glenn Coolidge Drive from the Hagar Drive/Glenn Coolidge Drive intersection to the bus stop suggests a desire for a paved path to the stop on the north side of Glenn Coolidge Drive. Persons living on the Hagar site would likely be tempted to cross Hagar Drive on the north side of Glenn Coolidge Drive, which could represent a safety hazard. The impact related to access to transit would be potentially significant. Mitigation is set forth below to address this impact and includes a crosswalk and a paved path along the north side of Glenn Coolidge Drive.

The paved path and crosswalk on the north side of Glenn Coolidge Drive to the bus stop would assist pedestrian access from the Hagar site to transit. The addition of a marked crosswalk to the north leg of the Hagar Drive/Glenn Coolidge Drive intersection would have minimal to no effect on LOS, as shown below in **Table 4.11-8, 2020 Conditions Intersection Level of Service with New Crosswalk**, below. Along with providing direct access for pedestrians, providing a path with a width of at least four feet with five feet passing spaces at intervals of 200 feet (or 5 foot paths along the entire length), as described in the *2010 ADA Standards for Accessible Design*, would provide accessible path from the project site to the bus stop on the north side of Glenn Coolidge Drive. A similar improvement to the existing path on the

south side of Glenn Coolidge Drive would also improve pedestrian access to the bus stop on the south side of the roadway.

Table 4.11-8
2020 Conditions Intersection Level of Service with New Crosswalk

Intersection ¹	Peak Hour	2020 without Project		2020 with Project		2020 with Project and North Leg Crosswalk	
		Average Delay ²	LOS	Average Delay ²	LOS	Average Delay ²	LOS
1. Hagar Drive and Glenn Coolidge Drive	AM	10.1	B	11.9	B	12.1	B
	PM	16.1	B	19.6	B	19.8	B
<p>Source: Source: Fehr & Peers, January 2018.</p> <p>1. Hagar Drive/Glenn Coolidge Drive is signalized.</p> <p>2. Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections.</p> <p>3. An LOS of D is the UC Santa Cruz's LOS standard for the lower campus.</p>							

SHW Mitigation TRA-6A is proposed to address the impact on transit from the high volume of pedestrian crossings on Heller Drive. **SHW Mitigation TRA-6B** is proposed to address the impact related to access to transit at the Hagar site. The proposed improvement would not result in any secondary environmental effects.

Mitigation Measures:

SHW Mitigation TRA-6A: The circulation element of the project design for the Heller site shall include provisions for a clear, safe path of travel from the project site to the bus stop on the east side of Heller Drive, north of Oakes Road.

Consistent with LRDP Mitigations TRA-4A and TRA-4C, the Campus shall monitor pedestrian traffic and transit times at the Heller Drive crossing adjacent to the project site and, if warranted, extend the existing crossing guard program to this crossing.

SHW Mitigation TRA-6B: The Campus shall install a paved pathway along the north side of Glenn Coolidge Drive from the bus stop on Glenn Coolidge Drive to the intersection of Hagar Drive/Glenn Coolidge Drive and a crosswalk across the north leg of the intersection of Hagar Drive/Glenn Coolidge Drive prior to occupation of the proposed project. The design of the pathway and crosswalk shall meet the standards contained in the 2010

ADA Standards for Accessible Design. The Campus shall also improve the south side sidewalk to be ADA compliant.

Significance after Mitigation: Impacts on transit service as well as access to transit would be reduced to a less than significant level with the implementation of the mitigation measures set forth above.

4.11.5 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

The Rachel Carson dining facilities expansion would take place in an area east of Heller Drive whereas the Porter College dining facilities expansion would be in an area west of Porter-Kresge Road.

Impacts and Mitigation Measures

DF Impact TRA-1: **The implementation of the proposed dining facilities expansion project would not conflict with any applicable plans, ordinances or policies establishing measures of effectiveness for the performance of the traffic circulation system; increase traffic hazards; or result in inadequate emergency access. (*Less than Significant*)**

Effect on Traffic Circulation System

The proposed dining facilities expansion project would not result in a substantial increase in vehicle trips to and from the campus. Other than a small increase in the number of delivery truck trips, no increase in traffic would result from the project. The users of the expanded facilities would be students residing on the campus. The project's traffic impacts would be less than significant. Furthermore, the proposed project is within the scope of the 2005 LRDP, and to the extent that it generates any vehicle trips, those are captured and adequately analyzed in the traffic analysis conducted for the 2005 LRDP in the 2005 LRDP Final EIR. .

Increase in Traffic Hazards

The proposed dining facilities expansion project would not construct any vehicular roadways or traffic improvements. No impact related to traffic hazards due to design features would occur.

Inadequate Emergency Access

Due to the small scale of the construction project and the location of the proposed facilities, the dining facilities expansion project would not impede emergency access. No impact would occur.

Mitigation Measures: No mitigation measures are required.

4.11.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

SHW Impact C-TRA-1: Implementation of the proposed SHW project would not result in significant cumulative traffic impacts. (*Less than Significant*)

The cumulative operational traffic impacts of campus development under the 2005 LRDP are analyzed in the 2005 LRDP EIR under LRDP Impacts TRA-1, TRA-2, and TRA-6. Those impacts evaluate the increase in traffic in 2020 under two scenarios: a Without Project scenario that estimates the increase in traffic along campus roadways, city streets, and freeways as a result of 2020 background traffic volumes, and a With Project scenario that adds 2005 LRDP-related traffic volumes to 2020 background traffic volumes and then estimates the levels of service operations of the facilities. The analysis presented under LRDP Impacts TRA-1, TRA-2, and TRA-6, therefore, presents the cumulative traffic impacts in the study area and finds that the traffic added to city streets as a result of campus growth under the 2005 LRDP would result in significant cumulative traffic impacts (UCSC 2006). As discussed above, the proposed SHW project would decrease the total amount of daily and peak hour traffic to and from the campus. Therefore, it will not contribute to the previously evaluated cumulative traffic impacts and would, in fact, reduce the severity of the previously analyzed cumulative traffic impacts.

The cumulative analysis in the 2005 LRDP EIR extends to 2020. No analysis of cumulative traffic impacts beyond 2020 is required in this EIR because the proposed project would not increase the traffic to and from the campus.

Near Term Cumulative Construction Phase Impacts

With respect to near-term cumulative construction traffic impacts, those would occur if other projects were to be under construction at the same time as the proposed project, and if these concurrent projects would be in close proximity of the proposed project such that the construction traffic from the concurrent projects would affect the same roadways. **Table 4.0-1** (in **Section 4.0**) presents the other reasonably foreseeable campus projects that would be under construction during the same time period as the proposed project. The potential for construction phase cumulative traffic impacts is discussed below.

Heller Site

Construction of the proposed housing on the Heller site would occur between 2019 and 2022 over a period of about 3 years. Construction of the dining facilities at Rachel Carson and Porter College and the construction of the Kresge College improvements would also occur during this time period. The concurrent construction would have the potential to result in localized cumulative traffic impacts. However, the proposed SHW project would implement SHW Mitigation TRA-3, which would mitigate any construction traffic impacts and render the project's contribution cumulatively not considerable.

Hagar Site

With the exception of one campus project, none of the cumulative projects are in the vicinity of the Hagar site, and therefore there is no potential for cumulative construction traffic impacts for that site. With respect to Ranch View Terrace Phase 2, the construction schedule for that project is not known at this time and it is considered unlikely that that project would be constructed in 2018-19, the same time as the project construction on the Hagar site. There would be no construction-phase cumulative impacts.

Mitigation Measures: No mitigation is required.

4.11.7 REFERENCES

Fehr & Peers. 2018. Student Housing West Project – Intersection Operations and Multimodal Site Access Evaluation. Memorandum dated March 20.

4.12 TRIBAL CULTURAL RESOURCES

4.12.1 INTRODUCTION

This section evaluates the potential impacts to Tribal Cultural Resources (TCRs) from the implementation of the proposed Student Housing West (SHW) project. TCRs are sites, features, places, cultural landscapes, sacred places and objects with cultural value to a California Native American tribe. As detailed later in this section, potential impacts of the proposed project on TCRs are evaluated based on consultation with interested Native American tribes pursuant to Assembly Bill (AB) 52.

With respect to the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, neither the CEQA documentation nor AB 52 consultation for that project has been commenced by the Campus at this time. Therefore, this EIR section cannot document the potential impacts on TCRs as a result of that project based on AB 52 consultation. However, this EIR section does explain why significant impacts on TCRs due to the dining facilities expansion project are considered unlikely.

4.12.2 ENVIRONMENTAL SETTING

Detailed information regarding the prehistoric occupation is presented in the 2005 LRDP EIR and in **Section 4.4, Cultural Resources**, of this EIR. As noted in **Section 4.4**, the earliest confirmed evidence of prehistoric occupation in the Santa Cruz region comes from an archaeological site located 4 miles northeast of the campus in the Santa Cruz Mountains near Scotts Valley. Cartier has postulated that this site may date to approximately 10,000 years before present (BP).

Archaeological evidence indicates that native groups of the region participated in extensive trade networks. They successfully pursued a wide range of subsistence practices including hunting large and small terrestrial and marine animals; fishing and shell fishing; and gathering and processing plant foods. As throughout much of central California, acorns were an important plant food staple. They developed a technological expertise in bow making (after about A.D. 500), basketry, and the creation and use of boats. In addition to the well-known plant and animal foods, important resources available locally included Monterey banded chert, which Native Americans used for the manufacture of chipped stone tools such as arrowheads, scrapers, and awls. The Monterey Bay was also an exceptional source of abalone (*Haliotis* sp.) and olive snail (*Olivella*) shells, raw material for the manufacture of shell ornaments and beads that Native Americans traded throughout California and much of the West, and which were important wealth items often placed in graves.

The Protohistoric Period (1602 to 1797 A.D.) – the time during which native cultures began to experience nonnative influences – is demarcated by the first contact with Europeans. Sebastián Vizcaíno, a Spanish explorer, landed in the area of Monterey in 1602, and missions were established in the Santa Cruz region beginning in 1770. The Spanish referred to the indigenous population in this region as Costano or "coast people;" historically they have become known as Costanoan. Mission life, nonnative diseases, and cultural disruption took a severe toll on the Costanoan population.

Archaeological testing at several sites on the UC Santa Cruz campus has resulted in recovery of two human burials and nearly 1,300 artifacts. Artifact types and radiocarbon dates suggest occupation of campus land from as early as 5,500 years before present (3550 B.C.) to 200 years before present (1750 A.D.) (UCSC 2006).

4.12.3 REGULATORY CONSIDERATIONS

4.12.3.1 Federal Laws and Regulations

There are no federal laws or regulations related to TCRs.

4.12.3.2 State Laws and Regulations

Assembly Bill (AB) 52

AB 52, which was approved in September 2014 and became effective on July 1, 2015, requires that CEQA lead agencies consult with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of a proposed project, if so requested by the tribe. A provision of the bill, chaptered in CEQA Section 21084.12, also specifies that a project with an effect that may cause a substantial adverse change in the significance of a TCR is a project that may have a significant effect on the environment.

Defined in Section 21074(a) of the Public Resources Code, TCRs are:

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; or
 - 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.

TCRs are further defined under Section 21074 as follows:

- a. A cultural landscape that meets the criteria of subdivision (a) is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape; and
- b. A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a “non-unique archaeological resource” as defined in subdivision (h) of Section 21083.2 may also be a TCR if it conforms with the criteria of subdivision (a).

Mitigation measures for TCRs must be developed in consultation with the affected California Native American tribe, pursuant to Section 21080.3.2, or according to Section 21084.3. Section 21084.3 identifies mitigation measures that include avoidance and preservation of TCRs and treating TRCs with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource.

4.12.4 IMPACTS AND MITIGATION MEASURES

4.12.4.1 Significance Criteria

The impacts related to TCRs resulting from the implementation of the proposed SHW project would be considered significant if the proposed project would cause:

- a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:
 - listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resource Code Section 5020.1(k); or
 - a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

4.12.4.2 CEQA Checklist Items Adequately Analyzed at the 2005 LRDP Level or Not Applicable to the Project

At the time the 2005 LRDP EIR was prepared, CEQA did not require an analysis of impacts to tribal cultural resources due to project implementation.

4.12.4.3 Methodology

Although AB 52 requires the Native American tribes to request notification of projects that involve an EIR or a Mitigated Negative Declaration (MND), the University proactively reached out to the Native American Heritage Commission (NAHC) and requested a list of tribes with traditional lands or cultural places located within the boundaries of each campus. Following the receipt of the list from NAHC, UC Santa Cruz has been notifying the six listed Native American tribes whenever an Initial Study/proposed MND is commenced for a project or when an NOP is issued for an EIR. Following the issuance of the NOP for the proposed project in October 2017, the Campus sent out letters to the tribes on December 4, 2017.

4.12.4.4 2005 LRDP EIR Mitigation Measures Included in the Proposed Project

There are no mitigation measures pertaining to TRCs in the 2005 LRDP EIR that are applicable to the proposed project.

4.12.4.5 Project Impacts and Mitigation Measures

SHW Impact TCR-1: The proposed project could cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Section 21074. (Potentially Significant; Less than Significant with Mitigation)

As previously noted, UC Santa Cruz sent out notification letters on December 4, 2017, to the six tribes listed by NAHC for the Santa Cruz campus. According to AB 52, the tribes had 30 days from the receipt of the letter to request consultation with UC Santa Cruz. On December 12, 2017, Valentin Lopez, representing the Amah Mutsun Tribal Band, responded to the notification letter. The Amah Mutsun Tribal Band requested formal consultation, as the proposed project is within traditional tribal territory. The tribe also requests that a Native American Monitor be present for any ground disturbance within 400 feet of a known archaeological site. No other requests for formal consultation have been received by UC Santa Cruz from the other five tribes as of the publication of this Draft EIR. Mr. Lopez requested information on the proposed project and a site visit. Campus planning staff met with Mr. Lopez on January 31, 2018 and a site visit of both project sites was completed. Based on the site visit, and

information regarding the site conditions, and proximity of known prehistoric sites, Mr. Lopez provided recommendations regarding mitigation measures to be included in the EIR to avoid impacts on TRCs. Campus planning staff documented the site visit and Mr. Lopez's recommendations in a letter and Mr. Lopez confirmed that the letter accurately reflected the request of the tribe (email communication between Ms. Klaus, UC Santa Cruz and Mr. Lopez dated February 23, 2108). UC Santa Cruz further communicated with the NAHC to ensure that the tribal notification process had been conducted appropriately.

The area of disturbance for the SHW project is not known or expected to contain any TCRs. As noted in **Section 3.0, Project Description**, the proposed SHW project would involve the construction of new buildings on the Heller site, however all building construction would be within the footprint of the existing FSH development. The new FSH units and a childcare center would be constructed on the Hagar site. Both sites involve a utility corridor that extends to the north and the south of the two sites, and the Hagar site development also includes a storm water detention basin that would be off-site and on the east side of Glenn Coolidge Drive. As noted in **Section 4.4**, excavation and grading activities at the Heller and Hagar sites are unlikely to affect any known prehistoric or historic-period archaeological resources as none are present within the area of ground disturbance at both sites and the areas of off-site improvements. However, earthmoving activities associated with the proposed project could expose previously undiscovered buried archaeological resources, including human remains, which could be considered TRCs and could be adversely affected by the project construction. The impact would be considered potentially significant.

LRDP Mitigations CULT-1B, -1C and -4B and **SHW Mitigations CULT-2A, -2B and -2C** would be implemented to ensure that should cultural resources be encountered, they would be protected, documented, and preserved, as appropriate. **SHW Mitigations CULT-2B and -2C**, which are presented in **Section 4.4**, are mitigation measures requested by Amah Mutsun Tribal Band, including the requirement that a Native American monitor is provided an opportunity to monitor during ground disturbance within 200 feet of a known prehistoric deposit, and any additional excavation within 200 feet of the margins of a discovered prehistoric deposit, and that another archaeological survey of the Hagar site is conducted once the vegetation on the site has been removed. If human remains are uncovered and are determined to be of Native American origin, the Campus will implement the procedures set forth in LRDP Mitigation CULT-4C for protection of the remains, documentation, and respectful treatment in consultation with a Native American Most Likely Descendant. Therefore, while no TCRs are expected to be affected by the proposed project, these mitigation measures would ensure that any previously unknown TRCs encountered during ground disturbing activities associated with the proposed project would not be adversely affected.

As set forth in **Section 4.12.4.1 Significance Criteria** above, CEQA guidelines also require that a determination be made whether the proposed project would result in an impact on a historic resource as defined in Public Resource Code Section 5020.1(k) or a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. As the analysis under **SHW Impacts CULT-1** and **CULT-2** in **Section 4.4** shows, the proposed project would not result in any impacts on resources that would qualify as a historical resource or a unique cultural resource.

Mitigation Measures:

SHW Mitigation TCR-1: Implement **SHW Mitigation CULT-2A** through **2C**.

Significance after Mitigation: The impact would be reduced to a less than significant level.

4.12.5 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

The Porter and Rachel Carson dining facilities expansion project would be located adjacent to the existing dining facilities at both colleges. While most of the improvements would be made within the existing developed area, should the existing dining areas be expanded, some undeveloped land adjacent to the existing buildings would be disturbed during construction and permanently developed with facilities.

Impacts and Mitigation Measures

DF Impact TCR-1: Implementation of the proposed project would be unlikely to cause a substantial adverse change in the significance of a Tribal Cultural Resource.
(*Less than Significant*)

As discussed in **Section 4.4**, the areas that would be disturbed to construct the proposed dining facilities are generally considered unlikely to contain archaeological resources due to their locations and the previous disturbance that occurred in the area in conjunction with the construction of the existing college facilities. Nonetheless, consistent with LRDP Mitigation CULT-1A, previous survey coverage of the areas would be assessed. In the event that the areas have not been previously surveyed, consistent with LRDP Mitigation CULT-1B, a survey of the sites would be conducted. Furthermore, the project would be required to comply with LRDP mitigation measures for protection of resources from inadvertent damage

during construction. This would ensure that impacts to archaeological resources would be less than significant.

Although unlikely, unknown human remains could occur on the project sites and could be inadvertently affected by grading and excavation activities. Implementation of LRDP Mitigation CULT-4C would reduce the impact to a less than significant level.

With respect to the potential to affect historic resources or unique cultural resource, as analyzed in **Section 4.4**, the dining hall at Rachel Carson College is of recent construction and based on its age, would not qualify as a historical resource. Therefore, changes to the Rachel Carson College dining facilities would not result in a significant impact on a historical resource. Porter College was constructed in 1969-70, and would be approximately 49-50 years in age at the time that alterations and additions to the dining hall would be constructed. It is anticipated that in compliance with LRDP Mitigations CULT-2B through 2D, the Campus will evaluate the affected structure and if the building is determined to be a historic resource, the Campus will appropriately design the addition to avoid a significant impact. Therefore, with LRDP mitigation, the impact on historical resources would be less than significant. Based on available information it appears unlikely that the area affected by project construction would contain any unique cultural resources.

In summary, as with the SHW project, while no TCRs are expected to be affected by the proposed dining facilities, should they be encountered and disturbed during construction, the impact could be potentially significant. However, LRDP mitigation measures would ensure that any resources encountered would not be adversely affected.

Mitigation Measures: No mitigation is required.

4.12.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

SHW Impact C-TCR-1: Implementation of the proposed project would not result in a significant cumulative impact on Tribal Cultural Resources. (*Less than Significant*)

An evaluation of potential impacts on TCRs was not required at the time that the 2005 LRDP EIR was prepared. Therefore the EIR does not contain an evaluation of the potential for campus development under the 2005 LRDP to result in a cumulative impact on TRCs. The EIR however contains an analysis of the cumulative impact of campus development under the 2005 LRDP along with other development in the City of Santa Cruz on cultural resources and human remains under LRDP Impact CULT-7, and that

analysis concludes that the cumulative impact would be less than significant because campus projects would be required to implement appropriate LRDP mitigation measures to avoid or minimize impacts to significant resources. Because the same measures would avoid and minimize impacts to TRCs, it is reasonable to conclude that the cumulative impacts of campus development under the 2005 LRDP, including the proposed SHW project, the dining facilities expansion project and other near-term campus projects, would result in a less than significant cumulative impact on TRCs. All of these projects would also implement the LRDP mitigation measures. The proposed project would not make a cumulatively considerable contribution to a cumulative impact on TCRs. There would be a less than significant impact.

Mitigation Measures: No mitigation is required.

4.12.7 REFERENCES

UC Santa Cruz. 2006. 2005-2020 Long Range Development Plan Final Environmental Impact Report, SCH No. 2005012113.

4.13 UTILITIES AND SERVICE SYSTEMS

4.13.1 INTRODUCTION

This section of the EIR describes the utilities and service systems that serve the UC Santa Cruz campus, including water, wastewater, storm water, and solid waste disposal and evaluates the potential for significant impacts to utilities and services systems from the implementation of the proposed Student Housing West project.

It also presents potential utility impacts from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and the existing colleges (see **Section 4.13.5** below).

The analysis in this section is tiered from the utilities and service system impacts analysis contained in the 2005 LRDP EIR, supplemented by project-specific analysis. This section is based on information obtained from previous environmental documentation prepared for the UC Santa Cruz campus and project-specific information and data.

4.13.2 ENVIRONMENTAL SETTING

4.13.2.1 Potable Water

Campus Water Demand and System

UC Santa Cruz receives potable water for use on the main campus from the City of Santa Cruz Water Department (SCWD). Water demand at the main campus varies from year to year. While historically it has been as high as 206 million gallons a year, the Campus has completed several high priority projects in order to reduce its water consumption and has also curtailed water use during the drought years. In 2016, about 161 million gallons of water was used on the main campus. (More information about the Campus's historical, current, and projected water demand is provided in **Section 7.2**.)

The UC Santa Cruz main campus water system receives water through four connections to the City's water distribution system. Water is pumped from the City's Bay Street Reservoir to three consecutive in-line 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 valves (UCSC 2006).

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. The reservoir is also necessary to provide adequate fire flow to the Crown/Merrill Apartments. The Campus has an existing on-campus well that could potentially supply water for non-potable purposes (UCSC 2006).

Although there are water mains on the Heller site, they would not be adequate to serve the proposed project and as discussed below, an off-site water main is proposed as part of the project to convey water to the site. Regarding the Hagar site, there is an existing water main that runs to the west of Hagar Drive near the project site.

City Water Demand and Supply

The SCWD provides water to approximately 95,000 customers in its water service area that includes the city of Santa Cruz, the UC Santa Cruz main campus, UC Santa Cruz Marine Science Campus and 2300 Delaware property, a portion of the unincorporated area of Santa Cruz County, a small portion of the City of Capitola, and coastal agricultural lands north of the City (West Yost 2017).

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 2017).

The Santa Cruz water system relies predominantly on local surface water supplies, which include the following: diversions from three North Coast streams (Reggiardo Creek, Laguna Creek, and Majors Creek) and one natural spring (Liddell Spring); the San Lorenzo River; and Loch Lomond Reservoir. Together, these surface water sources represent approximately 95 percent of the City's total annual water production. The balance of the City's supply comes from groundwater, all of which is extracted from wells in the Purisima Formation in the mid-County area (Live Oak Well system).

Water from the North Coast sources, the San Lorenzo River and Loch Lomond Reservoir is pumped to the Graham Hill Water Treatment Plant where it is treated to remove impurities and disinfected with chlorine. The capacity of the Graham Hill water treatment plant is 16 million gallons per day (mgd) and it currently treats about 10 mgd (City of Santa Cruz 2016).

More information on the City's water demand and supply sources is presented in **Section 7.2**.

4.13.2.2 Wastewater

Wastewater produced on the campus is collected via the campus sewer system, which includes collector lines located in campus roadways and two major trunk lines. There is an existing sewer line located in Heller Drive to the southeast of the Heller site, and an existing 12-inch sewer line about 900 feet to the west of Hagar site.

The two major trunk sewers on the UC Santa Cruz campus include one on Empire Grade Road 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 (UCSC 2006).

The current average dry-weather and peak wet-weather flow capacities at the WWTP are 17 million gallons per day (mgd) and up to 81 mgd, respectively (Santa Cruz PWD 2018). The average daily flow at the WWTP is 10 mgd. Thus, the plant currently operates at approximately 59 percent of capacity. Under the terms of a 1962 agreement between the City of Santa Cruz and the University, the City agreed to provide sanitary sewer lines sufficient to meet the needs of the University (UCSC 2006). 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 and the City to ensure that the Campus complies with wastewater discharge limitations (UCSC 2006).

4.13.2.3 Storm Water Drainage

The UC Santa Cruz campus and surrounding City and County lands rely on a series of natural drainage courses and sinkholes for storm water drainage. Historically, development near the campus has occurred without a major network of storm drainage pipes leading to the ocean. There is no existing City or County piped storm water drainage system for the campus to tie into. The 1962 agreement between the City of Santa Cruz and the University requires that the City provide, at no expense to the University, any and all storm drainage lines up to the boundaries of the campus (UCSC 2006).

The campus storm water conveyance system comprises engineered detention basins, bioretention areas, and detention tanks serving localized building clusters; conveyance features that include both pipes and vegetated swales to redirect storm water from developed areas to dissipation and infiltration structures in natural areas. Runoff from most parking lots on the campus is filtered to remove typical urban contaminants. Most of the flow in the natural drainages is captured by sinkholes and enters the karst

aquifer so that a relatively small amount of storm water leaves the campus as surface flow. Water in surface drainages fed by the karst aquifer, as well as water flowing off the campus in surface drainage, drains to the Monterey Bay (UCSC 2006).

While the existing storm drainage system meets current overall capacity requirements, there are localized areas of concern. The Campus has identified several problems with the existing system; in particular, surface flooding, concentrated flows, and the associated erosion and potential habitat degradation. Capacity problems at some sinkholes and the impact of sediment on sinkholes have also been identified as issues of concern. Furthermore, in some areas the detention systems and drainage/erosion control measures installed with the original development were not effective in preventing channel incision or spilling over of sinkholes. The Campus has been implementing a phased project to address these issues, through redirection of flow, construction of structures designed to promote infiltration of runoff into the subsurface, and in-stream restoration.

4.13.2.4 Solid Waste

The City of Santa Cruz Resource Recovery Facility (RRF) is approximately 2.5 miles southwest of the UC Santa Cruz 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. As of 2012, the landfill had a remaining capacity of 5,222,718 cubic yards (cy) and is not expected to reach capacity until 2066 (Pearson 2017).

Campus Generated Solid Waste

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 Monterey Regional Waste Management District (MRWMD). Hazardous waste from the campus is managed by the Office of EH&S 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 (UCSC 2017).

In 2011, a Landfill and Solid Waste Diversion Task Force was directed to identify initiatives to help the Santa Cruz campus reach the UC-wide goals of 75 percent waste diversion by 2012 and Zero Waste (100 percent diversion) by 2020 (UCSC 2012). In Fiscal Year 2010-2011, 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 FY 2015-2016, 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. As illustrated by **Table 4.13-1, UC Santa Cruz Solid Waste Generation and Recycling**, UC Santa Cruz has not as yet attained its 75 percent waste diversion goal (University of California 2015). The Campus continues to examine additional opportunities and ways to achieve this goal and eventually its 2020 zero waste goal.

Table 4.13-1
UC Santa Cruz Solid Waste Generation and Recycling
May 2017

Type of Waste	Tons	Percentage of Total Solid Waste
Hauled to Landfill		
Refuse	1,997	41.6%
Recycled, Reused, or Diverted		
Organics	99	34.4%
Container Recycling	27	9.4%
Paper Recycling	2	0.7%
Cardboard	32	11.0%
Other Recycling	8	2.9%
<i>Subtotal</i>	<i>168</i>	<i>58.4%</i>
Total	288	100%
<i>Source: UCSC Zero Waste Monthly Updates: May 2017</i>		

4.13.3 REGULATORY CONSIDERATIONS

4.13.3.1 Federal Laws and Regulations

Clean Water Act

The Clean Water Act (CWA) assists in the development and implementation of waste treatment management plans and practices by requiring provisions for treatment of waste using the best practicable technology before there is any discharge of pollutants into receiving waters, as well as the confined disposal of pollutants so that they would not migrate to result in water or other environmental pollution.

Section 402 of the CWA authorizes the US Environmental Protection Agency to establish a nationwide surface water discharge permit program for municipal and industrial point sources known as the National Pollutant Discharge Elimination System (NPDES) program.

4.13.3.2 State Laws and Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Act provides the basis for water quality regulation in California, and establishes the authority of the State Water Resources Control Board (State Water Board) and the nine Regional Water Quality Control Boards. The Act also authorizes waste discharge requirements for municipal wastewater treatment facilities through the NPDES program. The State Water Board grants and administers NPDES permits under a provision of the Act, which established effluent limitations and water quality requirements for wastewater plant discharges.

Urban Water Management Planning Act

California State Assembly Bill 797 (California Water Code Section 10610, et seq.), adopted in 1983, requires every urban water supplier providing water for municipal purposes to more than 3,000 customers or more than 3,000 acre-feet of water on an annual basis to prepare an Urban Water Management Plan (UWMP). The intent of the UWMP is to assist water supply agencies in water resource planning over at least a 20-year planning period given their existing and anticipated future demands. UWMPs must be updated every five years in years ending in zero and five. The City updated and adopted its current 2015 UWMP in August 2016. The 2015 UWMP projects and analyzes the City's future demand and water supplies through 2035.

Senate Bills 610 and 221; CEQA

In 2001, the California Legislature passed Senate Bill 610 (Water Code Section 10910 et seq.) and Senate Bill 221 (Water Code Section 66473.7) to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 and SB 221 were companion measures, which sought to promote more collaborative planning between local water suppliers and cities and counties.

SB 610 requires the preparation of a water supply assessment (WSA) for large developments (i.e., more than 500 dwelling units or business establishments employing 1,000 persons or 500,000 feet of floor space). SB 221 prohibits approval of subdivisions consisting of more than 500 dwelling units unless there is verification of sufficient water supplies for the project from the applicable water supplier(s) and only

applies to residential projects. SB 610 requires cities and counties to prepare a WSA for large developments. SB 221 requires a verification of an adequate water supply for large residential subdivisions before a final subdivision map may be recorded. Additionally, when a city or county determines that a “project” as defined by SB 610 (Water Code Section 10912) is subject to CEQA, the city or county must comply with the provisions of SB 610; this information must be included in environmental review under CEQA.

SB 610 and SB 221 apply only to cities and counties, and not to the University of California, a constitutionally established public entity. Nevertheless, although preparation of a Water Supply Assessment is not required for University projects, in order to evaluate the LRDP’s impact on water supply, UC Santa Cruz voluntarily prepared a Water Supply Evaluation (WSE) that conforms with the required elements of a Water Supply Assessment prepared pursuant to SB 610. The WSE is included in **Appendix 7.2** and was used in the preparation of this section.

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act of 2014 (SGMA) became law on January 1, 2015, and applies to all groundwater basins in the state (Wat. Code, § 10720.3). Pursuant to 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 (Wat. Code, § 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 will be presumed to be the groundwater sustainability agency for the basin. However, the county may decline to serve in this capacity (Wat. Code, § 19724).

Any established groundwater sustainability agency would have additional powers under the SGMA to manage groundwater within the basin, including, for example, the powers to conduct investigations of the basin, to require registration of groundwater extraction facilities and metering of groundwater extractions; to regulate groundwater extractions from individual groundwater wells or wells generally; and to assess fees on groundwater extractions (see generally Wat. Code, § 10725 et seq.). In exercising its authority under the SGMA, a groundwater sustainability agency must consider the interests of holders of overlying groundwater rights, among others, and may not make a binding determination of the water rights of any person or entity (Wat. Code, §§ 10723.2, 10726.8). The SGMA also provides local agencies with additional tools and resources designed to ensure that the state’s groundwater basins are sustainably managed.

The SGMA also requires the California Department of Water Resources (DWR) to categorize each groundwater basin in the state as high-, medium-, low-, or very low priority (Wat. Code, §§ 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. 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 (Wat. Code, § 10733.6). 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 (DWR 2014). 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 (City of Santa Cruz 2016).

In September 2015, the Soquel-Aptos Groundwater Management Committee (SAGMC) was formed which includes representatives from the County of Santa Cruz, Central Water District, Soquel Creek Water District, the City of Santa Cruz, and private well owners. This group is a joint exercise of powers entity with interest in management of the Soquel-Aptos groundwater basin (City of Santa Cruz 2016).

Assembly Bill 939 and Senate Bill 1016

The California Integrated Waste Management Act of 1989, or Assembly Bill 939, established the Integrated Waste Management Board, required the implementation of integrated waste management plans, and mandated that local jurisdictions divert at least 50 percent of all solid waste generated (from 1990 levels), beginning January 1, 2000, and divert at least 75 percent by 2010. Projects that would have an adverse effect on waste diversion goals are required to include waste diversion mitigation measures to assist in reducing these impacts to less-than-significant levels. With the passage of Senate Bill 1016 (the Per Capita Disposal Measurement System) in 2006, only per capita disposal rates are measured to determine if a jurisdiction’s efforts are meeting the intent of Assembly Bill 939.

4.13.3.3 Local Plans and Policies

UC Sustainable Practices Policy

As with all UC campuses, UC Santa Cruz is required to implement the UC Sustainable Practices Policy (Policy). The following are specific policies designed to address water conservation and solid waste.

Sustainable Water Systems

With the overall intent of achieving sustainable water systems and demonstrating leadership in the area of sustainable water systems, the University has set the following goals applicable to all locations:

1. In line with the Federal Government's Executive Order, locations will reduce growth-adjusted potable water consumption 20 percent by 2020 and 36 percent 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. Medical Centers shall also strive to reduce potable water use and will identify a separate reduction target by June 2016. 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.
2. Each location will develop and maintain a Water Action Plan that identifies long term strategies for achieving sustainable water systems. The next update of the plan shall be completed in December 2016.
 - A. 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.
3. Each Campus shall identify existing single pass cooling systems and constant flow sterilizers and autoclaves in laboratories and develop a plan for replacement.
4. 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.
 - B. 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.
 - B. If no alternative to single pass cooling exists, water flow must be automated and controlled to avoid water waste.

Recycling and Waste Management

1. The University prioritizes waste reduction in the following order: reduce, reuse, and then recycle.
2. The University's goal for diverting municipal solid waste from landfills is as follows:
 - 50 percent as of June 30, 2008
 - 75 percent as of June 30, 2012
 - Ultimate goal of zero waste by 2020

UC Santa Cruz Campus Sustainability Plan 2017-2022

UC Santa Cruz drafted its first Campus Sustainability Plan (CSP) in 2010 to direct cohesive, campus-wide action to improve sustainability at UC Santa Cruz. The plan was updated in 2013, and most recently, in 2017 to assess progress under the previous plans and establish new goals and objectives for the future. The CSP 2017-2022 provides a detailed road map to sustainability that builds on the Campus's successes and presents opportunities to develop new initiatives. Recommendations made in the CSP are designed to facilitate the achievement of goals set forth in the UC Sustainability Policy. The CSP 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.

Natural Environment and 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 2005-2008 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 2.3 Improve communication about water management, use, and conservation to the campus and local community.

Strategy 2.3 Identify new sources of funding for both potable water reduction and non-potable sourced development projects.

Materials Management and Food Systems

Goal 2: Achieve and maintain the UC Office of the President Sustainable Practices Policy goal of Zero Waste.

Strategy 2.1 Improve operational infrastructure to increase waste diversion,

Strategy 2.2 Complete the Resource Recovery Yard, including on-site composting program rollout.

- | | |
|------------------|--|
| Strategy 2.3 | Increase the percentage of equipment and items sold or repurposed from Surplus, rather than discarded. |
| Strategy 2.4 | Develop effective waste reduction and Zero Waste education and training for students, staff and faculty. |
| Strategy 1.5/2.5 | Advance the single-use bottled water ban. |

UC Santa Cruz Storm Water Management Program

As required by the Clean Water Act, UC Santa Cruz operates its storm drain system under a general permit for Non-Traditional Small Municipal Separate Storm Sewer Systems (MS4), issued by the State Water Resources Control Board. The Campus implements a Storm Water Management Program (SWMP), under a Guidance Document prepared in 2014 to comply with the requirements of this permit. The SWMP covers all facilities in urbanized areas owned and operated by UC Santa Cruz (which includes the main campus, the Marine Science Campus, the 2300 Delaware Facility and the UC Monterey Bay Education, Science and Technology (MBEST) Center). The SWMP includes education, outreach, and public participation programs; policies and procedures to ensure detection of illicit discharges; construction site runoff control policies and procedures; pollution prevention/good housekeeping procedures for Campus operations; and post-construction storm water management program that includes site and building design requirements.

UC Santa Cruz Campus Standards Handbook

The Campus Standards Handbook includes site requirements that address drainage issues. Among the requirement, most relevant to stormwater flows are the following, in Part III, Site Requirements, Section C. Drainage:

1. Protect all major springs, seep zones, drainage channels, year-round streams, and natural superficial drainage patterns from alteration. For new development and redevelopment a 30-foot buffer from water bodies will be included in the project. Where a 30-foot buffer is not feasible and for buffers less than 30 feet, written documentation from a qualified professional must be provided prior to design approval to show that the proposed buffer is adequate to prevent adverse effects on the watershed.

2. Design for high levels of absorption in all identifiable ground water recharge areas (flatter slopes encouraged to maximize absorption rates); verify specific requirements with the Project Manager.

3. Ensure that runoff passes through an appropriate filter before entering a sinkhole.
4. Where new development drains to existing outfalls, existing outfalls shall be upgraded as necessary to extend to toe of slope and provide energy dissipation.
5. Provide for detention of storm water runoff to ensure that peak post-development runoff flow rates do not exceed pre-development runoff rates. Post-development flow rates must not cause erosion. Ensure that storm water does not saturate the ground at building foundations
6. Ponding of water on the site ground surfaces is not allowable; all surfaces must have a positive drainage. Drain all water away from building foundations.
7. Refer to specific Soils Investigations of sites (when available) to determine any potential natural channels / sinkholes that may affect underground drainage, foundations, etc.
8. Where environmental conditions and engineering design shows adequate use sort armoring to minimize erosion in drainages.
9. To encourage storm water infiltration in small parking lots eliminate curbs or provide curb openings and slope parking lots to encourage storm water infiltration into vegetation islands and strips where the potential for erosion or a hazardous material spill is not expected.
10. Utilize all feasible opportunities to encourage on-site absorption, including porous pavers, vegetative strips, grassy swales, detention ponds and infiltration strips. Feasibility may be limited by constraints such as vegetative detritus, accessibility compliance under ADA, provisions for emergency vehicle access, soil permeability as well as sufficient sunlight to permit plant growth.
11. Refer to Stormwater and Drainage Master Plan, LRDP-EIR Mitigation Measures and Storm Water Management Plan for additional drainage guidelines.
12. The State Water Resources Control Board requires a storm water pollution prevention plan (SWPPP) for all projects disturbing one (1) acre or more. Verify requirements with Project Manager. See SWPPP example in *Reference Documents* and refer to Division 1 Section 1560.

4.13.4 IMPACTS AND MITIGATION MEASURES

4.13.4.1 Significance Criteria

The impact of the proposed project related to utilities and service systems would be considered significant if it would exceed the following standards of significance, in accordance with Appendix G of the State CEQA Guidelines, the UC CEQA Handbook, and the 2005 LRDP EIR:

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board;
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed;
- Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; or
- Comply with applicable federal, state, and local statutes and regulations related to solid waste.

4.13.4.2 CEQA Checklist Items Adequately Analyzed in the 2005 LRDP EIR or Not Applicable to the Project

Although redevelopment of the FSH complex on the Heller site was evaluated in the 2005 LRDP EIR, the currently proposed Heller site housing is substantially different from the previous proposal. With regard to the Hagar site, that site was not envisioned for any development under the 2005 LRDP. Therefore, although the analysis below uses the prior LRDP level analysis to the extent appropriate, none of the CEQA checklist items listed above under Significance Criteria are scoped out; all of the items are addressed in the project-level analysis below.

4.13.4.3 Methodology

The analysis of impacts to utilities and service systems is based on a comparison of the projected demand of the proposed project to available supplies, and the resulting need, if any, for new, expanded, or

modified facilities to meet the increased demand. Under CEQA, a project's impacts would be considered significant if the project would require new or expanded utility service facilities, the construction of which would result in significant environmental impacts.

4.13.4.4 2005 LRDP EIR Mitigation Measures Included in the Proposed Project

Table 4.13-2, 2005 LRDP EIR Mitigation Measures, presents the mitigation measure related to solid waste in the 2005 LRDP EIR that is applicable to the proposed project. Since this previously adopted mitigation measure is already being carried out as part of implementation of the 2005 LRDP, it is included in and is a part of the proposed project and will not be readopted. Implementation of this mitigation measure is assumed as part of the project impact analysis.

With respect to LRDP mitigation measures related to water supply, even though the 2005 LRDP EIR's water supply impact analysis was found to be deficient and therefore, the Campus is not required to implement these measures, the Campus has been voluntarily implementing these measures, and these measures have also been incorporated into the campus requirements for new development. Therefore the measures are listed in the table below.

Table 4.13-2
2005 LRDP EIR Mitigation Measures

Mitigation Measure	Description
UTIL-4	The Campus will continue to improve its recycling and waste reduction programs and identify additional means of reducing waste.
UTIL 9A	<p>The Campus shall continue to implement and improve all current water conservation strategies to reduce demand for water, including the following:</p> <ul style="list-style-type: none"> • Continue the leak detection and repair program. • Install an individual water meter in each new employee housing unit to encourage residential water conservation. • Install waterless urinals in all new buildings. • Require that new contracts for washing machines in student residences be certified by the Consortium on Energy Efficiency 6 to have a water factor of 5.5 or less or meet an equivalent standard. New washing machines purchased for use in athletic facilities shall meet applicable standards for water-efficiency for institutional machines. • Incorporate water-efficient landscaping practices in all new landscape installations. Water-conservative landscaping practices shall include, but will not be limited to the following: use of water-efficient plants, temporary irrigation systems for plant establishment areas where mature plants will be able to survive without regular irrigation, grouping of plants according to their water requirements, design of planting areas to maximize irrigation pattern efficiency, and mulch covering in planting areas. <p>To facilitate monitoring of water usage in all new development, the Campus shall: (1) install separate meters on water lines for individual buildings and (2) install meters on irrigation lines where one point of connection irrigates 1 acre or more.</p>

Mitigation Measure	Description
UTIL-9B	As new technologies become available, the Campus shall continue to conduct pilot programs for high-efficiency plumbing fixtures including, but not limited to, dual-flush toilets. If a piloted technology proves to be successful (i.e., the high-efficiency fixtures are effective in water savings and do not require more frequent or expensive maintenance than the existing standard), the Campus shall revise its standards to require use of the fixtures in all new buildings.
UTIL-9C	<p>Within one year following approval of the 2005 LRDP, the Campus shall implement a water conservation education program for campus residents. This will include but would not be limited to:</p> <ul style="list-style-type: none"> • Distribution to residents of employee housing of educational materials covering the following topics: basic home water conservation practices, plumbing retrofits and replacements, and strategies to conserve landscape irrigation. <p>Designation of a staff member who will be responsible for developing and implementing a water conservation education and awareness program to reduce water consumption in student residences, dining halls, and student affairs facilities.</p>
UTIL-9D	<p>Within one year following approval of the 2005 LRDP, the Campus shall consult with the City of Santa Cruz regarding the appropriate scope of and initiate, an engineering audit of campus water use. The audit will assess existing campus water uses, identify options for reducing water consumption, prioritize feasible improvements based on the amount of potential water savings and cost effectiveness, 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:</p> <ul style="list-style-type: none"> • 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. (Regarding retrofit of plumbing fixtures in student housing, see LRDP Mitigation UTIL-9H.) • 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. <p>Identification of landscaped areas on campus that have plants that are high water-use.</p>
UTIL-9E	The Campus shall begin implementation of the top priority recommendations of the water audit conducted under UTIL-9D within one year of completion of the audit and complete implementation of the top priority recommendations within five years after completing the audit.
UTIL-9F	<p>The Campus shall, at five-year intervals during the term of the 2005 LRDP, revisit the results of the water audit conducted under UTIL-9D, consult with the City of Santa Cruz Water Department, conduct round table discussions with representatives of relevant campus departments, and conduct additional study of new technologies as needed to identify additional feasible and effective water conservation measures for implementation on the campus during the subsequent five year period. The following are among the measures that shall be considered:</p> <ul style="list-style-type: none"> • Adding existing irrigation systems to the campus's central control system. • Retrofitting existing water meters such that building use and irrigation are separately metered. • Replacing natural turf on athletic fields with artificial turf. • Installing timers on showers in student residences.
UTIL-9G	Within two years following approval of the 2005 LRDP, the Campus shall initiate a study on feasible measures for utilization of reclaimed water (including rainwater, grey water, cooling tower blow down water and/or recycled water) in new development. Potential uses of reclaimed water include cooling, irrigation, and toilet flushing. The study shall contain a plan to utilize reclaimed water in new development as feasible and effective in water conservation, and shall include an implementation schedule.

Mitigation Measure	Description
UTIL-9H	Within five years following approval of the 2005 LRDP, the Campus shall complete the retrofit of all plumbing fixtures in student housing not meeting the efficiency standards current in 2005 (1.6 gallons per flush for toilets). The new fixtures installed under the retrofit program shall conform to the campus standard for new buildings current at the time of the retrofit.
UTIL-9I	<p>If and when the City implements drought emergency management measures, the University will implement the following measures for the duration of the drought emergency:</p> <ul style="list-style-type: none"> • Reduce use of potable water for irrigation on the campus landscape, the CASFS and the Arboretum in accordance with reductions required by the City for similar users. • Utilize water from the existing supply well in Jordan Gulch for non-potable uses. The Campus shall implement a program of monitoring flow at downgradient springs during the time when the well is being used. • Require that residential water use on campus be reduced consistent with the City's target for multifamily residential facilities.
Source: UC Santa Cruz 2006	

4.13.4.5 Project Impacts and Mitigation Measures

SHW Impact UTIL-1: The proposed project would not cause an exceedance of applicable wastewater treatment requirements but would entail the construction of new wastewater treatment facilities, the construction of which could result in significant environmental effects. (*Potentially Significant; Less than Significant with Mitigation*)

Heller Site

It is estimated that the Heller site would generate about 0.1 mgd of wastewater. All wastewater generated on the Heller site would be collected via an underground sewer line system constructed as part of the proposed project and would be conveyed to an on-site wastewater treatment facility that would be located in the southwestern portion of the Heller site. The proposed treatment facility is a membrane bioreactor (MBR) plant. The MBR plant constitutes a complete system for the treatment of municipal wastewater. The MBR plant is a fully enclosed modular facility that would consist of the following components:

- Headworks – where incoming wastewater would be received and where inorganic solids would be separated from the wastewater using screens
- Primary tank – an equalization tank where freshly screened wastewater would be held prior to introduction into the MBR process
- MBR – a system consisting of an anoxic tank, pre-aeration tank, and membrane tanks. The anoxic tank is a bioreactor in which aerobic bacteria digest organic material in the presence of dissolved oxygen. The membrane tanks contain a series of membrane cartridges. As effluent permeates

through the membrane cartridges, suspended organic matter and bacteria are separated from the water.

- Disinfection system – where effluent from MBR would be treated to eliminate bacteria and provide clean non-potable water
- Clean water holding tank – where treated effluent would be held prior to distribution
- Dry wells – excess treated effluent would be discharged into dry wells
- Sanitary sewer connection – for emergency sewer overflow, the plant would have a metered connection to the existing sanitary sewer line located along Heller Drive.

An MBR plant is capable of removing suspended solids to levels of below 5 ppm and BOD to below 10 ppm and producing an effluent with less than 2.0 NTU turbidity levels (and much better in some cases), which meet the current California Title 22 standards for unrestricted irrigation use and toilet flushing.

Recycled water (treated effluent) generated at the MBR plant would be pumped into a recycled water main and distribution system (“purple” pipes) and conveyed throughout the Heller site development to provide water for toilet flushing and landscape irrigation. Recycled water would also be conveyed north via a recycled water main that would be located in the utility corridor extending between the Kresge parking lot and the Heller site. The main would convey recycled water to Porter College where the residence halls are already fitted with dedicated purple pipes to convey recycled water for toilet flushing and landscape irrigation. Any excess recycled water that is not utilized elsewhere on campus would be disposed of in dry wells. It would be discharged to the municipal sewer system only in an emergency.

Since all wastewater from the Heller site would be treated at the proposed MBR plant, wastewater from the Heller site would not be discharged into the campus sewer system or the city’s sewer system and would, therefore, not contribute to an exceedance of the wastewater treatment requirements of the City of Santa Cruz Wastewater Treatment Plant. The environmental impacts from the construction and operation of the proposed MBR facility and recycled water lines are evaluated as part of the proposed project in this EIR. Potential air, noise, or water quality impacts from the construction of the MBR facility and recycled water lines would be less than significant. However, as discussed in **Sections 4.3** and **4.4** of this Draft EIR, the construction of the proposed facilities would result in potentially significant impacts on cultural and biological resources.

Hagar Site

It is estimated that the Hagar site would generate about 0.025 mgd of wastewater. The on-site sanitary sewer system would consist of a main that would loop through the development and serve the proposed buildings. The main would travel to the southwest of the Hagar site, cross under Hagar Drive, continue

south in a utility corridor that would parallel to Glenn Coolidge Drive, and connect to an existing 12-inch sewer main. As the on-site collection system is an element of the proposed project, the environmental impacts from the construction of the on-site collection system are addressed in other sections of the Draft EIR. As the analysis shows, potential air, noise, or water quality impacts from the construction of the collection system would be less than significant. However, as discussed in **Sections 4.3 and 4.4** of this Draft EIR, the construction of the proposed facilities would result in potentially significant impacts on cultural and biological resources.

The City of Santa Cruz provides municipal wastewater treatment services to the UC Santa Cruz campus through the Santa Cruz WWTP. The Santa Cruz WWTP currently operates at approximately 59 percent of capacity. As mentioned above, under the terms of a 1962 agreement, the City agreed to provide sanitary sewer lines sufficient to meet the needs of the University (UCSC 2006). 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 and the City to ensure that the Campus complies with wastewater discharge limitations (UCSC 2006). Therefore, the volume of wastewater generated by the proposed project would be accommodated by the treatment capacity at the Santa Cruz WWTP. Furthermore, the proposed project would provide housing for student families. Therefore, the quality of wastewater from the project site would not be different compared to flows received from other sources in the City. Consequently, the proposed project would not contribute to an exceedance of the wastewater treatment requirements of the Santa Cruz WWTP and no expansion of the Santa Cruz WWTP would be required to treat the project's wastewater flows. The impact would be less than significant.

