Draft EIR

UCSC MARINE SCIENCE CAMPUS CLRDP

Environmental Impact Report

SCH No. 2001112014

January 2004

Prepared for

University of California, Santa Cruz
Environmental Assessment Group

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TABLE OF CONTENTS

UCSC MARINE SCIENCE CAMPUS CLRDP
DRAFT ENVIRONMENTAL IMPACT REPORT

LIST OF FIGURES

Page

LIST OF FIGURES (Continued)

Page

LIST OF TABLES

Page

LIST OF TABLES (Continued)

Page

LIST OF TABLES (Continued)

CHAPTER 1
INTRODUCTION

This environmental impact report (EIR) has been prepared by the University of California, Santa Cruz (UCSC) pursuant to the applicable provisions of the California Environmental Quality Act (CEQA) and its implementing guidelines (CEQA Guidelines), and the Amended University of California Procedures for Implementation of the California Environmental Quality Act (UC Procedures). The University of California (UC) is the lead agency for this EIR, which examines the overall effects of implementing the proposed UCSC Marine Science Campus Coastal Long Range Development Plan (CLRDP) for the approximately 98-acre Long Marine Laboratory site (referred to throughout this document as "Marine Science Campus," "project site" or "site"), located at the western edge of the City of Santa Cruz. The EIR also examines the environmental effects of five near-term projects included within the CLRDP. Throughout this EIR, references to the "project" or the "proposed project" include the CLRDP and the five near-term projects, unless otherwise indicated by the context.

CEQA requires that, before a decision can be made to approve a project with potentially significant environmental effects, an EIR must be prepared that fully describes the environmental effects of the project. The EIR is a public informational document for use by governmental agencies and the public. It is intended to identify and evaluate potential environmental consequences of the proposed project, to identify feasible mitigation measures that would lessen or avoid significant adverse impacts, and to identify and examine feasible project alternatives capable of lessening or avoiding the project's significant effects. The information contained in the EIR is reviewed and considered by the lead agency prior to its action to approve, disapprove, or modify the proposed project.

This EIR has been prepared to inform the University of California, responsible agencies, trustee agencies, and the public of the proposed project's environmental effects. The EIR is intended to publicly disclose those impacts that may be significant and adverse, describe the feasible measures that would mitigate or avoid such impacts, and describe a reasonable range of project alternatives capable of diminishing adverse environmental effects.

A. PROJECT BACKGROUND

The proposed project is the adoption and implementation of the proposed UCSC Marine Science Campus Coastal Long Range Development Plan (CLRDP). The Preliminary Draft CLRDP, including Appendices A through E, was published in July 2002. The Draft CLRDP was published in July 2003. The Draft CLRDP is incorporated by reference into this EIR. The CLRDP was prepared over a period of about three years following the University's purchase of approximately 55 acres immediately to the east of, and adjacent to, its previous holdings of approximately 43 acres, which included the original Long Marine Laboratory (LML) site (approximately 16 acres), the adjacent Younger Lagoon Reserve (YLR) (approximately 24 acres), and the Seymour Marine Discovery Center site (approximately 3 acres).

Existing development on the 98-acre project site is limited primarily to the original 16-acre LML portion of the site and the additional 3-acre Seymour Marine Discovery Center site. Existing development on the LML site consists of a combination of permanent buildings, temporary and ancillary support structures, and outdoor space, for a net total of 108,604 gross square feet (gsf). Existing development also includes an approximately 2.5-acre federal "inholding," which is occupied by the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) laboratory. This inholding is not owned or controlled by the University of California.

The CLRDP building program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new development of 529,856 square feet (sf)[1] (consisting of 377,856 sf of net new building space plus 152,000 sf of outdoor development) at the Marine Science Campus by about 2020. The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education; 70,000 sf for Outdoor Research Areas; 19,000 sf for Support Facilities; 98,100 sf for Support Housing (including up to 80 apartment/townhouse units, up to 30 two-person Researcher Housing Rooms, up to 10 overnight visitor accommodations, and up to two caretaker replacement quarters); 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for a seawater system expansion required to provide for a total system capacity of 6,000 gallons-per-minute (gpm). The CLRDP building program would also include removal of the following uses: 3,000 sf of Temporary Office Trailers; 26,844 sf of Greenhouses; and 1,400 sf of Temporary Caretaker Housing. In addition, the project would include about 550 onsite parking spaces (including 50 spaces designated for dual use (i.e., either campus visitor or public coast access parking) and 10 spaces designated solely for public coastal access parking), and various onsite infrastructure and other improvements to serve the new development. See Chapter 3, Project Description, for a more detailed description of the proposed project. The figures included in this EIR are both definitive and illustrative in nature. In general, the figures that depict major attributes and features of the site plan (e.g., land use, setbacks, view corridors, etc.) are definitive; figures that depict possible aspects of building design are illustrative.

To date, development on the Marine Science Campus site has been guided by the 1992 UCSC Institute of Marine Sciences Long Marine Laboratory Master Plan that addresses about 16 acres of the approximately 98-acre campus. Although the UCSC 1988 LRDP[2] addresses the total population and the amount of physical development that can be accommodated on the UCSC Main Campus, that plan does not apply to the Marine Science Campus (only the population at the Marine Science Campus is accounted for in the UCSC 1988 LRDP). This CLRDP is a separate document from the LRDP for the Main Campus and is the first long range development plan that has been prepared for the Marine Science Campus.

1 Unless noted otherwise, all building area space reported in this EIR is in gross square feet.

2 The University of California has determined that enrollment throughout the University system will increase by approximately 60,000 to 70,000 students within the next 10 to 15 years. This growth in enrollment is related to projected demographic changes that are expected to increase the demand for a college education in California. UC Santa Cruz is currently considering how it should plan to accommodate the campus' share of this enrollment growth. The campus has commenced preliminary feasibility studies to consider possible future enrollment growth. Based on these studies, the campus will update its LRDP to identify the changes required to accommodate the anticipated growth, and will prepare an EIR that will assess the environmental impacts of such changes. It is anticipated that The Regents will review and consider approval of the updated LRDP and its EIR in the fall of 2004/spring of 2005. Until the updated LRDP is approved by The Regents, the existing 1988 LRDP and 1989 LRDP EIR will remain in effect.

The primary goal of the CLRDP is to facilitate the orderly, flexible, and environmentally sensitive expansion and development of the UCSC Marine Science Campus over the next 20 years in support of the academic, research, and public service mission of the University of California. The proposed CLRDP sets forth plans and policies that are intended to guide the physical development of the UCSC Marine Science Campus, including the construction of new buildings, roads, parking lots, public-access routes and overlooks, and infrastructure systems, and the provision of short-term and overnight housing in support of Marine Science Campus programs, as well as protection and enhancement of significant natural resources of the site.

B. PROGRAM AND PROJECT EIR

This EIR on the CLRDP project is a program and project EIR. It has been prepared (1) to provide environmental review of the CLRDP to allow The Regents of the University of California to approve the CLRDP, and (2) to facilitate future environmental review of individual projects as they are proposed at the Marine Science Campus.

In accordance with CEQA, a program EIR is the appropriate environmental document for a series of actions that can be characterized as one large project, such as a Coastal Long Range Development Plan (CEQA Guidelines Section 15168). A program EIR generally establishes a foundation for "tiered" or project-level environmental documents that may be subsequently prepared in accordance with the overall program. According to CEQA Guidelines Section 15168(b), a program EIR can provide the following advantages:

(1) Provide an occasion for a more exhaustive consideration of effects and alternatives than would be practical in an EIR on an individual action;

(2) Ensure consideration of cumulative impacts that might be slighted in a project-level analysis;

(3) Avoid duplicative reconsideration of basic policy considerations;

(4) Allow the lead agency to consider broad policy alternatives and programwide mitigation measures at the earliest possible time when the agency has greater flexibility to deal with basic problems or cumulative impacts; and

(5) Allow a reduction in paperwork.

This EIR is also a project EIR that provides environmental review of five near-term projects that are included in the CLRDP.

- Shared Campus Warehouse and Laydown Facility
- 42 Apartment/Townhouse Units (in the middle terrace portion of the site)
- United States Geologic Survey (USGS) Western Coastal and Marine Geology Facility
- Sea Otter Research and Conservation Center (SORACC)
- Center for Ocean Health Phase II (including two new overlooks and improvement of an existing overlook)

A detailed description of the five near-term projects is provided in Chapter 3, Project Description. At this time, UCSC is seeking The Regent's approval only of the CLRDP. Approvals of the five near-term projects, and other projects in the CLRDP, will be sought in the future. The determination as to whether additional environmental information and analysis is needed will be made when an individual project is actually proposed for approval and implementation.