Mitigation Measures:

SHW Mitigation UTIL-1: Implement SHW Mitigations BIO-1B, BIO-2, and CULT-2B.

Significance after Mitigation: The impacts on biological and cultural resources from the construction of the MBR and wastewater collection system would be reduced to a less than significant level.

SHW Impact UTIL-2: The proposed project would result in the construction of off-site wastewater conveyance infrastructure, the construction of which could cause significant environmental effects. (*Potentially Significant; Less than Significant with Mitigation*)

Heller Site

As mentioned above, all of the wastewater generated on the Heller site would be routed to the proposed MBR facility and would not be conveyed off site. Therefore, the Heller site development would not require an expansion or construction of any off-site wastewater conveyance infrastructure. There would be no impact.

Hagar Site

With respect to the Hagar site, to serve the proposed development approximately 900 feet of sewer line would be constructed from the project site to the 12-inch sewer main located southwest of Hagar Drive. The environmental effects from the construction of this off-site improvement are analyzed in other section of this Draft EIR. Potential air, noise or water quality impacts from pipeline construction activities would be less than significant. However, as discussed in **Sections 4.3 and 4.4** of this Draft EIR, the construction of the proposed off-site sewer line would result in potentially significant impacts on cultural and biological resources.

Wastewater from the Hagar site would be discharged into the Jordan Gulch sewer main which combines with the Empire Grade sewer main into a single sewer at the Cook House, and the single sewer then discharges into the City's sewer system at Bay and High Streets. From Bay Street, the wastewater is conveyed south in a sewer main located in Arroyo Seco canyon. The 2005 LRDP EIR estimated the increase in wastewater flows from the main campus and estimated that the peak wet weather wastewater flow would be about 1,405 gpm in 2020 based on projected indoor water demand. The EIR evaluated the impact of additional wastewater flows from the campus on the City's conveyance system and noted that an upgrade of the Arroyo Seco sewer line would likely be required to handle the increased campus and non-campus flows. The EIR noted that the Campus would comply with its obligations as authorized under Government Code Section 54999. In addition, the Campus had previously committed to implement a 1988 LRDP EIR mitigation measure which required the Campus to pay for sewer line capacity improvements. An upgrade of the Arroyo Seco sewer line was completed by the City in 2010, with a "dedicated" capacity of 2,125 gpm under peak wet weather flows for UC Santa Cruz main campus. The Campus paid a share of the cost of the upgrade.

The net increase in wastewater discharged from the campus due to the Hagar site housing would be minimal because the proposed 148 student housing units would replace the existing 196 FSH units on the Heller site. The increase would be small and would be within the peak wet weather flow analyzed in the 2005 LRDP for 2020 conditions. The projected main campus flow of 1,405 gpm in 2020 is well within the

dedicated capacity of 2,125 gpm. Therefore, the Hagar site development would not require an expansion of the City's conveyance system.

In summary, while no sewer line improvements would be needed off-campus, the construction of the sewer line from the Hagar site to the Jordan Gulch sewer main would have the potential to significantly affect biological and cultural resources. In addition to LRDP mitigation measures, project-specific mitigation measures are set forth in those sections to mitigate the impacts from the construction of the proposed sewer line.

Mitigation Measures:

SHW Mitigation UTIL-2: Implement SHW Mitigations BIO-1B, BIO-2, and CULT-2B.

Significance after Mitigation: The impacts on biological and cultural resources from sewer line construction would be reduced to a less than significant level.

SHW Impact UTIL-3: The proposed project would require the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. *(Potentially Significant; Less than Significant with Mitigation)*

Heller Site

The proposed project would increase the total area of impervious surfaces on the 13-acre Heller site by about 1.9 acres. As a result, additional storm water runoff would be generated that would require collection, treatment, disposal in compliance with NPDES requirements. The project is required to comply with water quality (treatment) and volume requirements as defined by the UC Santa Cruz Post-Construction Storm Water Management Requirements.

The proposed drainage system on the Heller site would collect storm water runoff within bio-filtration basins located adjacent to the proposed buildings and then direct it to a storm water main. Two options are under consideration for final discharge of storm water: under the first option the main would discharge to an infiltration well, within the soil layer over the weathered schist bedrock, whereas under the second option, the storm water runoff would be detained on-site and discharged at a metered rate (not to exceed the pre-project peak flows for the 2- through 10-year 24-hour storm events) to an existing detention basin on the east side of Heller Drive. This design of the storm water drainage system on the Heller site would ensure that post-development peak flows do not exceed pre-development peak flows

from 2 to 10-year storms in compliance with LRDP Mitigation HYD-3C and the Campus's Post Construction Stormwater Management Requirements (UCSC 2018a). Thus, compliance with NPDES requirements, incorporation of bioretention features, slope limits, and landscaping, the Heller site would not require or result in the construction of new storm water drainage facilities or expansion of existing facilities other than those described above, the construction of which could cause a significant environmental effect. This impact would be less than significant.

Hagar Site

The proposed project would install impervious surfaces, including the townhouses, childcare center, pathways, roadways, and parking areas on the Hagar site, which would result in the generation of storm water runoff that would require collection and disposal. The project is required to comply with water quality (treatment) and volume requirements as defined by the UC Santa Cruz Post-Construction Storm Water Management Requirements. These require that new runoff be minimized, all storm water be treated before discharge into receiving waters, and that the post-development peak flows discharged from the site shall not exceed pre-project peak flows for the 2- through 10-year 24 hour storm events.

At the Hagar site, all site runoff would be directed to pipes or lined bioswales. Treatment to remove urban pollutants would be accomplished in the bioswales and, if necessary, using engineered treatment systems. The bioswales would also serve to slow runoff, but underground detention pipes would be used detain runoff to reduce peak flows as required by the Post-Construction Standards. The treated and metered runoff, as well as run-on from the grasslands above the site, would be discharged to two locations, in order to limit the impact to the existing sinkhole at the intersection of Hagar and Glenn Coolidge Drives. Some of the treated and metered runoff may be discharged to this detention basin. The remainder of the runoff would be piped beneath Hagar Drive and the undeveloped meadow area and would be discharged through a dissipation structure into Jordan Gulch. The Hagar site development would not require or result in the construction of new storm water drainage facilities or expansion of existing facilities other than those described above, the construction of which could cause a significant environmental effect. The impacts of constructing the storm drain from the project site to Jordan Gulch are evaluated in this EIR and are noted to be potentially significant with respect to impacts on biological and cultural resources. Project-specific mitigation measures are set forth to mitigate the impacts from the construction of the proposed sewer line.

Mitigation Measures:

SHW Mitigation UTIL-3: Implement SHW Mitigations BIO-1B, BIO-2, and CULT-2B.

Significance after Mitigation: The impacts on biological and cultural resources from storm drain construction would be reduced to a less than significant level.

SHW Impact UTIL-4: The proposed project would increase the amount of water used on the project site, and would be adequately served by existing entitlements and water resources under normal water years but not under multiple dry year conditions. (*Significant; Significant and Unavoidable*)

The project would be constructed in phases with the Hagar site available for occupancy by Fall 2019 and the Heller site occupied by Fall 2022.

Heller Site

There are currently 572 students and dependents at the existing FSH facility on the Heller site.¹ Water demand at the existing FSH site is approximately 7.2 million gallons per year. The students with families would be moved from the Heller site and 2,652 undergraduate, 200 graduate students and about 100 dependents would occupy the proposed Heller site.² It is estimated that the proposed Heller site would demand approximately 19.1 million gallons of water per year (mgy). This estimate accounts for a 25 percent water efficiency reduction attributed to efficiency measures necessary to achieve the Campus' net-zero water goal. Additionally, all wastewater generated at the Heller site would be collected and treated at the proposed on-site wastewater treatment facility. Recycled water from the proposed wastewater treatment facility would then be utilized for non-potable water uses at the Heller site including toilet flushing and irrigation.

Hagar Site

The Hagar site is currently undeveloped and there is no existing water use at the site. The proposed Hagar site development would house 148 students and 296 dependents, and additional employees would work at the Hagar site and childcare center. The proposed Hagar site is estimated to demand approximately 9.5 mgy.

Therefore, the total potable water demand associated with the proposed SHW project is estimated to be approximately 28.6 mgy. **Section 7.1, LRDP Water Supply Impact Assessment**, presents an evaluation of

¹ Includes 15 employees at the childcare center and 10 employees to manage FSH.

² There would also be a number of employees working on the Heller site.

the impact on water supply that would result from campus growth under the 2005 LRDP, including the potable water demand associated with the proposed SHW project. As detailed in **Section 7.1**, the Campus's water demand at buildout under the 2005 LRDP, including the demand associated with the proposed project, is accounted for in the City's water projections used in the City's 2015 Urban Water Management Plan (UWMP). The UWMP notes that there would be adequate water supply from the City's existing water sources in normal water years to serve the total projected water demand and the City would not need to secure a new water source to serve the increase in demand. However, during 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. The Campus's incremental water demand, including the water demand of the proposed SHW project, 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. As discussed in **Section 7.1**, the impact of the 2005 LRDP on water supply during multiple dry water year conditions would be a significant impact, which would not be mitigated to a less than significant level with available mitigation.

As the water demand associated with the proposed SHW project would make a substantial portion of the additional water demand of the Campus analyzed in **Section 7.1**, the project-level impact of the SHW project is also considered significant. This is a highly conservative conclusion for a number of reasons. First, the project's water demand is within the amount of water identified for the Campus by the City in its water planning efforts. Second, the project incorporates recycled water and minimizes the use of potable water to the maximum extent feasible. Third, similar to other campus facilities, in the event of a prolonged drought, the SHW occupants would curtail water use as would the rest of the campus. Lastly, in a recent CEQA document prepared by the City of Santa Cruz which involved a projected water demand comparable to that of the proposed SHW project, the City concluded that the project's water supply impact would be less than significant (e.g., see City of Santa Cruz Downtown Plan Amendments EIR dated October 2017). Nonetheless, the University has determined that the SHW project's water supply impact would be significant.

Mitigation Measures: No mitigation is feasible. The Campus has designed the proposed SHW project as a highly water efficient project that includes the use of recycled water and water efficient fixtures. No other design features or fixtures are available to further reduce the project's potable water demand.

Significance after Mitigation: The impact would be significant and unavoidable.

SHW Impact UTIL-5: The proposed project would increase the amount of solid waste generated on the project site, but would be adequately served by the regional landfill and would also comply with federal, state, and local statutes and regulations related to solid waste. (*Less than Significant*)

Heller Site

The proposed student housing at the Heller site would result in the generation of solid waste, recyclables, and compostable waste materials. The estimated increase in solid waste that would be generated at the Heller site is approximately 392 tons/year. The existing FSH facility generates solid waste at about 197 tons/year. The net increase at the Heller site would be 195 tons/year.

In addition to the waste generated in the new housing and related facilities, screened inorganic solids would be separated from the effluent in the MBR plant headworks, which would be deposited in garbage bags. The MBR plant would likely result in two large garbage bags per week to be collected for landfill disposal. Biological solids/sludge produced by the treatment process would be periodically pumped out of the plant and transported to an off-site properly regulated disposal site.

Hagar Site

The proposed family student housing at the Hagar site would result in the generation of solid waste, recyclables, and compostable waste materials. The estimated solid waste that would be generated at the Hagar site is approximately 163 tons/year.

Both sites combined would generate about 358 tons/year of municipal solid waste. In 2016, the main refuse trucks from UC Santa Cruz hauled approximately 1,500 tons of waste to the Santa Cruz landfill, not including green waste, recycling, and construction debris. Conservatively, without accounting for diversion, wastes generated at both project sites would account for about 24 percent of the 2016 total wastes from the campus. As of 2012, the landfill had a remaining capacity of 5,222,718 cubic yards (cy) and is not expected to reach capacity until 2066 (Pearson 2017). Additionally, per UC's Zero Waste policy goal, at both sites, the project would include adequate facilities to encourage recycling and composting, and minimize solid waste that would need landfill disposal. Thus, the proposed project would not result in a landfill exceeding its permitted capacity or non-compliance with federal, state, and local statutes and regulations related to solid waste.

Mitigation Measures: No mitigation is required.

4.13.5 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

There are existing utilities in and adjacent to the areas where the proposed dining facility expansions would be constructed.

Impacts and Mitigation Measures

DF Impact UTIL-1: **The implementation of the proposed dining facilities project would not cause substantial adverse impacts requiring new or expanded water supply or expansion of a water delivery system; result in the construction of new wastewater treatment facilities or conveyance systems; or require construction or expansion of new storm water drainage facilities. The proposed dining facilities project would comply with all regulations related to solid waste and there would be sufficient landfill capacity to serve the proposed project. (*Less than Significant*)**

Water Supply and Delivery System

Due to the nature of the project, a small increase in the use of potable water would occur as a result of expanding the two dining areas. The increase is accounted for in the projected water demand for the campus that is estimated and analyzed in **Section 7.1** of this EIR. The increase associated with the dining facilities expansion project, by itself, would be too small to result in the need for new or expanded water supply entitlements or expansion of the water delivery system. No significant impacts to water supply would occur.

Wastewater Conveyance and Treatment

The proposed dining facilities project may include construction of additional restrooms. However, the amount of wastewater produced is not expected to be substantial and would not result in the need for new or expanded wastewater facilities or conveyance systems.

Storm Water

The proposed expansion of the seating area at the Porter College Dining Hall would be on an elevated patio or second floor room located on piers. Thus, the increase of impervious surfaces would be negligible. The proposed new kitchen and servery at the Rachel Carson Dining Hall would be either

within the existing building and therefore there would be no increase in impervious surfaces, or to the extent the building is extended, the increase in impervious surfaces would be small. As any increase in impervious areas at both dining halls would be minimal, storm water drainage would not be affected, and new drainage facilities would not be required. Furthermore, the project would be required to comply with the Post Construction Requirements of the campus. Less than significant impacts related to storm water would occur.

Landfill Capacity

The increase of solid waste generated by the increase of students utilizing the expanded dining facilities would be minimal because of the Campus's program to minimize waste disposed in landfills as well as because of the fact that all compostable materials from dining halls on campus are collected in compactors which are then hauled to the Monterey Regional Waste Management District Landfill in Marina, where the materials are composted in an anaerobic digester and composting system. Thus, the impact from waste generated from dining facilities expansion project on landfill capacity would be less than significant.

Mitigation Measures: No mitigation is required.

4.13.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

SHW Impact C-UTIL-1: **The proposed project, in conjunction with other past, present and reasonably foreseeable future development, would result in a significant cumulative impact on utilities. (*Significant; Significant and Unavoidable*)**

The cumulative impact of campus development under the 2005 LRDP along with other regional growth in the SCWD service area is analyzed in the 2005 LRDP EIR under LRDP Impact UTIL-9. The 2005 LRDP Final EIR found that growth under the 2005 LRDP would generate increased demand for water during normal and drought years, and the development of new water supplies and infrastructure to serve normal and drought year demand could result in significant environmental impacts. The 2005 Final EIR found that although implementation of LRDP Mitigation Measures UTIL-9A through UTIL-9I along with the Campus's existing water conservation measures and obligations under Government Code Section 54999, would reduce the Campus's contribution to cumulative water supply impacts, they would not eliminate the need for a new water source and that water supply source may have significant environmental impacts. As discussed in **Section 7.0**, the Santa Cruz County Superior Court found that

the water supply impact assessment in the 2005 LRDP EIR was deficient and instructed the Campus to supplement that analysis. A new water supply impact assessment has been completed and is presented in detail in **Section 7.1**. That analysis shows that the Campus's demand for water under the 2005 LRDP, including the SHW project and the dining facilities expansion project, in conjunction with the demand for water due to foreseeable growth within the water service area would not exceed the City's water supply under normal and single dry water years and therefore the cumulative impact on water supply would not be significant. However under multiple dry water year conditions, the supplies would be substantially lower than the demand and that the City would need to develop a new water supply source to serve the demand. Potential environmental impacts from developing a new supply source are presented in **Section 7.1**, and were determined to be significant and unavoidable. Although mitigation measures identified in **Section 7.1** would reduce the Campus's contribution to cumulative water supply impacts, they would not eliminate the need for a new water source. Therefore the impact would be significant and unavoidable.

The cumulative impact of campus development under the 2005 LRDP along with other regional development on wastewater treatment facilities and landfills is analyzed under LRDP Impact UTIL-10. The 2005 LRDP EIR found that the expansion of associated utilities and service systems to meet this demand would not result in significant environmental impacts. The proposed SHW project as well as the related dining facilities expansion project would not increase enrollment at UC Santa Cruz or the regional population levels. Therefore, the cumulative impact of the proposed SHW project and related dining facilities expansion project on wastewater treatment facilities and landfills is adequately addressed by the analysis in the 2005 LRDP EIR, and would be less than significant.

Mitigation Measures: No mitigation is feasible.

Significance after Mitigation: The cumulative impact on utilities would be significant and unavoidable.

4.13.7 REFERENCES

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4.14.1 INTRODUCTION

This section evaluates potential impacts associated with the consumption of energy that would result from the implementation of the proposed Student Housing West project (“proposed project”). The section follows the guidance for the evaluation of energy impacts provided in Appendix F, Energy Conservation, of the State CEQA Guidelines.

It also presents potential energy impacts from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and the existing colleges (see **Section 4.14.5** below).

4.14.2 ENVIRONMENTAL SETTING

Electricity Supply

Electricity

Approximately 67 percent of electricity used within California in 2015 was generated within the state from natural gas (40 percent), nuclear (6 percent), large hydroelectric (4 percent), renewable resources (16 percent), and coal (<1 percent) (CEC 2016a). The remaining portion of electricity was generated in the southwest United States (21 percent) and within the Pacific Northwest (12 percent). The State of California power mix, including in-state generation and out of state purchase in 2015, comprised natural gas (44 percent), renewable resources (22 percent), large hydroelectric (5 percent), coal (6 percent), nuclear (9 percent), and additional unspecified sources of power (14 percent) (CEC 2016a). In 2015, the total system power for California was 295,405 gigawatt-hours (GWh), which is almost 4 percent higher than 2014 (CEC 2016a).

Pacific Gas and Electric (PG&E) currently 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 21 kilovolts (kV) of electricity is directed 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 to most of the campus buildings (UCSC 2006). Lower campus buildings receive power from a separate, single line and the Family Student Housing and employee housing complexes are served by separate PG&E connections as well. Electricity is “master metered” at the whole-campus level by PG&E, except for FSH and employee housing, but the campus

Energy Department maintains a sub-metering system to monitor energy use at the building level (UCSC 2006).

In 2014, the campus used 48,370,319 kilowatt hours per year (kWh/year), with peak daily consumption of 163,394 kWh/day occurring in May. In general, the campus uses between 120,000 kWh/day and 150,000 kWh/day during the school year. During the summer months and school breaks, when the campus population drops significantly, average daily usage drops to between 110,000 kWh/day and 130,000 kWh/day (CES 2017).

In 2015-2016, the campus purchased approximately 22,000,000 kWh from PG&E, the smallest purchase of electricity since before 2007, and a significant decrease from 2014-2015, when the campus purchased nearly 55,000,000 kWh. This decrease is associated with the installation and operation of a new natural-gas-powered combustion turbine generator at the campus cogeneration plant (described below), which provides approximately 4.1 MW usable output or about 56 percent of the campus' electricity needs (CES 2017). The substantial decrease in electricity purchased in 2015-2016 is reflected in an equally substantial increase in natural gas purchased.

UC Santa Cruz Cogeneration Plant

Some of the electricity utilized at UC Santa Cruz is produced on campus by the cogeneration plant, located in the Central Heat Plant area on campus. The plant provides backup for emergency responders, safety systems, and research equipment, as well as supplementing the electricity purchased from PG&E. In 2012, the cogeneration facility was remodeled into a 4,900 sq. foot multi-story building, which is managed and maintained by Physical Plant staff. The building houses a Solar Mercury CTG single combustion turbine and associated heat recovery unit (HRU) to produce hot water and electricity. 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 (UCSC 2011).

Natural Gas

In 2012, natural gas used within California was extracted in the state (9 percent), Canada (16 percent), the Rocky Mountain region of the United States (40 percent), and in the southwest United States (35 percent) (CPUC 2016). In 2012, natural gas was used in California to produce electricity (45.6 percent), in residential uses (21 percent), in industrial uses (25 percent), and in commercial uses (8.6 percent). The total natural gas usage in 2012 was 2,313,000 BBTU/year (CEC 2016a).

UC Santa Cruz currently uses natural gas to run the cogeneration plant and 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 (UCSC 2011).

Petroleum Based Fuel

In 2015, approximately 12 billion gallons of gasoline (non-diesel) and 1.6 billion gallons of diesel fuel were sold statewide (CEC 2016a). It is estimated that in Santa Cruz County, 96 million gallons of gasoline were purchased in 2015, in addition to 6 million gallons of diesel fuel (CEC 2016b). Both gasoline and diesel consumption in 2015 were slightly lower than the California Energy Commission's (CEC) projections. UC Santa Cruz has a transportation fleet of approximately 700 vehicles. There is an on-campus fueling station, located behind the Fleet Services' Central Garage near the southern end of campus that provides unleaded and diesel fuel, as well as compressed natural gas (CNG) for campus vehicles.

4.14.3 REGULATORY CONSIDERATIONS

4.14.3.1 Federal Regulations

Energy Independence and Security Act

In 2007, Energy Independence and Security Act (EISA) was signed into law. EISA aims to increase building, product, and vehicle efficiency; accelerate clean renewable fuel production; and institute other measures aimed at increasing U.S. energy independence and security.

Executive Order 13693

On 19 March 2015, the President signed Executive Order (EO) 13693, *Planning for Federal Sustainability in the Next Decade*. The overarching goal of EO 13693 is to maintain Federal leadership in sustainability and greenhouse gas emission reductions. Among other goals, the EO includes the following goals related to energy:

- 25 percent reduction in energy use intensity (2015 baseline)
- 30 percent of electricity supply from renewable energy
- 25 percent of energy supply (electricity and natural gas) from renewable energy

- 25 percent reduction in transportation-related greenhouse gas emissions (2008 baseline)
- 30 percent reduction in fleet petroleum use (2014 baseline)
- New buildings to be zero net energy (and where feasible, zero net waste and water) that enter the design process after 2020

Energy Policy and Conservation Act

Enacted in 1975, this legislation established fuel economy standards for new light-duty vehicles sold in the U.S. The law placed responsibility on the National Highway Traffic and Safety Administration (a part of the U.S. Department of Transportation) for establishing and regularly updating vehicle standards. The U.S. Environmental Protection Agency (U.S. EPA) administers the Corporate Average Fuel Economy (CAFE) program, which determines vehicle manufacturers' compliance with existing fuel economy standards. Since the inception of the CAFE program, the average fuel economy for new light-duty vehicles (autos, pickups, vans, and SUVs) steadily increased from 13.1 mpg for the 1975 model year to 27.5 mpg for the 2012 model year and is proposed to increase to 54.5 by 2025.

Energy Star Program

In 1992, the U.S. EPA introduced Energy Star as a voluntary labeling program designed to identify and promote energy-efficient products to reduce greenhouse gas emissions. The program applies to major household appliances, lighting, computers, and building components such as windows, doors, roofs, and heating and cooling systems. Under this program, appliances that meet specifications for maximum energy use established under the program are certified to display the Energy Star label. In 1996, US EPA joined with the Energy Department to expand the program, which now also includes qualifying commercial and industrial buildings, and homes.

4.14.3.2 State Regulations

Title 24

Title 24, Part 6, of the California Code of Regulations contains the California Energy Commission's (CEC) Energy Efficiency Standards for Residential and Nonresidential Buildings. Title 24 was first established in 1978, in response to a legislative mandate to reduce California's energy consumption. Since that time, Title 24 has been updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods.

On April 23, 2008, the CEC adopted the 2008 standards, which applied to projects that submitted an application for a building permit on or after January 1, 2010. The CEC adopted the 2008 standards for a

number of reasons: (1) to provide California with an adequate, reasonably priced, and environmentally sound supply of energy; (2) to respond to Assembly Bill 32 (AB 32; the Global Warming Solutions Act of 2006), which requires California to reduce its greenhouse gas emissions to 1990 levels by 2020; (3) to pursue the statewide policy that energy efficiency is the resource of choice for meeting California's energy needs; (4) to act on the findings of California's Integrated Energy Policy Report, which indicate that the 2008 Standards are the most cost-effective means to achieve energy efficiency, reduce the energy demand associated with water supply, and reduce greenhouse gas emissions; (5) to meet the West Coast Governors' Global Warming Initiative commitment to include aggressive energy efficiency measures in the update of all state building codes; and (6) to meet the Executive Order in the Green Building Initiative to improve the energy efficiency of nonresidential buildings through aggressive standards.¹ In 2013, updates were made to the 2008 Title 24 standards (effective January 1, 2014).

The California Green Building Standards Code, which is Part 11 of the Title 24 Building Standards Code, is commonly referred to as the CALGreen Code. The 2008 edition, the first edition of the CALGreen Code, contained only voluntary standards. The CALGreen Code was last updated in 2016 and became effective January 2017. The CALGreen Code identifies mandatory requirements for new residential and nonresidential buildings (including buildings for retail, office, public schools, and hospitals) throughout California. The CALGreen Code contains requirements for construction site selection, stormwater control during construction, construction solid waste reduction, indoor water use reduction, building material selection, natural resource conservation, site irrigation conservation, and more. Additionally, this code encourages buildings to achieve exemplary performance in the area of energy efficiency.

AB 32, Executive Order S-3-05, Executive Order B-30-15, and SB 32

In addition to Title 24, a number of state laws and regulations, including AB 32, Executive Order S-3-05, Executive Order B-30-15, and SB 32, are anticipated to result in the future regulation of energy resources in California. (See **Section 4.4, Greenhouse Gas Emissions**, for additional information on AB 32, SB 32, and the two executive orders.) In order to achieve the GHG emission reductions targeted under these state laws, it is generally accepted that California will need to improve its overall energy efficiency as well as continue to increase its use of renewable energy resources. Pursuant to AB 32 and SB 32, the California Air Resources Board (CARB) will work with other state agencies (including the CEC), to implement feasible programs and regulations that reduce emissions and improve energy efficiency.²

¹ See <http://www.energy.ca.gov/title24/2008standards/index.html>, 2013.

² See <http://www.arb.ca.gov/cc/ghgsectors/ghgsectors.htm#electric>, September 13, 2013 (highlights targeted improvements for the energy sector).

Senate Bill 350

Senate Bill 350 (SB 350) was signed into law in 2015. The legislation requires that, by 2030, 50 percent of all electricity provided by power plants in California must be from renewable sources. SB 350 further requires the CEC to establish annual targets for statewide energy efficiency savings and demand reduction that would achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas by retail customers by 2030. The bill requires the Public Utilities Commission to establish efficiency targets for investor-owned electrical and gas corporations consistent with the 2030 goal, and the CEC to establish annual targets for energy efficiency savings and demand reductions for local publicly-owned electric utilities consistent with the 2030 goal. Each retailer of electricity must regularly file an integrated resource plan (IRP) for review and approval. This bill requires that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be at 50 percent of the total sold energy by December 31, 2030.

Other Energy Related Statutes and Executive Orders

Additional legislation and executive orders focused on energy efficiency in California are highlighted briefly below:

- Senate Bill 107: This legislation, which addresses California's Renewables Portfolio Standard (RPS), required retail sellers of electricity to procure 20 percent of retail sales from renewable energy.
- Assembly Bill 1613: This legislation, also known as the Waste Heat and Carbon Emissions Reduction Act, was designed to encourage the development of new combined heat and power systems in California with a generating capacity of up to 20 megawatts (MW).
- Senate Bill 1: This legislation enacted the Governor's Million Solar Roofs program and has an overall objective of installing 3,000 MW of solar photovoltaic systems.
- Senate Bill 1389: This legislation requires the CEC to prepare a biennial integrated energy policy report that contains an assessment of major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety.
- Executive Order S-14-08: This order established accelerated RPS targets—specifically 33 percent by 2020.
- Executive Order S-21-09: This order required CARB to adopt regulations, increasing California's RPS to 33 percent by 2020.

- Senate Bill SBX1-2: This legislation established new RPS goals of 20 percent of retail sales from renewables by the end of 2013, 25 percent by the end of 2016, and 33 percent by the end of 2020.³

4.14.3.3 Local Plans and Policies

University of California Sustainable Practices Policy

The University of California Sustainable Practices Policy (“Policy”), most recently updated in September 2016, is a system-wide commitment to minimize the University’s impact on the environment and reduce its dependence on non-renewable energy sources. The Policy establishes goals in 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. More information on the Policy is presented in **Section 4.6, Greenhouse Gas Emissions**.

UC Santa Cruz Climate and Energy Strategy

The UC Santa Cruz Climate and Energy Strategy (CES) report was prepared in 2016. The CES report resulted from an eighteen-month process led by campus staff in partnership with a team of consultants to develop a detailed plan for achieving UC Santa Cruz’s two climate and energy goals:

- Achieve carbon neutrality by 2025 for scopes 1 and 2 emissions, and
- Mitigate the impacts of Cap and Trade regulation.

Campus Sustainability Plan 2017-2022

The Campus Sustainability Plan 2017-2022 lays out UC Santa Cruz’s sustainability goals for the next five years. Goals and strategies addressed within the plan are grouped into five topics:

Learning and Culture

The goals and strategies under this topic provide mechanisms for engaging students, staff, faculty and the Santa Cruz community in sustainability through research, curricular and co-curricular efforts, outreach, education and collaboration; identify opportunities for integrating prosperity, equity, and fairness into our campus’ business and operations; and strategies to encourage the use of the campus as a living laboratory for academic research on sustainability and justice issues (UCSC 2017).

³ PG&E is currently under contract through 2020 to procure 37 percent of retail sales from renewable energy sources.

Material Management and Food Systems

The goals and strategies under this topic 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.

Natural Environment & Infrastructure

The goals and strategies under this topic highlight the interrelated nature of campus lands and physical infrastructure and explore synergies related to the operational topics of Transportation, Land & Habitat Stewardship, Watershed & Stormwater, and Water Conservation.

Climate & Energy

The goals and strategies under this topic addresses the Carbon Neutrality Initiative, a system-wide challenge issued by President Napolitano for all campuses to achieve carbon neutrality by 2025 for their onsite sources of combustion, such as cogeneration and boilers, purchased electricity and the campus vehicle fleet.

4.14.4 IMPACTS AND MITIGATION MEASURES

4.14.4.1 Significance Criteria

Public Resources Code (PRC) Section 21100(b)(3) and State CEQA Guidelines Section 15126.4 require EIRs to describe, where relevant, the wasteful, inefficient, and unnecessary consumption of energy caused by a project. Neither Appendix F of the State CEQA Guidelines nor PRC Section 21100(b)(3)) offer a threshold of significance that might be used to evaluate the potential significance of energy consumption of a proposed project. Rather, the emphasis is on reducing “the wasteful, inefficient, and unnecessary consumption of energy.”

Additionally, UC Santa Cruz has determined that a project’s impacts would be considered significant if the project would require new or expanded energy facilities, the construction of which would result in significant environmental impacts.

Therefore, based on the above, the impact of the proposed project related to energy would be considered significant if it would exceed the following standards of significance:

- Involve the wasteful, inefficient, and unnecessary consumption of energy, especially fossil fuels such as coal, natural gas, and oil, associated with project design, project location, the use of

electricity and/or natural gas, and/or the use of fuel by vehicles anticipated to travel to and from the project; or

- Exceed the LRDP EIR standard of significance by resulting in the construction of new or expanded electrical or natural gas facilities, the construction of which would cause significant environmental effects. (see Section 3.15 of the 2005 LRDP EIR.)

Appendix F of the State CEQA Guidelines describes the means of achieving the goal of conserving energy to include:

- Decreasing overall per capita energy consumption;
- Decreasing reliance on natural gas and oil; and
- Increasing reliance on renewable energy sources.

4.14.4.2 CEQA Checklist Items Adequately Analyzed at the 2005 LRDP Level or Not Applicable to the Project

Although redevelopment of the FSH complex on the Heller site was evaluated in the 2005 LRDP EIR, the currently proposed Heller site housing is substantially different from the previous proposal. With regard to the Hagar site, that site was not envisioned for any development under the 2005 LRDP. Therefore, although the analysis below uses the prior LRDP level analysis to the extent appropriate, neither of the CEQA checklist items listed above under Significance Criteria are scoped out; both items are addressed in the project-level analysis below.

4.14.4.3 Methodology

Appendix F requires an EIR to present the total energy required by a project by fuel type and end use, during construction, operation and removal of the project. The methodology used to estimate the construction-phase energy use is described in **SHW Impact EN-1** below. With respect to energy consumption during occupancy/operation, the increased electricity and natural gas demand due to operation/occupancy of the proposed project were obtained from the project description.

4.14.4.4 2005 LRDP EIR Impacts and Mitigation Measures

Table 4.14-1, 2005 LRDP EIR Mitigation Measures, presents an energy-related mitigation measure in the 2005 LRDP EIR that is applicable to the proposed project. Since this previously adopted mitigation measure is already being carried out as part of implementation of the 2005 LRDP, it is included in and is a part of the proposed project and will not be readopted. Implementation of the mitigation measure is assumed as part of the project impact analysis.

Table 4.14-1
2005 LRDP EIR Mitigation Measures

Mitigation Measure	Description
UTIL-5	Where feasible, new campus buildings will be added to the Campus Energy Management System and heating and cooling will be controlled based on time of use of building and outside temperature..
<i>Source: UC Santa Cruz 2006</i>	

4.14.4.5 Project Impacts and Mitigation Measures

SHW Impact EN-1: **Construction and operation of the proposed project would increase the use of energy resources on the project site but would not result in wasteful, inefficient or unnecessary consumption of energy resources. (*Less than Significant*)**

Construction

During construction of the proposed project, energy would be consumed in the form of petroleum-based fuels used to power off-road construction vehicles and equipment on the project site, construction worker travel to and from the project site, as well as delivery truck trips; and to operate generators to provide temporary power for lighting and electronic equipment. The manufacture of construction materials used by the proposed project would also involve energy use. Due to the large number of materials and manufacturers involved in the production of construction materials (including manufacturers in other states and countries), upstream energy use cannot be reasonably estimated. However, it is reasonable to assume that manufacturers of building materials such as concrete, steel, etc., would employ all reasonable energy conservation practices in the interest of minimizing the cost of doing business. Furthermore, UC Santa Cruz has no control over or the ability to influence energy resource use by the manufacturers of construction materials. Therefore, this analysis does not evaluate upstream energy use.

At the Heller site, the project would require site preparation (i.e., demolition and grading); pavement and asphalt installation; building construction; architectural coating; and landscaping and hardscaping. The Hagar site would involve the same construction activities but no demolition would be required. All construction would be typical for the region and building type. The total consumption of gasoline and diesel fuel during project construction was estimated using the same assumptions and factors from CalEEMod that were used in estimating construction air emissions in **Section 4.2, Air Quality**. The

estimated amounts of energy resources that would be consumed at each site are presented in **Table 4.14-2, Construction Period Diesel Fuel and Petroleum Fuel Consumption** below (see **Appendix 4.14** for detailed breakdown).

Table 4.14-2
Construction Period Diesel Fuel and Petroleum Fuel Consumption

Fuel Type	Diesel Fuel (in gallons)^a	Petroleum Fuel (in gallons)
Heller Site	211,740	185,817
Hagar Site	65,208	17,049
Total	276,948	202,866
<i>Source: CalEEMod Model Data; Illingworth & Rodkin 2018</i> <i>Notes:</i> <i>a. Includes consumption from off-road construction equipment, vendor trips, and hauling trips.</i> <i>b. Includes consumptions from worker trips.</i>		

As shown in **Table 4.14-2**, above, off-road construction equipment, vendor trips, and hauling trips would consume a total of approximately 276,948 gallons of diesel over the project construction period. Worker trips would consume a total of 202,866 gallons of gasoline over the project's construction period. These would be consumed over a period of 46 months and would represent a small percentage of the total energy used in the state and by UC Santa Cruz. More importantly, for reasons presented below, this consumption would not represent a wasteful and inefficient use of energy resources.

There is growing recognition among developers and retailers that sustainable construction is not any more expensive than "business as usual" construction methods, and further, that there are long-term significant cost-savings potential in utilizing green building practices and materials. In addition, the proposed project would feature a sustainable design to comply with CALGreen, which would also result in the use of sustainable materials and recycled content that would reduce energy consumption during project construction. Construction materials would be products originating from nearby sources to the extent feasible in order to comply with CALGreen and to reduce costs of transportation.

CARB has adopted an Airborne Toxic Control Measure (ATCM) to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter and other toxic air contaminants. This measure prohibits diesel-fueled commercial vehicles greater than 10,000 pounds from idling for more than 5 minutes at any given time. Furthermore, to reduce public exposure to diesel particulate matter, **SHW Mitigation AIR-1** is proposed (see **Section 4.2, Air Quality**), which requires that construction equipment be selected to minimize emissions, and that all diesel-powered off-road

equipment larger than 25 horsepower and operating on the site for more than two days in a row shall, at a minimum, meet US EPA emissions standards for Tier 3 engines or equivalent and shall be fitted with CARB-certified Level 3 Diesel Particulate Filters. Idling restrictions and the use of newer engines and properly maintained equipment would result in less fuel combustion and energy consumption. Furthermore, contractors have a strong financial incentive to avoid wasteful, inefficient, and unnecessary consumption of energy during construction.

For the reasons listed above, the proposed project would not involve the inefficient, wasteful, and unnecessary use of energy during construction and the construction-phase impact related to energy consumption would be less than significant.

Operation

As presented in **Table 3.0-2**, the proposed project would result in a net new demand of approximately 33,855 cubic feet per hour (cfh) of natural gas or 33,855,000 British thermal units (BTU) and a net new electricity demand of 19,877 kilovolt-ampere (KVA).

Title 24 represents the state policy on building energy efficiency. The goals of the Title 24 standards are to improve energy efficiency of residential and non-residential buildings, minimize impacts during peak energy-usage periods, and reduce impacts on state energy needs. UC Policy requires buildings to exceed Title 24 by 20% or meet energy performance targets. The proposed project is pursuing compliance with the Policy by meeting the energy performance target of an EUI of 26 kBtu/sf/yr. Therefore, the proposed project would exceed the Title 24 energy requirements. The University also requires all UC projects to achieve a minimum of a Silver rating under United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) Building Design and Construction (BD+C) v4.0 Green Building Rating System (the "LEED Rating System"). The proposed project will achieve a Silver rating and is targeting to achieve a LEED Platinum certification (the highest rating). Thus, the proposed project would comply with the *UC Sustainable Practices Policy*, which requires 20 percent better energy performance than Title 24 (and strives to achieve 30 percent).

Furthermore, UC Santa Cruz will implement LRDP Mitigation UTIL-5, and is also proposing to include the following features to minimize energy consumption, which would further reduce the amount of electricity and natural gas consumed by the proposed project from the estimates reported above:

Heller Site

- All buildings would be designed and constructed to be energy efficient. The exterior envelope would be optimized to improve thermal isolation. The exterior walls and roofs would have enhanced insulating qualities. High-performance glass would be used to promote daylighting

and passive solar heat gain in the winter without excessive use of glazing. Horizontal sun shades at south-facing elevations, and vertical sun shades at unshaded west-facing elevations would be installed to reduce solar heat gains during the summer and allow passive solar heating during winter months.

- The general lighting in the buildings would be accomplished through a combination of daylighting and general artificial lighting. In areas of special function, specialty lighting would be utilized. Light fixtures and lighting system would be selected based on performance and aesthetics.
- The student housing units would be provided with heating-only mechanical systems. Ventilation would be provided by unit exhaust with makeup air through trickle vents in the exterior wall. The units would also be provided with operable windows to provide natural ventilating and passive cooling whenever conditions are appropriate. Cooling would be provided only for certain spaces such as main electrical rooms.
- Roof-top photovoltaics would be included in at the Heller site to provide electricity to the project.
- High efficiency electrical fixtures and appliances would be included in the proposed housing.

Hagar Site

- Buildings will be oriented and located to be energy efficient and sustainable.
- The street network will be designed to encourage multi-modal circulation.
- Climate-appropriate plant materials will be used.
- The project will also seek to utilize renewable sources of energy including solar PVs, sewer heat recovery, and water recycling.
- Low-flow water fixtures, energy star appliances, high-efficiency irrigation systems, high-performance exterior building envelopes, insulated glazing, LED lighting, and natural ventilation will also be utilized.

As the project would be in compliance with Title 24 and include the above sustainable project features, electricity and natural gas use would not be inefficient, wasteful, and unnecessary. The impact would be less than significant.

Petroleum-Based Fuel

The proposed project would not result in a substantial increase in petroleum-based fuel consumption because it would not result in a substantial increase in vehicle trips. This is because students living in the proposed on-campus housing would walk, ride a bike or take a UC Santa Cruz shuttle to travel between the project site, classes, and other campus facilities. In addition, the project would reduce daily trips

compared to existing conditions and also compared to the no project scenario because students who would otherwise live off campus and make trips to the campus would instead live on campus.

In summary, the proposed building would be energy efficient and by virtue of its location and design features such as limited parking, provision of bicycle facilities and convenient access to transit, the project would minimize petroleum-based fuel use, and the proposed project would not involve the inefficient, wasteful, and unnecessary use of energy during operation. The impact related to operation-phase energy consumption would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact EN-2: **The proposed project would not require or result in the construction of new or expanded electrical or natural gas facilities, which would cause significant environmental effects. (*Less than Significant*)**

Construction

Some electricity, obtained from the electrical distribution system, would be used during project construction for activities. However, it is not anticipated that the usage of electricity would be so high as to require new or expanded electricity generation or transmission facilities. The construction-phase impact would be less than significant.

Operation

As mentioned above and in **Table 3.0-2**, the proposed project would result in a net new electricity demand of 19,877 kilovolt-ampere (KVA). The project would not routinely use natural gas; natural gas would be used only when needed to operate the emergency generators during power outages and during maintenance testing. The electrical loads and natural gas demand that would be required by the proposed project are within the parameters of projected load growth under the 2006 LRDP. Although the proposed project would increase demand for energy, the project-generated demand would be typical for a project of this size and not significant in the context of the overall consumer demand in the City of Santa Cruz and the state. It is anticipated that natural gas and electricity could be provided to the project site using existing and proposed infrastructure. The project's demand for electricity by itself would not require the construction of new power generation facilities. Therefore, the proposed project would not result in the consumption of energy resources that could not be accommodated within the long-term electricity and natural gas supply and distribution system of PG&E.

The proposed project demand would, however, combined with the demand for electricity associated with past, present and reasonably foreseeable future projects in the region could contribute to the need for an expansion of an existing power plant or the construction of a new power plant. Both electricity and gas needed by the cumulative development may, in fact, be generated out of state. It is therefore not reasonable to predict where the new supply sources would be located or to evaluate the environmental consequences from the construction and operation of such facilities. Furthermore, if the new power generation facilities were to be located in California, they would be subject to environmental review and would be required to avoid or minimize their environmental impacts. Accordingly, the impact would be less than significant.

Mitigation Measures: No mitigation measures are required.

4.14.5 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

The proposed dining facilities expansion project would add to existing facilities on the west side of Rachel Carson College and to the southern end of Porter College. In both instances, the facilities would be located above or adjacent to existing buildings, or would replace the existing buildings with larger buildings.

Impacts and Mitigation Measures

DF Impact EN-1: Construction and operation of the proposed dining facilities expansion project would minimally increase the consumption of energy but would not result in wasteful, inefficient or unnecessary consumption of energy or exceed the capacity of distribution systems. (*Less than Significant*)

The proposed dining facilities expansion project would minimally increase diesel fuel and gasoline use during construction due to a small number of construction worker trips and the use of some pieces of construction equipment. However, although energy consumption would temporarily increase due to construction, this use would not be wasteful, inefficient or unnecessary. A less than significant impact would occur.

Similarly, while operation of the expanded dining facilities would involve use of energy resources, the use would not be considered wasteful for the same reasons presented above for the proposed SHW project. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

4.14.6 ALTERNATIVES

Appendix F states that alternatives should be compared in terms of overall energy consumption and in terms of measures to reduce energy use. The energy use and impacts of alternatives to the proposed project are presented in **Chapter 5.0, Alternatives**, of this Draft EIR.

4.14.7 UNAVOIDABLE ADVERSE EFFECTS

Appendix F requires that the EIR report any unavoidable adverse impacts associated with the project's energy use. The analysis presented in **SHW Impacts EN-1** and **EN-2** above shows that the proposed project would not result in a significant unavoidable impact associated with a wasteful use of energy resources or an impact associated with the construction of new electricity and natural gas facilities.

4.14.8 IRREVERSIBLE COMMITMENT OF RESOURCES

Appendix F states that an irreversible commitment of resources could occur if the project preempts future energy development or future energy conservation. The Heller site is currently developed with buildings and the Hagar site has buildings and development in the nearby vicinity. Both sites are located on the UC Santa Cruz campus, which is within a developed portion of the City of Santa Cruz. Construction of new buildings to house undergraduates, graduates, and students with families would not preempt future energy development on the project sites since there are no energy resources located on or near the site. The proposed project would also not preempt future energy conservation, because UC Santa Cruz continues to evaluate and implement ways to reduce its energy use.

4.14.9 SHORT-TERM GAINS AND LONG-TERM IMPACTS

Appendix F suggests that the project's short-term gains and long-term impacts can be evaluated by calculating the project's energy cost over the project's lifetime. The proposed project would operate with an estimated net new energy demand of 19,877 KVA of electricity during full operation. While this would represent an increase in energy use, it would not be a wasteful use of energy. Appendix F identifies as a goal "the wise and efficient use of energy." The proposed project would incorporate the sustainable

features listed in **SHW Impact EN-1** above. Consequently, the proposed project would help achieve the short-term gains and would not increase long-term impacts in the area of energy conservation.

4.14.10 GROWTH-INDUCING EFFECTS

Appendix F states that growth-inducing effects may include the energy consumption of the growth induced by the project. As stated in **Chapter 6, Other CEQA Considerations**, the proposed project would add new residents to the campus and reduce the demand on the City's overall housing stock. The proposed project would not promote an increase in enrollment above what was analyzed in the 2006 LRDP Final EIR. Therefore, substantial population growth and associated energy consumption due to new residents and staff would not occur. The proposed project would generate incidental, short-term construction employment that would be filled by the labor force available in the region, and would not induce growth.

4.14.11 REFERENCES

- California Energy Commission (CEC). 2016a. *Energy Almanac, Retail Fuel Report and Data for California*. Available online at: <http://www.energy.ca.gov/almanac/>, accessed October 11, 2016.
- CEC. 2016b. California Annual Retail Fuel Outlet Report Results (CEC-A15). October.
- California Public Utilities Commission (CPUC). 2016. *Natural Gas and California*. Available online at: http://www.cpuc.ca.gov/natural_gas/, accessed October 12, 2016.
- University of California, Santa Cruz. 2016. Climate and Energy Strategy (CES).UCSC). 2006. 2005-2020 Long Range Development Plan Final Environmental Impact Report, SCH#. 2005012113.
- UCSC. 2011. *Cogeneration Plant Replacement Final Tiered Initial Study/MND*. November.
- UCSC. 2017. Campus Sustainability Plan. Available online at: https://sustainabilityplan.ucsc.edu/campus-sustainability-plan/#climate_energy, accessed March 8, 2018.

4.15 OTHER RESOURCE TOPICS

4.15.1 INTRODUCTION

This section describes all other environmental topics, including agricultural resources, hazards and hazardous materials, and mineral resources that would either not be affected by the proposed project or that the impacts of the project would be clearly less than significant. It also addresses the impacts of the related Porter and Rachel Carson dining facilities expansion project on agricultural resources, hazards and hazardous materials, and mineral resources.

4.15.2 AGRICULTURE AND FORESTRY RESOURCES

In accordance with Appendix G of the California Environmental Quality Act (CEQA) Guidelines and the UC CEQA Handbook, and the 2005 LRDP EIR, the impacts of the proposed SHW and dining facilities expansion projects related to agriculture and forestry resources would be considered significant if the projects would:

- convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;
- 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 Public Resources Code section 12220(g)) or timberland (as defined in Public Resources Code section 4526);
- result in the loss of forest land or conversion of forest land to non-forest use; or
- involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use.

Impact AG-1: **The proposed SHW project and the related dining facilities expansion project would not convert farmland to non-agricultural use, conflict with existing zoning for agricultural use or a Williamson Act contract, or conflict with existing zoning for, or cause rezoning of, forestland or timberland. In addition, the proposed SHW project and the related dining facilities expansion project would not result in the loss of forestland or conversion of forestland to non-forest use, or involve other changes in the existing environment that could result in conversion of Farmland to non-agricultural use. (*Less than Significant*)**

The Heller site is designated as Campus Student Housing (CSH) in the 2005 LRDP and is developed with the FSH complex, which comprises 199 residential units, as well as a childcare facility. The Hagar site is designated Campus Resource Land (CRL) and is currently undeveloped. The designation maintains that, while not planned for development within the timeframe of the 2005 LRDP, the land is intended for eventual development. The Hagar site is located at the southeastern end of the East Meadow, where the nearest agricultural site is the UC Santa Cruz Center for Agroecology and the Sustainable Food Systems (CASFS), approximately 0.14 miles west across Hagar Drive. The Center manages the UC Santa Cruz Farm and the Alan Chadwick Garden, as well as the offices of Life Lab, a non-profit that develops nutrition and garden-based curricula for grade school students. Finally, the sites of the proposed dining facilities expansion project are located on west side of Rachel Carson College and on the southern end of Porter College. Both of these sites are designated CSH.

None of the sites are utilized for agriculture and are not designated as Important Farmland on maps prepared pursuant to the Farmland Mapping and Monitoring Program (DOC 2016). In addition, none of the sites are designated or zoned for agricultural use, forestland, or timberland. Finally, no Williamson Act contract is applicable to any site or its vicinity (DOC 2016). Therefore, implementation of the proposed SHW and dining facilities projects would not conflict with existing agricultural, forestland, or timberland zoning or with a Williamson Act contract, and the proposed SHW and dining facilities expansion projects would have no impact on agricultural or forest resources.