The planning period for the CLRDP is 20 years, and therefore would extend from 2004 (the expected year of CLRDP approval) to 2024. This EIR evaluates environmental impacts through only the year 2020, however, because traffic growth projections extend out only to 2020. The impact analysis superimposes full development under the CLRDP on other growth anticipated by 2020 (i.e., "2020 background growth"). The analysis covers all growth planned under the CLRDP and does not underestimate the amount of anticipated growth. By superimposing CLRDP growth on 2020 conditions, the analysis may in fact overstate project impacts, since the CLRDP building program may not actually be completed until 2024.

C. ENVIRONMENTAL REVIEW PROCESS

On November 1, 2001, UCSC issued a Notice of Preparation–Environmental Impact Report (NOP) to governmental agencies, organizations, and persons interested in the project. The NOP is included as Appendix A in this EIR. The NOP requested those agencies with regulatory authority over the project to identify the environmental issues relevant to their authority that should be addressed in the EIR, and encouraged agencies and the public, in general, to provide comments on the proposed content of the EIR. Comments on the NOP were received from the California Coastal Commission (CCC), the California Department of Toxic Substances Control (DTSC), the California Department of Transportation (Caltrans), the City of Santa Cruz, the Monterey Bay Unified Air Pollution Control District (MBUAPCD), the California Regional Water Quality Control Board (CRWQCB), the Association of Monterey Bay Area Governments (AMBAG), the Sierra Club, and the Terrace Point Action Network. Seven members of the public also submitted written comments on the NOP. A scoping meeting was held on November 14, 2001, at the Seymour Marine Discovery Center at the Long Marine Laboratory to provide the public another opportunity to present comments on the proposed content of the EIR. The meeting was advertised and the public was invited to attend. Approximately 17 members of the public attended the meeting; 6 people provided comments on the proposed content of the EIR. Issues raised in all oral and written comments regarding the proposed content of the EIR have been addressed in this Draft EIR.

This Draft EIR will be published and circulated for review and comment by the public and other interested parties, agencies, and organizations for a 50-day period. The Draft EIR will also be available for review and comment on the internet, accessible at: http://www2.ucsc.edu/ppc/planning/lml.html. The public review period will be from January 29, 2004 to March 19, 2004. A public hearing on the Draft EIR will be held during this time. The public is invited to attend the hearing and to offer comments on the Draft EIR. All comments or questions about the Draft EIR should be addressed to:

Environmental Assessment Group
University of California
515 Swift Street
Santa Cruz, CA 95060

Following the public review, responses to all substantive comments received on the adequacy of the Draft EIR and submitted within the specified review period will be prepared and included in the Final EIR. The Regents will then review and consider the Final EIR prior to any decision to approve, revise and approve, or reject the proposed project. Prior to approval of the CLRDP, The Regents must certify the Final EIR as complete and adequate and adopt a Mitigation Monitoring Program. After approving the CLRDP, the campus will submit it to the California Coastal Commission, which will review it for consistency with California Coastal Act requirements.

D. ORGANIZATION OF THE DRAFT EIR

The Draft EIR begins with this Introduction (Chapter 1). The chapters following the Introduction are organized as follows:

Chapter 2, Summary, describes the proposed project, the controversial issues associated with the project, the environmental effects of the project, and alternatives to the project (including the No Project Alternative). The Summary includes Table 2-1, Summary of Environmental Impacts and Mitigation Measures, which lists each identified environmental impact, corresponding mitigation measure(s), and the residual level of significance following implementation of mitigation. The summary table is divided into three sections, identifying significant impacts that cannot be mitigated to a less-than-significant level (if any), significant but mitigable impacts, and less-than-significant impacts.

Chapter 3, Project Description, provides a description of the project site and location, the project objectives, the proposed project characteristics, and an outline of the approval process.

Chapter 4, Environmental Setting, Impacts, and Mitigation Measures, contains an analysis of environmental topics in relation to both the entire development program (i.e., the CLRDP building program and other improvements, such as trails and stormwater facilities) and the five near-term projects. The discussion of each topic is divided into an *introductory paragraph* that describes the scope of the issue under consideration and sets forth general standards of significance for potential impacts, the *Setting* section that describes baseline environmental information, the *Relevant Project Characteristics* section that describes the characteristics of the project relevant to the particular topic (including size, physical characteristics, and location with reference to site resources or infrastructure), the *Project Impacts and Mitigation Measures* section that describes the project impacts and mitigation measures for the entire development program and the five near-term projects, and the *Cumulative Impacts* section that describes the cumulative impacts of development proposed under the CLRDP. Mitigation measures identified in this EIR consist of General Mitigation Measures, which are implemented campus-wide, and Project-Specific Mitigation Measures, which are implemented on a project-by-project basis. Cumulative impacts are discussed in each section where the incremental effect of the project would be cumulatively considerable when viewed in connection with the effects of past projects, other current projects, and probable future projects.

Chapter 5, Alternatives, provides an analysis of a reasonable range of alternatives to the proposed CLRDP and five near-term projects. As required by the CEQA Guidelines, a discussion of the reasons for selecting the alternatives analyzed in this section is provided, along with a comparative analysis of each alternative and identification of the "environmentally superior" alternative.

Chapter 6, CEQA Considerations, reviews the significant, irreversible effects (if any) and cumulative impacts identified in Chapter 4, and describes the project's potential for inducing growth, as required by CEQA.

Chapter 7, Report Preparation, lists the firms and staff members that prepared the EIR.

Chapter 8, Agencies and Persons Contacted, lists the persons, agencies, and organizations who were contacted during preparation of the EIR.

Chapter 9, Bibliography, provides a list of documents used in the preparation of the EIR.

Chapter 10, Glossary and Abbreviations, lists and defines the technical terms and abbreviations used in the EIR.

Chapter 11, Appendices, presents the background documents and technical information used in support of the impact analyses provided in the EIR. Appendix A is the NOP for the project. Appendix B contains the Agricultural Resources LESA Study and an agricultural viability analysis completed for the project. Appendix C is the Transportation Technical Documentation conducted for the project.

CHAPTER 2

SUMMARY

This section briefly describes the UCSC Marine Science Campus Coastal Long Range Development Plan (CLRDP) and the five near-term projects, together with the environmental issues associated with project implementation. This section also summarizes project impacts and mitigation measures identified in this EIR (see Table 2-1 at the end of this section).

A. PROJECT UNDER REVIEW

The project reviewed in this EIR consists of two components: (1) a Coastal Long Range Development Plan (CLRDP) for the University of California, Santa Cruz (UCSC) Marine Science Campus; and (2) specific development plans for five individual projects within the Marine Science Campus.

COASTAL LONG RANGE DEVELOPMENT PLAN (CLRDP)

The project includes adoption and implementation of the proposed CLRDP, a physical development and land use plan intended to guide and control future development, land use, and resource protection at the UCSC Marine Science Campus through 2020. The Preliminary Draft CLRDP, including Appendices A through E, was published in July 2002. The Draft CLRDP was published in July 2003. That Draft CLRDP is incorporated by reference into this EIR. The CLRDP was prepared over a period of about three years following the University's purchase of approximately 54 acres immediately to the east of, and adjacent to, its previous holdings of about 44 acres, which included the original Long Marine Laboratory (LML) site (16 acres), the adjacent Younger Lagoon Reserve (YLR) (25 acres), and the Seymour Marine Discovery Center site that had recently been acquired (3 acres).

Existing development on the 98-acre project site is limited primarily to the original 16-acre LML portion of the site and the additional 3-acre Seymour Marine Discovery Center site. Existing development on the LML site consists of a combination of permanent buildings, temporary and ancillary support structures, and outdoor space, for a net total of 108,604 gross square feet (gsf). (See Chapter 3, Project Description, for a full description of existing development.) Existing development also includes an approximately 2.5-acre federal "inholding," which is occupied by the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) laboratory. This inholding is not part of the 98-acre project site, nor is it covered by the CLRDP.