Although the project site is not used for growing timber, the definition of timber under Public Resources Code 4526 is broad enough to include areas where commercial species trees such as redwoods, are growing within developed areas of campus. If it is determined that there are areas considered timberland on the Heller site, then a timberland conversion permit from CalFIRE would be required. However, the site is not zoned for any timber-related uses; the Campus does not use the site for growing timber; and commercial timber production would not be compatible with the 2005 LRDP land use designation or with the surrounding academic and residential land uses. Therefore, the Project would not conflict with the existing zoning for, or cause the rezoning of, forest land or timberland. The impacts from tree removal are addressed in other sections of this EIR and are determined to be less than significant with mitigation.

Mitigation Measures: No mitigation is required.

4.15.3 HAZARDS AND HAZARDOUS MATERIALS

In accordance with Appendix G of the CEQA Guidelines, the UC CEQA Handbook, and the 2005 LRDP EIR, the impacts of the proposed SHW and dining facilities expansion projects related to hazards and hazardous materials would be considered significant if the projects 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 that 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
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands

Impact HAZ-1: The proposed SHW project and the related dining facilities expansion project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. (*Less than Significant*)

Although hazardous materials, including fuel, lubricants, and cleaning products, would be used on each site during project construction, compliance with local, state, and federal regulations would minimize risks associated with the routine transport, use, or disposal of hazardous materials during project construction.

The operation of the proposed SHW and dining facilities expansion projects would not involve the routine transport, use, or disposal of hazardous materials, other than cleaning products and maintenance materials. Propane would be stored in fuel tanks and used to operate the emergency generators on the Heller site only in the event that the natural gas supply to the generators is interrupted. Consequently, there would not be any routine use of propane on the project site. Due to the nature of the materials and

the quantities used, impacts with regard to the routine transport, use, or disposal of hazardous materials are expected to be less than significant.

Mitigation Measures: No mitigation is required.

Impact HAZ-2: **The proposed SHW project and the related dining facilities expansion project would not 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. (*Less than Significant*)**

As the time the 2005 LRDP EIR was prepared, there are no known sites with soil or ground water contamination of the main campus (UCSC 2006). According to the Envirostar database, which is the California Department of Toxic Substances Control's system for tracking hazardous waste sites, no sites with soil or ground contamination have been reported on the campus (DTSC 2017). As a result, construction activities associated with the proposed SHW and dining facilities expansion projects would not expose construction workers and campus occupants to contaminated soil or groundwater. Due to the age of the FSH complex, which was built in 1969-70, hazardous materials, such as lead-based paint and/or asbestos-containing materials could be encountered during demolition of the existing structures on the Heller site, and disturbance of these materials during demolition could pose a hazard to the public and the environment. The proposed project is required to implement LRDP Mitigation HAZ-7, which stipulates that the buildings on the Heller site be surveyed for potential contamination before any demolition work is performed. Compliance with LRDP mitigation, federal and state regulations, and campus policies and procedures related to demolition would minimize the potential for construction workers, nearby receptors, and the environment to be exposed to contaminated building materials. As a result, this impact would be less than significant.

No hazardous materials would be stored on the SHW project sites other than propane, which would be stored in fuel tanks and used to operate the emergency generators on the Heller site only in the event that the natural gas supply to the generators is interrupted. The propane tanks would be placed securely on appropriately designed pads and enclosed by a secure enclosure. All fuel storage would comply with state laws governing the storage of propane. Consequently, there would be a minimal potential to result in a release of propane that could affect nearby receptors.

Small amounts of chemicals and fuel would also be stored on the Heller site for use in the MBR plant to treat wastewater. The storage of these chemicals would comply with applicable state laws focused on spill prevention and spill containment. The storage areas would also be secured. Therefore, there would

be a minimal potential to result in a release of chemicals and fuels that could affect nearby receptors. The impact related to an accidental release of hazardous materials would be less than significant.

The expanded dining facilities at Porter and Rachel Carson Colleges would not involve the storage of any hazardous chemicals or fuel. There would be no impact related to an accidental release of hazardous materials.

Mitigation Measures: No mitigation is required.

Impact HAZ-3: **The proposed SHW project and the related dining facilities expansion project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. (No Impact)**

Existing schools within one-quarter mile of the main campus boundary include Santa Cruz Waldorf School, located northwest of the campus in the Cave Gulch neighborhood, and Westlake Elementary School, located southeast of the campus on High Street (UCSC 2006). The proposed SHW project consists of student and small family residences, and the dining facilities expansion project consists of expanded kitchen and dining facilities. Neither project involves sources or activities that would emit hazardous emissions that could affect nearby schools. Therefore, no impact would occur.

Mitigation Measures: No mitigation is required.

Impact HAZ-4: **The proposed SHW project and the related dining facilities expansion project would not 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, it would not create a significant hazard to the public or the environment. (No Impact)**

The project sites are not located on properties associated with a hazardous site listed under Government Code Section 65962.5, also known as the Cortese List. As a result, the proposed SHW and dining facilities expansion projects would not create a significant hazard to the public or the environment. No impact would occur.

Mitigation Measures: No mitigation is required.

Impact HAZ-5: **The proposed SHW project and dining facilities expansion project would not be 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, and the proposed project would not result in a safety hazard for people residing or working in the project area. (*No Impact*)**

As stated in the 2005 LRDP EIR, the campus is not located within two miles of a public airport or public use airport. The closest public airport is the Watsonville Municipal Airport, approximately 15 miles east of the main campus. Given the distance, the proposed SHW and dining facilities expansion projects would not result in a safety hazard associated with a public airport. No impact would occur.

Mitigation Measures: No mitigation is required.

Impact HAZ-6: **The proposed SHW project and the related dining facilities expansion project would not be located within the vicinity of a private airstrip, and would not result in a safety hazard for people residing or working in the project area. (*No Impact*)**

As stated in the 2005 LRDP EIR, the campus is not located within the vicinity of a private airstrip. The closest private airstrip is the Bonny Doon Village Airport, located approximately seven miles northeast of the main campus (UCSC 2006). Given the distance, the proposed SHW and dining facilities expansion projects would not result in a safety hazard associated with a private airstrip. Therefore, no impact would occur.

Mitigation Measures: No mitigation is required.

Impact HAZ-7: **The proposed SHW project and the related dining facilities expansion project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. (*Less than Significant*)**

Construction of the proposed SHW and dining facilities expansion projects would not interfere with Emergency Operations Plan (EOP) for the main campus through construction-related road closures. Under current campus policy, contractors must complete work with the least possible obstruction to

traffic, and must keep fire hydrants accessible at all times. In addition, the Campus must be notified of all road closures in writing at least two weeks in advance (UCSC 2006). Both projects are required to implement LRDP Mitigation HAZ-9A, which requires that construction work be conducted to ensure the least possible obstruction to traffic, contractors notify a University representative at least two weeks prior to any road closure, alternatives route be clearly marked, fire hydrants be kept accessible, and alternative routes be reported to campus police and fire. Therefore, this impact would be less than significant.

Mitigation Measures: No mitigation is required.

Impact HAZ-8: **The proposed SHW project and the related dining facilities expansion project would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. (*Less than Significant*)**

The Heller site is located adjacent to a Moderate Fire Hazard Severity Zone (Cal Fire 2007). The Hagar site as well as the dining facilities expansion sites are located in areas that are not mapped for wildland fire hazards. Current Campus procedures have been successful at controlling fires on the campus in the past. The Campus Fire Marshall routinely performs annual inspections of buildings for internal (i.e., improper use of extension cords) and external (i.e., vegetation) fire hazards. In addition, the Fire Marshall reviews and approves all building plans. Finally, the Campus adheres to building component protection as prescribed in the International Uniform Wildland Interface Code (UWIC) where appropriate. Furthermore, the proposed SHW and dining facilities expansion projects would implement LRDP Mitigations HAZ-10A and HAZ-10D, which would require the continuation of annual inspections and the continued adherence to requirements outlined in the UWIC. As a result, this impact would be less than significant.

Mitigation Measures: No mitigation is required.

4.15.4 MINERAL RESOURCES

In accordance with Appendix G of the CEQA Guidelines, the UC CEQA Handbook, and the 2005 LRDP EIR, the impacts of the proposed SHW project and the dining facilities expansion project related to mineral resources would be considered significant if the projects would:

- result in the loss of availability of a known mineral resource that would be of future 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.

Impact MR-1: **The proposed SHW and dining facilities expansion projects would not result in the loss of availability of a known mineral resource or in the loss of availability of a locally important mineral resource recovery site. (*Less than Significant*)**

As stated in the 2005 LRDP EIR, the entire UC Santa Cruz campus is situated in an area designated as a Mineral Resource Zone due to the presence of subsurface limestone marble. The area is classified as Zone 3, which is defined as an area where mineral resources are known to exist, but where insufficient information is available to determine the value of those resources. According to the California Division of Mines and Geology, development within a Class 3 zone is not considered a significant impact under CEQA (UCSC 2006). Therefore, the implementation of the proposed SHW and dining facilities expansion projects would have a less than significant impact on mineral resources.

Mitigation Measures: No mitigation is required.

4.15.5 REFERENCES

California Department of Conservation (DOC). Division of Land Resource Protection. Farmland Mitigation and Monitoring Program (FMMP). 2016. Santa Cruz County Important Farmland 2014. Available at: <ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/2014/scr14.pdf>, accessed December 11, 2017.

California Department of Toxic Substances Control (DTSC). 2017. Envirostor website. Available at: <https://www.envirostor.dtsc.ca.gov/public/>, accessed December 2017.

California Department of Forestry and Fire Protection (Cal Fire). 2007. Fire Hazard Severity Zones in SRA [Santa Cruz County]. Available at: http://frap.fire.ca.gov/webdata/maps/santa_cruz/fhszs_map.44.pdf, accessed December 19, 2017.

University of California, Santa Cruz (UCSC). 2006. UC Santa Cruz Long Range Development Plan 2005-2020 Final Environmental Impact Report, SCH No. 2005012113.

5.0 ALTERNATIVES

5.1 INTRODUCTION

This chapter of the Draft EIR presents an analysis of the alternatives to the proposed Student Housing West project (“SHW project” or “proposed project”). CEQA requires that an EIR describe a range of reasonable alternatives to the proposed project or to the location of the project that could feasibly avoid or lessen any significant impacts while feasibly attaining most of the basic objectives of the proposed project. An EIR should also evaluate the comparative merits of the alternatives. This section sets forth potential alternatives to the proposed project and evaluates them, as required by CEQA.

Key provisions of the State CEQA Guidelines¹ pertaining to the alternatives analysis are summarized below:

- The discussion of alternatives shall focus on alternatives to the project or its location that 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 range of alternatives required in an EIR is governed by a “rule of reason.” Therefore, the EIR must evaluate only those alternatives necessary to permit a reasoned choice. The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project.
- The No Project alternative shall be evaluated along with its impacts. The No Project analysis shall discuss the existing conditions at the time the notice of preparation is published. Additionally, the analysis shall discuss 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.
- For alternative locations, only locations that would avoid or substantially lessen any of the significant effects of the project need be considered for inclusion in the EIR.
- An EIR need not consider an alternative whose effects cannot be reasonably ascertained and whose implementation is remote and speculative.

The range of feasible alternatives should be selected and discussed in a manner intended to foster meaningful public participation and informed decision-making. Among the factors that may be taken into account when addressing the feasibility of alternatives are environmental impacts, site suitability,

¹ California Code of Regulations, Title 14, Division 6, Chapter 3, *California Environmental Quality Act Guidelines*, Section 15126.6.

economic viability, availability of infrastructure, general plan consistency, regulatory limitations, jurisdictional boundaries, and whether the project proponent could reasonably acquire, control, or otherwise have access to an alternative site.²

5.2 PROJECT HISTORY AND BACKGROUND

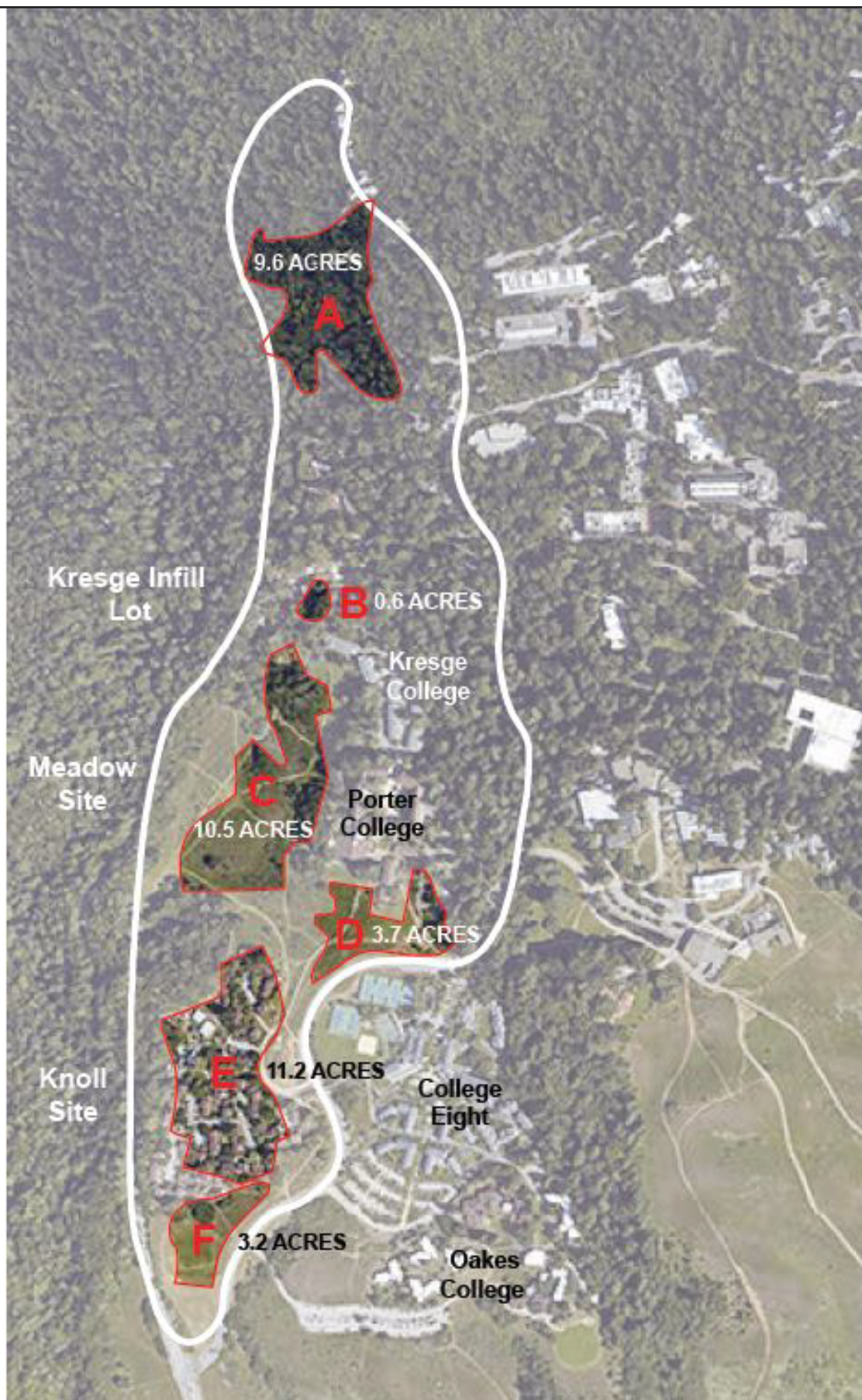
Planning for the proposed SHW project was commenced in 2014. UC Santa Cruz retained a consultant to evaluate a large area in the western portion of the campus for the development of additional student housing. The reason that the site evaluation effort was focused on the western portion of the campus and other areas on the campus were not considered was that under the 2008 Comprehensive Settlement Agreement between the University and the City and County of Santa Cruz, the University agreed that housing development in the area west of Porter College will be initiated before new bed spaces are developed in the North Campus area.

The results of the evaluation were published in a report entitled UC Santa Cruz Student Housing West, dated July 2015. As noted in that report, the 113-acre study area was evaluated to identify suitable sites for construction of new housing. The site identification process took into consideration a number of factors including but not limited to, proximity and relationship to existing facilities, general accessibility, topography and geology, proximity to utilities, and environmental factors such as habitats and significant landscape features. The evaluation yielded six potential sites (Sites A through F, shown on **Figure 5.0-1, Potential Housing Sites**) which were then narrowed down to three suitable sites (Sites B, C, and E). Based on further evaluation of these sites, the Campus narrowed down the area where additional housing could be constructed to a 50-acre area west of Heller Drive. This 50-acre development area included the Kresge parking lot as a development site in the north, a development site to the west of Porter College, and the Family Student Housing (FSH) complex to the south.

This 50-acre development area was provided to the P3 developer teams in a request for proposals (RFP) to prepare a site plan for the needed 3,000 student beds. The P3 developer teams submitted a plan that provided 200 graduate beds in two buildings on the Kresge parking lot, some of the needed undergraduate housing in one to two residence hall buildings to the west of Porter College, and the remaining development program on the FSH complex site (**Figure 5.0-2, Prior Project Concept**).

Concurrent with the preparation of this EIR, the Campus communicated with US Fish and Wildlife Service (USFWS) regarding the potential for the project to affect federally listed species. Based on these

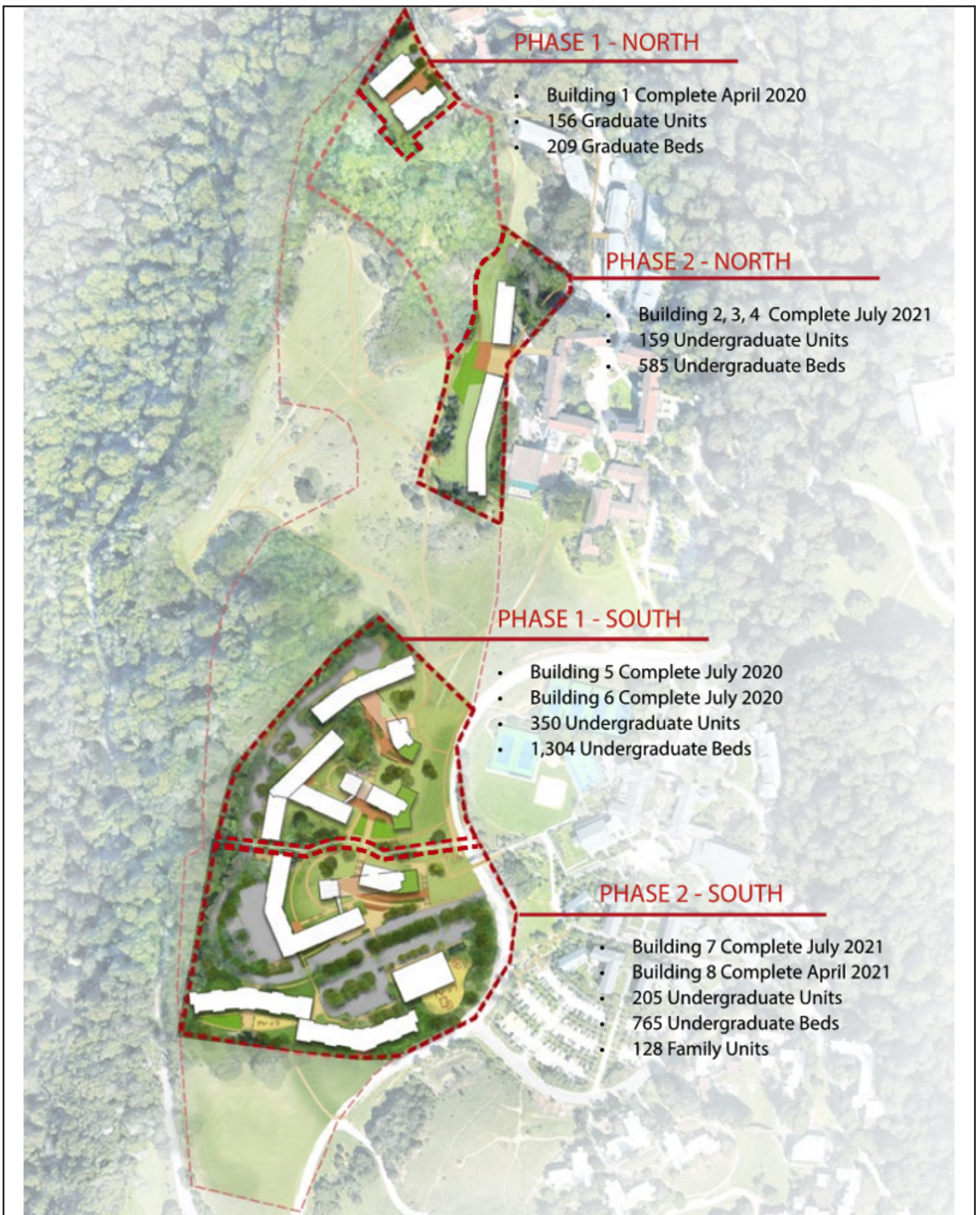
² California Code of Regulations, Title 14, Division 6, Chapter 3, *California Environmental Quality Act Guidelines*, Section 15126.6(f)(1).



SOURCE: UCSC, 2017

FIGURE 5.0-1

Potential Housing Sites



SOURCE: UCSC, 2017

FIGURE 5.0-2

early discussions, it was determined that certain areas may be considered dispersal or upland habitat for the California red legged frog (CRLF) and, to avoid a permitting process that could potentially delay the commencement of project construction, the project site must be confined to only those areas that do not provide any habitat for the listed species. Based on further communications with USFWS, the project site was redefined to include only the 13 acres that underlie the FSH complex. The development site west of Porter College was eliminated as it contained habitat for CRLF, and the Kresge parking lot site was eliminated because it was too constrained for the proposed program (this is discussed further in **Section 5.4.2** below under alternatives not carried forth for detailed evaluation).

In attempting to develop a site plan that would place the entire development program on the 13-acre FSH complex site, the selected P3 developer identified serious constraints that could affect the developer's ability to deliver the project on schedule. The P3 developer put forth a split site project that would locate most of the proposed program on the Heller site and some of the planned beds on another site in the eastern portion of the campus. The project, as proposed, consists of developing all of the undergraduate and graduate beds on the 13-acre FSH complex site, which is called the Heller site in this EIR, and developing 148 family student beds and an expanded childcare facility on a 15-acre site adjacent to Hagar Drive, called the Hagar site in this EIR.

5.3 PROJECT OBJECTIVES AND IMPACTS

To develop and evaluate project alternatives, the University, as Lead Agency, considered the project objectives and reviewed the significant impacts of the proposed project, identified those impacts that could be substantially avoided or reduced through an alternative, and determined the appropriate range of alternatives to be analyzed.

5.3.1 Project Objectives

As stated in **Chapter 3.0, Project Description**, the objectives of the proposed SHW project are to:

- Comply with the University's commitment under the 2008 Comprehensive Settlement Agreement ("Settlement Agreement") to initiate housing development in the area west of Porter College before development of new beds in the North Campus Area;
- Support the development of sufficient and affordable, on-campus student housing under the UC President's Housing Initiative;
- Develop additional housing in a timely manner in order to meet the stipulation in the Settlement Agreement;

- Develop new housing while minimizing displacement impacts on students with families;
- Locate undergraduate, graduate, and family student housing on campus in order to facilitate convenient access to classrooms and other learning environments; student services; and campus amenities such as retail, restaurants and fitness facilities;
- Incorporate adequate support space needed for students and residential life staff (i.e., social space, recreational space, laundry facilities);
- Provide a childcare facility to serve both students and employees in a location that maximizes its accessibility to families living on and off campus.
- Incorporate design, massing, density, siting, and building footprint strategies to minimize removal of sensitive habitats and environmental impact;
- Develop housing at the highest level of sustainability that the project can afford, with Leadership in Energy and Environmental Design (LEED) Silver certification at a minimum; and
- Provide a reasonable amount of on-site parking to meet basic parking needs of the project while minimizing traffic impacts on campus.

5.3.2 Project Impacts

The analysis of the proposed project's environmental impacts is presented in **Chapter 4.0**. That analysis concludes that implementation of the proposed project would result in significant and potentially significant impacts in eight resource areas: aesthetics, air quality; biological resources; cultural resources; geology and soils; hydrology and water quality; transportation and traffic; and utilities. With three exceptions, all of the significant and potentially significant impacts of the proposed project would be reduced to a less than significant level with the incorporation of LRDP and project-specific mitigation measures into the proposed project. The exceptions would be significant and unavoidable project impacts in the area of aesthetics, on scenic vistas and scenic resources, and a significant and unavoidable impact on water supply. A summary discussion of project impacts under each resource area analyzed in the Draft EIR is presented below.

Aesthetics

The analysis in **Section 4.1, Aesthetics**, of this Draft EIR, identified potentially significant impacts on scenic vistas at both Heller and Hagar sites (**SHW Impact AES-1**), and significant impacts on scenic resources and visual character at the Hagar site (**SHW Impacts AES-2 and AES-3**). All three impacts

would remain significant even after mitigation. The project's impact on light and glare was identified as less than significant.

Air Quality

The analysis in **Section 4.2, Air Quality**, of this Draft EIR, identified a potentially significant impact associated with construction-phase emissions of NO_x (**SHW Impact AIR-1**) and a significant impact associated with the exposure of existing sensitive receptors to construction emissions of toxic air contaminants (TACs) during construction (**SHW Impact AIR-3**). Both impacts would be reduced to a less-than-significant level with the proposed mitigation. Impacts associated with the proposed project's operational emissions of criteria pollutants and TACs were determined to be less than significant. No significant and unavoidable air quality impacts were identified.

Biological Resources

The analysis in **Section 4.3, Biological Resources**, of this Draft EIR, identified potentially significant impacts on sensitive natural communities (**SHW Impact BIO-1**), special-status plant species (**SHW Impact BIO-2**), California red-legged frog (**SHW Impact BIO-5**), California giant salamander (**SHW Impact BIO-6**); wildlife movement (**SHW Impact BIO-11**), and the potential for new lighting to affect wildlife behavior (**SHW Impact BIO-12**). All of these impacts would be reduced to a less than significant level with the implementation of LRDP and project-specific mitigation measures. All other biological resource impacts were found to be less than significant. No significant and unavoidable biological resource impacts were identified.

Cultural Resources

The analysis in **Section 4.4, Cultural Resources**, of this Draft EIR, concluded that the proposed project could inadvertently affect subsurface cultural resources and result in a potentially significant impact (**SHW Impact CULT-2**). However implementation of LRDP and project-specific mitigation would reduce the impact to a less than significant level. All other impacts, including impacts on paleontological and unique geologic resources, were identified as less than significant. No significant and unavoidable cultural resource impacts were identified.

Geology and Soils

The analysis in **Section 4.5, Geology and Soils**, of this Draft EIR, found that the proposed project would result in construction of facilities in an area underlain by karst features, which could lead to settlement or collapse beneath the structures (**SHW Impact GEO-3**). However, implementation of the recommendation

of the final geotechnical report per LRDP Mitigation GEO-1, and **SHW Mitigations GEO-3A, -3B, and -3C** would reduce the impact related to karst hazard to a less than significant level. All other impacts related to geology and soils would be less than significant. No significant and unavoidable impacts related to geology and soils were identified.

Greenhouse Gas Emissions

The analysis in **Section 4.6, Greenhouse Gas Emissions**, of this Draft EIR, found that the proposed project would not generate substantial GHG emissions that would have a significant impact on the environment and the project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. No significant and unavoidable impacts related to GHG emissions were identified.

Hydrology and Water Quality

The analysis in **Section 4.7, Hydrology and Water Quality**, of this Draft EIR, found that the proposed project at the Hagar site could increase the amount of runoff, or the flow rate, to the on-site detention basin which has the potential to result in expansion of the sinkhole. This could result in an increase in sediment deposition in the karst fracture system to which the sinkhole is connected, which could impact the springs fed by the karst aquifer (**SHW Impact HYD-2**). However, implementation of **SHW Mitigations HYD-2A through -2D** would reduce the impact related to to a less than significant level. All other impacts related to hydrology and water quality would be less than significant. No significant and unavoidable impacts were identified.

Land Use and Planning

The analysis in **Section 4.8, Land Use and Planning** of this Draft EIR, found that the proposed project would not physically divide an established community nor would it conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect. No significant and unavoidable impacts related to land use and planning were identified.

Noise

The analysis in **Section 4.9, Noise**, of this Draft EIR, found that the construction and operation of the proposed project would not result in any significant noise impacts. No significant and unavoidable impacts related to noise were identified. (Although the related Porter and Rachel Carson dining facilities expansion project would result in a significant and unavoidable construction noise impact, that impact

was adequately analyzed in the 2003 LRDP EIR and was fully addressed in the Findings and Statement of Overriding Considerations adopted by The Regents in connection with its approval of the 2005 LRDP. No conditions have changed and no new information has become available since certification of the 2005 LRDP EIR that would alter this previous analysis.)

Public Services and Recreation

Section 4.10, Public Services and Recreation, of this Draft EIR, found that the construction and operation of the proposed project would not result in any significant impacts on public services and recreational facilities. No significant and unavoidable impacts related to public services and recreation were identified.

Transportation and Traffic

The analysis in **Section 4.11, Transportation and Traffic**, of this Draft EIR, found that the proposed project would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit nor would it conflict with an applicable congestion management program because the proposed project would not generate new trips. In fact, the project would reduce trips compared to the previous trip estimate in the 2005 LRDP EIR and compared to the No Project condition, and the traffic impact on existing off-campus and on-campus intersections would be less than significant. However the analysis under **SHW Impact TRA-2** concluded that the new driveway intersection on Hagar Drive would operate at an unacceptable level. Mitigation identified for that impact would reduce it to a less than significant level. The analysis also found that construction activities associated with the proposed project would have the potential to affect traffic flow, pedestrian and bicycle use, and emergency access in the vicinity of the project sites (**SHW Impact TRA-3**); mitigation measures set forth in this EIR would reduce the impact to a less than significant level. The analysis of the project's impact related to transit and alternative transportation (**SHW Impact TRA-6**) noted that the high volume of pedestrian crossings across Heller Drive near the project could result in transit delays, and the lack of a crosswalk and sidewalk from the Hagar site along the north All other traffic impacts were determined to be less than significant. No significant and unavoidable impacts related to traffic were identified.

Tribal Cultural Resources

The analysis in **Section 4.12, Tribal Cultural Resources**, of this Draft EIR, found that with the implementation of LRDP and project-specific mitigation measure **SHW Mitigation CULT-2**, the proposed project would result in less than significant impacts on tribal cultural resources (TRCs). No significant and unavoidable impacts related to TRCs were identified.

Utilities and Service Systems

The analysis in **Section 4.13, Utilities and Service Systems**, of this Draft EIR, found that the construction and operation of the proposed project would result in the need for on- and off-site utility improvements, the construction of which could result in significant impacts (**SHW Impacts UTIL-1, UTIL-2, and UTIL-3**). However, the impacts would be reduced to a less than significant level by mitigation measures set forth in this EIR. The analysis also found that the proposed project would result in a significant impact on water supply (**SHW Impact UTIL-4**) for which no additional mitigation is feasible. The impact would be significant and unavoidable.

Energy

The analysis in **Section 4.14, Energy**, of this Draft EIR, concluded that although the proposed project would increase energy demand, it would not result in a wasteful, inefficient or unnecessary consumption of energy resources, nor require the construction of new energy facilities, and the impacts would be less than significant. No significant and unavoidable impacts related to energy were identified.

Other Resources

As discussed in **Section 4.15, Other Resources**, should the trees on the Heller site qualify as timberland, the proposed project would result in a less than significant timberland conversion impact.

5.4 ALTERNATIVES CONSIDERED BUT NOT EVALUATED IN DETAIL

Section 15126.6(c) of the State CEQA Guidelines states that an EIR should briefly describe the rationale for selecting the alternatives to be discussed and the reasons for eliminating alternatives from detailed consideration in an EIR. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR is failure to meet most of the basic project objectives, infeasibility, or inability to avoid or substantially reduce significant environmental impacts.

The following alternatives were considered by the University but eliminated from further consideration because they were determined not to meet most of the project objectives or were found to be infeasible based on economic viability and the lack of infrastructure. Each alternative is described below along with a brief explanation of the reasons for its exclusion.

5.4.1 Heller Site and North Campus Development Alternative

This alternative involves excluding the Hagar site from the proposed project; reducing the number of student beds on the Heller site to approximately 2,410; and providing the remaining 590 beds on a site on

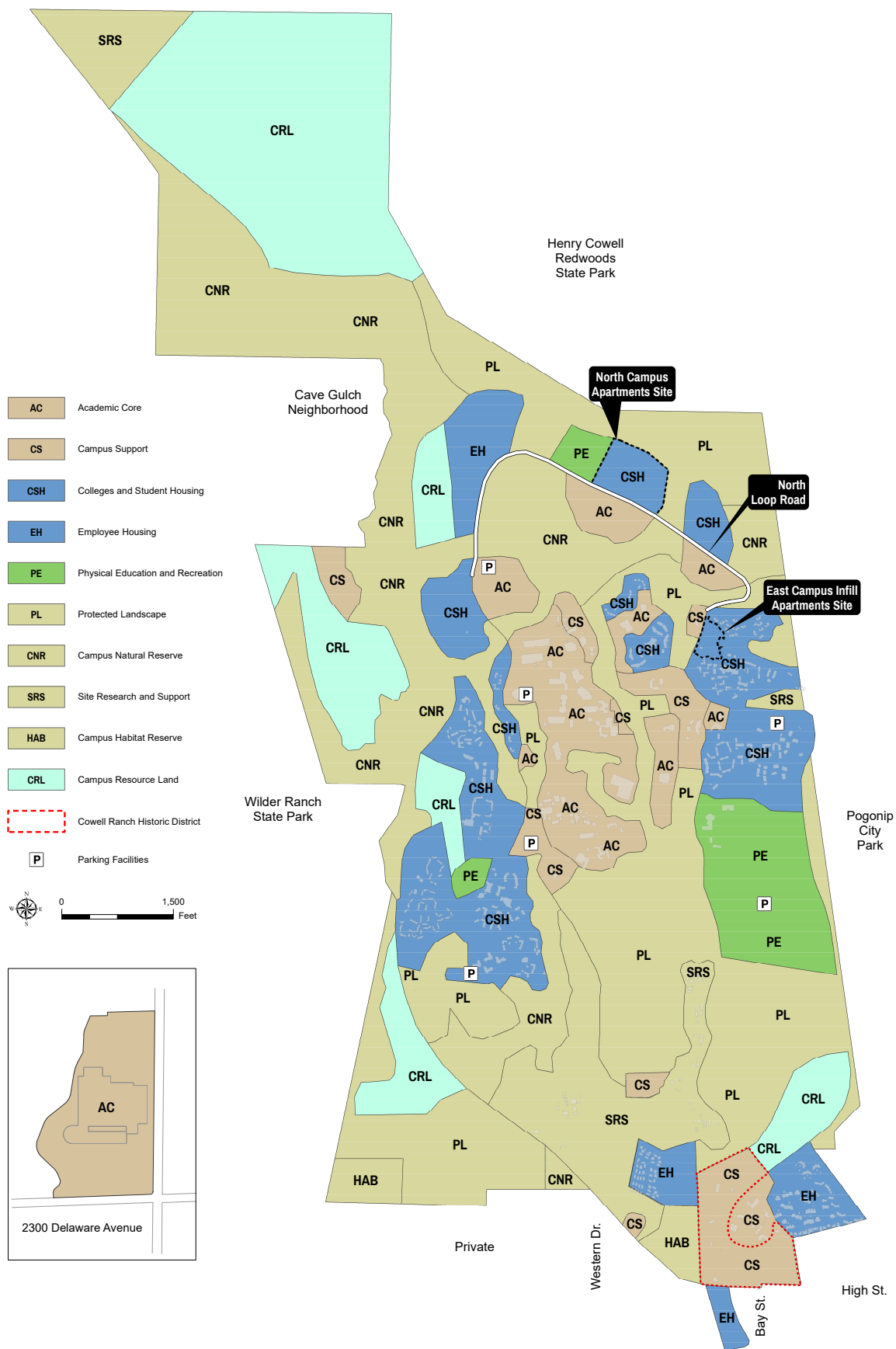
the North Campus. The 2005 LRDP land use diagram designated two areas on the North Campus as College and Student Housing (CSH). The larger of the two areas is about 14.6 acres (**Figure 5.0-3, North Campus and East Campus Infill Sites**). Based on the Housing Capacity Study conducted by the Campus in 2004, at a density of about 40.5 units/acre, this site can accommodate about 592 beds (UCSC 2004).

This alternative was rejected as infeasible for a number of reasons. Currently, there is no development in this portion of the campus and there are no roads or utility infrastructure anywhere in the vicinity of the site. In order to construct a student housing project in this area, a new roadway (which is shown as the North Campus Loop Road in **Figure 5.0-3**) would need to be constructed. Similarly, utility infrastructure (water, wastewater, and other utilities) would need to be extended to the project site, adding considerably to the cost of the housing. Furthermore, the project would involve the removal of large numbers of trees, and would require the preparation and approval of a timber harvest plan. All of these would increase project cost and result in time delays, such that the beds would not be delivered in the timeframe targeted by the proposed project. The alternative was, therefore, determined to be infeasible and was not carried forth for detailed evaluation.

5.4.2 Heller Site and East Campus Infill Alternative

This alternative involves excluding the Hagar site from the proposed project; reducing the number of student beds on the Heller site to approximately 2,400 beds; and providing the remaining 600 undergraduate beds on an approximately 3-acre site in the eastern portion of the campus off Chinquapin Road between Merrill College to the south and Crown/Merrill Apartments to the north (**Figure 5.0-3**). This site is referred to as the East Campus Infill (ECI) site and was previously evaluated in 2009 for the construction of infill student housing. That evaluation concluded that development of the ECI site would result in significant and unavoidable aesthetic impacts related to degradation of visual character and quality of the project area, and a significant and unavoidable construction noise impact. Although the student housing project was approved, the project was not constructed due to a very high per bed cost of construction on a site underlain by karst as well as determination made by the Campus that locating unaffiliated housing in an area surrounded by housing affiliated with colleges was not desirable.

This alternative was rejected as infeasible for the same reasons as the previously approved project. The alternative was, therefore, was not carried forth for detailed evaluation.



SOURCE: UCSC, 2017

FIGURE 5.0-3

5.4.3 Heller Site and Kresge Lot Development Alternative

This alternative also involves excluding the Hagar site from the proposed project; reducing the number of student beds on the Heller site to approximately 2,800 (including the units for student families), the childcare facility, other student facilities, and parking; and building one or more buildings to provide 200 graduate student beds on a parking lot to the west of Kresge College (see **Figure 5.0-2**, above).

As discussed earlier in this section, the use of the Kresge parking lot was considered by the Campus during the planning stages of the SHW project, it was rejected as infeasible for a number of reasons. The parking lot site was determined to be too small to construct a 200-bed housing project that is aesthetically pleasing and includes adequate outdoor space for the residents to use. In addition, the graduate housing would be adjacent to the new undergraduate residence hall that is proposed as part of the Kresge College project, an adjacency that is not considered desirable. Placing the graduate housing on the parking lot could affect the ability of the Kresge College project to enhance and improve the entrance to Kresge College, and the cost of providing infrastructure at this second site would be high for such a small number of beds that would be provided here. Furthermore, placing this small number of beds on this site would not help avoid or minimize the visual impacts from developing the undergraduate housing on the Heller site. The alternative was, therefore, determined to be infeasible and was not carried forth for detailed evaluation.

5.4.4 Heller Site and Off-Campus Housing Development Alternative

This alternative would involve eliminating the Hagar site from the proposed project; reducing the number of student beds on the Heller site; and providing some of the student housing on one or more sites off-campus, either in the South County/Watsonville area or in the City of Santa Cruz.

Providing any of the needed student housing in the South County/Watsonville area was determined to be infeasible as it would not meet any of the project objectives, especially the objectives of developing sufficient and affordable, on-campus student housing under the UC President's Housing Initiative, and providing housing with easy access to classes and other campus facilities. Such an alternative would be more costly as the University would also incur land acquisition costs, and would also have greater traffic and traffic-related air quality and greenhouse gas emissions impacts than the proposed project.

With respect to providing some of the 3,000 student beds off-campus in the City of Santa Cruz, according to the terms of the 2008 Comprehensive Settlement Agreement between the University and the City and County of Santa Cruz, the number of new off-campus beds created in the City of Santa Cruz by UC Santa Cruz cannot exceed 340 beds (225 new beds and 115 replacement beds to replace beds at the UC Santa Cruz Inn, a hotel downtown which UC Santa Cruz formerly leased) until the Campus complies with the

agreement terms related to the provision of on-campus housing . Therefore, this alternative would involve construction of approximately 2,660 student beds on the Heller site and about 340 beds at one or more locations in the City of Santa Cruz. Based on the City's General Plan, there are areas designated mixed-use medium density (MXMD) development along Mission Street and Ocean Street corridors, and mixed-use-high density (MXHD) areas along the Soquel/Water Street corridor, on east side of Santa Cruz, where the University could consider land acquisition and development of the off-campus student beds. However, this alternative was also rejected for the same reasons noted above with respect to the South County, as it would fail to meet the project's key objectives of providing the needed housing on the campus, and would be more costly due to land acquisition costs. Furthermore, such an alternative would also have the effect of taking away land parcels that could be developed with housing for the general public. For all of these reasons, this alternative was considered infeasible and was not carried forth for detailed evaluation.

5.5 ALTERNATIVES EVALUATED IN DETAIL

According to the State CEQA Guidelines, the discussion of alternatives, in addition to considering a "no project" alternative, should focus on alternatives to a project or its location that can avoid or substantially lessen the significant effects of the project, while feasibly attaining most of the basic project objectives. The State CEQA Guidelines indicate that the range of alternatives included in this discussion should be sufficient to allow decision makers to make a reasoned choice. The alternative discussion should provide decision makers with an understanding of the merits and disadvantages of these alternatives.

Alternatives considered for detailed evaluation in this Draft EIR include the mandatory No Project Alternative along with other potential alternate projects that meet most of the project's basic objectives while eliminating or reducing significant environmental impacts of the proposed project identified in **Chapter 4.0**. Alternatives considered in this Draft EIR for detailed evaluation include the following:

- No Project Alternative
- Reduced Project Alternative
- Heller Site Development Only Alternative
- Heller Site and North Remote Site Development Alternative

Table 5.0-1, Summary Description of Project Alternatives, below presents a summary description of these four alternatives that are evaluated in detail below.

**Table 5.0-1
Summary Description of Project Alternatives**

Alternative	Heller Site Beds	Hagar Site Beds	North Remote Site Beds	Total No. of Beds	Students to be housed off-campus
No Project	196	0	0	196	2,804
Reduced Project	2,100	0	0	2,100	900
Heller Site Development Only	3,000	0	0	3,000	0
Heller Site and North Remote Site Development	1,500	0	1,500	3,000	0

Table 5.0-2, Summary Comparison of Project Alternatives, presented at the end of this section, lists all potentially significant and significant impacts of the proposed project. Alternatives that would meet most of the basic project objectives and would avoid or reduce the project's significant impacts are identified and analyzed in detail below.

5.6 ALTERNATIVE IMPACT ANALYSIS

5.6.1 Alternative 1: No Project Alternative

The State CEQA Guidelines require the analysis of a No Project Alternative (Section 15126.6(e)). The analysis must discuss existing conditions, as well as what would be reasonably expected to occur in the foreseeable future if the proposed project were not to be approved, based on current plans, site zoning, and consistent with available infrastructure and community services. If a project is a development project on an identifiable site, CEQA Guideline Section 15126.6(e)(3)(B) provides that the discussion of the No Project Alternative should compare the environmental effects of the site remaining in its existing state against environmental effects which would occur if the project is approved.

However, in light of the Settlement Agreement, the No Project Alternative for this EIR consists of reasonably foreseeable actions that could be taken by the University in the absence of the project to provide as many as possible of the number of beds that are required for the campus population projected under the 2005 LRDP. With respect to providing the needed student housing beds in the absence of the project, as is discussed in **Chapter 3.0, Project Description**, the Campus has already implemented a number of projects to increase the density of occupancy of existing housing and has added beds where feasible by reconfiguring existing space as part of major maintenance/capital renewal projects (as at Crown College, where an additional 22 beds are being added). More beds cannot be added to the existing

colleges on the campus without new construction, as is being planned for Kresge College, and therefore are not considered reasonably foreseeable. With regard to adding student beds at other locations on the campus, as noted in **Section 5.4.2** above, the Campus did complete an environmental review of constructing 600 student beds on the ECI site. Although the project was approved, as noted above, the Campus determined that provision of the planned housing at the ECI site was infeasible. A project to redevelop the Heller site with 400 student beds and a new childcare center was evaluated in 2006 as part of the 2005 LRDP EIR and the EIR was certified. However, that redevelopment project was not approved and is not anticipated to be approved. Therefore, the No Project Alternative in this EIR is a no development alternative, under which no development would occur on either project site and no housing would be added to the campus inventory.

Under the No Project Alternative, the Heller site would remain in its current condition and would continue to provide 196 student beds and would continue to be occupied by student families, and the childcare center would remain in place. The Hagar site would remain undeveloped at least in the near term because it is designated Campus Resource Land in the 2005 LRDP, a land use designation given to land that is not planned for development under the 2005 LRDP but may be developed in the future. Until a new LRDP is adopted that redesignates the site for development or another development project is put forth under the existing LRDP that requests an LRDP amendment, the Hagar site would remain undeveloped. The impacts of a No Project Alternative are analyzed below.

Aesthetics

Under the No Project Alternative, the existing buildings at the Heller site would remain in their current condition and no buildings would be constructed on the Hagar site. All of the proposed project's visual impacts, including the significant and unavoidable impacts on scenic vistas and visual resources at both the Heller and the Hagar sites would be avoided.

Air Quality

No new construction would occur and therefore no construction emissions would occur and the proposed project's significant construction-phase NO_x and TAC impacts would be avoided. There would be no change in operational emissions currently emitted from the Heller site FSH complex and the childcare center. All of the proposed project's air quality impacts would be avoided under this alternative. However, under this alternative, the new students who would have been housed on the campus would live off campus and commute to the campus. This would result in increased mobile source emissions compared to existing conditions, an impact which the proposed project would avoid. However, because of the low trip generation rates of the campus population and the use of transit and other

transportation means by the students to travel to and from the campus, the increase in vehicle trips would not be proportional to the increase in enrollment and the resulting emissions would not be substantial enough to result in a significant air quality impact.

Biological Resources

Under the No Project Alternative, no ground disturbance would occur and all of the project's biological resource impacts would be avoided.

Cultural Resources

Under the No Project Alternative, no ground disturbance would occur and all of the project's cultural resource impacts would be avoided.

Geology and Soils

Under the No Project Alternative, no construction would occur and all of the project's geology and soils impacts would be avoided.

Greenhouse Gas Emissions

No new construction would occur, and therefore there would be no construction phase GHG emissions. Furthermore, there would be no change in operational GHG emissions currently emitted from the Heller site FSH complex and the childcare center. However, under this alternative, the new students who would have been housed on the campus would live off campus and commute to the campus. This would result in an increase in mobile source GHG emissions compared to existing conditions, which the proposed project would avoid. However the emissions would not be substantial enough to result in a significant GHG impact.

Hydrology and Water Quality

Under the No Project Alternative, no construction would occur and all of the project's significant and less than significant hydrology and water quality impacts would be avoided.

Land Use and Planning

Under the No Project Alternative, no construction activities would occur at either project site. As a result, this alternative would not result in any land use impacts and the project's less-than-significant land use impacts would be avoided.

Noise

Under the No Project Alternative, no construction activities would occur at either project site. As a result, this alternative would not result in construction noise and vibration and the project's less-than-significant construction noise and vibration impacts would be avoided. The alternative would also avoid placing any development on the Hagar site and there would be no increase in traffic in the vicinity of that site and the project's less than significant traffic noise impact would be avoided. However, under this alternative, the new students who would have been housed on the campus would live off campus and commute to the campus. This would increase the daily vehicle trips on roadways leading to and from the campus, compared to existing conditions. It takes a doubling of traffic to result in a 3 decibel increase in traffic noise levels. It is unlikely that enough trips would be added to the roadways such that there would be a significant increase in traffic noise along the affected roadways.

Public Services and Recreation

Under the No Project Alternative, no construction activities would occur at either project site and the new beds would not be added to the campus. As a result, this alternative would not result in any public service impacts and the project's less-than-significant impacts would be avoided.

Transportation and Traffic

Under the No Project Alternative, no construction activities would occur at the project site and the potentially significant project impact related to construction traffic, impact related to transit service, and the impact at the project driveway on Hagar Drive would be avoided. However, under this alternative, the new students who would have been housed on the campus would live off campus and commute to the campus. This would increase the daily vehicle trips on roadways leading to and from the campus compared to existing conditions. However, given the low per person vehicle trip rate of the campus, it is unlikely that enough trips would be added to the roadways to result in a significant traffic impact.

Tribal Cultural Resources

Under the No Project Alternative, no construction activities would occur at either project site. As a result, the project's TRC impacts would be avoided.

Utilities and Service Systems

Under this alternative, the existing buildings at the Heller site would remain. There would be no change in the use of utilities compared to existing conditions and no impacts would occur. The proposed

project's potentially significant impacts related to wastewater and storm water and the project's less than significant solid waste impact would be avoided under this alternative.

However, because the students who would be housed on the campus under the proposed project would instead live off-campus, with a large number of them within the City's water service area, the No Project Alternative would result in a demand for potable water that would potentially be greater on a per bed basis than that associated with the proposed project because the off-campus housing that the students would live in would most likely not use recycled water for indoor non-potable uses. Therefore, this alternative would not avoid or reduce the project's water supply impact and, in fact, may increase the severity of that impact.

Energy

Under the No Project Alternative, no demolition or construction activities would occur at the Heller site or the Hagar site. The proposed project's energy impacts that would result from construction at the project sites, such as an increase in petroleum-based fuel usage, would be avoided under this alternative. However, under this alternative, the new students who would have been housed on the campus would live off campus and commute to the campus. This would increase the daily vehicle trips on roadways leading to and from the campus compared to existing conditions. However, it is unlikely that enough trips would be added to the roadways to result in a significant energy impact.

Other Resources

Should the trees on the Heller site qualify as timberland, the proposed project's less than significant timberland conversion impact would be avoided under the No Project Alternative.