The CLRDP building program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development. Under the proposed CLRDP, approximately 409,100 square feet (sf)[1] of new

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[1] Unless noted otherwise, all building area space reported in this EIR is in gross square feet.

building area would be constructed on the Marine Science Campus, and approximately 31,244 sf of existing building area would be removed and replaced, resulting in 377,856 sf of net new building area. An additional 152,000 sf of outdoor development would be constructed, for a total net new development of 529,856 sf. The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education; 70,000 sf for Outdoor Research Area; 19,000 sf for Support Facilities; 98,100 sf for Support Housing; 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for Seawater System Expansion. The additional seawater facilities would provide for a total system capacity of approximately 6,000 gallons per minute (gpm). The CLRDP building program would include removal of approximately 31,244 sf of existing building area consisting of: 3,000 sf of Temporary Office Trailers; 26,844 sf of Greenhouses; and 1,400 sf of Temporary Caretaker Housing. The CLRDP would also include approximately 550 additional parking spaces, of which 50 would be designated for dual use (i.e., either campus visitor or public coast access parking) and 10 would be designated solely for public coastal access parking. Recreational facilities proposed by the CLRDP would include paved and unpaved recreational courts, an enhanced trail network, two new overlooks, and improvements to an existing onsite overlook. The CLRDP also provides for various onsite infrastructure and other improvements to serve the new development. See Chapter 3, Project Description, for a more detailed description of the proposed CLRDP.

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program by 2010. Amongst the building locations depicted in the CLRDP prototype site plan are specific sites for these five near-term projects:

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area.
- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area.
- The United States Geological Survey (USGS) Western Coastal and Marine Geology Facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area.
- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area.
- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area. Additionally, this proposed project would include the construction of two new public-access overlooks (Overlooks A and E) and improvement of an existing overlook (Overlook D).

This EIR evaluates specific development plans for these five near-term projects.

B. AREAS OF POTENTIAL CONTROVERSY

In response to the November 1, 2001, issuance of the Notice of Preparation for this EIR, UCSC received 10 comment letters from agencies and organizations, including the California Coastal Commission, the California Department of Toxic Substances Control (DTSC), the California Department of Transportation (Caltrans), the City of Santa Cruz, the Monterey Bay Unified Air Pollution Control District (MBUAPCD), the Sierra Club, and the Terrace Point Action Network. Seven members of the public also submitted written comments on the NOP. A public scoping meeting on the EIR was held for the proposed project on November 14, 2001, at the Seymour Marine Discovery Center at the Long Marine Laboratory; about 17 members of the public attended the meeting, with 6 people providing oral comments on the project.

Areas of potential controversy that were identified through this input, such as the residual effect of pesticides on soil that may be excavated from the site, the conversion of currently fallow agricultural land for new development onsite, the potential impact of development on nearby sensitive habitats and animal species, and the visual impact of increased development within an urban-to-rural transitional area, are addressed in sections of Chapter 4, Environmental Setting, Impacts, and Mitigation Measures of the EIR.

C. IMPACTS AND MITIGATION MEASURES

Under CEQA, a significant effect on the environment is defined as a substantial or potentially substantial adverse change in any of the physical conditions within the area affected by a project, including effects on land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. The criteria used to determine whether or not effects are significant are included in the introduction to each topic discussion in Chapter 4 of this EIR.

This EIR presents information in the following 16 impact categories, as required under CEQA and the *UC CEQA Handbook*: Aesthetics; Agricultural Resources; Air Quality; Biological Resources; Cultural Resources; Geology and Soils; Hazards and Hazardous Materials; Hydrology and Water Quality; Land Use and Planning; Mineral Resources; Noise; Population and Housing; Public Services; Recreation; Transportation/Traffic; and Utilities, Service Systems, and Energy.

Potential environmental impacts of the project are summarized in Table 2-1 at the end of this chapter. This table lists impacts and mitigation measures in three major categories: significant impacts that would remain significant even with mitigation, significant impacts that could be mitigated to a less-than-significant level, and less-than-significant impacts for which the EIR identifies mitigation. For each impact, the table includes a summary of mitigation measure(s) and an indication of whether the impact would be mitigated to a less-than-significant level. Please refer to Chapter 4, Environmental Setting, Impacts, and Mitigation Measures, for a complete discussion of each impact and associated mitigation.

Cumulative effects have been included in the consideration of potential project impacts, as reflected in Table 2-1. Cumulative effects to which the project would contribute include increased demands on public utility and service systems, increases in traffic, and increases in traffic-related air pollutant emissions and noise, among others. The increased cumulative demand on public water supply is considered significant and unavoidable. In addition, the cumulative traffic impact at six study area intersections would be considered significant and unavoidable if the proposed mitigation measure proves infeasible. None of the other cumulative effects are considered significant and unavoidable.

D. ALTERNATIVES TO THE PROJECT

The purpose of the EIR alternatives analysis is to determine whether an alternative would feasibly attain some or most of the project objectives while avoiding or substantially lessening some of the significant effects of the proposed project. This EIR evaluates alternatives to both the proposed CLRDP and the five near-term projects. Chapter 5, Alternatives, presents detailed descriptions and an analysis of potential impacts of each alternative.

COASTAL LONG RANGE DEVELOPMENT PLAN (CLRDP)

The following five alternatives to the CLRDP are analyzed in detail in this EIR:

- **Reduced Program Alternative.** The net new marine research space developed on the middle and lower terraces would be reduced from 254,500 square feet to approximately 148,000 square feet through reductions in development density and/or the development footprint.

- **Modified Land Use Diagram Alternative.** Development on the upper terrace would be eliminated, the footprint of programmed development on the middle terrace would be altered and increased, and development on the lower terrace would be decreased. The net area of development would be approximately the same as under the proposed CLRDP. Development buffers for wetlands and potential wildlife habitat and habitat corridors would be increased.

- **Increased Program Alternative.** More space would be provided for marine research and education (345,000 square feet), support housing (102,100 square feet), and warehouse and laydown area (143,143 square feet). All other program space would be the same as under the CLRDP. The building program would be about 97,640 square feet larger than the proposed CLRDP. This alternative represents the original development program envisioned for the Marine Science Campus.

- **Project-by-Project Development Alternative.** Development on the campus would not be directed by a CLRDP or Master Plan. Instead, individual projects would be proposed by UCSC or non-UC entities; considered, approved, and developed on a case-by-case basis; and directed by the objectives of each project rather than by programmatic or campus-wide objectives.

- **No Project Alternative.** The CLRDP would not be adopted and no further growth would be planned for the campus. Existing facilities and programs on the campus would continue to operate, with only such population growth as the current facilities can accommodate.

The No Project Alternative would reduce or avoid the potential environmental impacts of CLRDP development and would be the environmentally superior alternative, although it would meet none of the project's primary objectives associated with program development and growth. If the environmentally superior is the No Project Alternative, CEQA Guidelines Section 15126(d)(2) requires that the EIR identify another alternative as environmentally superior. Of the remaining alternatives, the Reduced Program Alternative would be considered environmentally superior, although it would be less effective than the CLRDP in meeting certain project objectives.

NEAR-TERM PROJECTS

In addition to analyzing alternatives to the CLRDP, the EIR considers alternatives to each of the five near-term projects, as follows.

SHARED CAMPUS WAREHOUSE AND LAYDOWN FACILITY

The EIR evaluates the following four alternatives to the proposed Shared Campus Warehouse and Laydown Facility:

- **Reduced Shared Warehouse and Laydown Facility Project Alternative.** Shared warehouse space would be reduced from the proposed 37,500 square feet to about 23,300 square feet, and the shared laydown yard would be reduced from the proposed 70,000 square feet to about 33,000 square feet. Additional paved areas adjoining individual marine research facilities would be developed for equipment storage.

- **Individual Laydown Yards Alternative.** No centralized shared warehouse space and laydown yard would be provided, and the proposed warehouse and laydown project on the upper terrace would not be developed. Warehouse space and laydown yards would be developed adjacent to individual marine research facilities on the middle terrace. Compared to the proposed project, about the same amount of warehouse space and almost 50,000 more square feet in laydown space would be developed.

- **Alternate Shared Warehouse and Laydown Facility Site Alternative.** The 37,500 square feet of warehouse space and the 70,000-square-foot laydown yard would not be developed on the upper terrace, but would instead be located at the middle terrace site proposed in the CLRDP for development of the SORACC. Another site would be identified for the SORACC. Some project-proposed parking areas and research facilities would be reconfigured, and open space in the middle terrace would be reduced.

- **No Project Alternative.** No shared warehouse and laydown facility would be developed on the Marine Science Campus and the upper terrace site would remain undeveloped in the near term. The entities that require warehouse/laydown facilities would provide individual facilities on campus or lease already-developed facilities in the City of Santa Cruz. Since the development of individual facilities is already considered (see Individual Laydown Yards Alternative above), the No Project Alternative is defined as the use of existing space at undetermined off-site locations for warehouse and laydown facility functions.

The No Project Alternative is marginally the environmentally superior alternative but would not meet any of the project objectives. Among the other alternatives, the proposed project is considered the environmentally superior alternative.