Conclusion and Relationship to Project Objectives

The No Project Alternative would avoid or reduce the proposed project's potentially significant, significant, and significant and unavoidable impacts related to aesthetics, air quality, biological resources, cultural resources, traffic, and utilities. This alternative would, however, not achieve any of the objectives of the proposed project.

5.6.2 Alternative 2: Reduced Project Alternative

Under the Reduced Project Alternative, only the 13-acre Heller site would be used to provide additional housing and the Hagar site would not be used. The Heller site would be developed with 148 apartment units for students with families, an expanded childcare facility and the proposed 200 graduate student beds. However, the number of undergraduate student beds would be reduced by about 900 beds, with

approximately 1,752 undergraduate student beds provided under this alternative. Therefore, the alternative would provide a total of 2,100 student beds.

As undergraduates, graduates, students with families, and the childcare center would all be accommodated on the project site, it will be necessary to provide adequate separation between the three population groups. The site plan for this alternative would place the student family apartments in two four-story buildings in the southern portion of the site, with the childcare center at the eastern end of the first building near Heller Drive. Undergraduate student beds would be provided in four apartment buildings (Buildings 1 through 4), with half of Building 4 developed to provide 200 graduate student beds. Buildings 1 and 2 in the western portion of the site would be six to seven stories high, Building 3 would be six stories high, and Building 4 would be five to six stories high. **Figure 5.0-4, Heller Site Plan under Reduced Project Alternative**, presents the site plan for the Heller site under this alternative.

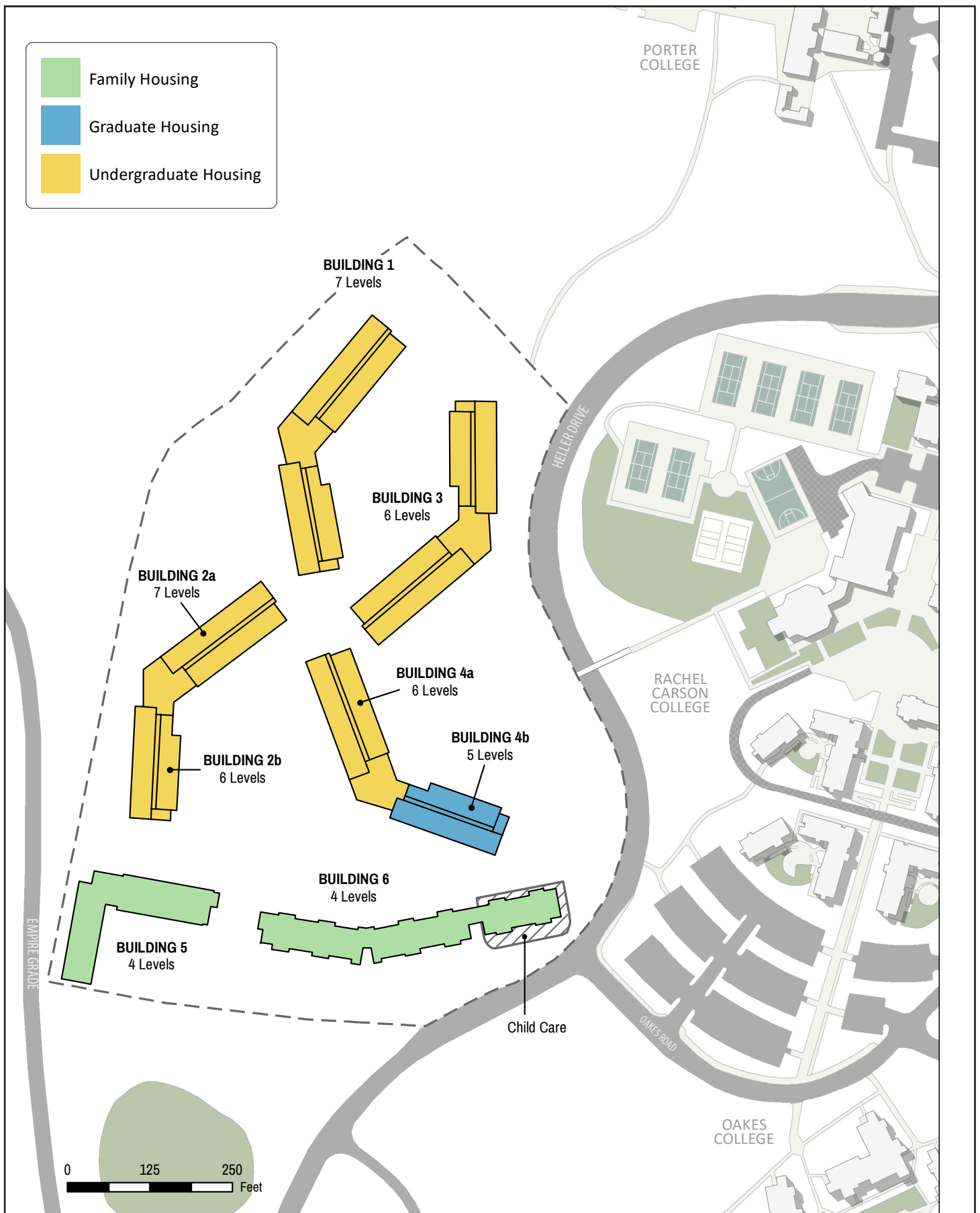
Because the Heller site is highly constrained in terms of development area, it would not be possible to construct the housing under this alternative without first relocating at least some of the student families living in the existing FSH complex to another location. This location would likely be off campus in University-leased housing, because housing that would be suitable for student families is not available elsewhere on the campus.

Similar to the proposed project, this alternative would require the expansion of the Rachel Carson and Porter College dining facilities.

As this alternative would provide 2,100 beds compared to 3,000 beds under the proposed project, the amount of building space constructed under this alternative would be about 30 percent less than the space constructed under the proposed project. Due to the reduced size of this alternative, the construction period would be slightly shorter than the 3-year construction period associated with the Heller site development under the proposed project.

Aesthetics

Under this alternative, the Heller site would be less densely developed with six buildings and shorter four to seven-story buildings, compared to the proposed project which includes seven buildings that range in height between five to 10 stories. As a result, the impact on the view from Porter Knoll would be slightly reduced under this alternative, especially because Building 1, which is a L-shaped building that blocks off views through the project site under the proposed project, would be replaced by a building that is aligned north-south. The impact to the view from Empire Grade would also be reduced due to the reduction in building heights. However, the Reduced Project Alternative would still result in a significant and unavoidable impact associated with changes in views from Porter Knoll and Empire Grade Road.



SOURCE: UCSC, 2018

FIGURE 5.0-4

As no housing would be constructed on the Hagar site, this alternative would avoid the significant and unavoidable impacts of the proposed project on scenic vistas and scenic resources on the Hagar site. It would also reduce the proposed project's less than significant impacts on visual character and light and glare at the Heller site due to the reduction in the scale of development and would avoid both impacts at the Hagar site.

Air Quality

Due to the 30 percent reduction in building space, this alternative would not result in a significant NOx impact due to construction emissions, and because no construction would take place at the Hagar site under this alternative, this alternative would also avoid exposing sensitive receptors to the potentially significant health risk impact from the construction phase TAC emissions. All of the other less than significant construction-related air quality impacts of the proposed project would be further reduced under this alternative. However, as this alternative would provide 2,100 beds, 900 additional students would need to find housing in the region, and would commute to the campus. As a result, this alternative would result in a small increase in mobile source emissions compared to baseline conditions which would not occur under the proposed project. However the emissions would not be substantial enough to result in a significant air quality impact.

Biological Resources

This alternative would result in the same potentially significant biological resource impacts associated with development at the Heller site as the proposed project because the same area would be disturbed under this alternative. Mitigation measures identified for the proposed project would apply to this alternative to reduce impacts to less than significant levels. However, all potentially significant and less than significant biological resource impacts at the Hagar site would be avoided.

Cultural Resources

This alternative would result in the same potentially significant impacts associated with the disturbance of unknown archaeological resources and human remains at the Heller site as the same area and the same amount of soil would be disturbed under this alternative. Mitigation measures identified for the proposed project would apply to this alternative to reduce impacts to less-than-significant levels. Similarly, the less-than-significant impacts of the proposed project associated with paleontological and unique geologic resources would occur under this alternative. However, all potentially significant and less than significant cultural resource impacts at the Hagar site would be avoided.

Geology and Soils

Under this alternative, construction on the Hagar site would be avoided and the proposed housing and childcare facility would be located on the Heller site. As with the proposed project, this alternative would have the potential for the same significant impact related to construction on karst in the southern portion of the Heller site. Implementation of the recommendation of the final geotechnical report per LRDP Mitigation GEO-1, and **SHW Mitigations GEO-3A and -3B** would similarly reduce the impact related to karst hazard to a less than significant level. Similar to the proposed project, all other impacts under this alternative related to geology and soils would be less than significant.

Greenhouse Gas Emissions

Under this alternative, GHG emissions during construction would be reduced by about 30 percent as the amount of building space constructed would be less than that for the proposed project. Similarly, GHG emissions during operation would also be proportionally reduced under this alternative as this alternative would accommodate a smaller project population, which would result in proportionally lower emissions related to area sources, electricity use, water use, solid waste and wastewater generation. However, as this alternative would provide 2,100 beds, 900 additional students would need to find housing in the region, and would commute to the campus. As a result, this alternative would result in a small increase in mobile source GHG emissions compared to current conditions, which the project would avoid. However, for the same reasons discussed above regarding air quality impacts of this alternative, the mobile GHG emissions would not be substantial enough to result in a significant GHG impact.

Hydrology and Water Quality

Similar to the proposed project, the Reduced Project Alternative would not result in any significant impacts related to hydrology and water quality at the Heller site. Because no development would occur on the Hagar site, the project's potentially significant impact related to stormwater discharge into karst areas would be avoided under this alternative.

Land Use and Planning

Similar to the proposed project, the Reduced Project Alternative would not divide an existing community as development would be confined to the Heller site. Similar to the proposed project, this alternative would also not conflict with an applicable land use plan, policy, or regulations. No habitat conservation plan or natural community conservation plan is applicable to the site.

Noise

Due to the reduced duration of construction, the project's less than significant construction noise impacts at the Heller site would be further reduced, and no construction noise would occur at the Hagar site. As with the proposed project, the alternative would result in less than significant operational noise impacts. As noted above, this alternative would provide 2,100 beds and about 900 additional students would need to find housing in the region, and would commute to the campus. As a result, this alternative would result in a small increase in vehicle trips compared to current conditions, which the project would avoid. However the increase in vehicle trips would not be substantial enough to result in a significant noise impact.

As this alternative would also require an expansion of the Rachel Carson and Porter College dining facilities, it would, like the proposed project, indirectly result in a significant construction noise impact.

Transportation and Traffic

Because the Reduced Project Alternative would involve no construction on the Hagar site, both the construction-phase traffic impact and the significant LOS impact at the project driveway and Hagar Drive intersection would be avoided. As a result of the reduced amount of development at the Heller site, the project's construction duration would be shorter and the construction phase traffic congestion impact would be reduced but not fully avoided. The same mitigation measure would be needed to reduce the traffic impact. As with the proposed project, this alternative would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit nor would it conflict with an applicable congestion management program because it would reduce the number of daily trips to the campus compared to existing conditions and the No Project Alternative. However, under this alternative, about 900 students would still live off campus, and would commute to the campus, and would add traffic to the roadways compared to existing conditions, but the increase would not be substantial enough to result in a significant traffic impact. As with the proposed project, this alternative would result in a substantial increase in pedestrian crossings across Heller Drive, and a significant impact on transit service. The same mitigation measure would be needed to mitigate the impact.

Tribal Cultural Resources

Similar to the proposed project, the Reduced Project Alternative would have the potential to affect TRCs at the Heller site, and the same cultural resources mitigation measure set forth for the project would need to be implemented to reduce the impact to a less than significant level.

Utilities and Service Systems

Under this alternative, all of the less than significant impacts of the proposed project associated with wastewater and solid waste disposal would be reduced due to less building space and fewer residents.

With respect to this alternative's water supply impact, all 2,100 beds would be located on the Heller site and the entire development would be served by recycled water. Therefore, the potable water demand of this alternative would be substantially lower than that of the proposed project. Nonetheless, the alternative would increase the Campus' water demand compared to existing conditions and contribute to the need for the City to secure a new water source for prolonged drought conditions. Furthermore, those students who would not be housed in on-campus housing due to the reduced number of beds under this alternative, would live in Santa Cruz and other communities and would place a demand for water in the study area. Therefore this alternative would have an impact on water supply substantially similar to that of the proposed project.

Energy

This alternative would involve petroleum-based fuel usage due to construction activities. However compared to the proposed project the amount of fuel usage would be less under this alternative because less building space would be constructed. Electricity and natural gas usage during operation would also be less than the proposed project. Thus, the alternative would reduce the project's less than significant energy impacts.

Other Resources

Should the trees on the Heller site qualify as timberland, the same less than significant timberland conversion impact that would occur under the proposed project, would occur under this alternative.

Conclusion and Relationship to Project Objectives

The Reduced Project Alternative would reduce most of the proposed project's impacts related to development at the Heller site. However, the project's significant and unavoidable impact on scenic vistas from developing the Heller site and the significant and unavoidable impact on water supply would not be avoided. With respect to the Hagar site, this alternative would avoid all potentially significant or significant impacts of the proposed project, including the project's potentially significant construction TAC impact, significant traffic impact, and significant and unavoidable visual resource impacts.

By reducing the size of the proposed project, this alternative would not achieve the University's objectives of providing the number of beds needed to meet the terms of the Settlement Agreement,

supporting development of sufficient and affordable, on-campus student housing under the UC President's Housing Initiative; and locating undergraduate housing on campus in order to facilitate convenient access to classrooms and other learning environments; student services; and campus amenities such as retail, restaurants and fitness facilities.

5.6.3 Alternative 3: Heller Site Development Only Alternative

This alternative would construct the entire proposed project on the Heller site, including the 3,000 student beds, the childcare facility, other needed student facilities, parking, and the wastewater treatment plant and the Hagar site would not be developed as part of the alternative.

As undergraduates, graduates, students with families, and the childcare center would all be accommodated on the Heller site, the site plan for this alternative would provide all of the undergraduate beds in three quadrangles on the western portion of the site. Family student housing and the childcare center would be located in the southeastern portion of the site and the graduate housing in two buildings in the central-eastern portion of the site. Under this alternative, the family student housing would be four stories, while the undergraduate and graduate student apartment buildings would range from six to nine stories in height (**Figure 5.0-5, Heller Site Only Alternative**).

Because the Heller site is highly constrained, it would not be possible to construct the proposed housing without first relocating at least some of the student families in the existing FSH complex and the childcare center to another location. This location would likely be existing off-campus housing that would be leased by the University, because housing that would be suitable for student families is not available elsewhere on the campus.

Similar to the proposed project, this alternative would require the expansion of the Rachel Carson and Porter College dining facilities. As this alternative would provide all 3,000 beds, the amount of building space constructed under this alternative would be the same as the space constructed under the proposed project. The construction duration would be 4 years.

Aesthetics

The Heller Site Development Only Alternative would result in a similar significant and unavoidable impact associated with construction of buildings up to 9 stories tall on the Heller site, resulting in changes in views from Porter Knoll and the West Entrance. It would increase the proposed project's less than significant impacts on visual character and light and glare at the Heller site due to the substantially greater density of development. However as no housing would be constructed on the Hagar site, this

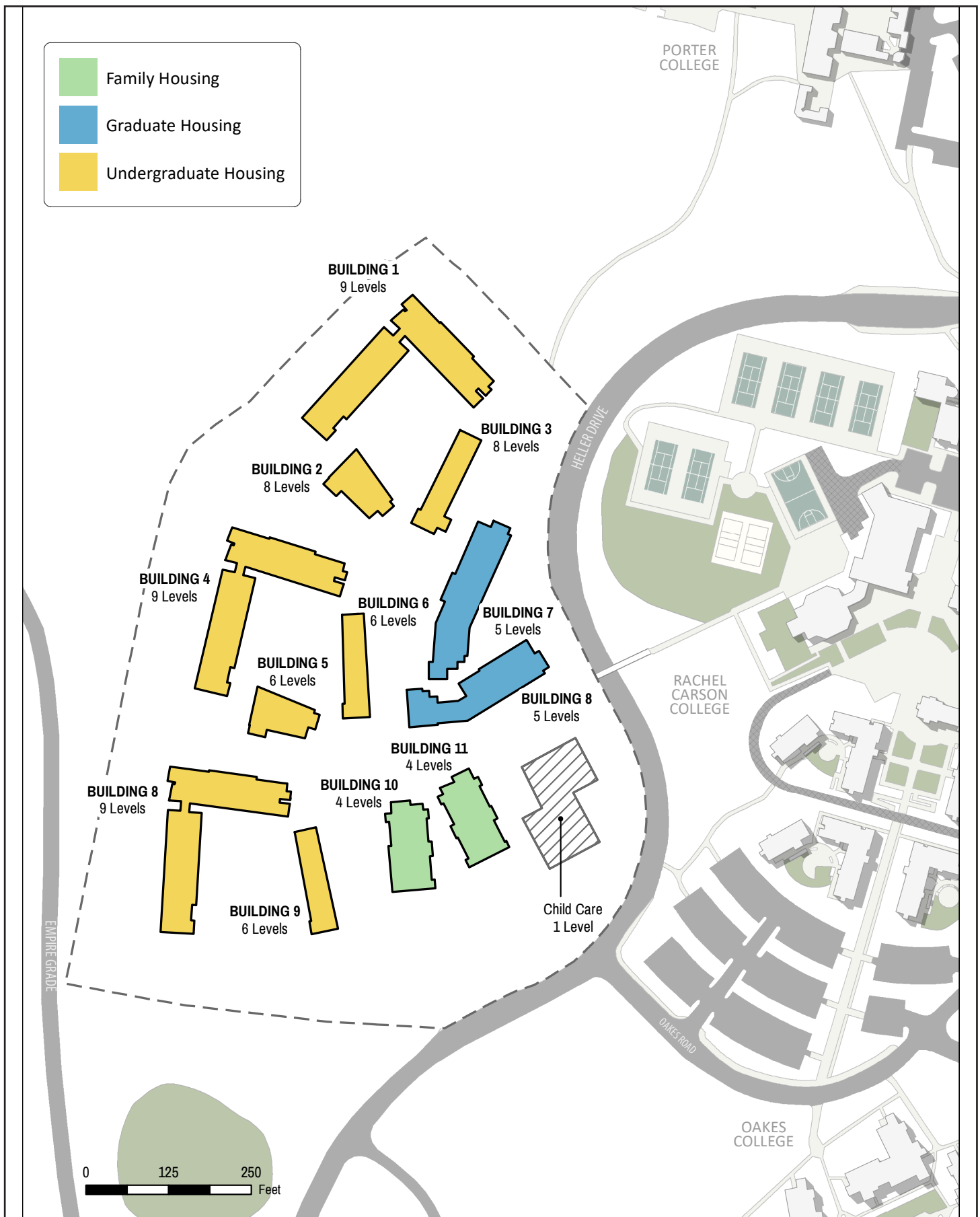


FIGURE 5.0-5

Heller Site Only Alternative

alternative would avoid the significant and unavoidable impacts of the proposed project on scenic vistas and scenic resources on the Hagar site.

Air Quality

Due to the comparable building space included in this alternative, this alternative would, like the proposed project, also result in a potentially significant NO_x impact due to construction emissions, which, like the impact of the proposed project, could be reduced to a less than significant level through mitigation. All of the other less than significant air quality impacts of the proposed project would also occur under this alternative. However because no construction would take place at the Hagar site under this alternative, this alternative would avoid exposing existing receptors to the potentially significant health risk impact from the construction phase TAC emissions.

Biological Resources

This alternative would result in the same potentially significant biological resource impacts associated with development at the Heller site under the proposed project, as the same area would be disturbed under this alternative. Mitigation measures identified for the proposed project would apply to this alternative to reduce impacts to less-than-significant levels. However, all potentially significant and less than significant biological resource impacts at the Hagar site would be avoided.

Cultural Resources

This alternative would result in the same potentially significant impacts associated with the disturbance of unknown archaeological resources and human remains at the Heller site as the same area and the same amount of soil would be disturbed under this alternative as under the proposed project. Mitigation measures identified for the proposed project would apply to this alternative to reduce impacts to less-than-significant levels. Similarly, the less than significant impacts of the proposed project associated with paleontological and unique geologic resources would occur under this alternative. However, all potentially significant and less than significant cultural resource impacts at the Hagar site would be avoided.

Geology and Soils

Under this alternative, construction on the Hagar site would be avoided. Due to construction on the Heller site, as with the proposed project, this alternative would have the potential to result in the same significant impact related to construction on karst in the southern portion of the Heller site. Implementation of the recommendation of the final geotechnical report per LRDP Mitigation GEO-1, and

SHW Mitigations GEO-3A and -3B would similarly reduce the impact related to karst hazard to a less than significant level. Similar to the proposed project, all other impacts under this alternative related to geology and soils would be less than significant.

Greenhouse Gas Emissions

Under this alternative, GHG emissions during construction and operation would be comparable to the proposed project because this alternative would build the same amount of building space and provide the same number of student beds as the proposed project.

Hydrology and Water Quality

Similar to the proposed project, the Heller Site Development Only Alternative would not result in any significant impacts related to hydrology and water quality at the Heller site. Because no development would occur on the Hagar site, the project's potentially significant impact related to stormwater discharge into karst areas would be avoided under this alternative.

Land Use and Planning

Similar to the proposed project, this alternative would not divide an existing community as development would be confined to the Heller site. Similar to the proposed project, this alternative would also not conflict with an applicable land use plan, policy, or regulations. No habitat conservation plan or natural community conservation plan is applicable to the site.

Noise

Due to the longer duration of construction at the Heller site, the project's less than significant construction noise impacts at the Heller site would be extended. However, no construction noise would occur at the Hagar site. As with the proposed project, the alternative would result in less than significant operational noise impacts.

As this alternative would also require an expansion of the Rachel Carson and Porter College dining facilities, it would, like the proposed project, indirectly result in a significant construction noise impact.

Transportation and Traffic

Because the Heller Site Development Only Alternative would involve no construction at the Hagar site, both the construction-phase traffic impact and the significant LOS impact at the project driveway and Hagar Drive intersection would be avoided. Because the entire development program would be located

on the Heller site, the project's construction duration at that site would be longer and the significant construction phase traffic congestion impact would be extended. The same mitigation measure would be needed to reduce the traffic impact. As with the proposed project, this alternative would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the transportation network because it would reduce the number of daily trips to the campus compared to existing conditions and the No Project Alternative. As with the proposed project, this alternative would result in a substantial increase in pedestrian crossings across Heller Drive, and the same significant impact on transit service. The same mitigation measure would be needed to mitigate the impact.

Tribal Cultural Resources

Similar to the proposed project, the Heller Site Development Only Alternative would have the potential to affect TRCs at the Heller site, and the same cultural resources mitigation measure set forth for the project would need to be implemented to reduce the impact to a less than significant level.

Utilities and Service Systems

Under this alternative, a MBR facility would be constructed to serve the Heller site that would provide recycled water for non-potable uses for all 3,000 beds instead of just the graduates and undergraduate beds (2,852 beds) under the proposed project. Thus this alternative would reduce the proposed project's impact on water supply. Nonetheless, the alternative would increase the Campus' water demand compared to existing conditions and contribute to the need for the City to secure a new water source for prolonged drought conditions. Unlike the proposed project, which would involve discharge of wastewater from the Hagar site into the city's sewer conveyance and treatment system, this alternative would involve no discharge to the City's sewer system. Similar to the proposed project, this alternative would result in a less than significant impact associated with solid waste disposal capacity.

Energy

This alternative would involve comparable construction-phase petroleum-based fuel usage as the proposed project. Electricity and natural gas usage during operation would also be comparable. The alternative would result in comparable less than significant energy impacts.

Other Resources

As with the proposed project, should the trees on the Heller site qualify as timberland, the same less than significant timberland conversion impact that would occur under this alternative.

Conclusion and Relationship to Project Objectives

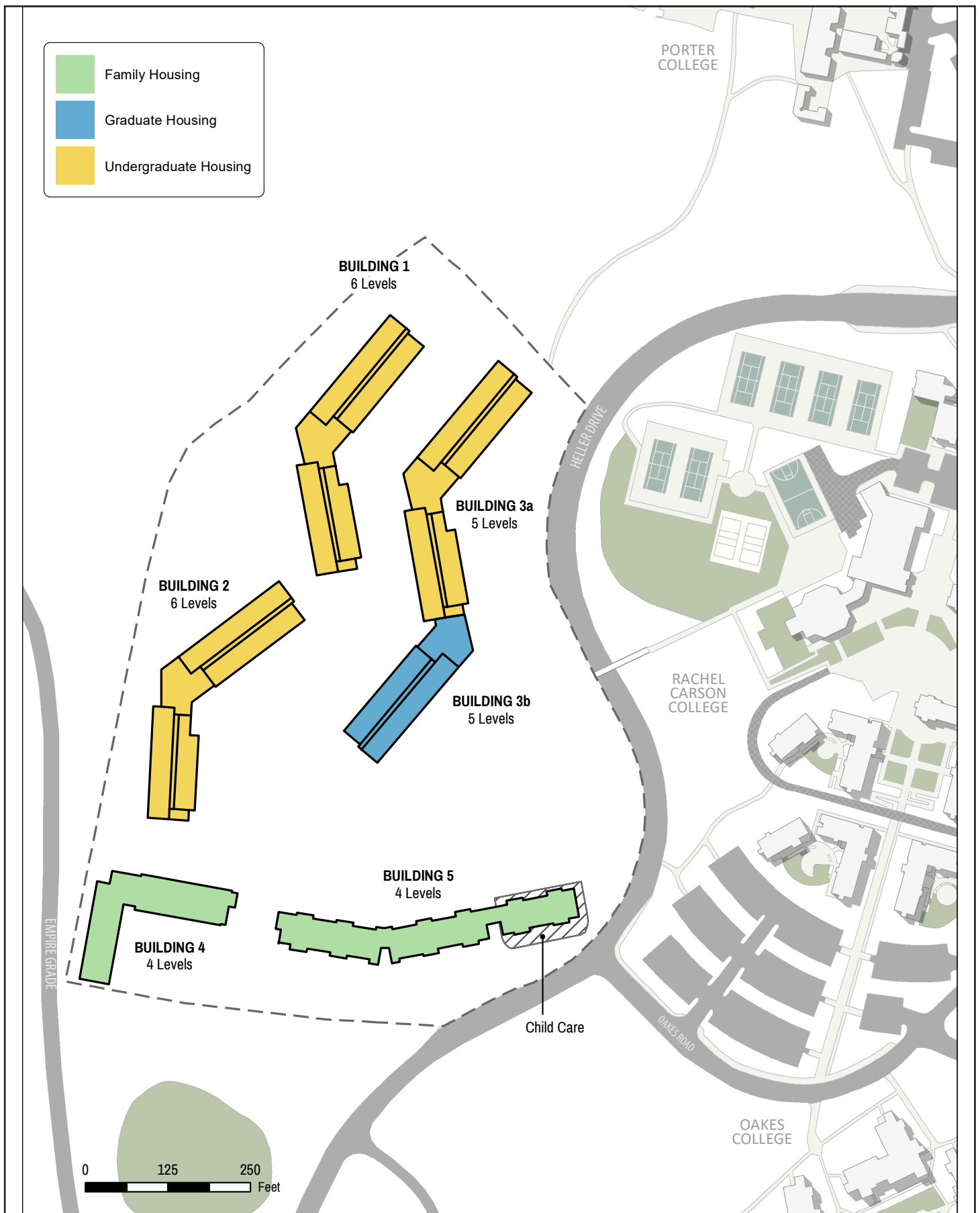
The Heller Site Development Only Alternative would increase all of the proposed project's impacts related to development at the Heller site, and would increase the project's significant and unavoidable impact on scenic vistas at the Heller site by developing the site at a very high density. Although the demand for water under this alternative would be lower than that under the proposed project, the alternative would still result in a significant and unavoidable water supply impact. With respect to the Hagar site, this alternative would avoid all impacts of the proposed project, including the project's potentially significant construction TAC impact, significant traffic impact, and significant and unavoidable visual resource impacts.

By placing the entire proposed project on the Heller site, this alternative would achieve all of the objectives of the proposed project except the objective of developing new housing while minimizing displacement impacts on students with families. Due to the small size of the Heller site, the need to demolish existing facilities first before new ones can be constructed, the need to avoid construction close to occupied family housing and the childcare center, and to ensure that housing for student families and the childcare facility are available during project construction, the only way in which such an alternative could be constructed on the Heller site would require that temporary FSH housing and probably the childcare facility be provided at another location (on- or off-campus) until the new facilities are in place. The provision of temporary FSH housing for at least some of the student families at an off-campus location would result in inconvenience to student families and add to the cost of the project.

5.6.4 Alternative 4: Heller Site and North Remote Site Development Alternative

Under this alternative, the Heller site would be redeveloped to provide 148 beds for students with families, about 200 beds for graduate students, and about 1,150 undergraduate student beds. An expanded childcare facility would also be constructed. About 1,500 undergraduate beds would be provided in apartment buildings constructed on the North Remote site, such that, similar to the proposed project, this alternative would provide a total of 3,000 beds. The Hagar site would not be used for the proposed housing.

Figure 5.0-6, Heller Site Plan under Alternative 4, presents the site plan for the Heller site under this alternative. As shown, the 148 beds for student families would be provided in two four-story apartment buildings and would include the childcare center, similar to those described above for the Reduced Program Alternative. Undergraduate housing would be provided in three apartment buildings (Buildings 1 through 3). The graduate student housing would be provided in a portion of Building 3.



SOURCE: UCSC, 2017

FIGURE 5.0-6

Buildings 1 and 2 would be six stories high and located along the western side of the Heller site near the forest edge, and Building 3 would be located in the center of the site and would be five stories high.

With respect to the North Remote site, in 2004, UC Santa Cruz completed the 2004 Student Housing Site Options Study. This study looked at a 18.5 acre site near the Camper Park in the northwestern portion of the campus for the siting of Colleges 11 and 12, which would consist of residence halls and apartments as well as academic and other space. In 2015, UC Santa Cruz re-examined the College 11-12 site as part of the Student Housing West Campus Housing Study. Under this study, the Campus looked at a smaller 9.6 acre site for the SHW project. Although this site was not carried forward in the 2015 housing study because the Heller site and other areas were determined to be superior for siting the proposed project, the 9.6-acre site is still available for the development of student housing. Therefore, under this alternative the 9.6-acre North Remote site would be used to construct student apartments to provide about 1,500 undergraduate beds. The undergraduate student beds would be accommodated within five buildings that would be five to six stories in height. The buildings at the North Remote site would be sited in a manner that would be appropriate for the site, likely alongside a loop road off of the North Remote parking lot. Development on the North Remote site would include a café, support spaces, such as laundry facilities, mail facilities, custodial space, storage, etc. Student hubs would be also included, which would be located centrally within the site and would include retail amenities, a fitness center, administrative and student services, music practice rooms, multi-purpose rooms, study areas, convenience store, and social spaces for residents. This alternative would also include a wastewater treatment facility at the North Remote site to serve the proposed residence halls. **Figure 5.0-7, North Remote Site Plan**, presents a conceptual site plan for the North Remote site housing development under this alternative.

This alternative would also require the expansion of the dining facilities at Rachel Carson and Porter Colleges to serve the approximately 1,500 students who would live on the Heller site. Due to the distance of the North Remote site from the existing colleges, students living in the housing at that site would not have convenient access to existing dining facilities at any of the colleges, and dining facilities would need to be developed as part of the project on this site.

Although this alternative would be comparable to the proposed project in terms of the number of beds, more building space would be constructed under this alternative because the development at the North Remote site would include dining facilities. Therefore, the construction duration of this alternative would be longer than that of the proposed project and is estimated to take about 4.5 to 5 years.

Undergraduate Housing

BUILDING 2
6 Levels

BUILDING 1
5 Levels

BUILDING 3
6 Levels

BUILDING 4
5 Levels

0 125 250
Feet

KRESGE COLLEGE

BASKIN
ENGINEERING

SCIENCE
HILL

SOURCE: UCSC, 2017

FIGURE 5.0-7

North Remote Site Plan

Aesthetics

Compared to the proposed project, this alternative would result in a lower density of development on the Heller site, such that the proposed project's impact on scenic vistas from Porter Knoll and the West Entrance would be reduced but not fully avoided. It would also reduce the proposed project's less than significant impacts on visual character and light and glare at the Heller site due to the reduction in the scale of development. As no housing would be constructed on the Hagar site, this alternative would avoid the significant and unavoidable impacts of the proposed project on scenic vistas and scenic resources as well as other less than significant visual impacts at the Hagar site.

Under this alternative, four undergraduate apartment buildings would be located on the North Remote site which is within a forested area in the northwestern portion of the central campus. The project site does not offer on- or off-campus long-distance views. Because of its location and the forest surrounding the site, the apartment buildings would not be visible from off-campus locations, including locations along Empire Grade Road or from the Cave Gulch area. There would be no impact to scenic vistas. With regard to the impact of the alternative on the visual character of the project site, the alternative would change the site from a forested area to a developed area. However, the site is located at the end of Heller Drive which terminates at the North Remote parking lot and is not near any campus roads or other existing development on and off campus and therefore the change in visual character would not be viewed by a substantial number of persons. The development would be subject to LRDP planning principles and would be required to implement LRDP Mitigations AES-5A through 5C, and AES-5F, especially to address visual impacts related to removal of trees. Therefore, the housing development on the North Remote site is expected to be similar to other colleges and facilities on the UC Santa Cruz campus that are also developed within forested areas and the change in visual character would not be considered adverse. Development on the North Remote site would increase sources of light and glare in the project area where light sources are currently limited to the Camper Park. Similar to the proposed project, under this alternative, buildings within the North Remote development would implement LRDP Mitigations AES-6B, -6C, and -6E to minimize potential impacts due to the increase in light and reflective surfaces at the site. A less than significant impact from light and glare would occur from the development of housing at the North Remote site.

In summary, impacts on visual resources would be reduced under this alternative compared to the proposed project, but the significant and unavoidable impact on scenic views from the Porter Knoll and the West Entrance would not be avoided.

Air Quality

Due to slightly more building space constructed under this alternative, this alternative would also result in a significant NO_x impact due to construction emissions; as with the proposed project this impact would be reduced to a less than significant level with the same mitigation set forth for the proposed project. All of the other less than significant air quality impacts of the proposed project would occur under this alternative. Because no construction would take place at the Hagar site under this alternative, this alternative would avoid exposing existing receptors to the significant health risk impact from the construction phase TAC emissions. There are no existing sensitive receptors near the North Remote site who would be exposed to TAC emissions and no health risk impacts would occur under this alternative.

Biological Resources

This alternative would result in the same potentially significant biological resource impacts associated with development at the Heller site as the proposed project because the same area would be disturbed under this alternative. Mitigation measures identified for the proposed project would apply to this alternative to reduce impacts to less-than-significant levels. All potentially significant and less than significant biological resource impacts at the Hagar site would be avoided.

Development of housing on the North Remote site would result in biological resource impacts that would not occur under the proposed project. This is because sensitive biological resources are present on and adjacent to the North Remote site. The western portion of the North Remote site is under redwood forest and there is a mix of North maritime chaparral, dwarf redwood forest, and dwarf redwood chaparral on the eastern portion, and Santa Cruz manzanita is also likely to occur on the site. The California Department of Fish and Wildlife (CDFW) considers northern maritime chaparral to be a sensitive natural community. Impacts under this alternative to northern maritime chaparral would be significant, but would be reduced to a less than significant level with implementation of LRDP Mitigations BIO-1A and -1B.

Both the redwood forest and dwarf redwood forest on the North Remote site are second-growth forests. Development of the North Remote site would result in the conversion of these forests that could be classified as timberland to other developed uses. However, timberland conversion and tree removal activities would not be considered to be a significant impact to biological resources, since second-growth redwood forests are not protected as sensitive natural communities by CDFW (UCSC 2005).

Santa Cruz manzanita is a California Rare Plant Rank (CRPR) List 1B species that has been recorded on or immediately adjacent to the North Remote site. The impact related to removal of Santa Cruz manzanita would be significant. However, implementation of LRDP Mitigations BIO-1A and -1B would reduce the

impact to a less than significant level.

Special-status plants also have a potential to occur at the North Remote site and the housing development would have the potential to affect special-status plants, should they be present on the site. Similar to the proposed project, this potentially significant impact would be reduced to a less than significant level with implementation of **SHW Mitigation BIO-2**.

Development under this alternative could result in impacts to California red-legged frog, California giant salamander, San Francisco dusky-footed woodrat, nesting birds, and special-status bats. Similar to the proposed project, same mitigation measures set forth for the proposed project (**SHW Mitigations 5A** and **5B**) would be implemented to reduce impacts on California red-legged frog, California giant salamander, and San Francisco dusky-footed woodrat to a less than significant level and LRDP mitigation measures would be implemented to mitigate impacts on nesting birds and bat species.

Cultural Resources

This alternative would result in the same potentially significant impacts associated with the disturbance of unknown archaeological resources and human remains at the Heller site as the same area and the same amount of soil would be disturbed under this alternative. Mitigation measures identified for the proposed project would apply to this alternative to reduce impacts to less-than-significant levels. Similarly, the less-than-significant impacts of the proposed project associated with paleontological and unique geologic resources would occur under this alternative. However, all potentially significant and less than significant cultural resource impacts at the Hagar site would be avoided.

There are no existing structures or development on the North Remote site. Therefore, similar to the proposed project, this alternative would result in a less than significant impact to historical resources. There are no known archaeological resources on the North Remote site. The entire campus was subjected to an archaeological survey in the past (Edwards, Podzorski and Pryor 1978). That survey did not find any prehistoric resources in this portion of the campus. Furthermore, due to its location distant from streams and springs, the site is unlikely to be considered sensitive for prehistoric resources. However, because the past survey was not intensive and the North Remote site may contain unrecorded historic landscape resources associated with the Cowell quarrying activities, development of the site would have the potential to affect cultural resources. As with all projects on the campus, and consistent with LRDP mitigation measures, the site would be subject to a systematic survey by a qualified archaeologist to determine presence or absence of cultural resources on the site. As with the proposed project, this alternative would have the potential to affect unknown archaeological resources and human remains during construction. Mitigation measures identified for the proposed project would apply to this

alternative to reduce impacts to less than significant levels. Similar to the Heller site, the North Remote site is underlain by schist, which is not considered sensitive for paleontological resources and a less than significant impact would occur.

Geology and Soils

Under this alternative, no construction would occur on the Hagar site and the potentially significant impact related to construction on karst at that site would be avoided. The North Remote site is located in an area designated as Karst Hazard Level 2, and hence there would not be any significant impacts related to construction on karst at that site. As with the project, the alternative would involve construction on the Heller site which would have the potential for the same significant impact related to construction on karst in the southern portion of the Heller site. Implementation of the recommendation of the final geotechnical report per LRDP Mitigation GEO-1, and **SHW Mitigations GEO-3A** and **-3B** would similarly reduce the impact related to karst hazard to a less than significant level. Similar to the proposed project, all other impacts under this alternative related to geology and soils would be less than significant.

Greenhouse Gas Emissions

Under this alternative, GHG emissions during construction would be comparable to those under the proposed project as the amount of building space constructed would be the same as that for the proposed project. Similarly, GHG emissions during operation would also be comparable as this alternative would accommodate a similar project population, which would result in comparable emissions related to area sources, electricity use, water use, solid waste and wastewater generation. The North Remote site is occupied by trees which would be removed, resulting in a reduction in carbon sequestration which would be partly offset by the planting of trees as part of the development on the site. Based on calculations for other projects involving development of wooded sites on campus, it is likely that this impact would be less than significant.

Hydrology and Water Quality

Similar to the proposed project, this alternative would not result in any significant impacts related to hydrology and water quality at the Heller site. Because no development would occur on the Hagar site, the project's potentially significant impact related to stormwater discharge into karst areas would be avoided under this alternative.

The North Remote site is located partly within the Moore Creek watershed and partly within the Cave Gulch watershed. The site is underlain by schist and Santa Margarita sandstone which is suitable for on-site retention of runoff. Development of the North Remote site with the proposed housing would

generate additional runoff. The project will be required to comply with the Post-Construction Requirements and therefore provide water quality, runoff reduction, and peak management. Therefore the alternative would not result in significant hydrology and water quality impacts.

Land Use and Planning

Similar to the proposed project, this alternative would not divide an existing community as development would be confined to the Heller site, and the North Remote site development would not divide or displace any residents of the Camper Park. Similar to the proposed project, this alternative would also not conflict with an applicable land use plan, policy, or regulations. No habitat conservation plan or natural community conservation plan is applicable to the site.

Noise

Due to the reduced duration of construction at the Heller site, the project's less than significant construction noise impacts at the Heller site would be further reduced, and no construction noise would occur at the Hagar site. Construction noise impacts would occur at the Camper Park due to its proximity to the North Remote site. However the LRDP mitigation measures would be implemented to mitigate the impact. As with the proposed project, the alternative would result in less than significant operational noise impacts. Similar to the proposed project, this alternative would also require an expansion of the Rachel Carson and Porter College dining facilities. Therefore it would, like the proposed project, indirectly result in a significant construction noise impact.

Transportation and Traffic

Because this alternative would involve no construction at the Hagar site, the significant construction phase traffic impact and the new driveway and Hagar Drive intersection LOS impact would be avoided. However, the development at the Heller and North Remote sites would be comparable. The alternative's construction duration would be comparable and the significant construction-phase traffic congestion impact on Heller Drive would still occur. The same mitigation measure would be needed to reduce the construction traffic impact. As with the proposed project, this alternative would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit nor would it conflict with an applicable congestion management program because it would reduce the number of daily trips to the campus compared to existing conditions and the No Project Alternative. It would also increase pedestrian crossing across Heller Drive and result in the same significant impact on transit and the same mitigation measure would be required to mitigate the impact. All other traffic impacts would be less than significant.

Tribal Cultural Resources

Similar to the proposed project, with mitigation, the Heller site development under this alternative would not result in any significant impacts related to TRCs. Although consultation pursuant to AB 52 with the Native American tribes has not been undertaken for the North Remote site, however, as noted under Cultural Resources, above, the site is not likely to be considered sensitive for prehistoric cultural resources. Furthermore, surveys would be completed to ensure that any prehistoric resources are identified, and LRDP mitigation measures would be implemented to minimize impacts to known and unknown cultural resources. Therefore, the impacts on TRCs under this alternative would be comparable to those under the proposed project.

Utilities and Service Systems

Under this alternative, two MBR facilities would be constructed, one at each site. The recycled water produced at each site would be utilized for non-potable water uses, including toilet flushing and irrigation. As there are no colleges near the North Remote site that could utilize the recycled water, excess water would be disposed via injection wells.

As a result of the inclusion of two wastewater treatment facilities in this alternative, the potable water demand associated with the undergraduate and graduate housing under this alternative would be comparable to that under the proposed project. However slightly more water would be used at the North Remote site due to the inclusion of dining facilities at that site. As with the proposed project, the water supply impact under this alternative would also be significant and unavoidable.

Similar to the proposed project, this alternative would result in a less than significant impact associated with wastewater infrastructure as no off-site improvements would be required. As this alternative would include the same number of beds as the proposed project, its solid waste impact would be comparable. All utility impacts at the Hagar site would be avoided.

Energy

This alternative would involve comparable petroleum-based fuel usage due to construction activities. Electricity and natural gas usage during operation would also be comparable to the proposed project. Thus, the alternative would result in comparable less than significant energy impacts.

Other Resources

As with the proposed project, should the trees on the Heller site qualify as timberland, the timberland conversion impact would occur at the Heller site. In addition, development of about half the proposed

student housing on the North Remote site would result in the development of a forested site. The site is not zoned Timberland Production. The project site is wooded, primarily with second growth redwoods, which is a commercial species. Therefore, the site would likely be considered timberland as defined in Public Resources Code 4526.1. This would require a timberland conversion permit from CalFIRE and the preparation of a timber harvest plan. However, the acreage of timberland would be very small. Furthermore, the site is not zoned for any timber-related uses; the Campus does not use the site for growing timber; and commercial timber production would not be compatible with the 2005 LRDP land use designation or with the surrounding academic and residential land uses. Therefore, the alternative would not conflict with the existing zoning for, or cause the rezoning of, forest land or timberland. The alternative would convert approximately 9.6 acres of forest land to non-forest use. The loss of forest land could result in adverse aesthetic, GHG, or biological resource impacts. These potential impacts of the alternative are discussed under Aesthetics, Biological Resources, and Greenhouse Gas Emissions. All of the potential impacts of the conversion of forest land to non-forest use would be less than significant with implementation of previously adopted LRDP EIR mitigation measures.

Conclusion and Relationship to Project Objectives

The Heller site and North Remote site Development Alternative would avoid all of the proposed project's impacts related to development at the Hagar site and would reduce the impacts at the Heller site. However, this alternative would have greater impacts on timberland and biological resources compared to the project, although the impacts would be mitigable to a less than significant level.

This alternative would achieve all of the objectives of the proposed project as it would provide all the needed housing. However, due to the need to obtain approval to remove timberland, the alternative would likely fail to develop additional housing in a timely manner in order to meet the terms of the Settlement Agreement.

5.7 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA requires the identification of the environmentally superior alternative among the alternatives to the proposed project. The environmentally superior alternative must be an alternative to the proposed project that reduces some of the environmental impacts of the proposed project, regardless of the financial costs associated with this alternative. Identification of the environmentally superior alternative is an informational procedure and the alternative identified as the environmentally superior alternative may not be that which best meets the goals or needs of the proposed project.

Based on the analysis above, the No Project Alternative would be the environmentally superior alternative as it would avoid all significant and significant and unavoidable impacts of the proposed

project. If the No Project Alternative is determined to reduce most impacts, CEQA requires that the EIR identify an environmentally superior alternative among the other alternatives (State CEQA Guidelines Section 15126.6(e)). Of the other alternatives evaluated in this EIR, Alternative 3 (Heller Site Development only) would have greater visual impacts than the proposed project, and Alternative 4 (Heller Site and North Remote Site Development) would have greater impacts on timberland and biological resources which would not occur under the proposed project. The Reduced Project Alternative would avoid all of the proposed project's impacts at the Hagar site and reduce the project's impacts at the Heller site. For this reason, the Reduced Project Alternative is considered the environmentally superior alternative.

5.6 REFERENCES

Edwards, R., P. Podzorski, J. Pryor, and J. Toenjes. 1978. *A Preliminary Archaeological Reconnaissance of the Lands of the University of California at Santa Cruz*. Report (S-3947) on file at the Environmental Assessment Group, University of California at Santa Cruz, Santa Cruz, California.

**Table 5.0-1
Summary Comparison of Project Alternatives^a**

Project Impact	Proposed Project (Before and After Mitigation)	Alternative 1: No Project	Alternative 2: Reduced Project	Alternative 3: Heller Site Development Only	Alternative 4: Heller Site and North Remote Site Development
Aesthetics					
SHW Impact AES-1: Implementation of the proposed project would have a substantial adverse effect on a scenic vista.	<i>S/SU</i>	<i>Avoided; NI</i>	<i>Reduced; S/SU</i>	<i>Greater; S/SU</i>	<i>Reduced; S/SU</i>
SHW Impact AES-2: Implementation of the proposed project would substantially damage scenic resources.	<i>S/SU</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>
SWH Impact AES-3: Implementation of the proposed project would not substantially degrade the visual character or quality of the project sites and the immediate surrounding areas.	<i>PS/SU</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>
Air Quality					
SHW Impact AIR-1: Construction of the proposed project could result in construction emissions that violate an air quality standard or contribute substantially to an existing or projected air quality violation.	<i>S/LTS</i>	<i>Avoided; LTS</i>	<i>Reduced; LTS</i>	<i>Similar; S/LTS</i>	<i>Similar; S/LTS</i>
SHW Impact AIR-3: Implementation of the proposed project would expose sensitive receptors to substantial concentrations of toxic air contaminants.	<i>S/LTS</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>
Biological Resources					
SHW Impact BIO-1: Development of the proposed project would result in a substantial adverse impact on two sensitive natural communities.	<i>PS/LTS</i>	<i>Avoided; NI</i>	<i>Reduced; PS/LTS</i>	<i>Similar; PS/LTS</i>	<i>Greater; PS/LTS</i>
SHW Impact BIO-2: The proposed project may result in an adverse impact, directly and indirectly, to special-status plant species at the Hagar site.	<i>PS/LTS</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>
SHW Impact BIO-5: The proposed project could result in a substantial adverse effect on important movement habitat and direct impacts to California red-legged frog.	<i>PS/LTS</i>	<i>Avoided; NI</i>	<i>Similar; PS/LTS</i>	<i>Similar; PS/LTS</i>	<i>Similar; PS/LTS</i>
SHW Impact BIO-6: The proposed project could result in direct impacts to California giant salamanders.	<i>PS/LTS</i>	<i>Avoided; NI</i>	<i>Similar; PS/LTS</i>	<i>Similar; PS/LTS</i>	<i>Similar; PS/LTS</i>

Project Impact	Proposed Project (Before and After Mitigation)	Alternative 1: No Project	Alternative 2: Reduced Project	Alternative 3: Heller Site Development Only	Alternative 4: Heller Site and North Remote Site Development
SHW Impact BIO-11: The proposed project could interfere with the movement of wildlife species or with established native resident or migratory wildlife corridors.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>
SHW Impact BIO-12: Outdoor lighting associated with the proposed project could impact wildlife behavior adjacent to the project sites.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>
Cultural Resources					
SHW Impact CULT-2: The proposed project could cause a substantial adverse change in the significance of a previously unknown historical or archaeological resource, or to human remains.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>
Geology and Soils					
SHW Impact GEO-3: The proposed project would result in construction of facilities in an area underlain by karst features, which could lead to settlement or collapse beneath the structures.	<i>PS/LTS</i>	Avoided; <i>LTS</i>	Reduced; <i>PS/LTS</i>	Reduced; <i>PS/LTS</i>	Reduced; <i>PS/LTS</i>
Hydrology and Water Quality					
SHW Impact HYD-2: Project occupancy and operations would have the potential to substantially degrade surface or groundwater quality.	<i>S/LTS</i>	Reduced; <i>LTS</i>	Similar; <i>S/LTS</i>	Similar; <i>S/LTS</i>	Similar; <i>S/LTS</i>
Transportation and Traffic					
SHW Impact TRA-2: Implementation of the proposed project would not increase traffic volumes and degrade existing on-campus intersection levels of service under 2020 conditions but would result in a significant impact at a new intersection.	<i>S/LTS</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>	Avoided; <i>NI</i>
SHW Impact TRA-3: Construction period traffic could temporarily impact traffic conditions along roadways serving the project sites, including potential effect on emergency vehicle access.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Reduced; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>	Similar; <i>PS/LTS</i>
SHW Impact TRA-6: The proposed project would conflict with UC Santa Cruz policies related to alternative transportation.	<i>PS/LTS</i>	Avoided; <i>NI</i>	Reduced; <i>PS/LTS</i>	Reduced; <i>PS/LTS</i>	Reduced; <i>PS/LTS</i>

Project Impact	Proposed Project (Before and After Mitigation)	Alternative 1: No Project	Alternative 2: Reduced Project	Alternative 3: Heller Site Development Only	Alternative 4: Heller Site and North Remote Site Development
Tribal Cultural Resources					
SHW Impact TCR-1: The proposed project could cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Section 21074.	<i>PS/LTS</i>	<i>Avoided; NI</i>	<i>Reduced; PS/LTS</i>	<i>Reduced; PS/LTS</i>	<i>Similar; PS/LTS</i>
Utilities and Service Systems					
SHW Impact UTIL-1: The proposed project would not cause an exceedance of applicable wastewater treatment requirements but would entail the construction of new wastewater treatment facilities, the construction of which could result in cause significant environmental effects.	<i>PS/LTS</i>	<i>Avoided; NI</i>	<i>Reduced; PS/LTS</i>	<i>Reduced; PS/LTS</i>	<i>Similar; PS/LTS</i>
SHW Impact UTIL-2: The proposed project would result in the construction of off-site wastewater conveyance infrastructure, the construction of which could cause significant environmental effects.	<i>PS/LTS</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>
SHW Impact UTIL-3: The proposed project would require the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.	<i>PS/LTS</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>	<i>Avoided; NI</i>
SHW Impact UTIL-4: The proposed project would increase the amount of water used on the project site, and would be adequately served by existing entitlements and water resources under normal water years but not under multiple dry year conditions.	<i>S/SU</i>	<i>Greater; S/SU</i>	<i>Similar; S/SU</i>	<i>Similar; S/SU</i>	<i>Similar; S/SU</i>
SHW Impact C-UTIL-1: The proposed project, in conjunction with other past, present and reasonably foreseeable future development, would result in a significant cumulative impact on utilities.	<i>S/SU</i>	<i>Greater; S/SU</i>	<i>Similar; S/SU</i>	<i>Similar; S/SU</i>	<i>Similar; S/SU</i>

Project Impact	Proposed Project (Before and After Mitigation)	Alternative 1: No Project	Alternative 2: Reduced Project	Alternative 3: Heller Site Development Only	Alternative 4: Heller Site and North Remote Site Development
Other Resources					
SHW Impact AG-1: The proposed SHW project and the related dining facilities expansion project would not convert farmland to non-agricultural use, conflict with existing zoning for agricultural use or a Williamson Act contract, or conflict with existing zoning for, or cause rezoning of, forestland or timberland. In addition, the proposed SHW project and the related dining facilities expansion project would not result in the loss of forestland or conversion of forestland to non-forest use, or involve other changes in the existing environment that could result in conversion of Farmland to non-agricultural use.	<i>LTS</i>	Avoided; <i>NI</i>	Similar; <i>LTS</i>	Similar; <i>LTS</i>	Greater; <i>LTS</i>
<p><i>a. This table lists only the significant or potentially significant environmental impacts of the proposed project.</i></p> <p>KEY</p> <p><i>SU</i> Significant and unavoidable</p> <p><i>S</i> Significant impact</p> <p><i>PS</i> Potentially significant impact</p> <p><i>LTS</i> Less than significant impact</p> <p><i>NI</i> No Impact</p> <p><i>Avoided</i> Proposed project's impact avoided</p> <p><i>Similar</i> Impact similar to proposed project</p> <p><i>Reduced</i> Impact less than proposed project</p> <p><i>Greater</i> Impact greater than proposed project</p>					

6.0 OTHER CEQA CONSIDERATIONS

6.1 INTRODUCTION

Section 15126 of the California Environmental Quality Act (CEQA) Guidelines states that an Environmental Impact Report (EIR) must include a discussion of the following three topics:

- Significant environmental effects which cannot be avoided if the proposed project is implemented;
- Significant irreversible environmental changes which would be involved in the proposed project should it be implemented; and
- Growth inducing effects of the proposed project.

In addition, Section 15128 of the State CEQA Guidelines requires a brief statement of the reasons that various possible effects of a project have been determined not to be significant and, therefore, are not evaluated in the EIR. The following sections address each of these types of impacts.

6.2 SIGNIFICANT AND UNAVOIDABLE EFFECTS

An EIR must identify significant impacts associated with implementation of the proposed project that could not be mitigated to a less than significant level. As part of the certification process, The Board of Regents of the University of California (The Regents) will make a final decision as to the significance of impacts and the feasibility of mitigation measures in this EIR. As detailed in **Chapter 4.0**, implementation of the proposed project would result in the following significant impacts that would not be mitigated to a less than significant level:

6.2.1 Aesthetics

SHW Impact AES-1: Implementation of the proposed project would have a substantial adverse effect on a scenic vista.

SHW Impact AES-2: Implementation of the proposed project would substantially damage scenic resources.

SWH Impact AES-3: Implementation of the proposed project would substantially degrade the visual character or quality of the Hagar site.

6.2.2 Utilities and Service Systems

SHW Impact UTIL-4: The proposed project would increase the amount of water used on the project site, and would be adequately served by existing entitlements and water resources under normal water years but not under multiple dry year conditions.

SHW Impact C-UTIL-1 The proposed project, in conjunction with other past, present and reasonably foreseeable future development, would result in a significant cumulative impact on utilities.

6.3 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

Section 15126.2(c) of the State CEQA Guidelines states that an EIR must include a discussion of any significant irreversible environmental changes that would be caused by a proposed project. Generally, a project would result in significant irreversible environmental changes if:

- the primary and secondary impacts would generally commit future generations to similar uses;
- the proposed consumption of resources is not justified (e.g., the project involves the wasteful use of energy);
- the project would involve a large commitment of nonrenewable resources; or
- the project involves uses in which irreversible damage could result from any potential environmental accidents associated with the project.

Implementation of the proposed project would continue to commit the project sites to institutional uses, thereby ruling out other land uses on those sites during operation of the campus. The University's ownership of the campus represents a long-term commitment of the Santa Cruz campus lands to an institutional use. Restoration of the campus to pre-developed conditions is not feasible given the levels of disturbance and capital investment.

Resources that would be permanently and continually consumed by project implementation include water, electricity, natural gas, and fossil fuels. In addition, construction activities related to the proposed project would result in the irretrievable commitment of nonrenewable energy resources, primarily in the form of fossil fuels (including fuel oil, natural gas, and gasoline) for automobiles and construction equipment.

As discussed in **Section 3.0, Project Description**, the proposed buildings would be constructed to meet the University of California Sustainable Practices Policy, which require UC projects to aim towards

achievement of Triple Net Zero (Net Zero Energy, Net Zero Water and Net Zero Waste). The University also requires all UC projects to achieve a minimum of a Silver rating under United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) Building Design and Construction (BD+C) v4.0 Green Building Rating System (the "LEED Rating System"). The project is targeting to achieve a LEED Platinum certification. Therefore, the consumption of these resources during construction and operation of proposed facilities would not represent unnecessary, inefficient, or wasteful use of resources.

As the project would achieve a LEED Silver rating and the new buildings are being designed and planned to be constructed to achieve a LEED® Platinum Certification, construction and operation of the proposed project would include strategies to minimize energy and water consumption and solid waste generation. Construction and operation of the proposed project would also comply with all applicable building codes, campus conservation features, and would ensure that all natural resources, including water, are conserved to the maximum extent feasible. Overall, due to the variety of energy and water conservation measures that would be implemented, the proposed project would not involve a large commitment of nonrenewable resources.

The State CEQA Guidelines also require a discussion of the potential for irreversible environmental damage caused by an accident associated with the project. While the campus uses, transports, stores, and disposes of hazardous wastes, as described in **Section 4.15.3, Hazards and Hazardous Materials**, the campus complies with all applicable state and federal laws and existing campus programs, practices, and procedures related to hazardous materials, which reduces the likelihood and severity of accidents that could result in irreversible environmental damage. In the history of UC ownership of the campus, there have been no accidents resulting in irreversible environmental damage, indicating that current practices with respect to hazardous materials handling are adequate, and thus the potential for the proposed project to cause irreversible environmental damage from an accident or upset of hazardous materials, is considered low (Delemus 2018).

6.4 GROWTH-INDUCING IMPACTS

Section 15126.2(d) of the State CEQA Guidelines requires that an EIR include a discussion of the potential for a proposed project to foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. The State CEQA Guidelines do not provide specific criteria for evaluating growth inducement and state that it must not be assumed that growth in an area is necessarily beneficial, detrimental, or of little significance to the environment. Growth inducement is generally not quantified, but is instead evaluated as either occurring or not occurring with implementation of a project. The identification of growth-inducing impacts is generally informational,

and mitigation of growth inducement is not required under CEQA. It must be emphasized that the State CEQA Guidelines require an EIR to “discuss the ways” that a project could be growth inducing and to “discuss the characteristics of some projects that may encourage ... activities that could significantly affect the environment.” However, the State CEQA Guidelines do not require an EIR to predict or speculate specifically where such growth would occur, in what form it would occur, or when it would occur.

Growth inducing impacts are discussed in Chapter 6, Other CEQA Considerations, in the 2005 LRDP EIR. The 2005 LRDP EIR analyzed impacts from growth under the 2005 LRDP through the year 2020. The 2005 LRDP EIR found that the study area as a whole would have enough housing to handle the demand related to the 2005 LRDP. However, there would not be enough affordable housing, and if the LRDP-related demand were combined with the demand for housing from other regional growth, there would not be an adequate supply of housing to meet the cumulative demand. Therefore, the EIR noted that due to the projected cumulative demand, in addition to the new housing provided for in the general plans of the affected communities, more housing would need to be constructed.

The 2005 LRDP EIR also found that environmental impacts on agricultural lands, biological resources, and cultural resources from the development of new housing within the City of Santa Cruz would likely be less than significant because much of the new housing in the City would be developed on infill or redevelopment sites where these resources would likely not be encountered. However some significant and unavoidable impacts, especially related to habitat conversion and traffic, would occur. The 2005 LRDP EIR concluded that by virtue of being a contributor to the regional demand for new housing and urban amenities, the Campus would contribute to these environmental impacts as they are created by overall growth in regional housing and other urban amenities. In addition to impacts from the development of new housing, LRDP-related population that would reside off campus in regional communities would place a demand on utilities and services such as water, sewer, schools, and parks in these affected communities.

The 2005 LRDP EIR found that for every new direct job on the campus, additional indirect and induced jobs would be created or supported in the county. It also projected that the campus-related indirect and induced employment growth would result in more commercial infill development on lands that are vacant or underutilized, especially in those parts of the city that are near the campus. The EIR also concluded that the indirect and induced employment that would result from the implementation of the 2005 LRDP could in turn result in additional population growth as individuals could move into the study area to fill these jobs.

As discussed in **Section 3.0, Project Description**, the proposed project is within the planned development and growth projections of the 2005 LRDP. Therefore, as such the growth inducing impacts of the proposed project are accounted for in the 2005 LRDP EIR analysis. Because the proposed SHW project would build more on-campus housing than previously planned under the 2005 LRDP, it will reduce the demand for off-campus housing and thereby reduce some of the housing-related growth impacts analyzed and reported in the 2005 LRDP EIR.

6.5 EFFECTS FOUND NOT TO BE SIGNIFICANT

Section 15128 of the State CEQA Guidelines requires an EIR to briefly describe any potential environmental effects that were determined not to be significant during the Initial Study and EIR scoping process and were, therefore, not discussed in detail in the EIR. A discussion of the effects of the proposed project on agricultural and forest resources, hazards and hazardous materials, and mineral resources, that were found not to be significant, are presented in **Section 4.15, Other Resources**. Other impacts found to be less than significant in the EIR are discussed in detail in **Section 4.0, Environmental Setting, Impacts, and Mitigation Measures**, and summarized in **Section 2.0, Executive Summary**.

6.6 REFERENCES

Delemus, J. 2018. Environmental Programs Manager. UC Santa Cruz Environmental Health & Safety. Personal communication with A Klaus, Senior Environmental Planner, UC Santa Cruz. February.

7.0 SUPPLEMENT TO THE 2005 LRDP EIR

7.0.1 INTRODUCTION

In September 2006, The Regents certified UC Santa Cruz 2005 LRDP EIR (SCH #2005012113) and approved the UC Santa Cruz 2005 LRDP. The 2005 LRDP provides a comprehensive framework for the physical development of the UC Santa Cruz campus (which includes the 2,030-acre main campus and the 18-acre University-owned property at 2300 Delaware Avenue) to accommodate an on-campus three-quarter-average enrollment of 19,500 full time equivalent (FTE) students by 2020-21, or an increase of approximately 5,100 students from the 2003-04 baseline. The 2005 LRDP includes a building program to accommodate UC Santa Cruz's academic, research, and public service mission as enrollment grows, and a land use plan that assigns elements of the building program to designated land-use areas and describes general objectives that will guide development within those areas. The building program identifies a total of about 3,175,000 gross square feet of net new building space, including 1,196,000 gross square feet of student and employee housing. The 2005 LRDP identifies targets for on-campus housing for 50 percent of undergraduate students and 25 percent of graduate students. Thus, the 2005 LRDP EIR evaluated the addition of 2,300 student beds to the inventory of 6,891 beds existing in Fall 2004, for a total of 9,190 beds.

The certification of the 2005 LRDP Final EIR was challenged in 2007 by several entities, including the City of Santa Cruz. A ruling by the Santa Cruz County Superior Court in *City of Santa Cruz et. al. v. Regents of the University of California et. al.* (CV155571, consolidated with Case No. CV155583) concluded that additional analyses relating to water supply, housing, and traffic mitigation were required. Specifically the Court ruled that:

- a. The water supply analysis in the EIR for the 2005 LRDP is deficient because it failed to meet the standards set forth in *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova*, 40 Cal.4th 412 (2007).
- b. Mitigation Measure TRA-2 does not constitute a feasible enforceable measure for ensuring the University's payment of fair share contributions to transportation improvements under the control of the City of Santa Cruz.
- c. The population and housing analysis of the 2005 LRDP EIR is deficient because it fails to identify the probable locations of housing necessary to serve the LRDP and the growth contemplated by the plan.

The Court also ruled that the University suspend all project approvals and construction-related activities that are based upon the 2005 LRDP approvals and that could result in any adverse change or alteration to the physical environment until: (1) the writ had been discharged, or (2) adequate stand-alone CEQA documents had been prepared for those projects.

In August 2008, a Comprehensive Settlement Agreement (2008 Settlement Agreement) was executed by all parties to resolve the lawsuits. The 2008 Settlement Agreement was entered as a final judgment of the Court, thereby superseding the previous court ruling. Key provisions of the 2008 Settlement Agreement are as follows:

- **Enrollment:** The 2005 LRDP projected a full time equivalent (FTE) on campus three quarter average (fall winter spring) combined graduate and undergraduate enrollment of 19,500 in academic year 2020-2021. The 2008 Settlement Agreement revised the 2005 LRDP enrollment projections by limiting undergraduate enrollment to 17,500, and total on-campus combined graduate and undergraduate to 19,480 in academic year 2020-2021. The 2008 Settlement Agreement provides that enrollment will be adjusted downward by UC Santa Cruz if its settlement housing commitment (see below) is not met or water demand increases during a City service area wide moratorium.
- **Housing:** UC Santa Cruz will provide 7,125 beds for student enrollment up to 15,000 FTE and will provide additional housing to accommodate 67 percent of new student enrollment above 15,000 FTE. This results in provision of a total of 10,125 available beds for an enrollment of 19,500 FTE. The 2005 LRDP originally called for UC Santa Cruz to provide housing for 50 percent of undergraduates and 25 percent of graduate students during the life of LRDP for a total of 9,190 beds. The 2008 Settlement Agreement increases student housing by 935 beds to be provided by new construction, remodeling, and off-campus housing. UC Santa Cruz will also contribute specified fees to the City for each UC Santa Cruz owned or leased, off-campus student bed that results in a tax revenue loss to the City (which will be used by the City to support services for UC Santa Cruz's off-campus population).
- **Water and Sewer Services:** To support UC Santa Cruz in achieving its on-campus housing commitment, the City agreed to continue to provide water service to the campus through the existing connections. The 2008 Settlement Agreement requires the City and UC Santa Cruz to concurrently apply to the Santa Cruz LAFCO for a Sphere of Influence amendment (City application) and for extraterritorial water and sewer services (University application) for the area identified as the North Campus to allow for the development of 3,175,000 gross square feet of additional building space as described in the 2005 LRDP. The Agreement provides that UC Santa

Cruz's housing commitment under the Agreement will be excused if the LAFCO decision is legally challenged, and the final judicial determination upholds a LAFCO denial or reverses a LAFCO approval of the University's application.

UC Santa Cruz will pay a fee for increased water use (equivalent to the City's "system development charges") to cover its proportional share of use of City developed new water source capacity and the City's construction of public facilities to serve UC Santa Cruz's non-drought water demand on the Main Campus. Additionally, UC Santa Cruz will 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.

- **2005 LRDP & LRDP EIR:** For future projects under the 2005 LRDP, UC Santa Cruz will not "tier" from or otherwise rely on the 2005 LRDP EIR water or housing analyses as invalidated by the Santa Cruz Superior Court.

In compliance with the court order and the 2008 Settlement Agreement, between 2007 and the present time, the Campus did not undertake any projects that were based upon the 2005 LRDP approvals. The Campus did approve a few small- to mid-sized projects based on stand-alone CEQA documents.

The proposed Student Housing West (SHW) project is a project under the 2005 LRDP. Although the SHW project would not, in itself, cause campus enrollment to increase, it would house some of the increased student enrollment under the 2005 LRDP. It would also add new building space to the campus that would be within the building space projections of the 2005 LRDP. As an on-campus student housing project, this project would have the effect of increasing the demand for potable water on the campus above current conditions, and the project would contribute to the Campus' total demand for water under the 2005 LRDP. Therefore, the University has determined that in order to comply with the court order, it must prepare a new water supply impact analysis for the 2005 LRDP as a whole that is inclusive of the water demand associated with the proposed SHW project. The new 2005 LRDP water supply impact assessment is presented in **Section 7.1**

As an on-campus student housing project that would add 3,000 student beds to the Campus's housing stock, the SHW project would have the effect of reducing the impact of the 2005 LRDP on off-campus population and housing, and therefore, the SHW project EIR does not rely on any program-level analysis of the population and housing impacts of the 2005 LRDP as a whole. Nonetheless, the University has determined that it will address the Court's directive and prepare a new population and housing analysis for the 2005 LRDP. The new analysis is presented in **Section 7.2**

This document supplements the 2005 LRDP EIR. The analysis in **Section 7.1** replaces in full the prior water supply impact analysis reported under LRDP Impact UTIL-9 in the 2005 LRDP EIR on pages 4.15-29 to 4.15-36 in Volume 2, and the amended water supply analysis for the Reduced Enrollment Alternative on pages 2-14 through 2-16 in Volume 4 of the 2005 LRDP EIR. The analysis in **Section 7.2** replaces in full the prior analysis under LRDP Impact POP-1 and LRDP Impact POP-3 in Section 4.11 in Volume 2 and the amended population information for the Reduced Enrollment Alternative in Volume 4 of the 2005 LRDP Final EIR.

7.1 LRDP WATER SUPPLY IMPACT ASSESSMENT

7.1.1 INTRODUCTION

As noted in **Section 7.0** the Court found the water supply analysis in the 2005 LRDP EIR to be deficient because it failed to meet the standards set forth in *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova*, 40 Cal.4th 412 (2007). To address this, the Court provided the following direction:

“Supplement the water supply analysis of the 2005 LRDP EIR, in accordance with the standards announced in *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova*, 40 Cal.4th 412 (2007), to include an analysis of the environmental impacts of developing new water sources to support new Campus development under the 2005 LRDP, specifically considering the environmental impacts if Campus growth under the LRDP triggers the need to develop new water sources or if the City were required to build a higher capacity desalination plant more quickly than it would be in the absence of the LRDP Project.”

This section addresses the Court’s directive and presents a new analysis of the water supply impacts of the campus growth under the 2005 LRDP, including the water supply impacts from providing additional student housing on the campus pursuant to the Student Housing West (SHW) project as well as other housing and non-housing projects that are proposed for development under the 2005 LRDP.

Since the prior analysis was conducted, several years have elapsed and other changes that have occurred, including the changes in the conditions in the project area including the completion of a 2015 Urban Water Management Plan (UWMP) by the City, changes to the campus’s growth projections, and advances in water efficiency of new development. Because of this, rather than simply update the 2005 analysis, the University has prepared a new water supply impact assessment which replaces in full the prior water supply impact analysis reported under LRDP Impact UTIL-9 in the 2005 LRDP EIR on pages 4.15-29 to 4.15-36 in Volume 2, and the amended water supply analysis for the Reduced Enrollment Alternative on pages 2-14 through 2-16 in Volume 4 of the 2005 LRDP EIR.

Data used in preparation of this section were obtained primarily from a *Water Supply Evaluation for the UC Santa Cruz 2005 Long Range Development Plan* prepared by West Yost, dated March 2018; the City’s 2015 *Urban Water Management Plan* adopted in August 2016; City of Santa Cruz Water Supply Advisory Committee’s *Report on Agreements and Recommendations*, dated October 2015; and other recent water planning documents. The 2005 LRDP Water Supply Evaluation (WSE) is included in full in **Appendix 7.1**.

7.1.2 ENVIRONMENTAL SETTING

7.1.2.1 Relevant Study Period

The 2005 LRDP, adopted in 2006, was developed to guide the Campus's growth to an enrollment level of 19,500 FTE students, which was projected to be attained by 2020-21. Therefore the plan was designed for the time period 2005 through 2020-21, and the 2005 LRDP EIR, which was prepared and certified in 2006, evaluated the impacts of campus growth between approximately 2003-04 (used as the baseline year in the EIR) and 2020-21. The 2005 LRDP is unchanged with regard to the maximum enrollment level of 19,500 FTE students and at this point in time it is still projected that this enrollment level would be attained by 2020-21. However, some of the housing that would be constructed under the 2005 LRDP to serve this enrollment level will not be completed until 2023. Therefore, the study period used in this updated water supply impact assessment is 2003-04 through 2023.

7.1.2.2 Terminology

In 2005 when the 2005 LRDP Draft EIR was published, the EIR analyzed and disclosed the impacts associated with an enrollment level of 21,000 FTE students and 10,125 student beds by 2020-21. However, in preparing the Final EIR in 2006, the University evaluated a Reduced Enrollment Alternative that included an enrollment level of 19,000 FTE students and 9,190 student beds by 2020-21. In September 2006, The Regents approved the Reduced Enrollment Alternative as the 2005 Final LRDP. Subsequently, to settle lawsuits with the City and other entities, the University agreed that, for as long as the 2005 LRDP is in effect, full-time equivalent (FTE) on-campus 3-quarter average enrollment for undergraduate students would not exceed 17,500, and the University further projected that on-campus combined graduate and undergraduate enrollment levels would be 19,480 in academic year 2020-2021. The University also committed to providing more on-campus housing consistent with the terms of the 2008 Settlement Agreement. As a result of this, while the enrollment growth under the 2005 LRDP to 19,500 FTE students remains unchanged from the 2005 Final LRDP that was adopted by The Regents, more on-campus housing is now planned under the 2005 LRDP than previously projected. In addition, there have been some changes at UC Santa Cruz with respect to on-campus employment. These actual conditions that have occurred to date under the 2005 LRDP, implemented per the Settlement Agreement, plus remaining foreseeable activities and conditions under the 2005 LRDP, are referred to in this section as the "Post-Settlement LRDP," whereas the approved 2005 LRDP as originally analyzed and approved in 2006 is referred to as the "2005 LRDP" in this section.

7.1.2.3 UC Santa Cruz

Background

UC Santa Cruz main campus receives potable water from the City of Santa Cruz Water Department (SCWD). Under the terms of a 1962 Water Services Agreement between the City of Santa Cruz and the University, the City agreed to provide, at no expense to the University, water and sewer lines up to the boundaries of the campus, consistent with good engineering and the University's reasonable needs. The agreement also states that the City shall make water and sewer services available to the University at rates no less favorable than those prevailing to large scale industrial users. An additional agreement made between the University and City of Santa Cruz in 1965 states that the City will install a water system capable of supplying 2 million gallons per day to the campus. Through these agreements, the University has contracted for adequate water service for the entire campus. The University executed a Memorandum of Understanding with the City of Santa Cruz under which the University agreed to pay the cost of certain pump upgrades that could be needed in the future to serve the campus.

As noted in **Section 7.0**, as part of the Settlement Agreement, in order to support UC Santa Cruz in achieving its on-campus housing commitment, the City agreed to continue to provide water service to the campus through the existing connections. The Settlement Agreement requires the City and UC Santa Cruz to concurrently apply to the Santa Cruz LAFCO for a Sphere of Influence amendment (City application) and for extraterritorial water and sewer services (University application) for the area identified as the North Campus to allow for the development of 3,175,000 gross square feet of additional building space as described in the 2005 LRDP. The Agreement provides that UC Santa Cruz's housing commitment under the Agreement will be suspended if the LAFCO decision is legally challenged, and that the housing commitment will be excused if a final judicial determination upholds a LAFCO denial or reverses a LAFCO approval of the University's application.

In addition, the Settlement Agreement sets forth that for every increment of 85,000/gallons of water used over 206 MGY (2005 LRDP baseline year for the UC Santa Cruz main campus, each incremental payment resets the baseline), UC Santa Cruz will pay a fee for increased water use (equivalent to the City's "system development charges") to cover its proportional share of use of City developed new water source capacity and the City's construction of public facilities to serve UC Santa Cruz's non-drought water demand on the main campus. Additionally, UC Santa Cruz will 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. The City agreed to treat UC Santa Cruz as it would any other developer with regard to the remaining excess water supply capacity.

Campus Water Supply System

The water is delivered through four connections to the City's water distribution system. Water is pumped from the City's Bay Street Reservoir to three consecutive in-line reservoirs at separate 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 valves (UCSC 2006).

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. The reservoir is also necessary to provide adequate fire flow to the Crown/Merrill Apartments. The Campus has an existing on-campus well that could potentially supply water for non-potable purposes.

The UC Santa Cruz 2300 Delaware Avenue property is also covered by the 2005 LRDP and served by the City's water distribution system. Water mains that serve the site are located in adjacent streets.

Campus Water Use

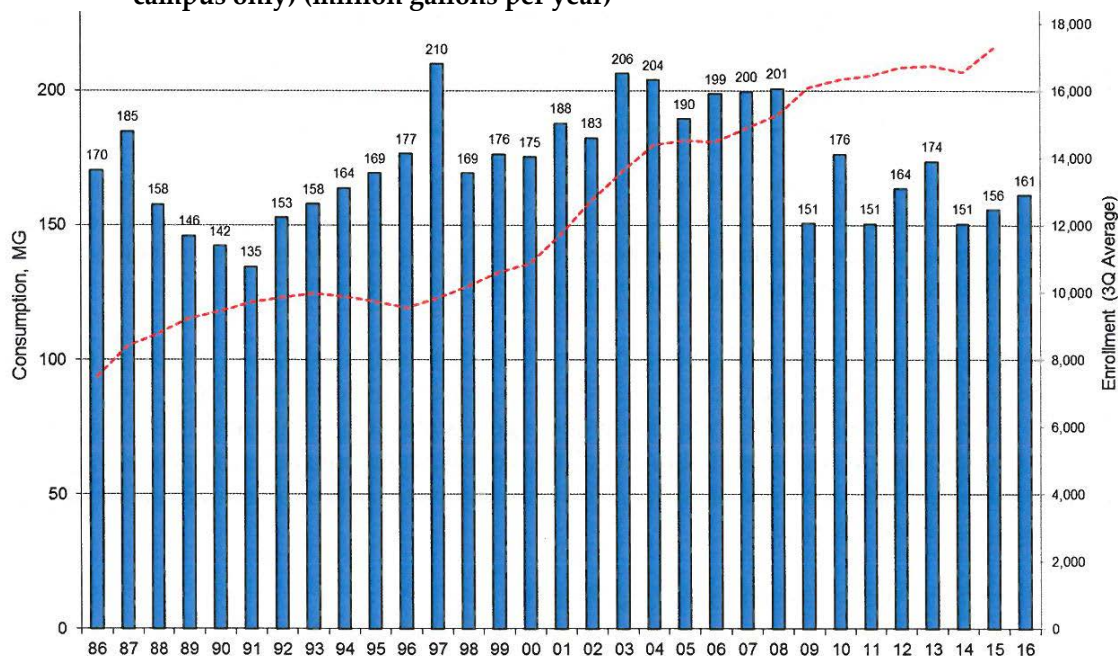
As reported in the 2005 LRDP EIR, in 2003, the UC Santa Cruz campus water demand was 565,601 gallons per day (gpd) (206 million gallons per year [MGY]). Total UC Santa Cruz water demand was estimated to be about 4 percent of total SCWD demand in 2003 based on the City's Integrated Water Plan, and about 5.3 percent based on another City report focused on adequacy of the City's supply for future development. Residential water use accounted for half of the UC Santa Cruz consumption in 2003. Academic buildings and "other" water use accounted for 22 percent of UC Santa Cruz consumption. Irrigation (which included landscape irrigation, use of water for Agriculture/Research at the CASFS, Garden, and Arboretum, and irrigation of turf fields) accounted for 28 percent of water use (UCSC 2006).

As shown in **Figure 7.1-1**, historically, the general trend in the main campus water demand was one in which water use rose roughly in parallel with enrollment growth, with water demands generally increasing each year, except in the late 1980s and early 1990s when it declined in response to drought and

as a result of the implementation of mitigation measures included in the 1988 LRDP EIR. However since 2003, the Campus has implemented a number of conservation programs to keep its water usage from increasing to a level that exceeded the level established as baseline in the Settlement Agreement. In 2007, the Campus conducted a water efficiency study which identified 19 high-priority projects to address issues identified in the report and reduce water use on the campus. The projects included pilot tests of high-efficiency toilet, urinal, and shower fixtures; campus-wide fixture retrofits; changing cooling tower operating procedures; installing additional campus sub-meters for irrigation systems; designating a staff person to coordinate a water conservation education program for student residents; installing “purple pipe” in new and renovated buildings to facilitate future use of non-potable water for toilet flushing; replacing turf with low-water-use landscaping; replacing the existing campus sub-meters with more accurate, radio-read meters; installing efficient spray valves in kitchens, cafes, and restaurants; and collection of rainwater for use in a new cooling tower. The Campus completed all of the 19 high-priority projects by 2013. By improving its sub-metering system, the Campus also reduced the amount of unaccounted-for water use substantially. Many of the implemented water conservation measures have resulted in permanent reductions in water use (e.g., plumbing fixture retrofits, improvements in leak detection, etc.). Furthermore, during the recent drought years, the Campus implemented additional programs to curtail water use to comply with the City’s mandatory water reduction goals. While historically from 2003 to 2008, the average annual water use on the main campus was about 200 MGY, as a result of these efforts in recent years, annual water use on the campus has dropped to as low as 151 MGY, representing a 25 percent reduction in water use. As the graphic shows, despite increases in enrollment, the Campus has substantially reduced its water use, and as of 2016, the main campus water use is about 161 MGY. In essence, the University has been effective in reducing and controlled the growth in water use such that compared to a rate of 60 gallons per day per student in 1986, the current rate of water use is about 25 gallons per student per day (City of Santa Cruz 2017a).

With regard to the 2300 Delaware property, based on 2016 data, the current annual water use at that site is estimated to be 0.31 MGY.

Figure 7.1-1 Annual Water Consumption, 1986-2016 University of California, Santa Cruz (main campus only) (million gallons per year)



Legend

--- Enrollment

Source: City of Santa Cruz, Information Report: Water Use Efficiency at the University of California, 2017

Campus Water Conservation

Water conservation activities at UC Santa Cruz include the following:

- Retrofitting campus toilets, showerheads and sink faucets with water efficient alternatives
- Using predominantly drought-tolerant species in campus landscaping
- Installing well-designed, efficient and serviceable irrigation systems
- Adjusting irrigation systems to reduce overspray onto unlandscaped areas or hardscape
- Adjusting irrigation run times to match fluctuating water demand conditions
- Using mulch for landscaping
- Installing irrigation meters

In addition to these efforts, the Campus Standards Handbook includes guidelines for development that seek to conserve water. For example, water-efficient plant species are recommended for landscaping, and minimal lawn areas are recommended to minimize water usage (UCSC 2006).

7.1.2.4 City of Santa Cruz

The City of Santa Cruz provides water service to an area approximately 20 square miles in size, including the entire City of Santa Cruz, adjoining unincorporated areas of Santa Cruz County, a small part of the City of Capitola, coastal agricultural lands north of the City, and the UC Santa Cruz main campus, Coastal Science Campus and 2300 Delaware property (located in the western part of the City). According to the City's 2015 UWMP, the current population residing in the Santa Cruz water service area is estimated to be 95,251 people. Approximately two thirds of the total population, almost 64,000, lives inside the City limits (West Yost 2018).

City's Supply Sources

The Santa Cruz water system relies predominantly on local surface water supplies, which include the following:

- Diversions from three North Coast streams (Reggiardo Creek, Laguna Creek, and Majors Creek) and one natural spring (Liddell Spring);
- The San Lorenzo River; and
- Loch Lomond Reservoir.

Together, these surface water sources represent approximately 95 percent of the City's total annual water production. The balance of the City's supply comes from groundwater wells. As noted in the 2015 UWMP, all of the City's water resources are obtained from local sources. The system relies entirely on rainfall, surface runoff, and groundwater infiltration occurring within watersheds located in Santa Cruz County. No water is purchased from state or federal sources or imported to the region from outside the Santa Cruz area. In general, the City's water system is managed to use available flowing sources to meet daily demands as much as possible. Groundwater and stored water from Loch Lomond are used mainly in the summer and fall months when flows in the coast streams and river sources decline, and additional supply is needed to meet higher daily water demands (West Yost 2018).

The San Lorenzo River is the City's largest source of water supply. The main surface water diversion is located at Tait Street near the City limits just north of Highway 1. The Tait Street Diversion is supplemented by shallow, auxiliary wells located directly across the river. The other diversion on the San Lorenzo River is Felton Diversion, located about 6 miles upstream from the Tait Street Diversion. Water is pumped from this diversion to Loch Lomond Reservoir. The facility is used to augment storage in the reservoir during dry years when natural inflow from Newell Creek is low. While the City is the largest user of water from the San Lorenzo River basin, two other water districts, several private water companies and numerous individual property owners share the San Lorenzo River watershed as their primary source for drinking water supply (West Yost 2018).

Even though groundwater constitutes only up to about 5 percent of the entire City water supply on an annual basis, it has been a crucial component of the water system for meeting peak season demands, maintaining pressure in the eastern portion of the distribution system, and for weathering periods of drought. The City's Live Oak well system consists of four production wells and two water treatment plants located in the eastern portion of the City water service area. The City's Live Oak well field derives groundwater from the Purisima Formation, which is the primary groundwater aquifer underlying the entire Mid county region. Groundwater from the Purisima Formation is used by the City, the Soquel Creek and Central Water Districts, several small water systems, and numerous private rural water wells. The City's well field is located within the newly defined Santa Cruz Mid County Groundwater Basin, which is included on DWR's list of critically overdrafted basins (DWR 2016).

In 2010, the City was advised by its hydrogeologist that the yield of the Live Oak well field was substantially less than half the 420 MGY annual production that the City had long assumed for water supply planning purposes, and that the dry season pumping rate that can be sustained without causing seawater intrusion in average years was closer to 170 MGY. Since then the City has kept its groundwater pumping below that level in all years except 2014. As part of the region's compliance with the Sustainable Groundwater Management Act (SGMA), the Soquel Aptos Groundwater Management Committee (SAGMC) was formed in 2015 and includes representatives from the County of Santa Cruz, Central Water District, Soquel Creek Water District, the City of Santa Cruz and private well owners. The committee will be responsible for developing a sustainable groundwater management plan for the Soquel Aptos groundwater basin (City of Santa Cruz 2016).

City's Water Treatment Facilities

Water from the North Coast sources, the San Lorenzo River and Loch Lomond Reservoir is pumped to the Graham Hill Water Treatment Plant where it is treated to remove impurities and disinfected with

chlorine. The GHWTP is a conventional surface water treatment plant that was commissioned in 1960 as a 12 mgd plant and has been expanded and improved several times since then. At the present time, it has a capacity to treat 16 mgd and is currently treating 10 mgd (City of Santa Cruz 2016). The plant has adequate capacity to treat surface water to serve the City's future demand. However the City continues to make other improvements to address changes in source water mix, changing water quality regulations, and other factors. Groundwater pumped from the Live Oak wells is treated at the two water treatment plants located near the wells.

City's Historical and Projected 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 2018).

The City utilized a demand model to forecast future water demands for 2020 through 2035 for the 2015 UWMP, considering numerous factors including historical data on customer class water use, weather, price of water, household income, conservation, and other economic variables driving water demand. With respect to the water demands for UC Santa Cruz in the City's 2015 UWMP, the City utilized demand projections developed by the University for the 2005 LRDP EIR. The 349 MGY estimate includes water demand for the main campus and the 2300 Delaware property under the 2005 LRDP, and Coastal Science Campus's projected demand under its Coastal LRDP through 2020, and an additional 10 MGY for development beyond 2020 (City of Santa Cruz 2010; City of Santa Cruz 2011).

The only change made by City staff to the University's water demand projection in the 2015 UWMP was to extend UC Santa Cruz's previous forecast of 349 MGY in 2030 further out into the future to reflect a lower, more realistic, rate of growth in water use with two potential endpoints: 2035 and 2050. In the low projection, the full use of 349 MGY occurs in 2050. In the high projection, the full use occurs in 2035. The primary projection, which is included in the City's 2015 UWMP, is the midpoint between the high and low projections which places the full use of 349 MGY in 2042 (West Yost 2018). The demand forecasts for UC Santa Cruz based on these three rates of growth in water use are shown in **Table 7.1-1**.

Table 7.1-1
Potable Water Demand Projections for UC Santa Cruz^(a)

	2013 (actual) ^(b)	2020	2025	2030	2035
Low Projection, MGY ^(c)	182	186	213	240	268
Primary Projection, MGY ^(d)	182	196	234	271	308
High Projection, MGY ^(e)	182	207	254	302	349
<p>a) Source: City of Santa Cruz 2015 UWMP, Appendix E.</p> <p>b) Based on City of Santa Cruz Water Department Billing Records.</p> <p>c) Under the Low Projection, buildout is assumed to occur in 2050.</p> <p>d) The Primary Projection is the midpoint between the low and high projections.</p> <p>e) Under the High Projection, buildout is assumed to occur in 2035.</p>					

Table 7.1-2, which is based on tables in the 2015 UWMP, provides a summary of the City's 2015 and future water demand projections for its various water use types through 2035, including UC Santa Cruz. As noted in the UWMP, UC Santa Cruz is the single largest water user in the service area, and as of 2015 accounted for about 6.5 percent of the total demand.

Table 7.1-2
City of Santa Cruz 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
Source: West Yost 2018					

Projected Water Supply

Table 7.1-3, which is also based on tables in the 2015 UWMP, provides a summary of the City’s existing and projected water supplies in normal years.

Table 7.1-3
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

Source: West Yost 2018

The City of Santa Cruz is facing several obstacles in meeting its present and future water supply needs. While each complication presents a unique set of water management challenges, the common theme is the limitation in where, when, and how much water is available to meet the area’s water service needs, particularly during years when rainfall is below average. The issues and constraints include the following:

- **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. Declaration of a local water shortage emergency for the past two years 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 (HCP) 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. As stated in the 2015 UWMP, although the HCP negotiations are ongoing, ultimate compliance with the state and federal Endangered Species Acts will result in less water being available from the City’s

flowing sources for supply in future years compared to the past, which will place a greater reliance on water stored in Loch Lomond Reservoir to meet the community's annual water needs (City of Santa Cruz 2016).

- **Source Water Quality and Treatment Capacity:** According to the 2015 UWMP, 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. In other words, it must operate properly 100 percent of the time to maintain water service throughout the entire system. With the last major expansion, the plant can now process up to 16 mgd, and the year-round average production is 10 mgd. The City has been evaluating improvements to accommodate a variety of changing conditions such as potential higher daily plant output in the winter, evolving water quality regulations, and future changes in the source water mix (City of Santa Cruz 2016).
- **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. The City's Water Rights Conformance Project is intended to eliminate technical constraints for the operations of its water supply resources (City of Santa Cruz 2016).
- **Climate Change:** As the 2015 UWMP notes, the City of Santa Cruz water supply consists of only local sources maintained and recharged by natural processes. Potential weather conditions related to climate change could greatly impact the sources of supply. A widely accepted profile is that climate change may make the future hydrology drier than the historical record maintained in the region (1937 to today). General forecasts describe deviation in the seasonal patterns of rainfall with longer and more severe droughts. Additionally, the annual average temperature in the region may increase leading to variability in the rate of evaporative processes that can greatly impact local sources and watersheds (City of Santa Cruz 2016).

Planned Sources of Water

Given the constraints listed above and the City's analysis of the system's vulnerability under drought conditions, in early 2014, City Council appointed members to the Water Supply Advisory Committee (WSAC). The purpose of establishing the WSAC was to (1) explore the City's water profile, including supply, demand and future risks; (2) analyze potential solutions to deliver a safe, adequate, reliable, affordable and environmentally sustainable water supply; and (3) develop recommendations for City Council consideration. In its Final Report issued in November 2015, the WSAC presented a Water Supply Augmentation Plan that included the following:

- Element 0: Additional water conservation with a goal of achieving an additional 200 to 250 million gallons of demand reduction by 2035 by expanding water conservation programs;
- Element 1: Passive recharge of regional aquifers by working to develop agreements for delivering surface water as an in lieu supply to the Soquel Creek Water District and/or the Scotts Valley Water Districts so they can rest their wells, help the aquifers recover, and effectively store water for use by Santa Cruz Water Department in drought years;
- Element 2: Active recharge of regional aquifers 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 to store water that can be available for use by Santa Cruz in drought years;
- Element 3: 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 Plan's goals of cost effectiveness, timeliness or yield. In the event advanced treated recycled water does not meet the needs, desalination would then become Element 3.

Based on this augmentation plan, the City is currently evaluating the feasibility of in lieu/transfers, aquifer storage and recovery (ASR), a treated recycled water plant near its existing wastewater treatment plant, and a future 3.3 million gallons per day (mgd) desalination plant. **Table 7.1-4, City of Santa Cruz Projected Water Supplies**, below, which is taken from the 2015 UWMP, presents the City's current planning for future supplies.

Table 7.1-4
City of Santa Cruz Projected Water Supplies

Water Supply	Additional Detail on Water Supply	Projected Water Supply (mgd) <i>Report to the Extent Practicable</i>				
		2020	2025	2030	2035	2040 (opt.)
		Reasonably Available Volume	Reasonable Available Volume	Reasonable Available Volume	Reasonable Available Volume	Reasonable Available Volume
Surface water	North Coast Sources	637	642	671	671	n/a
Surface Water	San Lorenzo River	1,882	1,842	1,829	1,834	n/a
Surface water	Loch Lomond Reservoir	595	551	540	547	n/a
Groundwater	Live Oak/Beltz Wells	138	129	127	128	n/a
Transfers	Near term transfer to SqCWD of up to 100 mgd to assess the effect of reduced pumping on the groundwater basin and explore the opportunity of developing a longer-term agreement for aquifer storage and recovery					
Exchanges						
Recycled Water	Recycled water feasibility study investigating options including regional partnership opportunities for a recycled water project to provide drought resistant supply and options for groundwater management strategies due to overdraft conditions of local basins					
Desalinated Water				Potential project to expand recycled water supply or investigate desalination		
Other						
Total		3,252	3,164	3,167	3,180	0
Source: City of Santa Cruz 2016.						
Notes: Projected supply volumes shown represent the output values from the City's Confluence (water supply) model. These projections consider the operations of the City's current supply system in response to a projected demand.						

7.1.3 REGULATORY CONSIDERATIONS

Federal Laws and Regulations

There are no laws at the federal level related to water supply that are relevant to the proposed project.

State Laws and Regulations

Urban Water Management Planning Act

The Urban Water Management Planning Act (California Water Code, Division 6, Part 2.6, Section 10610 et seq.) was enacted in 1983 due to concerns regarding potential water supply shortages throughout the State of California. The act requires every urban water supplier that provides water for municipal purposes to more than 3,000 customers or more than 3,000 acre-feet of water on an annual basis to prepare an Urban Water Management Plan (UWMP). The intent of the UWMP is to assist water supply agencies in water resource planning over at least a 20-year planning period given their existing and anticipated future demands. It requires the UWMP to include information on water supply reliability and water use efficiency measures. UWMPs must be updated every five years in years ending in zero and five.

The City of Santa Cruz updated and adopted its latest 2015 UWMP in August 2016. The 2015 UWMP projects and analyzes the City's future demand and water supplies through 2035.

Senate Bills 610 and 221; CEQA

In 2001, the California Legislature passed Senate Bill 610 (Water Code Section 10910 et seq.) and Senate Bill 221 (Water Code Section 66473.7) to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 and SB 221 were companion measures, which sought to promote more collaborative planning between local water suppliers and cities and counties.

SB 610 requires the preparation of a water supply assessment (WSA) for large developments (i.e., more than 500 dwelling units or business establishments employing 1,000 persons or 500,000 feet of floor space). SB 221 prohibits approval of subdivisions consisting of more than 500 dwelling units unless there is verification of sufficient water supplies for the project from the applicable water supplier(s) and only applies to residential projects. SB 610 requires cities and counties to prepare a WSA for large developments. SB 221 requires a verification of an adequate water supply for large residential subdivisions before a final subdivision map may be recorded. Additionally, when a city or county determines that a "project" as defined by SB 610 (Water Code Section 10912) is subject to CEQA, the city or county must comply with the provisions of SB 610; this information must be included in environmental review under CEQA.

SB 610 and SB 221 apply only to cities and counties, and not to the University of California, a constitutionally established public entity. Nevertheless, although preparation of a Water Supply Assessment is not required for University projects, in order to evaluate the impact of campus growth under Post-Settlement LRDP on water supply, UC Santa Cruz voluntarily prepared a Water Supply Evaluation (WSE) that conforms with the required elements of a Water Supply Assessment prepared pursuant to SB 610. The WSE is included in **Appendix 7.1** and was used in the preparation of this section.

SB 1262 – Sustainable Groundwater Management Act

State Senate Bill 1262 adopted in September 2016 amends Section 66473.7 of the Government Code to require WSAs to address certain elements regarding groundwater sustainability if the project relies in whole or in part on groundwater as a source of supply.

Local Plans and Policies

UC Policy on Sustainable Practices

As with all UC campuses, UC Santa Cruz is required to implement the UC Sustainable Practices Policy (Policy). With regard to water usage and conservation, the Policy contains the following goals and requirements:

Sustainable Water Systems

With the overall intent of achieving sustainable water systems and demonstrating leadership in the area of sustainable water systems, the University has set the following goals applicable to all locations:

1. In line with the Federal Government's Executive Order, locations will reduce growth-adjusted potable water consumption 20 percent by 2020 and 36 percent by 2025, when compared to a three-year average baseline of FY 2005/06, FY 2006/07, and FY 2007/08. Locations that achieve this target early are encouraged to set more stringent goals to further reduce potable water consumption. Medical Centers shall also strive to reduce potable water use and will identify a separate reduction target by June 2016. 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.

2. Each location will develop and maintain a Water Action Plan that identifies long term strategies for achieving sustainable water systems. The next update of the plan shall be completed in December 2016.
 - A. 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.
3. Each Campus shall identify existing single pass cooling systems and constant flow sterilizers and autoclaves in laboratories and develop a plan for replacement.
4. 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.
 - A. 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.
 - B. If no alternative to single pass cooling exists, water flow must be automated and controlled to avoid water waste.

UC Santa Cruz Water Action Plan

The UC Board of Regents Policy on Sustainable Practices, Sustainable Water Systems section states that each campus potable water usage be reduced by 36 percent by weighted campus user by 2025 from a 2005-2008 baseline. In addition, the Policy stipulates that each campus will develop and maintain a Water Action Plan to identify the campus' long term strategies for achieving sustainable water systems. In compliance with this directive, UC Santa Cruz prepared a Water Action Plan (WAP) in December 2013. The 2013 WAP was updated in December 2017. The 2017 WAP update reports that UC Santa Cruz has already exceeded the UC 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 FY 2005-08 baseline. In response to the City's drought emergency declaration 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.

UC Santa Cruz Campus Sustainability Plan 2017-2022

UC Santa Cruz drafted its first Campus Sustainability Plan (CSP) in 2010 to direct cohesive, campus-wide action to improve sustainability at UC Santa Cruz. The plan was updated in 2013, and most recently, in 2017 to assess progress under the previous plans and establish new goals and objectives for the future. The CSP 2017-2022 provides a detailed road map to sustainability that builds on the Campus's successes and presents opportunities to develop new initiatives. Recommendations made in the CSP are designed to facilitate the achievement of goals set forth in the UC Sustainability Policy. The CSP 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 on campus are detailed below.

Natural Environment and 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 2005-2008 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 2.3 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.

7.1.4 IMPACTS AND MITIGATION MEASURES

7.1.4.1 Significance Criteria

As noted earlier in this section, the Santa Cruz County Superior Court ruled that in accordance with the standards announced in *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova*, 40 Cal.4th 412 (2007), the University must supplement the water supply impact analysis to include an analysis of the environmental impacts of developing new water sources to support new Campus development under the 2005 LRDP, specifically considering the environmental impacts if Campus growth under the LRDP triggers the need to develop new water sources or if the City were required to build a higher capacity desalination plant more quickly than it would be in the absence of the LRDP Project.”