42 APARTMENT/TOWNHOUSE UNITS

The EIR evaluates the following three alternatives to the proposed 42 Apartment/Townhouse Units project:

- **Reduced Project Alternative.** A total of 21 housing units would be built at the same middle terrace location proposed by the project, in a single building structure totaling about 22,000 square feet. Housing would be provided only for essential staff and a limited number of visitors. Housing for most staff, for most visiting and short-term research scientists, and for students would have to be found elsewhere on the Main Campus or in Santa Cruz or other communities.

- **Alternate On-Site Location Alternative.** The proposed 42 housing units would be developed on the upper terrace in a similar configuration as proposed by the project, with the same square footage and height and the same population. The site plan for the Shared Campus Warehouse and Laydown Facility would be revised in order to accommodate additional future housing included on the CLRDP Prototype Site Plan.

- **No Project Alternative.** The proposed 42 apartments and townhouses would not be constructed and the proposed housing site would remain undeveloped. In the near term, no housing would be provided at the Marine Science Campus.

The proposed project is considered the environmentally superior alternative.

SEA OTTER RESEARCH AND CONSERVATION CENTER

The EIR evaluates the following four alternatives to the proposed Sea Otter Research and Conservation Center (SORACC):

- **Reduced SORACC Project Alternative.** The SORACC would be constructed with 6,000 to 7,000 square feet of building space and approximately 15,000 to 20,000 square feet of outside space, to accommodate only the existing research program of the Monterey Bay Aquarium.

- **Alternate Location Alternative.** The proposed 10,000-square-foot SORACC building and the associated 40,000 square feet of outdoor research area would be situated on the middle terrace on the east side of McAllister Way across from CDFG Marine Wildlife Center. The alternative facility would displace other future Marine Research and Education facilities programmed under the proposed CLRDP.

- **Larger SORACC Project Alternative.** Building area would be expanded from the project-proposed 10,000 square feet to 21,000 square feet, and outdoor research area would be reduced from 40,000 square feet to 35,000 square feet. The increased building area would provide more space for administrative offices and sea otter critical-care research and support uses consistent with the needs of the Monterey Bay Aquarium.

- **No Project Alternative.** The proposed SORACC would not be built and the SORACC site would remain in its current state.

The No Project Alternative is the environmentally superior alternative but would not meet any of the project objectives. Among the other alternatives, the proposed project is the environmentally superior alternative.

UNITED STATES GEOLOGICAL SURVEY WESTERN COASTAL AND MARINE GEOLOGY FACILITY

The EIR evaluates the following four alternatives to the proposed United States Geological Survey (USGS) Western Coastal and Marine Geology Facility:

- **Reduced USGS Project Alternative.** An approximately 58,000-square-foot facility containing only laboratory and non-laboratory research facilities would be developed on the proposed site. The USGS administrative, shop, and support space included in the proposed project would be housed either at leased facilities in the Santa Cruz area or at facilities at the USGS compound in Menlo Park.

- **Modified Site Plan Alternative.** The USGS Phase I facility would contain 78,500 square feet as proposed by the project, but the facility would be developed as a single three-story building with a smaller footprint than the proposed project. A portion of the proposed site would remain as open space.

- **Larger USGS Project Alternative.** The entire USGS development program (approximately 203,473 square feet) originally envisioned for the campus would be built. This alternative is considered for its potential to result in similar effects while potentially meeting project objectives to a greater degree than the proposed project.

- **No USGS Project Alternative.** The USGS Phase I facility would not be constructed and the site would remain undeveloped.

The No Project Alternative is the environmentally superior alternative but would not meet any of the project objectives. Among the other alternatives, the proposed project is the environmentally superior alternative.

CENTER FOR OCEAN HEALTH PHASE II

The EIR evaluates the following two alternatives to the proposed Center for Ocean Health (COH) Phase II:

- **Alternate COH Phase II Site Alternative.** The proposed expansion would be located on a site to the east of the existing facility, across McAllister Way from the project-proposed site and more distant from the Younger Lagoon Reserve.

- **No COH Phase II Project Alternative.** The COH Phase II project would not be constructed, COH Phase I would continue to operate within the limits of space and program deficiencies, and the Phase II site would remain undeveloped, at least in the near term. The existing overlook would not be upgraded, and two new overlooks would not be built.

The No Project Alternative is the environmentally superior alternative but would not meet any of the project objectives. Among the other alternatives, the proposed project is the environmentally superior alternative.