Consistent with this direction from the Court, the impacts on water supply from campus growth under the Post-Settlement LRDP would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the State CEQA Guidelines and the UC CEQA Handbook:

- Result in the need for new or expanded water supply entitlements if there are not sufficient water supplies to serve the project from existing entitlements and resources; i.e.,
 - Whether the project would trigger the need to develop new water sources;
 - Whether the project would require the City to provide a new source more quickly than otherwise;
 - Whether the project would require the City to provide a higher capacity new source than what would be needed in the absence of the project; and
 - If a new water source is needed, what would be the environmental impacts from developing that source?
- Require or result in the construction of new water treatment facilities or expansion of existing facilities, which could cause significant environmental effects.

7.1.4.2 Methodology

The analysis of the impact of increased water consumption on the UC Santa Cruz main campus and 2300 Delaware Avenue property due to the campus growth under the Post-Settlement LRDP is based on a comparison of the projected demand associated with the proposed project to available supplies, and the resulting need, if any, for new, expanded, or modified facilities to meet the increased demand. Under CEQA, a project's impacts would be considered significant if the project would require new or expanded water supply entitlements or resources, or construction of new or expanded treatment facilities, the construction of which would result in significant environmental impacts.

As noted above, although the University is not required to comply with SB 610 and a preparation of a Water Supply Assessment is not required for University projects, in order to evaluate the Post-Settlement LRDP's impact on water supply, UC Santa Cruz voluntarily prepared a Water Supply Evaluation (WSE) that conforms with the required elements of a Water Supply Assessment prepared pursuant to SB 610. The WSE is included in **Appendix 7.1** and was used in the preparation of this section. As part of the WSE, information was obtained from UC Santa Cruz on the existing water use on the main campus and the 2300 Delaware Avenue property, and an estimate of total water demand under the Post-Settlement LRDP was developed, per the methodology set forth below.

Projected Campus Water Demand

As a first step, existing main campus water demand for 2016 was obtained from the Campus. Based on known changes anticipated in 2017, the 2017 demand estimate was calculated. To this estimate, the water demand associated with the anticipated remaining projects that are considered part of the Post-Settlement LRDP was added.

The anticipated projects that are expected to be completed under the Post Settlement LRDP are listed in **Table 7.1-5 Water Demand associated with the Remaining LRDP Projects** below. These projects are within the scope of the 2005 LRDP because the building space that they would add is within the amount of building space planned under the 2005 LRDP and these projects would serve an enrollment level of 19,500 FTE students or less. Projected water demands for these remaining projects were estimated based on existing water use for similar existing facilities on the main campus. Historical water use patterns for existing undergraduate, graduate and employee housing facilities were reviewed to evaluate pre-drought and drought-period water use trends and estimate a demand rebound factor to account for post-drought water use, assuming that not all of the water conservation which has been achieved would be permanent. Overall, it was estimated that post-drought water use would rebound to a level about halfway between

the drought water use (which averaged about 160 MGY for the main campus) and the higher pre-drought water use (200 MGY in 2008 for the main campus). This resulted in an estimated demand rebound factor of approximately 12 percent above actual 2016 water uses. Estimated water demand for the remaining projects to be developed under the 2005 LRDP are summarized in **Table 7.1-5**, and the total demand is estimated to be approximately 30.8 MGY. Note that recycled water use is proposed as part of the SHW project for toilet flushing and irrigation uses, and is estimated to be approximately 13.7 MGY. In addition, the SHW project is being designed and constructed to achieve LEED Platinum. As a result, the SHW project's water demand is about 56 percent less than business as usual (BAU) water demand (BAU water demand refers to water demand associated with a standard market rate building project which does include any water efficiency strategies per LEED checklist or water reuse). The estimated potable water demand for the SHW project takes this recycled water use into account. It does not, however, account for the use of recycled water at Porter and Kresge Colleges for toilet flushing and irrigation.

Table 7.1-5
Water Demand associated with Remaining LRDP Projects

Project Description	New Building Space or Beds	Annual Water Demand (gallons)
Student Life Seismic 2B	2,220 gross square feet (gsf)	14,585
Kresge College (Student Services and Academic)	60,000 gsf	394,200
Student Health Services Addition	14,000 gsf	91,980
Rachel Carson and Porter Dining Facilities Expansion	10,000 gsf	
	3,222 new students	5,292,135
Kresge College (Student Housing—undergrad— residence hall)	185 beds (undergrad)	1,147,925
Crown College (Student Housing—undergrad— residence hall)	22 beds (undergrad)	136,510
Ranch View Terrace Phase 2 (42 3-4 BR single family homes)	42 SF homes	2,115,540
Student Housing West (Heller Site: 2,652 undergrad apartment beds, 200 graduate apartment beds with 300 occupants) (Hagar Site: 148 family apartments, Childcare Center—less 196 FSH apartment student beds to be	2,652 beds (undergrad apartments)	16,704,313
	200 beds (graduate apartments)	2,350,195
	148 family apartments	5,508,611
	1 childcare center	515,185
	(196) family apartments	(7,197,915)

Project Description	New Building Space or Beds	Annual Water Demand (gallons)
removed)		
Student Housing West (Hagar Site)	Irrigation	3,496,267
EH&S Regulated Waste Storage/Handling	7,100 gsf	188,705
Potable Water Demand Totals		30,758,236
Source: West Yost 2018		

This estimated demand was added to the estimated 2017 campus water demand and the resulting number was compared to the projected water demand for UC Santa Cruz included in the City's UWMP to determine whether campus growth under the Post-Settlement LRDP by itself or in combination with other projects in the City's water service area, would result in the need for additional water supply sources to be secured by the City and if so, what likely environmental impacts could result from the development of the new water sources.

Note that the impact of campus growth under the Post-Settlement LRDP on water supply is evaluated both as a project impact and as a cumulative impact. The impact is more accurately evaluated in a cumulative context because an argument could be made that the Campus's incremental demand for water under the Post-Settlement LRDP by itself could be easily served by the existing supplies and new entitlements or sources would not be required. The analysis below replaces in full LRDP Impact UTIL-9.

7.1.4.3 2005 LRDP EIR Mitigation Measures

As the water supply analysis in the 2005 LRDP EIR was set aside as deficient, the 2005 LRDP EIR did not formally impose the mitigation measures related to impacts on water supply. Instead, the Campus has implemented the measures in order to reduce its water usage in compliance with the Settlement Agreement and has incorporated these measures into the campus requirements for new development. As a result, the 2005 LRDP EIR mitigation measures for water supply impacts have already been implemented as applicable and are a project element of any future development under the 2005 LRDP, including the SHW Project. **Table 7.1-6, 2005 LRDP EIR Mitigation Measures**, presents the mitigation measures in the 2005 LRDP EIR for informational purposes only.

Table 7.1-6
2005 LRDP EIR Mitigation Measures

Mitigation Measure	Description	Current Status
UTIL-9A	<p>The Campus shall continue to implement and improve all current water conservation strategies to reduce demand for water, including the following:</p> <ul style="list-style-type: none"> • Continue the leak detection and repair program. • Install an individual water meter in each new employee housing unit to encourage residential water conservation. • Install waterless urinals in all new buildings. • Require that new contracts for washing machines in student residences be certified by the Consortium on Energy Efficiency 6 to have a water factor of 5.5 or less or meet an equivalent standard. New washing machines purchased for use in athletic facilities shall meet applicable standards for water-efficiency for institutional machines. • Incorporate water-efficient landscaping practices in all new landscape installations. Water-conservative landscaping practices shall include, but will not be limited to the following: use of water-efficient plants, temporary irrigation systems for plant establishment areas where mature plants will be able to survive without regular irrigation, grouping of plants according to their water requirements, design of planting areas to maximize irrigation pattern efficiency, and mulch covering in planting areas. • To facilitate monitoring of water usage in all new development, the Campus shall: (1) install separate meters on water lines for individual buildings and (2) install meters on irrigation lines where one point of connection irrigates 1 acre or more. 	<p>This measure is implemented on an ongoing basis to minimize water use on the campus.</p>
UTIL-9B	<p>As new technologies become available, the Campus shall continue to conduct pilot programs for high-efficiency plumbing fixtures including, but not limited to, dual-flush toilets. If a piloted technology proves to be successful (i.e., the high-efficiency fixtures are effective in water savings and do not require more frequent or expensive maintenance than the existing standard), the Campus shall revise its standards to require use of the fixtures in all new buildings.</p>	<p>This measure is also an ongoing measure as the Campus has and will continue to monitor the development and availability of water saving fixtures.</p>

Mitigation Measure	Description	Current Status
UTIL-9C	<p>Within one year following approval of the 2005 LRDP, the Campus shall implement a water conservation education program for campus residents. This will include but would not be limited to:</p> <ul style="list-style-type: none"> Distribution to residents of employee housing of educational materials covering the following topics: basic home water conservation practices, plumbing retrofits and replacements, and strategies to conserve landscape irrigation. <p>Designation of a staff member who will be responsible for developing and implementing a water conservation education and awareness program to reduce water consumption in student residences, dining halls, and student affairs facilities.</p>	This is also an ongoing measure that the Campus has and will continue to implement to minimize water use.
UTIL-9D	<p>Within one year following approval of the 2005 LRDP, the Campus shall consult with the City of Santa Cruz regarding the appropriate scope of and initiate, an engineering audit of campus water use. The audit will assess existing campus water uses, identify options for reducing water consumption, prioritize feasible improvements based on the amount of potential water savings and cost effectiveness, 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:</p> <ul style="list-style-type: none"> 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. (Regarding retrofit of plumbing fixtures in student housing, see LRDP Mitigation UTIL-9H.) 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. Identification of landscaped areas on campus that have plants that are high water-use. 	This measure was completed in 2007.
UTIL-9E	The Campus shall begin implementation of the top priority recommendations of the water audit conducted	The Campus committed to this measure in the Settlement

Mitigation Measure	Description	Current Status
	under UTIL-9D within one year of completion of the audit and complete implementation of the top priority recommendations within five years after completing the audit.	Agreement and the measure has been completed.
UTIL-9F	<p>The Campus shall, at five-year intervals during the term of the 2005 LRDP, revisit the results of the water audit conducted under UTIL-9D, consult with the City of Santa Cruz Water Department, conduct round table discussions with representatives of relevant campus departments, and conduct additional study of new technologies as needed to identify additional feasible and effective water conservation measures for implementation on the campus during the subsequent five year period. The following are among the measures that shall be considered:</p> <ul style="list-style-type: none"> • Adding existing irrigation systems to the campus's central control system. • Retrofitting existing water meters such that building use and irrigation are separately metered. • Replacing natural turf on athletic fields with artificial turf. • Installing timers on showers in student residences. 	The results of the 2007 water audit were reexamined in 2012, and these measures were incorporated into the Water Action Plan.
UTIL-9G	Within two years following approval of the 2005 LRDP, the Campus shall initiate a study on feasible measures for utilization of reclaimed water (including rainwater, grey water, cooling tower blow down water and/or recycled water) in new development. Potential uses of reclaimed water include cooling, irrigation, and toilet flushing. The study shall contain a plan to utilize reclaimed water in new development as feasible and effective in water conservation, and shall include an implementation schedule.	The study was completed in 2009.
UTIL-9H	Within five years following approval of the 2005 LRDP, the Campus shall complete the retrofit of all plumbing fixtures in student housing not meeting the efficiency standards current in 2005 (1.6 gallons per flush for toilets). The new fixtures installed under the retrofit program shall conform to the campus standard for new buildings current at the time of the retrofit.	This has not been completed, due to the cost of ADA improvements triggered in some locations. Crown College is currently being retrofitted as part of a phased major maintenance project that started in 2017. Kresge retrofits will be completed as part of Kresge College Project. Oakes College Apartments are tentatively scheduled for 2018.
UTIL-9I	If and when the City implements drought emergency management measures, the University will implement the following measures for the duration of the drought	The Campus has implemented this during the drought years. This measure is also a commitment in the

Mitigation Measure	Description	Current Status
	<p>emergency:</p> <ul style="list-style-type: none"> • Reduce use of potable water for irrigation on the campus landscape, the CASFS and the Arboretum in accordance with reductions required by the City for similar users. • Utilize water from the existing supply well in Jordan Gulch for non-potable uses. The Campus shall implement a program of monitoring flow at downgradient springs during the time when the well is being used. • Require that residential water use on campus be reduced consistent with the City's target for multifamily residential facilities. 	Settlement Agreement.
Source: UC Santa Cruz 2006		

7.1.5 PROJECT IMPACTS AND MITIGATION MEASURES

Revised LRDP Impact UTIL-9: Development under the 2005 LRDP would generate an additional demand for water which would not require that the City secure new or expanded water supply entitlements or resources in normal water years. However, the project's demand, in combination with the demand from other growth in the service area, would require the development of new water supplies for the supply shortfall under single and multiple dry water year conditions. (*Significant; Significant and Unavoidable*)

Campus growth under the Post-Settlement LRDP would increase the demand for domestic/fire water on the UC Santa Cruz main campus and the 2300 Delaware Avenue property. Other new development in the City's water service area (which is the study area for cumulative impacts on water supply) would also increase the demand for potable water during the time period of the 2005 LRDP. The impact of the Campus's water demand under the Post-Settlement LRDP or the project's contribution to a cumulative impact would be considered significant if the project's demand by itself or the cumulative water demand would trigger the need for new or expanded water supply entitlements or resources or new treatment facilities, the development of which would result in significant environmental impacts.

Both the on-campus water demand and the water demand associated with Post-Settlement LRDP-related population that would live off campus within the City's water service area are analyzed under this impact.

Project Background

In 2005 when the 2005 LRDP Draft EIR was published, water demand associated with an enrollment level of 21,000 FTE students by 2020-21 was estimated, reported and evaluated for its impact on available supplies. However, in the Final EIR in 2006, the University included a Reduced Enrollment Alternative (revised 2005 LRDP) that estimated and analyzed the effects on water supply from a demand associated with 19,000 FTE students in 2020-21. As reported in Volume 4 of the 2005 LRDP EIR, at buildout of this Final 2005 LRDP, the total UC Santa Cruz main campus and 2300 Delaware Avenue property was estimated to be about 341 MGY. Adding in the demand associated with the Coastal Science Campus, the total UC Santa Cruz demand for water in 2020-21 was estimated at 361.2 MGY.¹ The impact of this demand, in combination with demand from other land uses in the City's service area, on available supplies was determined to be significant and unavoidable, even with the mitigation measures set forth in the 2005 LRDP EIR. In September 2006, The Regents approved the Final 2005 LRDP (i.e., Reduced Enrollment Alternative), and in the Settlement Agreement with the City and other entities, the University committed to not exceed this enrollment level until a new LRDP is prepared and adopted. The University also committed to providing more on-campus housing consistent with the terms of the Settlement Agreement, and made other commitments related to traffic mitigation and water consumption on the campus.

Since 2006, the campus enrollment has increased and some new facilities have been added to the campus over the years, although as noted above, to date, only a small amount of additional building space has been added under the 2005 LRDP. Concurrent with implementing the Final 2005 LRDP, the Campus commenced an aggressive water conservation program to reduce and control the growth in water use to the maximum extent feasible in order to comply with the Settlement Agreement; the water conservation program included most of the 2005 LRDP mitigation measures set forth in **Table 7.1-6** above. As a result of this effort, as shown in **Figure 7.1-1**, despite enrollment growth, the main campus's water use has

¹ The 2020 water demand projection of 361 MGY in the 2005 LRDP Final EIR for all UC Santa Cruz facilities combined was higher than 349 MGY that the City used in its water planning documents.

decreased since 2003, the baseline year used in the 2005 LRDP EIR, and in 2016, the main campus's water demand was about 161 MGY, more than 25 percent lower than the 2003 baseline.

With regard to the remaining period of the approved 2005 LRDP, i.e., 2017 through 2020-21, the University has determined that only a small amount of additional building space and a substantial amount of new housing will be added to the main campus. **Table 7.1-5** above lists the projects that are planned to be completed under the Post-Settlement LRDP. All of these projects will be designed to comply with the UC Sustainable Practices Policy and will be required to minimize the incremental demand for water. As discussed in **Section 3.0** of this EIR, in addition to water efficient fixtures, the Student Housing West (SHW) project will include an on-site wastewater treatment plant at the Heller site that would generate recycled water that would be used for toilet flushing and irrigation, thereby substantially reducing that project's potable water demand at the Heller site compared to demand under a BAU scenario. Nonetheless, the SHW project, together with the other projects within the scope of the Post-Settlement LRDP, would increase the total demand for water on the main campus compared to the existing 2016-2017 demand. Relative to the main campus demand in 2003, the total demand in 2023 would be higher by about 4.4 MGY.

Projected Increase in Campus Water Demand

To evaluate the impact of campus growth under the Post-Settlement LRDP on water supply, water demand associated with anticipated future projects within the scope of the Post-Settlement LRDP (including the SHW Project) was added to the estimated 2017 demand. While the construction of these projects, if approved, will be commenced before 2020-21, some of them will be completed by 2022 or 2023. Therefore, the impact of the Post-Settlement LRDP was analyzed for the year 2023 as this would be the year by which the proposed facilities, especially the housing which affects water demand more than other types of campus facilities, would be occupied such that the projected water demand would come into full effect. **Table 7.1-7** provides a summary of the UC Santa Cruz existing and projected potable water demands under the Post-Settlement LRDP. As shown, the total potable water demand for UC Santa Cruz is projected to be about 220 MGY by 2023.

A projection of water demand after 2023 is not provided below because all of the new development under the 2005 LRDP to serve an enrollment level of 19,500 FTE students will be completed by 2023. UC Santa Cruz will prepare and adopt a new LRDP for enrollment growth above the 19,500 FTE level and for future development beyond the scope of the 2005 LRDP.

Table 7.1-7
Existing and Projected Potable Water Demand at Buildout of the UC Santa Cruz 2005 LRDP
(million gallons per year)

Area	2003 Potable Water Demand	2016 Water Demand (Actual)	2017 Estimated Water Demand	Additional Water Demand (2017-2023)	Projected Total Water Demand by 2023
Main Campus	206.4	161.0	180.0	30.8	210.8
2300 Delaware Property	0	0.3	0.3	2.7	3.0
Coastal Science Campus	7.7	4.0	4.0	1.9	5.9
Total Existing Potable Water Demand	214.1	165.3	184.3	35.4	219.7

Table 7.1-8 below presents previous and new estimates of water demand associated with campus growth under the 2005 LRDP. As the table shows, the revised 2023 water demand projections for all three UC Santa Cruz sites are substantially lower than previous 2020-21 projections in the 2005 LRDP EIR, and overall by 2023, UC Santa Cruz's total water demand will be higher than the 2003 baseline used in that document by only 5.6 MGY. Compared to the 2017 baseline, on the other hand, the increase would be on the order of 35.4 MGY, with about 33.5 MGY due to the increase in main campus demand. The impacts of UC Santa Cruz's total demand in 2023, the change in demand between 2003 and 2023, and the change in demand between 2017 and 2023 are analyzed below by comparing these estimates to the provision of water for UC Santa Cruz in the City's UWMP.

Table 7.1-8
UC Santa Cruz Current and Projected Water Demand
(million gallons per year)

Location	2003	Prior 2020-21 Projection	2017 Estimated	2023 Projection	Change 2003 to 2023	Change 2017 to 2023
Main Campus	206.4	338	180.0	210.8	4.4	30.8
2300 Delaware	0	3.4	0.3	3.0	3.0	2.7
<i>Subtotal</i>	206.4	341.4	180.3	213.8	7.4	33.5
Coastal Science	7.7	19.8	4.0	5.9	-1.8	1.9

Location	2003	Prior 2020-21 Projection	2017 Estimated	2023 Projection	Change 2003 to 2023	Change 2017 to 2023
Campus						
Total	214.1	361.2	184.3	219.7	5.6	35.4

Campus Water Demand and 2015 UWMP

As noted earlier, the City's 2015 UWMP includes projections of potable water demand for a variety of land uses in its service area through 2035, with UC Santa Cruz identified as a separate land use. The potable water demand projections included in the City's 2015 UWMP for UC Santa Cruz are summarized in **Table 7.1-9**. As the table shows, the UWMP projects a water demand for UC Santa Cruz ranging between 196 MGY in 2020 and 234 MGY in 2035. As shown in **Table 7.1-7** above, the revised potable water demand projection for the Post-Settlement LRDP, along with other existing and projected UC Santa Cruz water demands is about 220 MGY. This water demand of about 220 MGY is considerably lower than the maximum amount of 349 MGY that the City used in the UWMP for UC Santa Cruz, and is consistent with the water demand projected for UC Santa Cruz in the City's 2015 UWMP for the 2020 to 2025 time period (196 MGY in 2020 to 234 MGY in 2025). Although the UWMP does not report the City's total water demand for 2023, it was estimated by interpolating between the demands for 2020 and 2025. That estimate and the estimated UC Santa Cruz demand for 2023 are shown in **Table 7.1-9** below. As such, the City's 2015 UWMP does include the projected water demand for currently anticipated buildout of the Post-Settlement LRDP by 2023.

Table 7.1-9
Campus Water Demands included in the City of Santa Cruz 2015 UWMP
(million gallons per year)

	2015 (actual) ^(a)	2020	2023 ^(d)	2025	2030	2035
Total City Water Demand (b)	2,452	3,327	3,266	3,225	3,205	3,220
UC Santa Cruz (c)	160	196	219 (220)	234	271	308
UC Santa Cruz Water Demand, as a percent of Total City Water Demand	6.5%	5.9%	6.7%	7.3%	8.5%	9.6%
<p>a) 2015 actual demands from City's 2015 UWMP (Table 4-1).</p> <p>b) Projected City water demands for 2020 to 2035 are from City's 2015 UWMP (Table 4-3).</p> <p>c) Projected UC Santa Cruz water demands for 2020 to 2035 are based on the Primary Projection presented in Table 7.2-2 above</p> <p>d) Data in this column is derived by interpolating between the 2020 and 2025 forecasts in the 2015 UWMP. UC Santa Cruz's water demand</p>						

	2015 (actual) ^(a)	2020	2023 ^(d)	2025	2030	2035
<i>in 2023 per the UWMP is projected at 219 MGY, whereas based on the analysis in the WSE, it is estimated to be 220 MGY. Both numbers are reported in the table.</i>						

The City of Santa Cruz utilizes the Confluence model to analyze the variability of water supplies to determine whether existing supply would be adequate or whether water supply shortages would occur and if so, what the magnitude of the shortage would be. The City has been utilizing the Confluence model to support water supply planning activities since 2003 and this model was used to generate the results for the 2010 UWMP (City of Santa Cruz 2011). The model takes into account the variation in demand both within and between years, the availability of water from various sources, and the capacity of infrastructure to pump and treat the water. As described in Chapter 7 of the City's 2015 UWMP, the results provide perspective on the City's water supply reliability based on accepted planning criteria and projected conditions in the water system, concurrently taking into account external factors that could affect the water supply (West Yost 2018). In compliance with the Urban Water Management Planning Act, the UWMP analyzes for a normal water year, a single dry water year, and multiple dry water year conditions. **Table 7.1-10** below, presents a summary of the City's projected demands and available supplies under each of those conditions (West Yost 2018).

Table 7.1-10
City of Santa Cruz Water Supply and Demand
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 Years				
First Year				
Supply Totals	2,430	2,377	2,377	2,381

	2020	2025	2030	2035
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%
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%
<i>Source: West Yost 2018</i>				

Based on the results of this modeling, the 2015 UWMP notes the following:

- Historically, in normal water years, the City experienced a slight surplus of supply and this trend can be expected to continue until the HCP agreement is approved and maintenance of higher instream flows goes into effect. With the addition of the ecosystem protection conditions likely to begin prior to 2020, a small shortage (1 to 3 percent) can be expected in future normal water years. The City predicts the supply and demand volumes to be in balance for 90 percent of all normal water years for 2020-2035 (West Yost 2018).
- With regard to a single dry water year condition, annual shortages of 16 to 21 percent are projected given the modelled supply and demand figures developed for planning and reliability purposes (West Yost 2018).
- 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, according to the model, 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 is over 50 percent (West Yost 2018).

The UWMP notes that although the plan reflects water supply and demand on an average annual basis as is required by law, the bigger issue for Santa Cruz is the peaking of water demand during the summer months due to tourism and the reduced supply in the same months as flows in the streams decline.

Impact of the Post-Settlement LRDP on Water Supply

Based on the tables above and the analysis in the 2015 UWMP, the following information is pertinent to understanding the impact of campus growth under the Post-Settlement LRDP on water supply and the need for a new water source:

- Under the Post-Settlement LRDP, UC Santa Cruz's total water demand (all sites) is estimated to increase from a baseline of 214 MGY in 2003 to about 220 MGY by 2023, an increment of about 5.6 MGY over baseline demand. Compared to a baseline of 2017, the increase would be on the order of about 35.4 MGY. (See **Table 7.1-8**, above.)
- UC Santa Cruz's demand for water will continue to constitute a small fraction of the total demand in the service area, making up less than 7 percent of the total demand in 2023, although UC Santa Cruz will continue to be the single largest water user in the service area.
- The total water that would be required for UC Santa Cruz in 2023 is consistent with the water demand projected for UC Santa Cruz in the City's 2015 UWMP for the 2020 to 2025 time period (196 MGY in 2020 to 234 MGY in 2025 – see **Table 7.1-9**, above). Therefore, the Post-Settlement LRDP will not affect the City's water planning efforts or require the City to revise its demand projections.

Impact Under Normal Water Year Conditions

The analysis in the City's 2015 UWMP shows that during normal water years, the City's existing water supply sources will be adequate to serve the projected demand in its service area through 2023 (and beyond), including the UC Santa Cruz's total demand following the implementation of the Post-Settlement LRDP. According to the UWMP, for 90 percent of the normal water years the supply and demand would be in balance, and for the 10 percent of the years when deficits are projected to occur, they would be on the order of 1 to 3 percent.

Because the amount of water needed by UC Santa Cruz in 2023 is within the City's projections for the campus, provision of this water to the campus would not require the City to reduce the supply to other users. With respect to the small shortfall in supply of 1 to 3 percent in one in 10 years, it is anticipated that

the City would address it by conservation and water use curtailment, and that similar to other customers, UC Santa Cruz would also curtail its use. Note that according to the WSAC recommendations, Element 0 of the Water Supply Augmentation Plan is an expanded water conservation program that would reduce water demand in the City by 200 to 250 MGY by 2035. This program would help address the small shortfall in supply. Due to the small size of the deficit and the low frequency at which it would likely occur, it is reasonable to assume it would not require the City to secure a new source of water.

Impact Under Single Dry Water Year Conditions

With regard to the single dry water years, the service area wide demand would exceed the supply by 16 to 21 percent. While the gaps between demand and supply would be more substantial, it is expected that the gaps would also be addressed by implementing conservation and curtailing use as was successfully done in the recent drought years. The City's Water Shortage Contingency Plan uses a combination of voluntary and mandatory demand reduction measures which vary in "stages," depending on the level of cutback required. The Contingency Plan includes reduction goals for UC Santa Cruz under each shortage scenario, which were developed in consultation with UC Santa Cruz. UC Santa Cruz reached, and even exceeded its reduction targets in 2010 and 2014 when the City implemented the Plan. In 2015, UC Santa Cruz reduced its peak season water use by almost 18 percent. Given the projected gaps between supply and demand under single dry water year conditions, measures to address a Stage 3 shortage would need to be implemented. Similar to other customers, UC Santa Cruz would also curtail its use. It would be unlikely that the City would plan to develop a new source of water to increase its single dry year supply. However, to avoid the scale of cutbacks required under a Stage 3 shortage, the City would be likely to secure a new water source to help ameliorate the impact of the single dry year supply shortages.

Impact Under Multiple Dry Water Year Conditions

With regard to multiple dry water year conditions, the gap between supply and demand would be on the order of about 52 percent by the third year of drought. As **Table 7.1-9** above shows, in 2025 (which is the year closest to 2023, the year when the Post-Settlement LRDP demand would come into full effect), during the third year of a drought, only 48 percent of the demand in the service area would be served and there would be a 1.66 billion gallon gap between supply and demand. Although the City's Water Shortage Contingency Plan provides for a Stage 5 scenario under which a deficit of up to 50 percent

would be addressed by demand curtailment, the shortfall in 2025 would exceed 50 percent and would not be addressed by curtailing water use. In fact, in 2015, the City's WSAC determined that a gap of 1.2 billion gallons a year (BGY) between supply and demand during periods of extended drought was a worst-case gap² that needed to be addressed and as noted earlier in this section, the WSAC identified a series of strategies to address this gap, including conservation to reduce demand; groundwater storage and water transfers; an advanced treated recycled water plant or a desalination plant.

The Court has directed that the supplemental analysis of the LRDP's impact on water supply analyze the potential environmental impacts of developing new water sources to support new development under the LRDP, with particular focus on three questions: (1) whether campus growth under the LRDP would require the City to secure a new water source, (2) whether campus growth under the LRDP would require the City to provide a larger capacity new water source due to the project's demand, and (3) whether campus growth under the LRDP would require the City to secure the new water source earlier than planned.

As the information in **Table 7.1-8** above shows, campus growth under the Post-Settlement LRDP would increase the main campus's and 2300 Delaware demand for water by 7.4 MGY from the 2003 baseline. However, because the demand for the Coastal Science Campus is lower than previously projected, the total UC Santa Cruz increase would be about 5.6 MGY over the 2003 baseline. This amount would not, by itself, require the City to secure a new water source, because this amount is a very small fraction (0.5 percent) of the worst-case gap of 1.2 BGY identified by the City under prolonged drought conditions that needs to be addressed by securing a new water source, and is an even smaller fraction of the gap identified in the UWMP for the year 2025. Given the size of the Post-Settlement LRDP's contribution, it is reasonable to conclude that absent the incremental water demand under the Post-Settlement LRDP, the City would still need to secure a new source of water for single dry year conditions and periods of prolonged drought. The Campus's incremental demand, compared to the 2003 baseline, would also not cause the City to secure a larger source of water than it is currently planning for because of the small size of this increment, particularly since all of the campus's water demand, inclusive of this increment of 5.6 MGY, is accounted for in the City's plan. Lastly, with regard to the effect of the Campus's incremental

² According to the WSAC, "the supply-demand gap has been established at 1.2 billion gallons per year (bgy) for the worst year, based on Confluence modeling of the frequency and severity of shortages. The analysis takes into account DFG-5 fish flows and a plausible estimate of climate change impacts."

demand on the timing of when a new source must be secured, given the small size of incremental demand compared to the 2003 baseline, it would not have a discernible impact on the timing of when the new water source must be secured; the project would not require the City to secure a new source of water any sooner than it is planning to. Thus, it would be reasonable to conclude that, compared to the 2003 baseline, the Post-Settlement LRDP would not make a cumulatively considerable contribution to the need for the City to secure a new source of water, nor would it require the City to secure a new source of higher capacity, or any sooner, than it would absent the campus's demand under the Post-Settlement LRDP.

However, if a conservative approach were taken, and the 2017 baseline were used to evaluate the increase in water demand at UC Santa Cruz, the incremental demand between 2017 and 2023 is about 35.4 MGY for all three UC Santa Cruz sites (or 19.3 MGY if 15 MGY of recycled water is deducted). This higher amount of 35.4 MGY would constitute 2.95 percent of the worst-case 1.2 BGY gap and would be considered a substantial contribution to the need for a new water source. However, this incremental demand will also not require the City to secure a larger new water source or bring the new source on line earlier than planned because all of the campus's water demand, inclusive of this increment, is accounted for in the City's plan.

The Court directed that in the event that it is determined that campus growth under the LRDP would require that the City secure a new water source or contribute substantially to the need for a new water source, the supplemental water supply impact analysis must disclose the environmental impacts from securing the new source (s).

A number of new water sources are being evaluated by the City for their feasibility. All of these sources would address the supply shortfall in both the single dry water year conditions and the multiple dry water year conditions. The new water sources are described below along with the environmental impacts from developing one or more new water source.

New Water Sources and their Environmental Impacts

As described above, in 2014 the WSAC was tasked by the City Council to "explore, through an iterative, fact-based process, the City's water profile, including supply, demand and future risks; analyze potential solutions to deliver a safe, adequate, reliable, affordable and environmentally sustainable water supply; and, to develop recommendations for City Council consideration." The goal was to provide significant improvement to the sufficiency and reliability of the Santa Cruz water supply by 2025.

In order to develop its recommendations, the WSAC undertook a lengthy process to develop an understanding of the water supply issues, including the nature and limitations of the current supply sources, including existing water rights, instream flows for fish, climate change, and operational constraints, as well as establish the scale of the supply shortfall. It then commenced an alternatives evaluation. From more than 80 suggestions and more than 40 proposals, the WSAC developed 20 consolidated alternatives, which were then screened using a set of evaluation criteria. Upon completion of the process, the WSAC determined that the best solutions for the City's water supply problem were the following:

- "Harvesting and storing winter flows. This approach can work, even with current water rights, DFG-5 instream flows, and climate change. The analysis considered how the Santa Cruz water system would benefit if there were additional storage in the form of a "virtual reservoir." To achieve this benefit, the "virtual reservoir" used in the Confluence analysis would have to become real, i.e. suitable infrastructure improvements and institutional arrangements would have to be made to have a place to reliably store sufficient water and to be able to recover and use a sufficient portion of that water. The analysis indicated that the estimated quantity, about three billion gallons, would need to be banked and be recoverable at required daily volumes. This would require increasing the capacities of various current infrastructure components."
- "Developing a more drought-resistant supply (i.e. one that is insulated from year-to-year variability in weather and streamflow). Examples of such a supply include desalination and use of advanced treated recycled water. These alternatives would also require development and improvement of infrastructure."

As stated above, in its 2015 report, WSAC presented a Water Supply Augmentation Plan that, in addition to conservation, included passive recharge of regional aquifers, active recharge of regional aquifers, and a potable water supply using advanced treated recycled water as its source. Based on this augmentation plan, the City is currently evaluating the feasibility of three water supply options: in lieu/transfers, aquifer storage and recovery (ASR), and a treated recycled water plant near its existing wastewater treatment plant. To prevent significant delay in developing an effective supply of reliable water, recycled water is being considered simultaneously with groundwater storage feasibility (in-lieu and ASR). According to the City, after the initial five-year study phase, strategy options will be selected for buildout beginning in year 2020 to augment the existing supply by 2025. As the City is still evaluating the feasibility of these three options, there is substantial uncertainty as to which options will eventually be implemented. With regard to a desalination plant, the City will consider a future 3.3 million gallons per

day (mgd) desalination plant if the advanced treated recycled water plant does not meet the City's needs. As noted by the City in numerous documents, there is substantial uncertainty regarding the approval and timing of both the recycled water and desalination water supply options. In fact, the 2015 UWMP shows that these projects, if determined to be feasible, would not be constructed until sometime after 2030. Therefore, the University cannot confidently determine that these options are "likely future water sources," the impacts of which an EIR must analyze, "to the extent reasonably possible," under *Vineyard Area et al. v. City of Rancho Cordova* (2007) 40 Cal. 4th 412. However, because these are under consideration by the City and none of these options has been determined to be infeasible at this time, all four water supply augmentation options (including the desalination facility) are briefly described below and the likely environmental impacts from their implementation are presented based on available information.

In Lieu Transfers (Passive Recharge)

In normal years, the Santa Cruz Water Department (SCWD) receives more rainfall than is needed to meet customer demand and the water can be stored in Loch Lomond Reservoir. The adjacent Soquel Creek Water District (SqCWD) and/or Scotts Valley Water District (SVWD) rely on groundwater to serve their customers. Using in lieu water exchanges, available winter flows would 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 relying on existing infrastructure to provide potable water to the SqCWD. The program would 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)

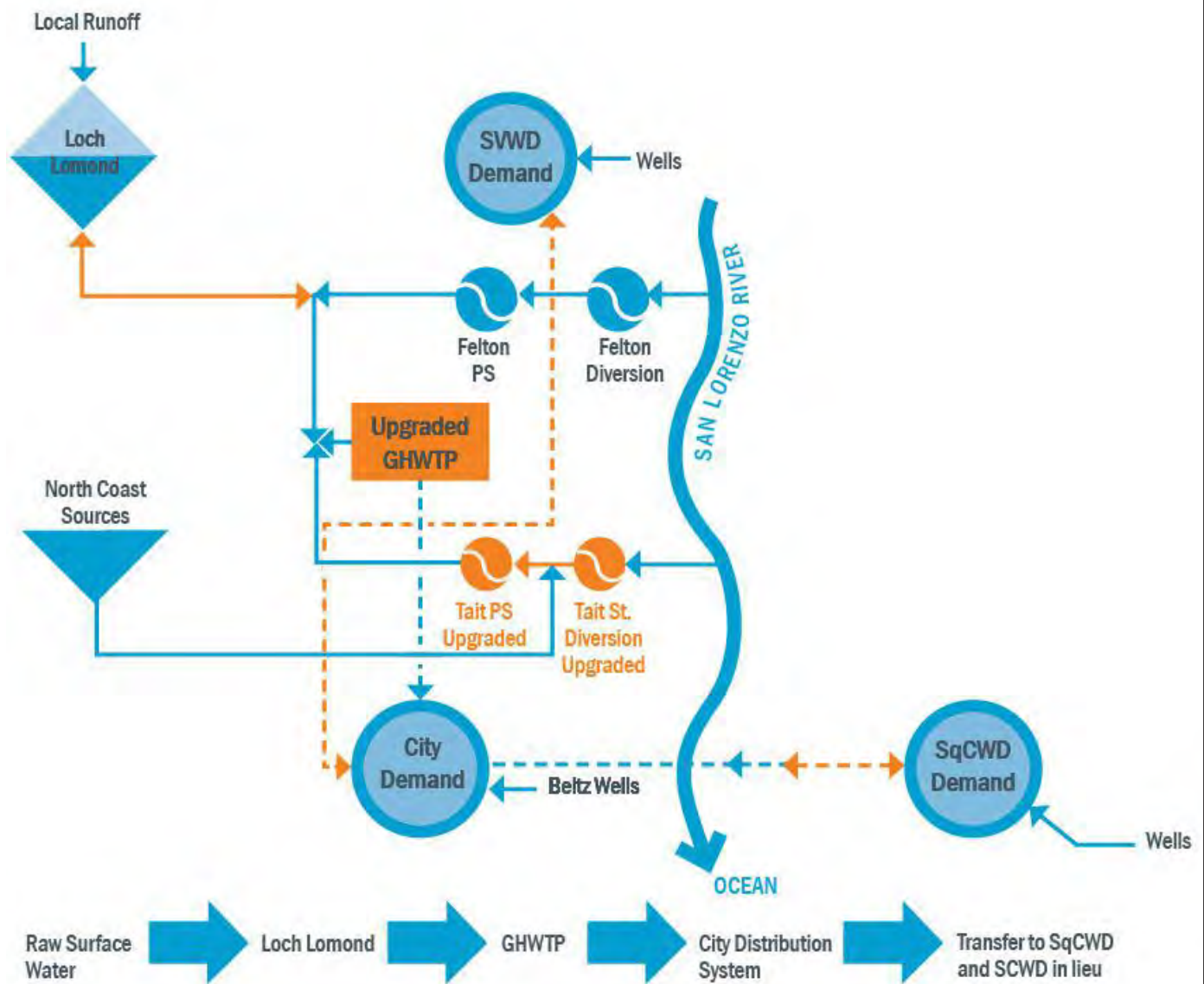
The Aquifer Storage and Recover (ASR) alternative, available winter flows would be injected into aquifers through new and existing wells owned by the SCWD, SVWD and/or SqCWD, thereby actively recharging aquifers. The water would be effectively banked in the aquifers to be extracted and returned to SCWD as a supplemental supply when needed in future dry years. This program would 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 would 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 (in the case of ASR). **Figures 7.1-2 and 7.1-3**, which are taken from the WSAC report, present the conceptual approach and components of each option.

In 2015, the City approved an in lieu water transfer pilot project, which is described below for its environmental impacts. The City is still evaluating the feasibility of a larger in lieu transfer project and has not commenced a review of that project under CEQA. Similarly, the City is still reviewing the feasibility of an ASR project and no CEQA review has been undertaken. Because no CEQA review has been undertaken and neither project has been developed to a level that its environmental impacts may be ascertained, this EIR cannot reasonably present the environmental impacts of a larger in lieu transfer or an ASR project, although it is acknowledged that such projects would likely result in environmental impacts greater than those described below for the pilot project.

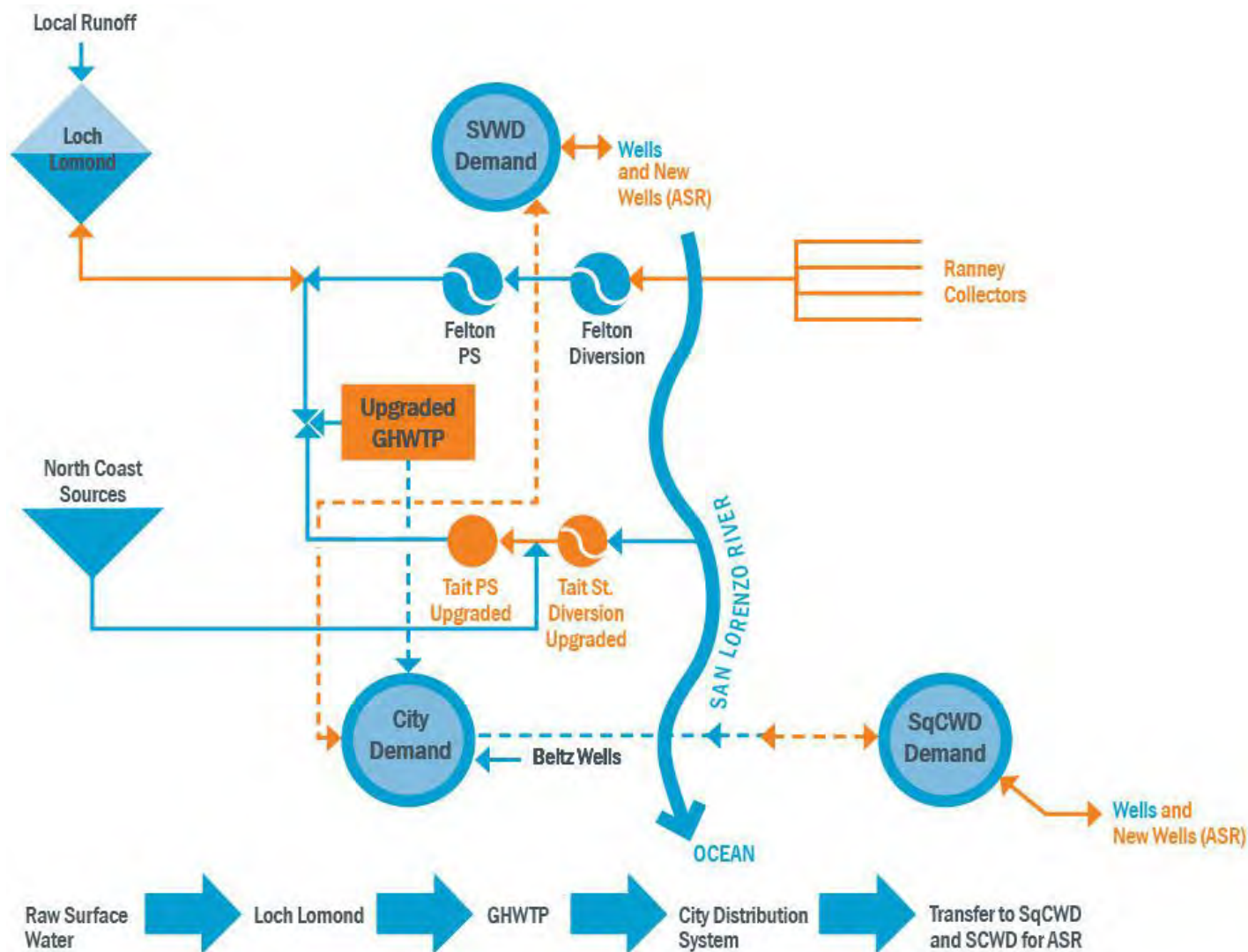
Cooperative Water Transfer, Groundwater Recharge, and Resource Management Pilot Project – In 2016, the City prepared and adopted a Negative Declaration for the Cooperative Water Transfer, Groundwater Recharge, and Resource Management Pilot project. The Pilot project includes a 5-year agreement between SCWD and SqCWD under which SCWD will transfer available winter supply from Majors Creek and Liddell Springs to SqCWD. The project also considers potential future extension of the agreement beyond the 5-year pilot period. Under certain conditions, winter water will be directed from existing intakes on Liddell Spring and/or Majors Creek through the City's system (north coast piping, coast pump station, GHWTP, and potable water distribution system) and then to existing metered interties with SqCWD. No physical improvements to the SCWD's or SqCWD's systems are required for this project. Additionally, the source water is from the City's pre-1914 appropriative water rights, and the amount of water transferred will be within the range of what has been delivered to and used in the City in the past.

According to the City, the primary purpose of this project is to reduce groundwater pumping in the Soquel-Aptos Basin, decrease the potential for accelerating seawater intrusion, and support an assessment of the technical and financial feasibility of a longer-term process to use water transfers and water exchanges to ameliorate the overdraft condition of the groundwater basin that impacts both the SqCWD and SCWD and other pumpers of groundwater from the Soquel-Aptos Basin. SCWD and Fig



SOURCE: City of Santa Cruz Urban Water Management Plan, 2015

FIGURE 7.1-2



SOURCE: City of Santa Cruz Urban Water Management Plan, 2015

FIGURE 7.1-3

SqCWD intend to use this pilot project to collect information related to: (1) the physical operating system issues; (2) system water quality; (3) response of groundwater levels from in-lieu recharge; and (4) the potential opportunity of developing a longer-term agreement in which the groundwater basin will be used for a combined in-lieu and aquifer storage and recovery program that will help resolve the basin overdraft that will protect SCWD and SqCWD wells from addition seawater intrusion and provide needed drought storage for the City. Because the pilot project would use existing infrastructure and would not involve a water transfer that exceeds the range of water used in the City, the Initial Study prepared by the City concluded that there would be no significant impacts from project implementation (City of Santa Cruz 2016).

Regional Recycled Water Facilities Project

As with the larger in lieu transfer and ASR projects, the recycled water facilities project is still being evaluated by the City for its feasibility and has not yet been evaluated in a CEQA document. However, the project has been broadly defined and described by the City in draft planning studies and at Water Commission hearings (City of Santa Cruz 2017b; 2017c). Based on that description, the impacts of this potential future water supply source are presented generically in this EIR.

As noted by the City, the Regional Recycled Water Facilities project would likely be a multipart project that would treat, store, and provide recycled water to areas near the existing Santa Cruz wastewater treatment plant (WWTP) and would ultimately serve customers along Bay Street and the UC Santa Cruz campus. The project would likely be implemented in two phases, the first of which is called the SCPWD Title 22 project and the second phase is called the BayCycle project. Both projects are described below, followed by a summary of potential environmental impacts from the construction and operation of these projects.

Santa Cruz Public Works Department (SCPWD) Title 22 Project – The project phase would involve construction of treatment and storage facilities at the existing WWTP to treat the effluent to Title 22 standards to produce 0.13 mgd of non-potable recycled water. Facility upgrades would include a pasteurization unit, pump station and chemical dosing system, and a filtration system and pump station, all located northeast of the existing plant within the WWTP site. A chlorine contact tank would be located just north of the filtration system and pump station. The project would also construct recycled water line (purple pipe) from the pasteurization unit to convey recycled water to a non-potable water storage tank within the existing WWTP tank farm. Additional purple pipelines would be constructed from the pasteurization unit to La Barranca Park and Neary Park allowing non-potable water to be used for

irrigation at the parks. Lastly, a bulk water station would be constructed at the end of the purple pipe at Neary Park (at the intersection of Bay Street and California Street).

BayCycle Project – This project phase would add capacity to the Title 22 treatment facilities at the WWTP to increase production and extend the purple pipeline to serve customers along Bay Street including UC Santa Cruz and other City customers. A purple pipeline would be extended from the SCPWD Title 22 project bulk water station northwest up Bay Street and up to the UC Santa Cruz campus. An additional storage tank and pump station would be constructed near the UC Santa Cruz main campus entrance, northeast of the intersection of High Street and Glenn Coolidge Drive. Details as to the size of the storage tank are not available at this time.

The potential environmental impacts of the Regional Recycled Water Facilities Project are described in **Table 7.1-11** below. As the table shows, with the exception of a potentially significant visual impact and a significant impact on the Cowell Lime Works Historic District, the project’s impacts would be less than significant. These two potentially significant impacts could potentially be mitigated by relocating the proposed water tank.

Table 7.1-11
Environmental Impacts of the Regional Recycled Water Facilities Project

Resource Topic	Potential Impacts
Aesthetics	The project would not result in any significant impacts to aesthetics as the upgrades would be within the existing WWTP and purple pipelines would be located underground within roadways. The location of the storage tank and pump station near the UC Santa Cruz main campus entrance is designated as Campus Support in the 2006 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 would likely 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 purple pipelines would be constructed within roadways. The location of the storage tank and

Resource Topic	Potential Impacts
	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 entrance area. Less than significant impacts to biological resources would occur.
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, human remains, and paleontological resources during ground disturbing activities, those would be expected to be reduced to a less than significant level with implementation of mitigation measures.
Geology and Soils	The purple pipelines and updates 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 SWPPP in compliance with NPDES requirements.
Greenhouse Gas (GHG) Emissions	Due to the nature of the project, 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 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 proposed project would not substantially increase the amount of impervious areas. In compliance with the NPDES requirements, implementation of a storm water pollution prevention plan (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 purple pipelines would be constructed within existing roadways. The location of the storage tank and pump station near the campus entrance is designated as Campus Support in the 2006 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	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 added due to project implementation.
Transportation	As no people would be added due to project implementation, no vehicle trips

Resource Topic	Potential Impacts
	would be generated. No impacts due to operational traffic would occur. During construction of the project, lane closures to install the purple pipes could be required, which could result in some temporary traffic congestion. The impact would however be temporary and less than significant.
Utilities and Service Systems	The project would have no impacts on other utilities including water and solid waste.

City Seawater Desalination Project

As noted above, the City will consider a future 3.3 million gallons per day (mgd) desalination plant if the advanced treated recycled water plant does not meet the City's needs. The University also acknowledges that there is substantial uncertainty regarding the approval and timing of the desalination water supply option, especially due to the fact that such a project would require permits and approvals not only from the City and the County, but a host of federal and state agencies, including but not limited to the US Army Corps of Engineers, US Fish and Wildlife Service, NOAA, US Coast Guard, California Coastal Commission, California Department of Fish and Wildlife, Regional Water Quality Control Board, and the Monterey Bay National Marine Sanctuary. Nonetheless, as it is an option listed by the WSAC and also included in the City's UWMP, this option is described below, along with its potential environmental impacts.

The City has been considering the development of a desalination plant to serve as a back-up supply during droughts for more than a decade. In 2006, the City prepared a program level impact evaluation of a desalination plant as a new water source in its Integrated Water Plan (IWP) EIR which was certified, and in 2013, the City prepared a project-level Draft EIR for a desalination plant which was not certified. Information from the 2013 Draft EIR is used below to disclose the impacts of a future desalination plant.

This project would involve the construction and operation of a seawater reverse osmosis (SWRO) desalination plant and related facilities to provide up to 3.3 mgd of potable water to the City of Santa Cruz. The seawater desalination project, as currently being considered by the City, consists of the following components:

- 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 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 (Plant Site A-1, Plant Site A-2, and Plant Site A-3) 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 similar project, proposed jointly in 2013 by City of Santa Cruz and the Soquel Creek Water District, was previously evaluated in the scwd² Regional Seawater Desalination Project Draft EIR ("scwd² DEIR"). The project was essentially the currently considered City Seawater Desalination project except with a smaller capacity that would provide 2.5 mgd of potable water to both the City of Santa Cruz and the Soquel Creek Water District. The City Seawater Desalination project would be similar to the previously evaluated project in terms of location, operations, and other attributes. The main change would be the need for greater processing equipment. In addition, as part of the Seawater Desalination project, the City is considering an open-ocean intake as well as subsurface radial collector wells. As the City Seawater Desalination project is very similar to the previously evaluated scwd² project, the conclusions of the scwd² DEIR were referenced to present the likely environmental impacts of the City Seawater Desalination project, which are reported in **Table 7.1-12** below. As the table shows, 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.

Table 7.1-12
Environmental Impacts of the City Seawater Desalination Project

Resource Topic	Potential Impacts
Aesthetics	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

Resource Topic	Potential Impacts
	to scenic vistas, scenic resources, and the project would not change the visual character of the area,
Agriculture and Forest 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	<p>There would be a significant and unavoidable (SU) from conflicting with local policies protecting the monarch butterfly overwintering site at Natural Bridges State Beach if Plant Site A-2 is selected. SU impact would be avoided if Plant Sites A-1 or A-3 are selected.</p> <p>Offshore construction impacts on marine life and habitats would be reduced to less than significant with mitigation.</p> <p>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.</p> <p>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.</p>
Cultural Resources	Impacts from inadvertent discovery of cultural resources, human remains, and paleontological resources would be reduced to a less than significant level with implementation of mitigation measures.
Geology and Soils	With implementation of mitigation measures, impacts related to seismic, slope, and soils hazards 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	<p>Hazardous exposure to workers due to accidental spills and/or release of chemicals would be mitigated with implementation of proper storage, containment, and emergency controls.</p> <p>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.</p>
Hydrology and Water Quality	<p>With implementation of mitigation measures, onshore and offshore construction water quality impacts would be reduced to less than significant.</p> <p>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.</p> <p>The project would dilute the brine from the desalination process with the</p>

Resource Topic	Potential Impacts
	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	There would be no impacts to public services and recreation as no people would be directly added due to the project.
Recreation	Impacts related to recreation would be reduced to a less than significant level with mitigation.
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 and Service Systems	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.
Source: URS 2013	

Impact of Summer Enrollment Growth on Water Supply

As the time that UC Santa Cruz prepared the 2005 LRDP Draft EIR, the Campus projected that it would expand its summer programs to enroll up to 8,100 students during 10-week summer quarter that extends from late June to end of August. As the summer quarter enrollment was about 1,650 students at that time, the Campus projected there could be up to 6,450 additional students present on the campus during the months of June, July and August by 2020-21. While there could also be an increase in the number of employees present on campus during the summer, this growth was anticipated to be minor, because the majority of the staff works on campus year-round, and the overall summer employee population would remain slightly less than the regular school year employee population.

Although the previously projected increase in summer quarter enrollment has not been as large as previously projected, the summer quarter enrollment has gone up by about 2,850 students since 2003-04. As of 2017, the summer quarter enrollment was 4,496 students. If recent increases in summer quarter

enrollment (in the last two years) are used to project the 2020-21 summer quarter enrollment, there would be about 6,500 students on the campus during the summer quarter in 2020-21.

The water demand associated with the expanded summer programs is accounted for in the total demand estimates reported above because the estimates are based on actual water usage rates from the campus which include the increased water use associated with the expanded summer programs. Furthermore, as noted earlier, even though the campus enrollment has been increasing, the annual water demand has not increased proportionally. Therefore, the impact of the remaining expansion of the summer programs is captured in the analysis above. The other effect of this summer enrollment increase would be that the water demand profile of the campus would change. Currently, the campus's water demand profile does not resemble the bell-shaped curve that is typical of most communities, with the demand peaking in the summer months and dropping to lower levels during the rest of the year. Instead, the campus's water demand profile includes two peaks – the first in May and June and a second peak in October and November, both peaks associated with the presence of students on the campus. The water usage on the campus drops in July and August as only a small student population is present during that period. With the addition of students during the summer quarter, the usage in June, July and August would rise but the increase would not be substantial because there would be only about 2,000 more students on the campus during those months in 2020-21 compared to the number in 2017 and the campus will continue to implement water conservation measures that it has committed to implement. The increased water use during the summer quarter would not result in the need for a new water source, and to the extent it contributes to the cumulative need for a new water source, that impact is fully analyzed above.

Impact of Post-Settlement LRDP-related Off-Campus Population on Water Supply

In addition to the increase in on-campus water demand as a result of campus growth under the Post-Settlement LRDP, an incremental demand for water would be generated in the SCWD service area by the additional students and employees (and their dependents), who would relocate into the service area in order to work or attend school at UC Santa Cruz. **Section 7.2** of this EIR presents the number of additional students and employees that would be added to the study area under the Post-Settlement LRDP, and **Revised LRDP Impact POP-3** presents the number of housing units that would be occupied by the additional students and employees that would relocate into the study area.

To estimate the water demand associated with the students and employee households that would live within the SCWD service area, the water demand forecast methodology used in the 2015 UWMP was reviewed. According to Appendix F, City of Santa Cruz Water Demand Forecast, the residential water demand for the UWMP was estimated by multiplying the number of housing units for each year of

forecast with a water use rate. Two rates were used to develop the primary 2020 forecasts – a rate of 53 centum cubic feet per year (CCF/year) for multi-family residential/MFR and a rate of 86 CCF/year for single family residential/SFR (slightly lower rates were used for subsequent years 2025 -2035 based on the assumption that future housing would be progressively more water efficient). The same methodology was used in this EIR to estimate the water demand associated with the students and employees who would live within the SCWD service area.

Table 7.2-12 under **Revised LRDP Impact POP-3** presents the estimated number of housing units that would be taken up by the Post-Settlement LRDP related students and employees in the study area communities in 2020 and 2023. The SCWD service area includes the City of Santa Cruz, Live Oak, and a portion of Capitola. Using the data from **Table 7.2-12**, **Table 7.1-13** below presents the total number of housing units that would be occupied by the Post-Settlement LRDP related population in 2020 and 2023, and the estimated water demand associated with these units based on the SFR rate of 86 CCF/year (the use of the SFR rate is considered conservative because not all the Post-Settlement LRDP related population would live in single-family residences, especially given the fact that most of the housing constructed in Santa Cruz over the last 10 to 15 years has been multi-family housing which has a lower water demand rate). As the table shows, the water demand associated with the off-campus population would be approximately 51 MGY in 2020 and once the on-campus housing is completed, the off-campus incremental demand would drop to about 17.9 MGY in 2023.

Table 7.1-13
Estimated Off-Campus Water Demand within SCWD Service Area

	Santa Cruz	Live Oak	Capitola	Total	Water Demand Rate	Total Water Demand (gallons)
2020						
Student Housing Units	470	58	16	544		
Employee Housing Units	214	30	10	254		
<i>Total</i>				798	86 CCF/year or 176.24 gallons/year	51,333,744
2023						
Student Housing Units	47	1	1	49		

Employee Housing Units	214	10	5	229		
Total				378	86 CCF/year or 176.24 gallons/year	17,883,184
<i>Source: Table 7.2-12 in Section 7.2; City of Santa Cruz 2015 UWMP Appendix F.</i>						

This demand for water by the incremental campus-related population that would reside off-campus within the SCWD service area is already accounted for in the City's 2015 UWMP. This is because the 2015 UWMP water demand forecasts are based on projected number of housing units that would be in place by 2020 based on the AMBAG 2014 forecasts and other sources of data, and in developing its 2014 population and housing projections, AMBAG took into account the enrollment and employment growth at UC Santa Cruz based on the 2005 LRDP.

As the analysis in **Table 7.1-10** above shows, for 90 percent of the normal water years the supply and demand (which includes the Post-Settlement LRDP related on and off-campus population) would be in balance, and for the 10 percent of the years when deficits are projected to occur, they would be on the order of 1 to 3 percent. During single dry water years, the deficits would be larger, whereas during multiple dry water year conditions, the gap between supply and demand would be substantial. As discussed above, UC Santa Cruz-related water demand would contribute to the need for the development of one or more new water sources, the potential environmental effects of which are described above.

Impact of the Post-Settlement LRDP on Water Treatment Facilities

The Graham Hill water treatment plant has a capacity to treat up to 16 mgd and currently treats about 10 mgd. The 16 mgd capacity translates into a capacity to treat 5,840 MGY. This is substantially more than the City's total water demand in 2025 and beyond, which includes the water demand associated with campus growth under the Post-Settlement LRDP. Therefore the Post-Settlement LRDP would not trigger the need for capacity expansion at the Graham Hill water treatment plant and any related environmental impacts from capacity improvements. No impact would occur.

Conclusion

The City's water supplies are adequate to serve the Campus's water demand under the Post-Settlement LRDP in normal water years. While the supplies are insufficient in single dry water years, conservation and curtailment are expected to address most, but not all, of the shortfall. The water supplies are substantially inadequate under multiple dry water year conditions, and a worst case gap of 1.2 BGY is

projected under prolonged drought conditions. Although the Campus's incremental demand under the Post-Settlement LRDP would constitute a very small portion of the City's water demand for water through 2023, given the severity of the supply shortfall, the University concludes that the Post-Settlement LRDP's contribution is considerable and that the campus's incremental water demand would contribute to the need for the City to secure a new water source to address drought conditions. As the analysis of probable environmental impacts of the City's potential new water sources shows, development of a recycled facilities project or a desalination project could result in significant or significant and unavoidable impacts. Campus growth under the Post-Settlement LRDP would contribute to those impacts.

To minimize its impact, UC Santa Cruz will comply with the UC Sustainable Practices Policy which currently requires that campus potable water usage is reduced by 36 percent by weighted campus user by 2025 from a 2005-2008 baseline. The Campus will also continue to comply with the Settlement Agreement, pursuant to which UC Santa Cruz will pay a fee for increased water use (equivalent to the City's "system development charges") to cover its proportional share of use of City developed new water source capacity and the City's construction of public facilities to serve UC Santa Cruz's non-drought water demand on the main campus. Additionally, UC Santa Cruz will 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 addition, mitigation measures are set forth below to further minimize the Campus's demand for potable water under the Post-Settlement LRDP.

Mitigation Measures:

LRDP Mitigation UTIL-9A: Continue to implement applicable prior LRDP Mitigations i.e., UTIL-9A, -9B, -9C, -9H, and -9I which the Campus is voluntarily implementing and has incorporated into campus operations and requirements for new development.

LRDP Mitigation UTIL-9B: Expand the use of recycled water on the main campus.

The Campus will evaluate the feasibility of using excess recycled water generated on the SHW project site for toilet flushing at the nearby Porter and Kresge Colleges, and for irrigation at the Arboretum. The SHW project will have a surplus of about 15 MGY of recycled water. Based on current and projected student beds at Porter and Kresge Colleges, it is

estimated that about 3.9 MGY of recycled water could be used in the two colleges, and the balance could potentially be used at the Arboretum.

Significance after Mitigation: Implementation of **LRDP Mitigation UTIL-9A** and **-9B** above would reduce the Post-Settlement LRDP's impact on water supply. The implementation of **LRDP Mitigation UTIL-9B** above would reduce the Campus's potable water demand of 220 MGY in 2023 by 15 MGY to 205 MGY, which would be less than the UC Santa Cruz's 2003 water use of 214.5 MGY and would be a 40 percent reduction in the demand increment between 2017 and 2023. The impacts of constructing a recycled water line from the SHW project site to Kresge and Porter Colleges are addressed by the analysis in **Sections 4.1** through **4.15** of this Draft EIR. This is because the recycled water line would be located in the same utility corridor as the water line for the SHW project that would extend from the Kresge College parking lot to the SHW project site. The analysis shows that construction in the utility corridor would not result in any significant environmental impacts that cannot be mitigated to a less than significant level. Implementation of this measure to convey recycled water to the Arboretum would also not result in any significant environmental effects with the implementation of 2005 LRDP mitigation measures.

Nonetheless, even with the proposed mitigation, the Campus's remaining water demand under the Post-Settlement LRDP will contribute to the need for the City to secure a new water source for single dry water year and multiple dry water year conditions. As set forth in **Tables 7.1-11** and **7.1-12** above, development of a new water source would have the potential to result in significant and unavoidable environmental impacts. The Post-Settlement LRDP would therefore indirectly result in these significant and unavoidable impacts.

7.1.6 REFERENCES

- City of Santa Cruz. 2010. City of Santa Cruz Sphere of Influence Amendment and Provision of Extraterritorial Water & Sewer Service Final Environmental Impact Report. SCH #2008102108.
- City of Santa Cruz. 2011. 2010 Urban Water Management Plan. Prepared by the City of Santa Cruz Water Department. December.
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7.2 LRDP POPULATION AND HOUSING IMPACT ASSESSMENT

7.2.1 Introduction

As noted in **Section 7.0**, the Santa Cruz County Superior Court found the population and housing analysis in the 2005 LRDP EIR to be deficient. In the Order related to the 2005 LRDP EIR, the Court noted that “the EIR lacked the required analysis as to where this predictable increase in housing is going to occur and how the City will accommodate it and what the environmental impact will be if it is accomplished.” In ruling with respect to the population and housing analysis, the judge relied on *Napa Citizens for Honest Government v. Napa County Bd. of Supervisors* (2005) 91 Cal.App.4th 342. In *Napa Citizens*, the Court ruled “[I]n order to fulfill its purpose as an informational document, the [EIR] should, at a minimum, identify the number and type of housing units that persons working within the Project area can be anticipated to require, and identify the probable location of those units. The [EIR] should consider whether the identified communities have sufficient housing units and sufficient services to accommodate the anticipated increase in population. If it is concluded that the communities lack sufficient units and/or services, the FSEIR should identify that fact and explain that action will need to be taken to provide those units or services, or both. Because it cannot be known if the Project will cause growth in any particular area, and because the Project most likely will not be the sole contributor to growth in any particular area, it is not, however, reasonable to require the [EIR] to undertake a detailed analysis of the results of such growth.” The ruling further noted “It does not follow, however that an EIR is required to make a detailed analysis of the impacts of a project on housing and growth. Nothing in the Guidelines, in the cases, requires more than a general analysis of projected growth.” (*Napa Citizens for Honest Government v. Napa County Bd. of Supervisors* (2005) 91 Cal.App.4th 342, 370.)

In *Napa Citizens*, the Court found that EIR deficient for not identifying the number of units that would be needed, whether the identified communities would have sufficient housing to accommodate the increase in population, and the actions that would need to be taken to provide those units. In the case of the 2005 LRDP EIR, the Superior Court did not find the 2005 LRDP EIR deficient on any of those accounts, just that the EIR did not disclose where new housing would be constructed and what the environmental impacts of that housing would be. To address this deficiency, the Court provided the following direction to the University:

“Supplement the LRDP EIR’s population and housing analysis to disclose the probable locations where new off-Campus housing will likely be built, as informed by the applicable General Plans and other land use regulations and controls that are in effect as of the date that [the University]

commences its supplemental analysis, and the environmental impacts of putting that housing in those locations, if any.”

Since the prior analysis was conducted, several years have elapsed, and other changes have occurred, including the changes in the conditions in the project area, changes in the Campus’s growth projections, and an increase in the amount of on-campus housing that is planned to be provided under the 2005 LRDP. Because of this, the University has prepared a new population and housing impact assessment for the 2005 LRDP which replaces in full the prior analysis under LRDP Impact POP-1 and LRDP Impact POP-3. As directed by the Court, the revised LRDP Impact POP-3 identifies areas where additional housing would likely be built as a result of the demand for housing associated with the 2005 LRDP, and the environmental impacts of putting that housing in those locations.

Data used in preparation of this section were obtained from the City of Santa Cruz General Plan, City of Santa Cruz Housing Element, U.S. Census Bureau (2010), the 2017 American Community Survey, the California Employment Development Department, the Association of Monterey Bay Area Governments (AMBAG), and the California Department of Finance (DOF).

7.2.2 Environmental Setting

7.2.2.1 Study Area

UC Santa Cruz facilities are located in a number of places within and outside Santa Cruz County.¹ The properties in the City of Santa Cruz include the main campus, 2300 Delaware Avenue property, leased space in the City’s Westside, the Coastal Science Campus, and the University Town Center in downtown Santa Cruz. Campus population on the main campus, the 2300 Delaware Avenue property. Campus population associated with Coastal Science Campus is covered by a separate LRDP. As of early 2017, about 525 employees located in the Westside leased spaces and some employees from the main campus were relocated to the newly established Scotts Valley Center in the city of Scotts Valley, which is not covered by the 2005 LRDP, and at the present time, the Westside leased spaces are used only for storage and other uses and do not provide office space for employees. Therefore, the 2005 LRDP now covers only the main campus and the 2300 Delaware Avenue property, and for ease of reference, both sites are collectively referred to as the “main campus” in this section.

The study area for the evaluation of population and housing impacts is defined to include the UC Santa Cruz campus, the City of Santa Cruz, and the rest of Santa Cruz County.

¹ UC Santa Cruz Extension operates a center in the City of Santa Clara known as the Silicon Valley Center. A small number of employees are associated with that center. Those employees are not covered by the 2005 LRDP.

7.2.2.2 Relevant Study Period

The 2005 LRDP, adopted in 2006, was developed to guide the Campus's growth to an enrollment level of 19,500 FTE students, which was projected to be attained by 2020-21. Therefore the plan was designed for the time period 2005 through 2020-21, and the 2005 LRDP EIR, which was certified in 2006, evaluated the impacts of campus growth between approximately 2003-04 (used as the baseline year in the EIR) and 2020-21. The 2005 LRDP is unchanged with regard to the projected enrollment level of 19,500 FTE students and at this point in time it is still projected that this enrollment level would be attained by 2020-21. However, some of the housing that would be constructed under the 2005 LRDP to serve this enrollment level will not be completed until 2023. Therefore, the study period used in this updated population and housing impact assessment is 2003-04 through 2023.

7.2.2.3 Terminology

In 2005 when the 2005 LRDP Draft EIR was published, the EIR analyzed and disclosed the impacts associated with an enrollment level of 21,000 FTE students and 10,125 student beds by 2020-21. However, in preparing the Final EIR in 2006, the University evaluated a Reduced Enrollment Alternative that included an enrollment level of 19,000 FTE students and 9,190 student beds by 2020-21. In September 2006, The Regents approved the Reduced Enrollment Alternative as the 2005 Final LRDP. Subsequently, in 2008, to settle lawsuits with the City and other entities, the University agreed that, for as long as the 2005 LRDP is in effect, full-time equivalent (FTE) on-campus 3-quarter average enrollment for undergraduate students would not exceed 17,500, and the University further projected that on-campus combined graduate and undergraduate enrollment levels would be 19,480 in academic year 2020-2021. The University also committed to providing more on-campus housing. As a result of this, while the projected enrollment growth under the 2005 LRDP to 19,500 FTE students remains unchanged from the 2005 Final LRDP that was adopted by The Regents, more on-campus housing is now planned under the 2005 LRDP than previously projected. In addition, there have been some changes at UC Santa Cruz with respect to on-campus employment. These actual conditions that have occurred to date under the 2005 LRDP, implemented per the 2008 Settlement Agreement, plus remaining foreseeable activities and conditions under the 2005 LRDP, are referred to in this section as the "Post-Settlement LRDP," whereas the 2005 LRDP as originally analyzed and approved in 2006 is referred to as the "2005 LRDP" in this section.

Environmental impacts of a long term development plan, such as the LRDP, are typically analyzed for "buildout conditions" i.e., impacts that would result when the ultimate level of growth and development under the plan would be completed. Therefore, the 2005 LRDP EIR analyzed the impacts of the 2005

LRDP under 2020-21 conditions. As noted above, the study period for the Post-Settlement LRDP extends to 2023. To distinguish between the impacts of the 2005 LRDP and the Post-Settlement LRDP, the phrase “2005 LRDP full development” is used to refer to the completion of the approved 2005 LRDP and the phrase “Post-Settlement LRDP full development” is used to refer to the completion of the development under the Settlement Agreement.

7.2.2.4 Campus Population

Campus population relevant to the analysis in this section consists of the following groups: students, faculty, staff, and dependents. **Table 7.2-1** shows the population totals for each group for the baseline academic year 2003-04 that was used in the 2005 LRDP EIR and for the latest academic year (2016-17) for which three-quarter average enrollment is available. The total population reported in this table and analyzed in this section includes only the employees and students associated with the main campus and 2300 Delaware Avenue as these two sites are covered by the Post-Settlement LRDP. However, because UC Santa Cruz employees at Scotts Valley Center (SVC) and Coastal Science Campus (CSC) also place a demand on housing in the study area, they have been taken into account in evaluating UC Santa Cruz’s cumulative impact on housing in the study area and the employees at these locations are also reported in the table below. Note that the students who take classes at the Coastal Science Campus also take classes at the main campus and are accounted for in the main campus enrollment.

Table 7.2-1
UC Santa Cruz Population – Baseline and Projected

Population	Baseline 2003-04	Existing 2016-17	2005 LRDP Full Development Projections	Post Settlement LRDP Full Development Projections
Main Campus				
Students (FTE)	14,050	17,870	19,500	19,500
Faculty and Staff	4,080	3,996	5,074	3,994
<i>Subtotal</i>	<i>18,130</i>	<i>21,866</i>	<i>24,574</i>	<i>23,494</i>
Coastal Science Campus				
Faculty and Staff	103	130	149	149
Scotts Valley Center				
Faculty and Staff	0	0	525	525
<i>Total</i>	<i>18,233</i>	<i>21,966</i>	<i>25,248</i>	<i>24,168</i>
Source: UCSC 2006; UCSC 2017				
Note: Most of the existing UC Santa Cruz employees moved to the Scotts Valley Center in January of 2017.				

Enrollment at UC Santa Cruz varies each quarter, with the highest enrollments in fall and the lowest in spring. The Campus uses an average of the student enrollment levels in the three primary quarters (fall, winter and spring) to track changes in enrollment from one year to another. That average is referred to as the three-quarter average enrollment. UC Santa Cruz main campus three-quarter average enrollment was 17,870 full-time equivalent (FTE) graduate and undergraduate students in 2016-17. Undergraduate students constitute about 90 percent of the total enrollment, and graduate students make up about 10 percent of all students.

As of Fall 2016, UC Santa Cruz main campus had 3,996 employees,² not including students who are also employees (see **Table 7.2-1**). About 21 percent of the total employees are faculty and 79 percent are staff.

7.2.2.5 Regional Population

Historical demographic data for the study area are available from the U.S. Census (US Bureau of Census 2010). Estimates of the current and projected populations of the study area cities and the county are available from the *Monterey Bay Area 2014 Regional Forecast—Population, Housing Unit and Employment Projections* published by Association of Monterey Bay Area Governments (AMBAG) in June 2014. Current (2017) estimates of city and county populations are also available from the California Department of Finance (DOF), which annually publishes estimated populations of California cities and counties. DOF also produces population projections at 10-year intervals for California counties but does not generate projections at the city level.

Table 7.2-2 shows the current and projected population of the City of Santa Cruz, other cities, and unincorporated Santa Cruz County through 2025. Although the horizon year for the 2005 LRDP is 2020, the study period for the Post-Settlement LRDP is 2004-2023. Therefore, 2025 projections are relevant and reported here.

The AMBAG projections acknowledge the presence of “special populations” within the AMBAG three-county area, including military residents of Fort Ord, CSUMB, and UC Santa Cruz. The projections take the specific growth projections of these special populations and incorporate them into the overall regional projections. The AMBAG projections include the projected increase in enrollment to 19,500 FTE students and associated employees by 2020 at UC Santa Cruz under the 2005 LRDP.

² In 2016, UC Santa Cruz had an additional 268 employees at other locations, including the Coastal Science Campus, UC Santa Cruz extension in Santa Clara, and other locations outside of Santa Cruz County. In early 2017, UC Santa Cruz established the Scotts Valley Center and moved approximately 525 employees to that location from the main campus and Westside leased spaces. As discussed above, the 2005 LRDP does not cover any of these facilities.

Table 7.2-2
Historical, Existing, and Projected Population in the Study Area

City/County	2005 ^a	2010 ^b	2017 ^c	Projected Population	
				2020 ^d	2025 ^d
City of Santa Cruz	56,953	58,269	65,070	66,860	70,058
Capitola	10,869	9,801	10,162	9,119	9,427
Scotts Valley	13,182	11,351	12,163	11,638	11,696
Watsonville	52,716	49,580	53,015	59,446	61,452
Unincorporated County	133,824	127,900	136,193	132,318	134,879
Santa Cruz County	267,544	256,901	273,983	279,381	287,512
<i>Sources:</i> <i>a. UCSC 2006</i> <i>b. U.S. Bureau of Census, 2010</i> <i>c. DOF 2017</i> <i>d. AMBAG 2014</i>					

County of Santa Cruz

According to the last census, the total population of Santa Cruz County in 2010 was 256,901. Based on DOF estimates, as of 2017, the population of Santa Cruz County is approximately 273,983 persons. This represents an estimated increase of about 2.3 percent in the last 7 years (2010-2017). Based on AMBAG projections, the countywide population is projected to grow by about 4.9 percent from 2017 through 2025.

City of Santa Cruz

In 2010, the City of Santa Cruz had a population of 58,269 persons, accounting for 23 percent of the total county population. Based on the 2010 Census and DOF data, between 2000 and 2017 the City's population grew about 11.6 percent, and as of 2017, the City has a total population of about 65,070 persons. With respect to projected growth in the City's population between 2017 and 2025, AMBAG's planning forecast anticipates population growth of 7.6 percent over the next 8 years, and a population of about 70,058 persons by 2025.

Other Study Area Communities

Other study area communities where UC Santa Cruz related population is known to reside include several small unincorporated communities in the north and central county (Davenport, Ben Lomond,

Boulder Creek, Bonny Doon, Mount Hermon, Brookdale, Live Oak, Soquel, Aptos, and Felton), and the cities of Scotts Valley, Capitola, and Watsonville. Community-specific current and projected population data are reported in **Table 7.2-2** for the incorporated cities; the populations of the smaller unincorporated communities are included in “Unincorporated County” totals.

7.2.2.6 UC Housing and Residence Patterns

This section describes the UC-owned or leased housing both on and off campus and the residence patterns of students and employees.

Student Housing

As of 2016, UC Santa Cruz had a total University-managed student housing capacity of 9,387, measured in terms of student beds (see **Table 7.2-3**).³ These included 9,250 beds on the main campus and about 137 student beds in off-campus housing leased by the University in the City of Santa Cruz.⁴ On-campus beds account for 98.5 percent of the total student housing and off-campus beds for 1.5 percent.

Table 7.2-3
UC Santa Cruz Housing Capacity and Occupancy Levels

Housing Type	Capacity ^a (Fall 2004)	Occupancy (Fall 2004)	Capacity ^a (Three Quarter Average 2016)	Occupancy (Three Quarter Average 2016)
On-Campus Student Housing^b				
Residence Halls	3,745	3,486	5,970	5,678
Apartments	2,549	2,371	2,988	2,898
Guest Housing and Other Facilities	42	42	96	94
Family Student Housing	199	189	196	190
Off-Campus Student Housing^b				

³ Student beds refer to the number of students that can be accommodated in the available housing. These beds are contained in dormitories and apartments and therefore do not represent the number of housing units. The 2016 number reported here is the temporary adjusted capacity and includes beds in converted lounges, and double rooms converted to triple occupancy rooms.

⁴ Off-campus housing excludes housing for students enrolled in the UCDC program in Washington, DC. Historically, UC Santa Cruz also leased a hotel building in the City and converted it to student housing. That facility, University Inn, is no longer included in the Campus’s housing inventory, as the lease has been discontinued.

Housing Type	Capacity ^a (Fall 2004)	Occupancy (Fall 2004)	Capacity ^a (Three Quarter Average 2016)	Occupancy (Three Quarter Average 2016)
University Town Center	108	53	137	126
Subtotal	6,643	6,141	9,387	8,986
Faculty and Staff Housing				
Faculty/Staff - For Sale Units	143	143	188	186
Faculty/Staff - For Rent Units	51	51	51	48
Employee Housing in Colleges	47	46	33	32
Subtotal	241	240	272	266
Total	6,784	6,381	9,659	9,252
<i>Source: UCSC 2006; UCSC 2017</i> <i>Notes:</i> <i>a. The actual capacity may vary from the design capacity and can be increased in various ways if needed.</i> <i>b. Reported in student bed spaces.</i>				

On-campus housing for students has increased over the years as new colleges have been constructed. In addition, in response to increased demand for more student housing on campus, the University has undertaken temporary modifications to on-campus housing, such as converting residence hall lounges into bedrooms and double occupancy rooms into triple occupancy rooms. As a result of these modifications, beds were added in the residence halls, and in single student apartments, above the total design capacity. In addition, the Campus entered into 10-year leases for two properties in downtown Santa Cruz, where additional student bed spaces were created. Although one of the two leased properties is no longer leased by the Campus, the Campus still maintains about 137 student beds in apartments at the University Town Center. In 2004 the Campus also added infill apartments at several of the colleges in order to house more students on campus and to provide more diversity in the types of housing available on the campus. In addition, the Campus has added beds to existing college housing during capital renewal projects through reconfiguration of interior spaces, enclosure of decks and, at Porter College, by adding on new floors. **Table 7.2-3** presents campus housing capacity and occupancy levels for the years 2004 and 2016.

The occupancy levels of student housing fluctuate from year to year, in response to the availability of housing on the campus as well as in response to the availability and cost of housing in the City of Santa Cruz and other nearby communities. In 2016, the average occupancy level was 95.5 percent (UCSC 2017).

Faculty and Staff Housing

Currently there are 272 employee housing units on the campus. This housing is located mainly in five housing complexes: 64-unit Laureate Court, 50-unit Hagar Court, 19-unit Hagar Meadow, 61-unit Cardiff Terrace, and the 45-unit Ranch View Terrace, and about 33 faculty and staff are housed in the colleges and in other student housing. In 2016, the occupancy level of on-campus employee housing was 97.8 percent (UCSC 2017).

Student Residence Patterns

Table 7.2-4 presents historical residence patterns of UC Santa Cruz students. In 2003-04, approximately 41 percent of the student population lived on the campus, about 40 percent lived off-campus in the city of Santa Cruz and in Bonny Doon,⁵ and about 13 percent lived in other communities in Santa Cruz County, mainly in Live Oak, Capitola, Aptos, and Soquel. The remainder of the students (about 6 percent) lived outside the county.

Current distribution of students by place of residence is not available because students are not required to report their place of residence to the Campus. Students will often list parents' addresses as their permanent addresses, and therefore the information provided by students about their residences cannot be used to determine the current residence patterns of students that live off campus. However, if the historical and recent distributions of UC Santa Cruz employees by place of residence (reported in the table that follows) are compared, the numbers do not show any substantial changes in the percentages of employees that live in each community, which suggests that residence patterns are stable and the 2004 residence pattern for students provides a reasonable approximation of the students' current residence patterns.

Table 7.2-4
Student Residence Patterns

Population	Fall 2003	Spring 2004
Total Population	14,631	13,556
Distribution between On- and Off-Campus Residents		
On-campus resident	38%	41%
Off-campus resident	62%	59%

⁵ Historical residence patterns of UC Santa Cruz students and employees were derived from UC Santa Cruz Place of Residence Surveys conducted by the Campus. Because the zip code for Bonny Doon is the same as a portion of the City of Santa Cruz, Bonny Doon residents are included in the City of Santa Cruz totals.

Population	Fall 2003	Spring 2004
Out-of-county commuters	6%	6%
In-county commuters	56%	53%
Distribution of In-County Commuters by Community		
Santa Cruz	43.5%	39.8%
Live Oak	5.0%	4.9%
Capitola	1.2%	1.4%
Scotts Valley	1.0%	0.9%
Soquel	1.0%	1.0%
Aptos	1.5%	1.2%
Watsonville	1.1%	0.8%
Other communities in the county	2.7%	3.0%
<i>Source: UCSC 2006</i>		

Employee Residence Patterns

Table 7.2-5 presents historical and recent residence patterns of UC Santa Cruz employees. In 2003-04, about 4 percent of employees lived in on-campus housing, about 49 percent lived in the City of Santa Cruz, and another 34 percent lived in other communities in the county. About 13 percent of employees lived outside the county.

In 2015, approximately 6 percent of employees lived in on-campus housing, about 47 percent lived in the City of Santa Cruz, and another 24 percent lived in other communities in the county. About 23 percent of employees lived outside the county. Within Santa Cruz County, the predominant residence locations of employees (other than Santa Cruz) are Live Oak, Watsonville, Aptos, Scotts Valley, Soquel, and Capitola.

Table 7.2-5
Current and Historical Employee Residence Patterns

Population	Fall 2003	Spring 2004	Fall 2015
Total Population	3,946	3,858	4,162
Distribution between On and Off Campus Residents			
On-campus resident	3%	4%	6%
Off-campus resident	97%	96%	94%
Out-of-county commuters	14%	13%	23%
In-county commuters	83%	83%	77%

Population	Fall 2003	Spring 2004	Fall 2015
Distribution of In-County Commuters by Community			
Santa Cruz	48.8%	49.1%	46.5%
Live Oak	7.5%	7.5%	6.5%
Capitola	5.4%	5.4%	4.0%
Scotts Valley	2.6%	2.5%	2.1%
Soquel	2.8%	2.9%	1.9%
Aptos	5.5%	5.4%	4.8%
Watsonville	6.6%	6.4%	5.8%
Ben Lomond	1.4%	1.5%	1.2%
Boulder Creek	1.4%	1.4%	1.2%
Felton	2.0%	2.0%	2.3%
Other communities in the county	1.5%	1.2%	1.5%
<i>Source: UCSC 2006; TAPS 2016</i>			

Currently about 6 percent of all employees live on campus, with the majority of this group being faculty members. From the data in **Table 7.2-5**, it appears that compared to earlier years, more employees are commuting to the campus from out-of-county locations with the percentage increasing from about 13 percent in 2004 to 23 percent in 2015, a pattern that likely is linked to a number of factors, including the availability of affordable housing, schools, and employment opportunities for spouses and dependents in Santa Cruz County. With respect to in-county commuting employees, the percentage of employees residing in each of the communities has not changed substantially for any community and a little over half the employees still live in the City of Santa Cruz.

7.2.2.7 Regional Housing Supply

Existing and Projected Housing Supply based on AMBAG Projections

Table 7.2-6 below presents the existing and projected supply of housing in the study area. The 2017 numbers are based on Department of Finance (DOF) E-5 report, and the projections are from AMBAG's 2014 Forecasts. AMBAG projections indicate that about 4,721 dwelling units (DU) would be added in the City of Santa Cruz between 2005 and 2025 (AMBAG 2014). With respect to the rest of the county, AMBAG planning forecast projects that about 5,013 DUs would be added between 2005 and 2025.⁶

⁶ Note that AMBAG planning forecast shows additional units will be added both in the City and the rest of the county between 2025 and 2035 but those are not included in this analysis because those units would be added to the regional housing inventory outside the study period of the Post-Settlement LRDP.

Table 7.2-6
Existing and Projected Housing Supply in Study Area

City/County	2017	Projected 2020	Projected 2025
City of Santa Cruz	23,693	26,890	27,547
Rest of SC County	81,808	84,149	85, 621
Santa Cruz County (total)	105,501	111,039	113,168
<i>Source: DOF 2017; AMBAG 2014.</i>			

Existing and Projected Housing Supply based on City of Santa Cruz Housing Element

The State of California requires the Department of Housing and Community Development to identify housing needs for each region in the state in response to projected growth in population and households. To address this, the Council of Government in each region distributes the housing needs allocation to each jurisdiction in its region. AMBAG oversees the Regional Housing Needs Determination (RHND) process for Monterey and Santa Cruz Counties, and determines each jurisdiction's fair share of the regional housing need. The RHND process establishes the regional housing needs for a period of 5 years at a time. Following the allocation and assignment of RHND goals by AMBAG, the City of Santa Cruz updated the General Plan Housing Element in 2016 to demonstrate how it would develop the needed housing. The AMBAG-assigned RHND goal for the City was 747 additional DUs between 2015 and 2023 (City of Santa Cruz 2016). According to the City of Santa Cruz 2015-2023 Housing Element, the City's objective is to produce 747 new DUs between 2015 and 2023. The Housing Element notes that from January 2014 through September 2015, 254 units were built or were under construction and, during the same period, an additional 621 units had been submitted for planning or building permit approval, for a total of 875 units (City of Santa Cruz 2016).

Table 7.2-7 and **Figure 7.2-1, Changes in City of Santa Cruz Housing Supply**, below present the historical and projected changes in housing supply in the City of Santa Cruz over the study period. Data for years 2004 through 2010, and 2011 through 2017 were obtained from the DOF E-8 and E-5 reports, respectively, for the City of Santa Cruz. This is also the source used by the City in its Housing Element to report the amount of existing housing in the City. Based on DOF numbers, approximately 1,639 DUs were added to the City's housing stock between 2004 and 2017. With regard to the projections of housing supply, a number of alternate approaches were used to estimate the number of DUs that would be added to the City's housing stock by 2020 and 2023, which are the buildout years of interest for this EIR.

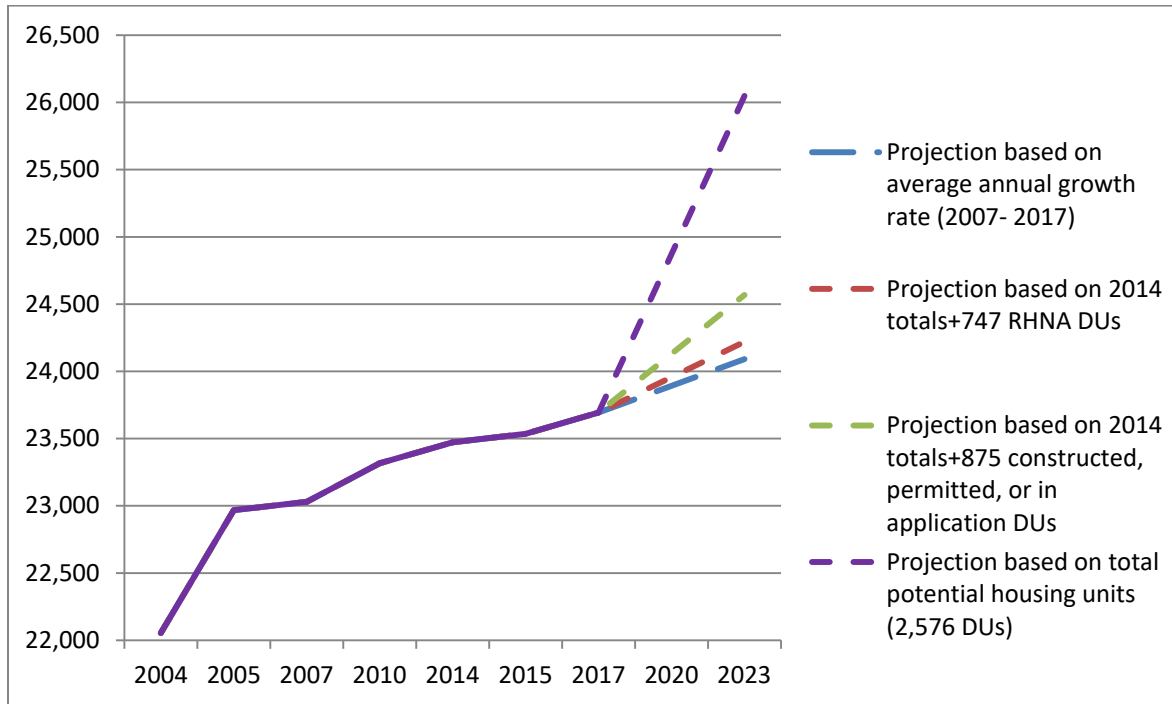
- Under the first approach, the average annual rate at which housing was added over the last 10 years (2007 to 2017) was calculated and used to project the additional units that could be added if housing continued to grow at the historic annual rate. The 2020 and 2023 projections based on the average annual growth rate are reported in the first row in **Table 7.2-7** below.
- Under the second approach, the number of DUs the City must add to address its RHNA obligation were used to estimate the minimum amount of housing that would be built in the City. The number of units in 2023 was estimated by taking the baseline 2014 number of 23,472 units from the City's Housing Element and adding 747 DUs to that number. The estimate for 2020 was arrived at by interpolating between the 2023 estimate and the 2017 number. The estimated numbers are reported in the second row in **Table 7.2-7** below. Under the third approach, 875 DUs were added to the baseline 2014 number from the Housing Element. These 875 DUs are reported in Table 4-4 of the Housing Element and include some units that have been constructed since 2014 and additional units that were either under construction, or approved but not constructed or in the entitlement process and were considered likely to be constructed over the period of the Housing Element (2014 through 2023). The projections based on this number are reported in the third row in **Table 7.2-7** below.
- Under the fourth approach, all potential housing identified by the City in its Housing Element was added (2,576 DUs) to the 2014 baseline to develop 2020 and 2023 projections. This includes the housing that could be built within the Opportunity Areas and on vacant or underutilized lands in the City. The projections based on this number are reported in the fourth row in **Table 7.2-7** below.

The projections that are based on the historic annual growth rate and the 747 RHNA units are considered unrealistically low because, based on the projects that have been approved and the projects that are in the entitlement process with the City, a greater amount of housing will be added in the next 5 to 6 years compared to the past several years. The projection based on the maximum number of units (2,576 units) that could be built in the City is considered unrealistic because it is unlikely that all this housing would be added in the next 5 to 6 years. Therefore, the intermediate projection based on the addition of 875 DUs was used to analyze the effect of the Post-Settlement LRDP on the City's housing supply in the years 2020 and 2023.

Table 7.2-7
City of Santa Cruz Historical and Projected Housing Supply (Dwelling Units)

	2004	2005	2007	2010	2014	2015	2017	2020	2023
2020-2023 Projection based on average annual growth rate (2007-2017)	22,054	22,968	23,029	23,316	23,472	23,535	23,693	23,892	24,091
2020-2023 Projection based on 2014 totals + 747 RHNA DUs	22,054	22,968	23,029	23,316	23,472	23,535	23,693	23,956	24,219
2020-2023 Projection based on 2014 totals + 875 constructed and/or permitted DUs	22,054	22,968	23,029	23,316	23,472	23,535	23,693	24,130	24,568
2020-2023 Projection based on total potential housing units (2,576 DUs)	22,054	22,968	23,029	23,316	23,472	23,535	23,693	24,871	26,048

Figure 7.2-1
Changes in City of Santa Cruz Housing Supply (Dwelling Units)



7.2.3 REGULATORY FRAMEWORK

There are no federal or State regulations related to population and housing that are applicable to the UC Santa Cruz campus.

7.2.4 IMPACTS AND MITIGATION MEASURES

7.2.4.1 Significance Criteria

As noted earlier in this section, the Santa Cruz County Superior Court ruled that the University must supplement the population and housing impact analysis to “disclose the probable locations where new off-Campus housing will likely be built, as informed by the applicable General Plans and other land use regulations and controls that are in effect as of the date that [the University] commences its supplemental analysis, and the environmental impacts of putting that housing in those locations, if any.”

Consistent with this direction from the Court, the impacts on population and housing from the Post-Settlement LRDP would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the State CEQA Guidelines and the UC CEQA Handbook:

- Directly induce substantial population growth in the area by proposing new housing and employment; or
- Contribute substantially to a cumulative demand for housing that could not be accommodated by local jurisdictions, and trigger the construction of new housing that could result in significant environmental impacts.

7.2.4.2 Methodology

The impact analysis presented below examines the population and housing impacts on the study area that would result from the population added to the study area as a result of campus growth under the Post-Settlement LRDP, compared to the 2003-2004 baseline. For reasons set forth in **Section 7.2.1** above, this section reexamines the projected population growth under the Post-Settlement LRDP, takes into account the amount of housing that would be built on the campus under the Post-Settlement LRDP, including the Student Housing West (SHW) project, and re-calculates the number of students and employees who would live off campus and place a demand for housing in the study area.

Project Background

As noted above, in September 2006, The Regents approved the Reduced Enrollment Alternative as the Final 2005 LRDP, and in the 2008 Settlement Agreement with the City and other entities, the University committed to providing more on-campus housing consistent with the terms of the Settlement Agreement, and made other commitments related to traffic mitigation and water consumption on the campus.

Since 2006, campus enrollment has increased steadily and as of academic year 2016-2017, the three-quarter average enrollment level is 17,870 FTE. Concurrently, the Campus has implemented projects to increase the on-campus student housing supply. Compared to the 2003-04 baseline of about 6,200 student beds, as of 2017, there are 9,399 student beds on the campus.

Concurrent with enrollment growth, employment on the main campus grew from 2003-04 through 2016. However in early 2017, the Scott Valley Center was established and about 525 employees moved to that location. As a result, the number of employees at the present time on the main campus is slightly lower than the number in 2003-04. On-campus employee housing has not increased substantially since 2003-04.

During the remaining period of the Post-Settlement LRDP, the University plans to add a substantial amount of student housing to the main campus. **Table 4.0-1** in **Section 4.0** lists the projects that will be completed under the Post-Settlement LRDP. Although the construction of the listed projects, if approved, will be commenced before 2020-21, some of them will not be completed by 2022 or 2023. Therefore, the impact from the full development of the campus under the Post-Settlement LRDP is analyzed in this section for the year 2023 as that would be the year by which the proposed housing would be completed and would have the effect of reducing the demand for off-campus housing.

The data, assumptions, and approach used to develop on- and off-campus population and housing demand estimates for this impact analysis are set forth below.

New Student Population

In the 2005 LRDP Final EIR, the Campus projected an increase in student enrollment to 19,500 FTE by academic year 2020-21. The Post-Settlement LRDP analysis below also uses 19,500 FTE students for the analysis of population and housing impacts.

Student Dependents

To evaluate the full impact of the enrollment increase on study area population, dependents that would accompany the new students that would live off campus were calculated using the assumption that there

would be about 0.1 dependent per student, which was also the assumption used in the 2005 LRDP EIR to estimate the number of student dependents. The number of student dependents living on the campus as provided by Campus Housing and Educational Services.

On-Campus Student Housing

As analyzed in the 2005 LRDP EIR, 9,190 student beds were planned to meet the housing targets identified in the 2005 LRDP. As reported in **Table 3.0-5, in Chapter 3.0 Project Description**, the Campus proposes to provide a total of 11,512 student beds under the Post-Settlement LRDP full development, with this housing supply in place by 2023. This number of student beds was used to estimate the number of students who would live on campus and the number that would live off campus under the Post-Settlement LRDP full development.

Student Off-Campus Housing Demand

To calculate the number of DUs that would be needed off campus, it was assumed that students living in off-campus housing would share accommodations, and that there would be 2.5 students living in each DU (the 2005 LRDP EIR used the assumption that there would be three students to a DU).

Using the data and assumptions above, the on and off-campus student population was estimated along with the number of off-campus DUs that would be needed for the additional students. The numbers were calculated both for the 2005 LRDP and the Post-Settlement LRDP, and are presented in **Table 7.2-8** below.

Table 7.2-8
Student Population and Housing Demand Summary

	2003-04	2005 LRDP 2020-21	Post-Settlement LRDP	
			2020-21	2023
Total enrollment	14,050 FTE	19,500 FTE	19,500 FTE	19,500 FTE
Students in University-controlled housing	6,237	9,190	9,945 ^a	11,512 ^a
On-campus student dependents	315	635	365	365
Students in off-campus housing	7,813	10,310	9,555	7,988
Off-campus student dependents	781	1,031	955	799
Student off-campus housing demand ^b	3,125 DU	4,124 DU	3,822 DU	3,195 DU
Sources: UCSC 2006; UCSC 2017				
a. This number includes 130 University controlled beds located off campus.				
b. Number of off-campus dwelling units estimated assuming 2.5 students per dwelling unit.				

Faculty and Staff Population

As noted above, the 2005 LRDP projected that main campus faculty and staff would increase from 4,080 employees in 2003-04 to approximately 5,074 employees by academic year 2020-21. However, due to the relocation of some of the employees to the Scotts Valley Center and a lower rate of growth in staff population projected by the Campus, UC Santa Cruz now estimates that the number of main campus employees will increase to a total of about 3,994 at Post-Settlement LRDP full development.

Employee Dependents

Data regarding existing and projected dependents of employees living on campus was provided by Campus Housing Services. Dependents that would accompany the new employees that would live off-campus were calculated using the assumption that there would be about 1.42 dependents per employee (this is based on the current average household size for the City of Santa Cruz, which is 2.42 persons per household).

On-Campus Employee Housing

As of 2017, there are a total of 239 housing units for employees on the campus. Another 33 employees are resident staff in colleges and other housing on the campus. The University has approved the construction of an additional 42 units in Ranch View Terrace Phase 2. Based on this housing inventory and a rate of 1.1 employees per on-campus dwelling unit, the current and projected numbers of employees who would live on campus at Post-Settlement LRDP full development were estimated.

Employee Off-Campus Housing Demand

Employee demand for off-campus housing was estimated based on the following assumptions:

- All of the additional employees hired by the University under the 2005 LRDP would be “new” to the area, i.e., non-local hires, and that none of the additional employees would already be living in the area at the time of hire.
- Each new employee would require one dwelling unit.

Using the data and assumptions above, the on and off-campus employee population was estimated along with the number of off-campus DUs that would be needed for the additional employees. The numbers were calculated both for the 2005 LRDP and the Post-Settlement LRDP, and are presented in **Table 7.2-9** below.

Table 7.2-9
Employee Population and Housing Demand Summary

	2003-04	2005 LRDP 2020-21	Post-Settlement LRDP	
			2020-21	2023
Total number of faculty/staff	4,080	5,074	3,994	3,994
Employees in on-campus housing	292	402	345	345
Employee dependents (on-campus)	365	693	372	372
Number of employees in off-campus housing	3,788	4,672	3,649	3,649
Employee dependents (off-campus)	5,526	6,634	6,138	6,138
Employee off-campus housing demand	3,788 DU	4,672 DU	3,649 DU	3,649 DU

7.3.4.3 2005 LRDP EIR Mitigation Measures

As the housing impact analysis in the 2005 LRDP EIR was set aside as deficient, the 2005 LRDP EIR did not formally impose the mitigation measures related to impacts on housing. However the Campus has voluntarily implemented these measures. **Table 7.2-10, 2005 LRDP EIR Mitigation Measures**, presents the mitigation measures in the 2005 LRDP EIR for informational purposes only.

Table 7.2-10
2005 LRDP EIR Mitigation Measures

Mitigation Measure	Description
POP-3A	The Campus will continue to monitor demand for student housing on an annual basis, and will ensure that a sufficient number of students beds are available on campus, through a combination of new housing construction and temporary modification of existing housing space ("overflow housing"), to accommodate at least 50 percent of undergraduate student enrollment and 25 percent of graduate student enrollment, as demand dictates.
POP-3B	Within one year following approval of the 2005 LRDP, the Campus will fund and carry out a study to identify ways in which the Campus can collaborate with other large employers, the City of Santa Cruz, and the County of Santa Cruz to assist in providing wider access to available housing for UC employees and affiliates and other community members, through mechanisms such as a jointly-funded housing trust augmented by grants and other funding sources.
POP-3C	The Campus will consult with the City and County of Santa Cruz on data needs and potential future joint projects and, within one year following approval of the 2005 LRDP, the Campus will fund and carry out a market analysis of the local housing market, including demand for housing by housing type and other demand factors,

Mitigation Measure	Description
	costs, vacancy, and occupancy rates, to provide data to assist the City in its planning activities related to housing needs, to assist the Campus in planning University housing, and to assist in the planning of potential joint projects. The Campus will update this study at no greater than five-year intervals.
Source: UCSC 2006	

7.2.4.4 CEQA Checklist Items Adequately Addressed in the Initial Study

- Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?
- Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

As noted in the 2005 LRDP EIR, the 2005 LRDP would not displace a substantial number of existing housing units or persons, necessitating the construction of replacement housing elsewhere. The EIR acknowledged that the Family Student Housing (FSH) Redevelopment Project, which was proposed in 2005, would remove the existing FSH complex but would replace the removed housing with twice the number of housing units. Because the affected housing would be replaced, there would be no long-term impacts relative to displacement of housing. The 2005 LRDP EIR also noted that the construction of the new colleges (Colleges 11 and 12) may require the removal of the Campus Trailer Park, which provides about 42 student beds. The potential removal of this housing was taken into account in planning additional student housing that would be provided on the campus under the 2005 LRDP. Therefore, the 2005 LRDP EIR concluded that no significant impacts related to housing displacement or displacement of a substantial number of people would occur. Since then, the Campus's proposal for the FSH site has changed and while the proposed SHW project would displace the existing FSH complex, it would provide substantially more housing. Furthermore, the SHW project would develop replacement housing for student families on the Hagar site before any units on the FSH site are removed so that housing continues to be available for student families and displacement impacts are avoided. Therefore the conclusions of the 2005 LRDP EIR relative to displacement of housing or people remain unchanged. No further analysis is required.

7.2.4.5 Project Impacts and Mitigation Measures

Revised LRDP Impact POP-1: Campus development under the Post-Settlement LRDP would result in substantial population growth in the study area by accommodating

**increased enrollment and additional employment. (Significant;
Significant and Unavoidable)**

The 2005 LRDP EIR evaluated the growth in study area population as a result of the proposed 2005 LRDP. The Draft EIR analyzed the increase in study area population as a result of an enrollment level of 21,000 FTE students by 2020-21. The analysis in the Draft EIR presented two scenarios. The first scenario was based on the assumption that all new employees hired by the campus under the LRDP would be non-local at the time of hire, and therefore due to enrollment and employment growth, the LRDP would directly increase the study area population by about 9,520 persons, whereas the second scenario assumed that about 68 percent of the new employees would be hired from within the study area, and under that assumption, the study area population would increase by about 7,820 persons. The analysis concluded that about 33 percent of this new population would live in the City of Santa Cruz, about 19 percent in the rest of the County, and the remainder on campus or outside the County. The Draft EIR noted that the growth in study area population due to the proposed 2005 LRDP would likely fall between the estimates derived under the two scenarios, and would make up between 2.7 and 3.2 percent of the study area's 2020 population, and between 31 and 38 percent of the projected population growth within the study area by 2020. The Draft EIR concluded that the 2005 LRDP would substantially increase the study area population and the impact would be significant and unavoidable.

However, at the time that the Campus prepared the Final EIR, the Campus prepared a qualitative evaluation of the environmental impacts of a Reduced Enrollment Growth Alternative that would accommodate an enrollment of 19,500 FTE students and house a slightly lower number of students on the campus than previously analyzed in the Draft EIR. The Final EIR qualitatively explained that while the previously disclosed impact on study area population would be proportionally reduced, the impact of the Reduced Enrollment Growth Alternative on study area population would still be significant and unavoidable. As noted earlier, the Reduced Enrollment Growth Alternative was approved by The Regents as the Final 2005 LRDP.

Since a quantitative analysis of the Reduced Enrollment Alternative was not conducted in the Final 2005 LRDP EIR, the Campus, as part of the current analysis, developed quantitative estimates for the 2005 LRDP, using the assumptions identified above under **Methodology**. The estimated numbers for the 2005 LRDP full development are presented in **Table 7.2-11** below.

In addition, the table below reports the total number of students and employees at the Post-Settlement LRDP full development. As noted earlier, the 2005 LRDP would accommodate an enrollment of 19,500 FTE three-quarter average. Any enrollment increases above that level must be preceded by the

development and adoption of a new LRDP. Therefore the table below shows the enrollment level of 19,500 FTE students at Post-Settlement LRDP full development, which is unchanged from the number analyzed for the 2005 LRDP. With regard to employment growth, a smaller number of main campus employees are now projected at the Post-Settlement LRDP full development. Note that the numbers in the table are conservative as they do not discount for persons who would already be living in the study area at the time of enrollment and hire. (Based on enrollment data from the Campus, about 1 percent of the new students enrolled each year are local high school graduates or transfer students and hence already residing in the area at the time of enrollment. In addition, hiring data for the campus indicates that a substantial number of staff are hired from within the study area and are already living in the study area at the time of hire).

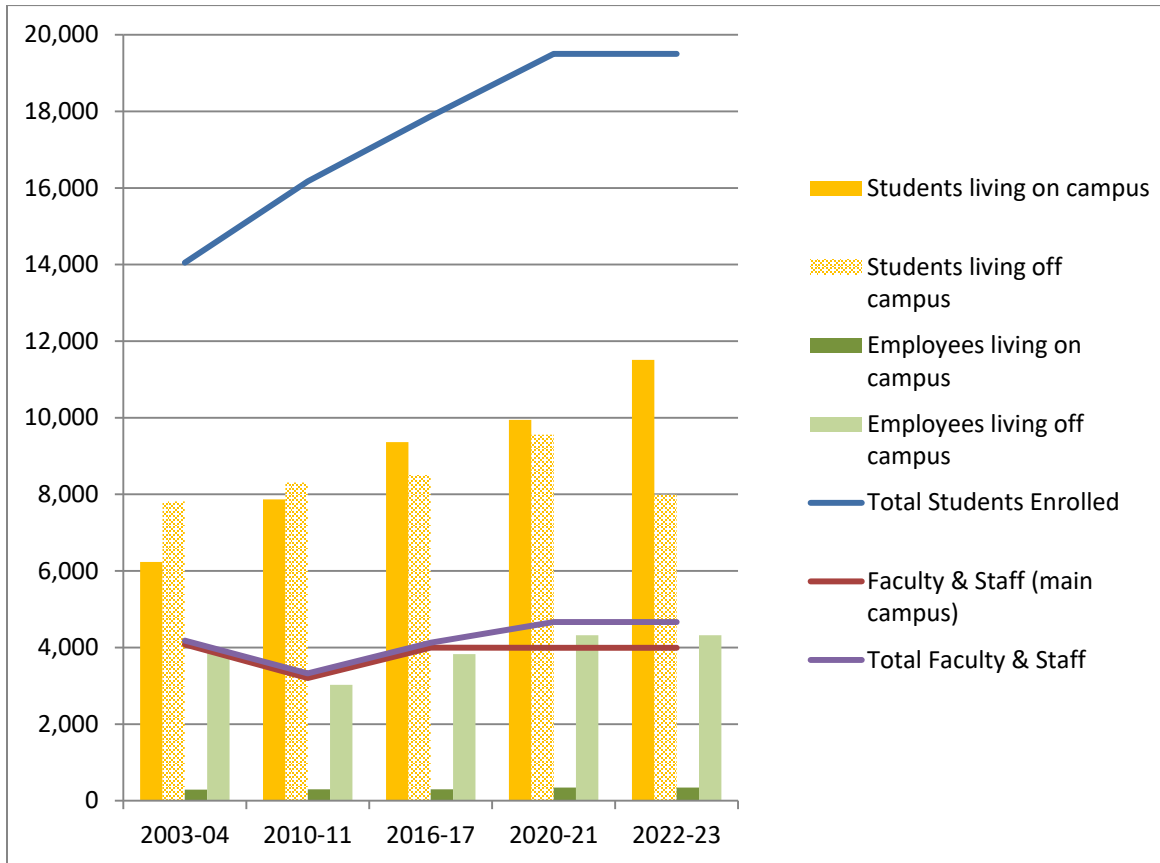
Table 7.2-11
Change in Study Area Population Due to 2005 LRDP

Population	2003-04	2005 LRDP		Post-Settlement LRDP	
		2020-21	Change between 2004 and 2020	2023	Change between 2004 and 2023
Students	14,050	19,500	5,450	19,500	5,450
Faculty/Staff	4,080	5,420	1,340	3,994	-86
Total	18,130	24,920	6,790	23,494	5,364

As the table shows, the main campus population (excluding dependents) is projected to increase by about 5,364 persons between 2004 and Post-Settlement LRDP full development, which is lower than the increase of about 6,790 persons projected under the 2005 LRDP. Note that due to the time that has lapsed since 2003-04, most of this population increase has already occurred and based on the level of enrollment and employment at the campus in 2016-17, the remaining incremental growth that is projected under the Post-Settlement LRDP at full development is less than 1,650 persons.

Figure 7.2-2, Changes in UC Santa Cruz Enrollment and Employment, below shows the changes in enrollment and employment at UC Santa Cruz over the study period. To provide a complete picture, it includes the employees at Coastal Science Campus and Scotts Valley Center. It also presents the distribution of students and employees between those living on campus and those living off campus, to exhibit the manner in which the distribution has changed over time.

Figure 7.2-2
Changes in UC Santa Cruz Enrollment and Employment



As noted earlier in this section, the student enrollment level of 19,500 FTE students and associated employees as analyzed in the 2005 LRDP EIR are already accounted for in AMBAG's population projections for Santa Cruz County. Because growth under the LRDP would result in a smaller population increase under the Post-Settlement LRDP than was previously estimated for the 2005 LRDP, the project's population impact would be less severe and would not affect AMBAG's projections. Nonetheless, the population increase at Post-Settlement LRDP full development would still be considered substantial, so similar to the conclusion in the 2005 LRDP Final EIR, this analysis also concludes that the impact due to this increase would be significant.

The consequences of this population growth in the study area are analyzed in the 2005 LRDP EIR and this current EIR Supplement and they consist of the following:

- An increase in the number of students and employees that would live off campus and place a demand on available housing in the study area. The magnitude of the impact on off-campus housing is evaluated in **Revised LRDP Impact POP-3** below.
- An increase in traffic on the study area roadways, which is adequately analyzed in the 2005 LRDP EIR and mitigation measures are set forth to mitigate significant traffic impacts.
- An increase in traffic-related air emissions and noise, which are adequately analyzed in the 2005 LRDP EIR and mitigation measures are set forth to mitigate significant impacts.
- An increase in the demand for services by both the on-campus population and the population that would live off campus, and the environmental impacts of that demand which are adequately analyzed in the 2005 LRDP and found to be less than significant.
- An increase in demand for water and other utilities by both the on-campus population and the additional population that would live off campus. The impacts on other utilities are adequately addressed in the 2005 LRDP. Impacts on water supply are reevaluated and disclosed in **Revised LRDP Impact UTIL-9** in **Section 7.1** of this EIR.

Because the Post-Settlement LRDP is a program that includes campus population growth as an essential objective of the LRDP, no mitigation is available to avoid or reduce this impact. Therefore, the impact is considered significant and unavoidable.

Mitigation Measures: No mitigation is feasible.

Significance after Mitigation: The population impact would be significant and unavoidable.

Revised LRDP Impact POP-3: The Post-Settlement LRDP would contribute substantially to the need for more off-campus housing, which would have the potential to trigger the construction of more housing off-campus. (*Significant; Significant and Unavoidable*)

Compared to the 2003-2004 baseline, full development under the Post-Settlement LRDP would add students and employees to the study area and generate a demand for housing in the study area communities. The impact on housing demand in the study area is evaluated below relative to the current and projected housing supply, to determine whether adequate housing would be available in the study

area or whether the project's housing demand by itself, or in combination with other housing demand, would result in the need for more housing development, which could result in significant environmental impacts. The analysis below also addresses the Court's directive to "supplement the population and housing analysis to disclose the probable locations where new off-campus housing will likely be built, as informed by the applicable General Plans and other land use regulations and controls that are in effect as of the date that [the University] commences its supplemental analysis, and the environmental impacts of putting that housing in those locations, if any."

The impact analysis below involves the following steps:

- Estimation of the total off-campus housing demand (total number of DUs needed) to serve the Post-Settlement LRDP population;
- Distribution of the total off-campus housing demand amongst the study area communities;
- Evaluation of housing supply in the affected study area communities to determine whether substantial new housing would be needed to serve the Post-Settlement LRDP population; and
- In communities where substantial housing would be needed, identification of the locations where the housing would likely be built and the environmental impacts of putting housing in those locations.

A. Estimation of Total Off-Campus Housing Demand

Post-Settlement LRDP Off-Campus Housing Demand

Using the assumptions listed above under **Methodology**, the off-campus student and employee housing demand under both the 2005 LRDP and the Post-Settlement LRDP was calculated and reported in **Tables 7.2-8** and **7.2-9** above. Numbers from those tables are summarized in **Table 7.2-12** below. Note that the estimated off-campus housing demands in this table are conservative estimates (that is, likely overestimate the off-campus housing demand) for two reasons: (1) they do not discount for those campus employees who may already be living in the study area when they are first hired, or the high school graduates and transfer students who may already be residing in the area at the time of enrollment, and (2) the analysis assumes that similar to current conditions, only 6 percent of the students and 23 percent of the new employees would live outside the county. It is possible that the cost and limited inventory of housing in the study area may cause more of the new population to live outside the county. Although like Santa Cruz County, housing prices in the neighboring Santa Clara, San Mateo and Monterey counties

are also high, the housing inventories are somewhat larger and therefore it is possible that in the future, a greater percentage of the new students and employees⁷ would live there.

Table 7.2-12
Total Demand for Off-Campus Housing (Dwelling Units)

	2003-04 Baseline Demand	2005 LRDP		Post-Settlement LRDP		
		2020-21 Demand	Change in Demand 2004 to 2020	2020-21 Demand	2023 Demand	Change in Demand 2004 to 2023
Students	3,125	4,124	999	3,822	3,195	70
Employees	3,788	4,672	884	3,649	3,649	-139
Total	6,913	8,796	1,883	7,471	6,844	-69

As the table above shows, although estimates for the 2005 LRDP indicate that about 1,883 DUs would be needed to house the additional students and employees who would live off campus, the estimates for the Post-Settlement LRDP shows that compared to 2003-04, the off-campus demand for housing would be lower by about 69 DUs. This reduced demand for off-campus housing is a product of two factors: first, at Post-Settlement LRDP full development, there would be additional on-campus housing for students, and a smaller number of new students would need housing off-campus; and second, this number is low because about 525 employees no longer work on the main campus or in Westside leased space and, as of early 2017, work at the Scotts Valley Center. Their housing demand is not captured in **Table 7.2-12** as they are not included in the Post-Settlement LRDP.

Total UC Santa Cruz Off-Campus Housing Demand

To develop a more complete picture of the impact of UC Santa Cruz on area housing, the housing demand associated with the Scotts Valley Center employees and the employees at the Coastal Science Campus was added to the off-campus housing demand of the main campus population under the Post-Settlement LRDP. The resulting total off-campus demand is presented in **Table 7.2-13** below. As the table shows, approximately 1,129 additional DUs would be needed off campus between 2004 and 2020-21. However, once more on-campus student housing is completed by 2023, the incremental off-campus demand for housing would decrease to approximately 502 DUs.

⁷ As the data for employees in **Table 7.3-6** shows, the percentage of employees living outside the county has increased from about 13 percent in 2004 to 23 percent in 2015.

Table 7.2-13
UC Santa Cruz Total Off-Campus Housing Demand (Dwelling Units)

	2003-04	2020-21	2022-23	Change 2004-2020	Change 2004-2023
Students	3,125	3,822	3,195	697	70
Main Campus Employees	3,788	3,649	3,649	-139	-139
Post-Settlement LRDP subtotal	6,914	7,471	6,844	558	-69
Scotts Valley Center & Coastal Science Campus Employees	103	674	674	571	571
UC Santa Cruz total	7,017	8,145	7,518	1,129	502

B. Distribution of Off-Campus Housing Demand among Study Area Communities

As the next step in this impact assessment, the estimated off-campus housing demand (associated with the total UC Santa Cruz population, including students, main campus, Coastal Science Campus and the Scotts Valley Center) was distributed geographically. In order to distribute the off-campus student demand, the Spring 2004 distribution of off-campus students by place of residence contained in **Table 7.2-4** was utilized. As that table shows, 59 percent of the students resided off campus, with 6 percent of the students living out of county, and 53 percent living within the county. Of the 53 percent, about 40 percent of the students lived in the City of Santa Cruz and about 13 percent in other communities in Santa Cruz County. With respect to employees, the Fall 2015 distribution of off-campus employees contained in **Table 7.2-5** was utilized. According to that table, 94 percent of the employees resided off campus, with 23 percent living out of the county, and 77 percent living within the county. Of the 77 percent in-county employees, about 53 percent lived in the City of Santa Cruz and 24 percent in other communities in the county. Using the percentages from **Tables 7.2-4** and **7.2-5**, the geographic distribution of UC Santa Cruz's incremental housing demand within the study area was developed and is presented in **Table 7.2-14** below.

Table 7.2-14
Distribution of Off-Campus Housing Demand (Dwelling Units)

Community	2020-21			2023		
	Student Demand	Employee Demand	Total Demand	Student Demand	Employee Demand	Total Demand
City of Santa Cruz	470	214	684	47	214	261

Community	2020-21			2023		
	Student Demand	Employee Demand	Total Demand	Student Demand	Employee Demand	Total Demand
Other Communities						
Live Oak	58	30	88	6	30	36
Capitola	16	10	26	1	10	11
Scotts Valley	11	15	26	1	15	16
Soquel	12	9	21	1	9	10
Aptos	14	22	36	1	22	23
Watsonville	9	27	36	1	27	28
Rest of County	35	1	35	3	1	4
Subtotal	155	114	268	14	114	128
Santa Cruz County Total			952			389
Out of County	71	106	177	7	106	113
Total UC Santa Cruz Off Campus Demand			1,129			502

As the table above shows, main campus growth under the Post-Settlement LRDP, along with employment growth at the Coastal Science Campus and Scotts Valley Center, would result in the following:

- A demand of about 684 additional DUs in the City of Santa Cruz and about 268 DUs in other communities in the County by 2020-21.
- A smaller demand of about 261 DUs in the City of Santa Cruz and about 128 DUs in other communities in the County by 2023.

Other than Live Oak, where an additional 88 DUs would be needed through 2020-21 and about 36 DUs once the on-campus student housing becomes available by 2023, other study area communities would experience relatively small increases in housing demand due to the Post-Settlement LRDP.

C. Effect on Housing Supply in the Affected Study Area Communities

As the analysis above indicates, of the additional students and employees that would live off campus, more than half would seek housing in the City of Santa Cruz. As noted earlier, in ruling with respect to the population and housing analysis in the 2005 LRDP EIR, the judge relied on the *Napa Citizens* case. In *Napa Citizens* case, the Court ruled “The [EIR] should consider whether the identified communities have

sufficient housing units and sufficient services to accommodate the anticipated increase in population. If it is concluded that the communities lack sufficient units and/or services, the FSEIR should identify that fact and explain that action will need to be taken to provide those units or services, or both.” This subsection compares the estimated incremental housing demand of the Post-Settlement LRDP to the projected supply of housing in the City of Santa Cruz to determine whether there would be sufficient housing units to accommodate the Post-Settlement LRDP-related population.

As noted in **Section 7.2.2.7** above, a number of alternative approaches were examined to develop projections of total housing supply in the City by 2020 and 2023, and the projection based on the addition of 875 DUs was determined to be the most reasonable projection of new housing in the City of Santa Cruz. Using the numbers from **Table 7.2-7**, **Table 7.2-15** below presents the estimated increase in housing supply in the City between 2004 and 2020, and the increase between 2004 and 2023. It also presents UC Santa Cruz’s incremental housing demand in the City of Santa Cruz over the same periods (taken from **Table 7.2-14** above). If the housing demand associated with UC Santa Cruz is compared to the projected supply, there would be a sufficient number of housing units constructed in Santa Cruz over the study period to serve the project population.

However, UC Santa Cruz would not be the only source of new housing demand in the City. Therefore to evaluate the impact on housing supply, the UC Santa Cruz’s demand was compared to the incremental supply. As the table shows, UC Santa Cruz’s incremental housing demand of 684 DUs would constitute about 33 percent of the additional housing that is projected to be added to the City through 2020. By 2023, with more student housing added on-campus, UC Santa Cruz’s off-campus demand would decrease to 261 DUs and the City’s supply would also be greater. Therefore by 2023, UC Santa Cruz’s incremental housing demand would constitute about 10 percent of the incremental supply.

Table 7.2-15
City of Santa Cruz Housing Supply and UC Santa Cruz Incremental Demand

	2004-2020	2004-2023
Increase in City Housing Supply	2,076	2,514
UC Santa Cruz Incremental Demand	684	261
Demand as Percent of Supply	32.9%	10.4%

Based on the above, it is concluded that main campus growth under the Post-Settlement LRDP combined with other UC Santa Cruz facilities would result in a housing demand that could be served by the projected supply. However, because the Campus’s demand would constitute a substantial portion of the

new supply, it would be reasonable to conclude that UC Santa Cruz demand would result in the construction of more housing in the City compared to the No Project scenario.

It is to be noted that because most of the study period for analysis in this chapter has already occurred, UC Santa Cruz enrollment and employment growth at the campus has occurred, and much of this demand on housing has already occurred. In the remainder of the study period, only a small number of additional housing units would be needed for UC Santa Cruz population. Nonetheless, similar to the conclusion in the 2005 LRDP EIR, this analysis also concludes that UC Santa Cruz enrollment and employment growth between the 2003-2004 baseline year and Post-Settlement LRDP full development would result in a significant impact on housing in the City of Santa Cruz, and would trigger the construction of additional housing, which would have the potential to result in environmental impacts.

D. Locations of New Housing in the City of Santa Cruz and Environmental Effects of New Housing

As stated above, in ruling with respect to the population and housing analysis in the 2005 LRDP EIR, the judge relied on *Napa Citizens*. In the *Napa Citizens* case, the Court ruled “It does not follow, however that an EIR is required to make a detailed analysis of the impacts of a project on housing and growth. Nothing in the Guidelines, in the cases, requires more than a general analysis of projected growth.” “. . . “Because it cannot be known if the Project will cause growth in any particular area, and because the Project most likely will not be the sole contributor to growth in any particular area, it is not, however, reasonable to require the [EIR] to undertake a detailed analysis of the results of such growth.” (*Napa Citizens for Honest Government v. Napa County Bd. of Supervisors* (2005) 91 Cal.App.4th 342, 370.)

Consistent with the guidance provided by the *Napa Citizens* case and the rule of reason that applies to all CEQA analysis, the analysis below presents the projected growth in housing in the City of Santa Cruz over the study period, including the locations where the housing has been built or is projected to be built through the end of the study period, and the likely environmental impacts from the construction of the housing, some of which would be occupied by the Post-Settlement LRDP-related population.

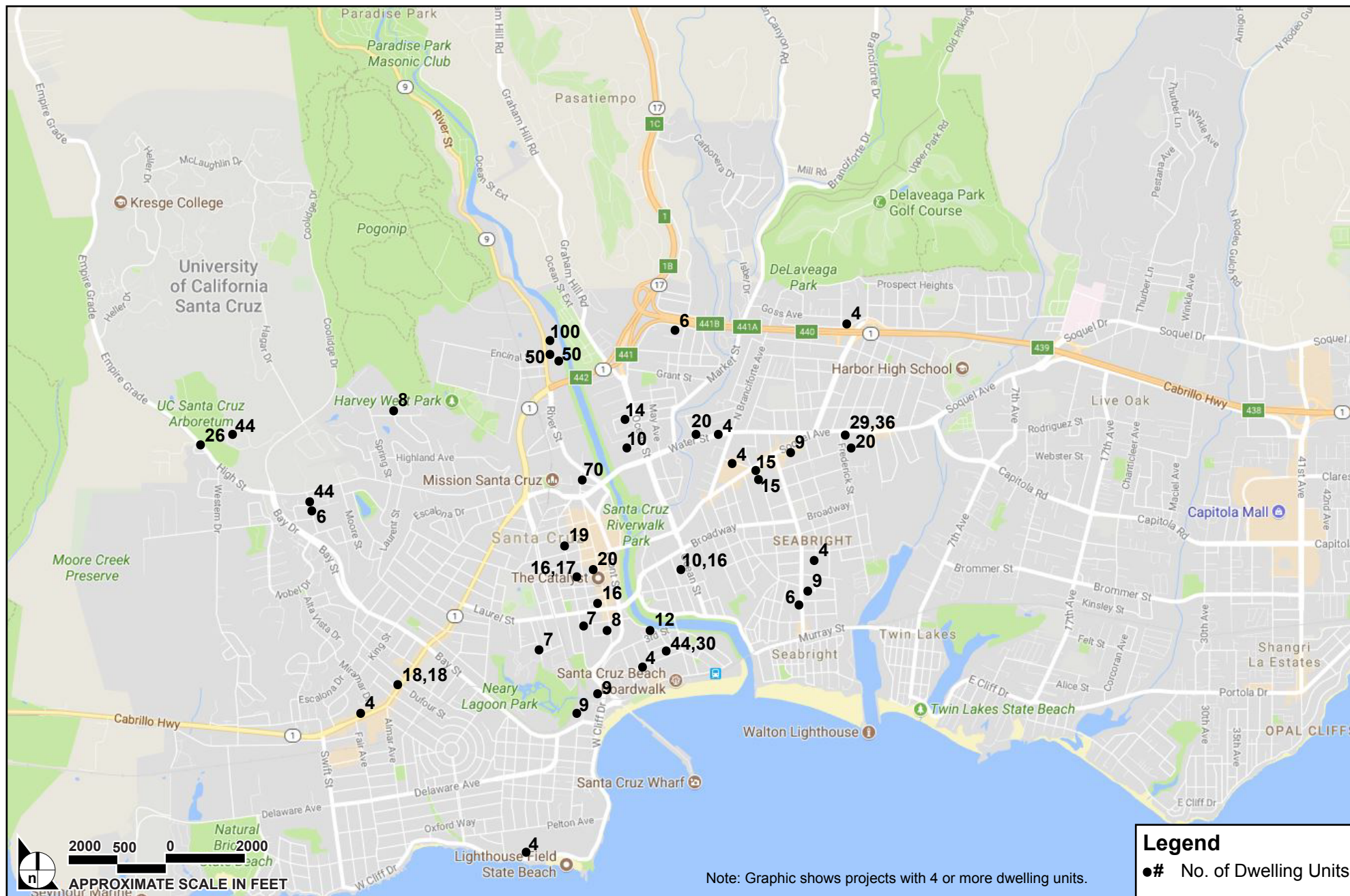
The City of Santa Cruz was contacted by the Campus to obtain data regarding housing development that has occurred in Santa Cruz since 2003-04, which is the baseline year for the 2005 LRDP. The City provided data on housing development that had occurred between 2003-04 and 2014. For the rest of the period of interest for this analysis, i.e., 2015 through 2023, information was obtained from the City’s Housing Element, which spans the period 2015 through 2023. The sections below describe the manner in which housing development has occurred in the City through about 2014-15 and how it is projected to increase in the next 5 to 8 years based on the information in the Housing Element and the City’s website.

Housing Development in Santa Cruz 2003 through 2014

Based on data provided by the City, between 2003 and 2006, building permits were issued for a total of 638 DUs, with the vast majority of permits involving one single family home or an additional dwelling unit (ADU). There were a total of 26 projects that involved four or more DUs, and the project sizes of these 26 projects ranged from four to 100 DUs. For the period 2007 through 2014, the City provided data on residential and non-residential projects that were constructed. According to that data, a total of 841 DUs (including ADUs) were constructed. Once again numerous projects involved one single family home or an ADU, and during this seven-year period, there were a total of 23 projects that involved four or more DUs. The sizes of these projects ranged from four to 70 units. Based on this data from 2003 through 2014, **Figure 7.2-3, Housing Development in Santa Cruz (2003-2014)**, depicts the locations of all housing development projects that involved 4 or more dwelling units. As this graphic shows, most of the projects that involved 4 or more dwelling units were added in the central portions of the City, although the larger projects involving 50 to 100 DUs were located in the northern portion of the city where larger land parcels existed.

Housing Development in Santa Cruz 2015 through 2023

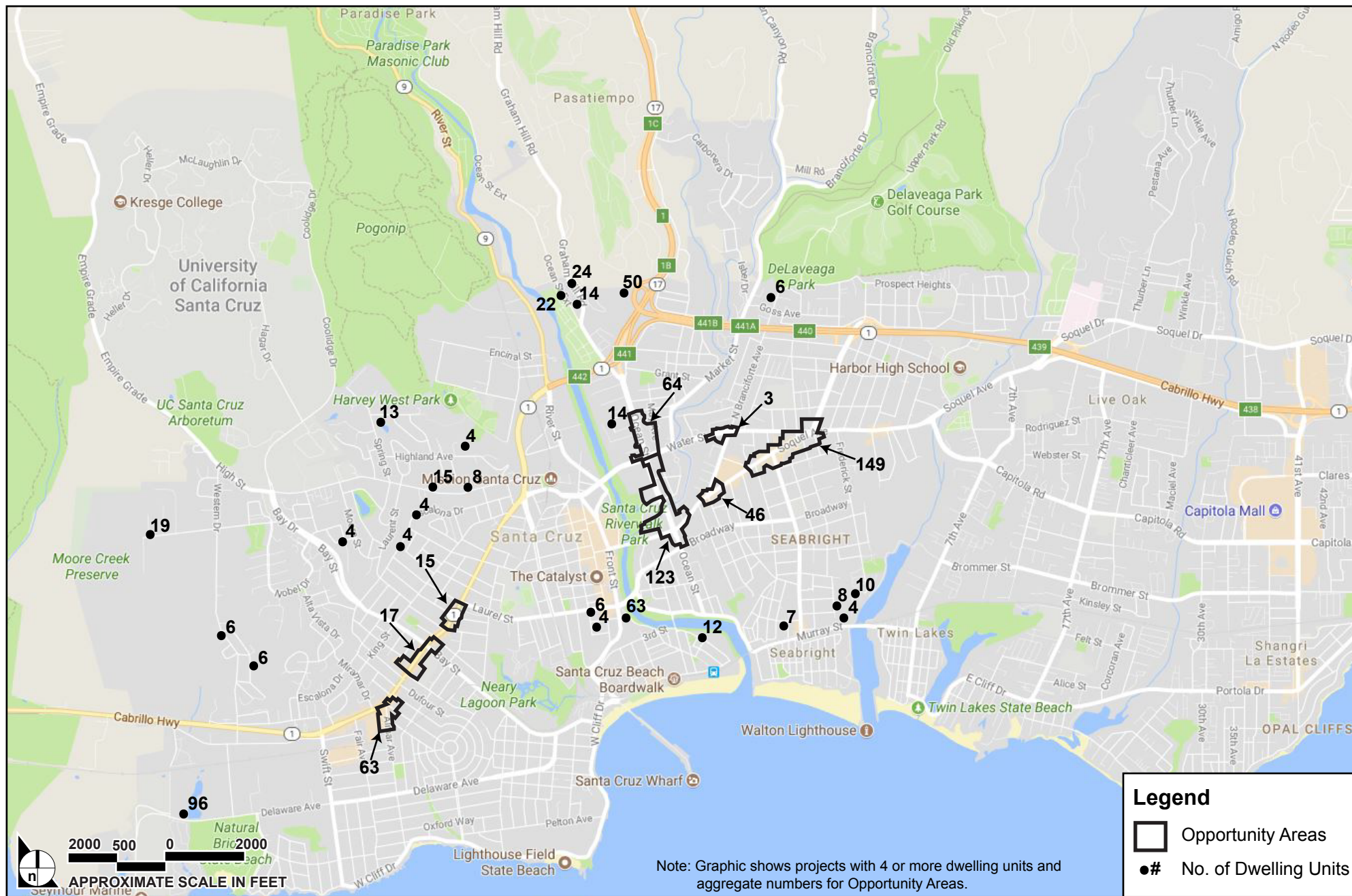
Information in the City's 2015-2023 Housing Element was used to identify the locations of the additional housing that has been constructed since 2015 and/or is projected to be constructed in the future. As noted earlier in this section, according to the Housing Element Table 4-4, a total of 875 DUs have been built, or are under construction, or are approved for construction or were applied for over the period January 2014 through 2015. In addition, about 761 DUs (including ADUs) could be developed on vacant land in the City (Table 4-5 of the Housing Element), 480 DUs could potentially be developed within seven Opportunity Areas identified by the City, and 240 multi-family units and about 220 ADUs could potentially be added throughout the City. As the Housing Element provides location data for housing that could be added in the Opportunity Areas and on vacant land parcels, that data was used to display the locations of future housing that could be constructed between 2015 and 2023, although it is acknowledged that not all the housing shown on **Figure 7.2-4, Projected Housing Development in Santa Cruz (2015-2023)**, would be constructed between now and 2023. In fact, a review of the City's Major Development Project list and map provides a better indication of the additional housing that would likely



SOURCE: Impact Sciences, 2017

FIGURE 7.2-3

Housing Development in Santa Cruz (2004-2014)



SOURCE: Impact Sciences, 2017

FIGURE 7.2-4

Projected Housing Developments in Santa Cruz (2015-2023)

be developed in the City in the foreseeable future. **Table 7.2-16** below presents all of the housing projects listed by the City as of November 15, 2017.

Table 7.2-16
City of Santa Cruz Major Development Projects – Housing Projects

Project Name	Project Description	Status
714 Darwin Street Apartments	Demolish SF home and build 15 apartments	Complete
Delaware Addition	Approved Planned Development of 400,000 square feet of industrial and up to 248 residential units	Phase 1A complete
1547 Pacific Avenue	Residential mixed use project with 63 residential condominiums	Under construction
Seabright Breakers	11-unit townhouse development on three vacant lots	Under construction
555 Pacific Avenue	Mixed use development with 94 small ownership units	Under construction
Windsor Street	Demolish single family home and build 5 apartments	Under construction
1804-1812 Ocean Street	Demolish non-residential buildings and construct 11 townhouses	Under construction
230 Grandview Street	Demolish single family home and construct 12 apartments	Under construction
630 Water Street	Application to add 20 single room occupancy (SRO) units to a developed parcel with housing	Approved
1129 Soquel Avenue	Mixed use project with 2 apartments	Pending Application
350 Ocean Street	Demolish existing housing on 4 parcels and construct mixed use project with 63 low income units	Approved
Water Street Affordable Housing	Demolish existing residential and non-residential buildings on 4 parcels and construct 56 unit affordable housing complex	Approved
Soquel Avenue Apartments	Demolish existing commercial and one residence and construct 51 SRO units	Approved
1800 Soquel Avenue Mixed Use	Demolish commercial buildings and construct ground floor commercial and 32 residential condominiums	Approved
River Street Townhomes	Demolish existing residential and build 12 townhomes	Approved
Upper Crust Apartments	Construct an apartment building with 14 units on an existing parking lot	Approved
Laurel Street Mixed Use	Convert office building into two residential units and commercial space	Approved
1930 Ocean Street Condominiums	Construct a 40-unit condominium development on a vacant 2.7-acre parcel	Pending Application
1013 Pacific Avenue Mixed Use	Construct a mixed use building including 18 residential units	Approved

Source: City of Santa Cruz website

Environmental Impacts of Past and Future Housing Development

As the information above indicates, a large number of housing projects were built between 2004 and 2014 and a number of projects are expected to be developed between 2015 and 2023. Due to the large number involved, the environmental impacts of each housing development project cannot be identified and disclosed in this EIR. Instead and consistent with the guidance provided by the Court, the City's General Plan 2030 EIR was reviewed as that EIR assesses the foreseeable environmental impacts from projected growth and development in the City, including the impacts from adding approximately 3,350 additional DUs to the City's housing stock through 2030. The findings of the General Plan EIR are summarized below to provide information on the likely environmental impacts of housing development in Santa Cruz.

In addition, available CEQA documents for individual housing projects in Santa Cruz were reviewed to further characterize the types and severity of environmental impacts of housing projects, as identified by the City of Santa Cruz. Note that these housing projects are considered representative of the type of multi-unit housing development that has already occurred in the City since 2004 and are also considered representative of foreseeable future multi-unit housing projects. From the information in the appendices to the City's Housing Element, in the future, there would be about three sites where more than 50 DUs could be built; about two sites where 25 to 50 DUs could be built; about 17 sites where 10 to 25 DUs could be built; and about 70 sites where the project size would be less than 10 DUs.⁸ The projects described below include: (1) a mixed use project that would be located on a 20-acre vacant site and would provide 248 DUs and is considered representative of large housing projects in the City of Santa Cruz; (2) a 200-unit apartment project on a 9-acre site also considered representative of large housing projects; (3) a 40-unit apartment project on a 2.7-acre site that is considered representative of mid-sized housing projects, (4) a 22-unit townhouse project located on a 1-acre site that is considered representative of small housing projects in Santa Cruz; and (5) a 94 small ownership unit⁹ project that is considered representative of small, infill projects. The findings of the environmental impacts of the representative housing projects are presented below.

Findings of the General Plan 2030 EIR (SCH # 2009032007)

⁸ Note that should the City approve changes in height restrictions or allow increased density especially within Opportunity Areas, it is likely that at least some future projects in the City will be larger in terms of the number of units than projected in the Housing Element.

⁹ Small ownership unit (SOU) is a dwelling unit containing no more than one bedroom and floor area ranging from four hundred to six hundred fifty square feet, located on a separate subdivided parcel and included in a residential development where all dwelling units are SOU units and are offered for sale to the general public. (City of Santa Cruz Municipal Code Chapter 24.16 Affordable Housing Provisions)

The City of Santa Cruz General Plan 2030 Final EIR was certified in June 2012. The General Plan 2030 updated and extended the prior General Plan to 2030. As noted in the Final EIR, to aid the environmental analysis, a “buildout” projection was developed that included 3,350 residential units; 1,087,983 square feet of commercial development and 311 hotel rooms; 1,273,913 square feet of office space; and 776,926 square feet of industrial development. The General Plan also included a revised Land Use Map which identifies land use designations and graphically depicts the arrangement and location of land uses throughout the City. The General Plan 2030 Land Use Map and land use designations remained largely unchanged from the 1990-2005 General Plan and Local Coastal Program, except for new mixed-use designations along segments of Mission Street, Ocean Street, Soquel Avenue and Water Street. Additionally, land use designations for two sites (“Golf Club Drive” and “Swenson” properties) were changed (City of Santa Cruz 2012). The City General Plan 2030 EIR analyzed and disclosed the environmental impacts from the implementation of the General Plan, including the impacts of changing the land use designations as well as growth and development, including 3,350 additional housing units by the buildout year. The findings of the General Plan EIR with respect to significant and significant and unavoidable impacts are presented below.

Significant and Unavoidable Impacts

- The implementation of the General Plan would result in significant and unavoidable traffic impacts at eight intersections and state highways that would not be mitigated to less than significant levels with available mitigation.
- The implementation of the General Plan could indirectly result in increased development and population growth that would result in an increased demand for water supply in a system that currently has inadequate supplies during dry years and may have inadequate supplies in normal years in the future. The impact would not be mitigated to less than significant level with available mitigation.
- Cumulative population growth (City and UC Santa Cruz) could result in an average annual growth rate of 1.3 percent if the North Campus area is annexed to the City in the next 20 years. This projected level of growth exceeds historical growth rates between 1990 and 2009 (0.901.9 percent), as well as the AMBAG population growth rate of 0.65 percent between 2009 and 2030.
- Cumulative traffic would result in significant cumulative impacts at seven intersections and along Highways 1 and 17.

- Cumulative development and growth in the City's water service area would result in a significant cumulative water impact, as it results in additional demand in a system that does not currently have adequate water supplies to meet existing or future demands during drought conditions or potentially during normal years at some time after the year 2020.
- Cumulative development and growth would result in noise increases associated with the traffic increases, but the increases would not exceed significance criteria (more than a 3 dBA increase), except for three road segments (Swift Street north of Delaware and Mission Street between Bay and Walnut) that would be considered significant.

Significant Impacts

- The General Plan EIR concluded that there would be significant impacts related to public services and utilities, air quality, and cultural resources. However the impacts would be reduced to a less than significant level with the proposed mitigation.

Findings of the 2120 Delaware Mixed Use Project Final EIR (SCH# 2007012097)

The 2120 Delaware Mixed-Use Project is considered representative of a large housing development project on an infill/redevelopment site in the City of Santa Cruz.

In 2008, the City certified an EIR for a Planned Development project proposed on an approximately 20-acre vacant site located on the north side of Delaware Avenue west of Swift Street and east of Natural Bridges Drive in the western portion of the City of Santa Cruz. The project would subdivide the property into 56 lots (including 11 common area lots) and provide for a mixed-use industrial/commercial/residential development with potential buildout of 535,553 square feet of buildings, including up to 248 residential condominium units. The proposed project involved about 26 buildings, one to two stories high (City of Santa Cruz 2008).¹⁰ The findings of the EIR with respect to significant and significant and unavoidable impacts of the project are presented below.

Significant and Unavoidable Impacts

- At full buildout, the proposed project would result in a maximum water demand of approximately 21 million gallons per year (MGY), which may prevent the City from being able to

¹⁰ Since the certification of the EIR and approval of the planned development project, the City has processed one major modification that revised the site plan but did not increase the amount of development on the site.

serve the project, along with other planned growth after 2015, given the City's limited water supply and without construction of additional water supply facilities.

- Cumulative development and growth would result in significant cumulative impacts at five intersections (Delaware/Swift, Mission/Bay, Mission/King, Mission/Chestnut and Highway 1/Highway 9). Impacts at three intersections would be reduced to less than significant with mitigation. However, while improvements to the Mission Street/King Street and Mission/Chestnut intersections will help reduce delays, intersection LOS would not be improved to acceptable levels during the PM peak hour.
- Cumulative development and growth in the City's water service area would result in a significant cumulative water impact as it results in additional demand in a system that does not have adequate current water supplies during drought conditions or adequate supplies in normal water years beginning in approximately 2015.¹¹ The incremental effects of the proposed project would be cumulatively considerable.

Significant Impacts

- The EIR concluded that there would be significant impacts on air quality (construction and operations), geology and soils, hydrology and water quality, traffic, and biological resources. However, all impacts would be reduced to a less than significant level with the proposed mitigation.

Findings of the 1930 Ocean Street Extension Residential Project Draft EIR (SCH # 2016102018)

The 1930 Ocean Street Extension Residential Project is considered representative of a mid-sized housing development project located near the periphery of existing development in the City of Santa Cruz.

In May 2017, the City published a Draft EIR for the 1930 Ocean Street Extension Residential project, a 40-unit apartment/condominium development that would be located on an approximately 2.74-acre site located at the northern edge of the City of Santa Cruz, on the east side of Ocean Street Extension, northwest of the Ocean Street/Plymouth Avenue/Highway 17/Highway 1 interchange. The project comprises 10 residential buildings, other accessory buildings, parking, and access improvements (City of Santa Cruz 2017). A final EIR has not yet been published. The findings of the Draft EIR with respect to significant and significant and unavoidable impacts of the project are presented below.

¹¹ This conclusion was based on the 2010 UWMP information. The 2015 UWMP finds that in 90 percent of the normal water years, the available supplies would be adequate to serve the demand through 2035.

Significant and Unavoidable Impacts

- No significant unavoidable impacts were identified.

Significant Impacts

- The Draft EIR concluded that there would be significant impacts on geology and soils, traffic, biological resources, and noise. However, all impacts would be reduced to a less than significant level with the proposed mitigation.

Findings of the Monarch Village Apartments Project Final EIR (SCH# 2001062120)

The Monarch Village Apartments Project is considered representative of a large housing development project located on the periphery of existing development in the City of Santa Cruz.

In November 2001, the City certified an EIR for the Shaffer Road/Monarch Village Apartments project, a 206-unit apartment development on an approximately 9-acre former corporation yard site located at the western edge of the City of Santa Cruz, south of Highway 1. The project comprised 13 residential buildings 3-stories high, amenities, parking, and access improvements (City of Santa Cruz 2001). The findings of the EIR with respect to significant and significant and unavoidable impacts of the project are presented below.

Significant and Unavoidable Impacts

- The project would increase human presence near Moore Creek.
- The project would result in a significant impact on water supply during drought years.
- The project would contribute substantially to a cumulative impact on water supply.

Significant Impacts

- The Draft EIR concluded that there would be significant impacts on aesthetics, air quality, biological resources, cultural resources, geology and soils, hydrology and water quality, hazards, noise, and traffic. However, all impacts would be reduced to a less than significant level with the proposed mitigation.

Findings of the Westlake Cottages Project Initial Study/Negative Declaration

The Westlake Cottages Project is considered representative of a small housing development project located on a small infill site in the City of Santa Cruz.

In November 2006, the City adopted a Negative Declaration for the Westlake Cottages project, a project that would be located on an approximately 1-acre site on Cardiff Court and would construct a total of 22 residential units, including 16 townhouses and 6 condominiums (City of Santa Cruz 2006).

Significant Impacts

No significant impacts requiring mitigation were identified.

Findings with regard to 555 Pacific Avenue Project

The 555 Pacific Avenue Project is considered representative of a mid-sized housing project located on an infill site in the City of Santa Cruz.

The City prepared a Notice of Exemption for the 555 Pacific Avenue project, which would construct 94 residential small ownership units (SOU) and 4,680 square feet of ground floor commercial space with outdoor seating in a four-story building. A below-grade parking garage would also be provided. The project is located at the lower end of Pacific Avenue south of Laurel Street and the Downtown area of the city of Santa Cruz. Based on the site conditions, studies conducted for the project, as well as the infill nature of the residential mixed-use project, the City determined that the project qualified for a categorical exemption under Section 15332 of the CEQA Guidelines (City of Santa Cruz 2018).

Significant Impacts

- No significant impacts requiring mitigation were identified.

In summary, as concluded in the General Plan 2030 EIR and based on the conclusions of other environmental documents prepared by the City for a range of residential projects, construction of additional housing would increase the City's population and would result in significant and unavoidable impacts on traffic and water supply. With respect to other environmental impacts, it is anticipated that all impacts would be mitigated to a less than significant level with mitigation.

E. Conclusion

Based on the foregoing analysis, this EIR finds that main campus growth under the Post-Settlement LRDP, combined with other UC Santa Cruz facilities, would result in a housing demand that could be

served by the projected supply. However, because the Campus's demand would constitute a substantial portion of the new supply, it would be reasonable to conclude that UC Santa Cruz demand would result in the construction of more housing in the City compared to the No Project scenario. The additional housing that would be constructed would not result in significant impacts on most resources that cannot be mitigated to a less than significant level. However, the additional housing would result in significant and unavoidable cumulative impacts related to traffic and water supply.

As noted above under **Revised LRDP Impact POP-1**, the cumulative traffic impacts of campus growth (both on- and off-campus population) under the 2005 LRDP are adequately analyzed in the 2005 LRDP EIR. Since the employment growth under the Post-Settlement LRDP would be less than previously analyzed and more of the student population would be housed on campus compared to the previous analysis, the cumulative traffic impacts of the Post-Settlement LRDP would be less than those evaluated in the 2005 LRDP EIR. This is confirmed by the traffic analysis in **Section 4.11** of this Draft EIR. With respect to the impacts of campus growth (both on- and off-campus) under the Post-Settlement LRDP on water supply, the cumulative impact has been reevaluated and is reported in **Section 7.1** of this Draft EIR under **Revised LRDP Impact UTIL-9**. Therefore, all of the environmental impacts of the Post-Settlement LRDP housing demand are adequately analyzed in the 2005 LRDP EIR and this Supplement to that EIR.

In summary, campus growth under the Post-Settlement LRDP would result in a significant impact on housing in the City of Santa Cruz and would result in the construction of more housing in the City, which in turn would result in significant and unavoidable traffic and water supply impacts.

Mitigation Measures:

LRDP Mitigation POP-3: The Campus will continue to implement prior LRDP Mitigations POP-3A through 3C which the Campus is voluntarily implementing.

Significance after Mitigation: Although the Campus would implement these measures, the impact related to housing would be significant and unavoidable.

7.2.5 REFERENCES

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