E. SUMMARY TABLE

Table 2-1 summarizes all project-related impacts identified during the preparation of this EIR; mitigation measures for those impacts are also described.

TABLE 2-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
A. SIGNIFICANT UNAVOIDABLE IMPACTS		
4.15 <u>Transportation/Traffic</u>		
Impact 4.15-1: The addition of traffic from the short-term development program to the Mission Street / Bay Street intersection would increase the existing volume by 3.1 percent (i.e., more than the 3-percent threshold) at this signalized intersection, which is projected to operate at LOS E during the PM peak hour. The 3-percent threshold would be exceeded at this intersection when the project generates 143 new PM peak hour trips. This would be a significant impact.	**General Mitigation Measure 4.15-1:** The University shall contribute its fair share (see definition of fair share on page 4.15-33) toward the cost of improvements to the intersection of Mission and Bay Street which would include re-striping the southbound Bay Street approach (which currently includes a left-turn and shared left-turn/through/right lane) to provide a separate right-turn lane, a shared through-left lane, and a left-turn lane. With this improvement, intersection operations would improve to LOS D with 37.7 second of delay in the peak hour.	SU*
Impact 4.15-3: The addition of traffic from the short- and long-term development program to the Mission Street / Bay Street intersection would increase the existing volume by 7.3 percent (i.e., more than the 3 percent threshold) at this signalized intersection, which is projected to operate at LOS E during the PM peak hour under Existing Plus Short- and Long-Term Development Conditions. The 3 percent threshold would be exceeded at this intersection when the project generates 143 new PM peak hour trips. This would be a significant impact.	**General Mitigation Measure 4.15-3:** Implement General Mitigation Measure 4.15-1.	SU*
Impact 4.15-4: The addition of traffic from the short- and long-term development program to the Mission Street / Chestnut Street intersection would increase the existing volume by 3.8 percent (i.e., more than the 3 percent threshold) at this signalized intersection, which is projected to operate at LOS F under Existing Plus Short- and Long-Term Development Conditions. The 3 percent threshold would be exceeded at this intersection when the project generates 272 new PM peak hour trips. This would be a significant impact.	**General Mitigation Measure 4.15-4:** The University shall contribute its fair share (see page 4.15-33 for definition of fair share) toward the cost of improvements to the Mission Street/Chestnut Street intersection, which would involve the following modifications: (1) convert the southbound dual right-turn lanes on Mission Street to a single-lane "free" right-turn lane and widen of the west leg of the intersection to accommodate a new 500-foot-long, third lane for merging; or (2) install a triple southbound right-turn lane, which would also require the new merge lane. In both cases, the modifications would require major reconstruction of the intersection, and possibly right-of-way acquisition and building modification/relocation.	SU*

* This impact remains significant and unavoidable because the mitigation may be infeasible and/or the University cannot guarantee its implementation (see Section 4.15 for further discussion).

SU = Significant and Unavoidable   LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
4.15 <u>Transportation/Traffic</u> (cont.)		
Impact 4.15-5: The entire development program under the CLRDP would cause total traffic volume to increase by between 5.0 and 5.9 percent (i.e., more than the 3-percent threshold) at the signalized Mission Street/Bay Street intersection, which is projected to operate at LOS E and F during the AM and PM peak hours, respectively, under 2020 Baseline Plus Project Conditions. This would be a significant impact.	**General Mitigation Measure 4.15-5:** Implement General Mitigation Measure 4.15-1.	SU*
Impact 4.15-6: The proposed CLRDP in conjunction with other regional development would cause the AM and PM peak hour traffic to increase significantly at six study intersections, which would reduce the levels of service to unacceptable levels, a significant cumulative impact. This impact would occur both in the short term (2010) and in the long term (2020). The project's contribution to this impact at five of the six affected intersections would be cumulatively considerable.	**General Mitigation Measure 4.15-6:** Implement General Mitigation Measures 4.15-1 and 4.15-4. In addition, the University shall contribute its fair share (as defined on page 4.15-33) toward the cost of improvements to the intersections at High Street/Western Drive, Empire Grade/Heller Drive, and State Route 1/River Street (SR 9). Mitigation measures include traffic signals at the High Street/Western Drive and Empire Grade/Heller Drive intersections. Potential improvements for the State Route 1/River Street (SR 9) intersection will be identified by the City of Santa Cruz.	SU*
4.16 <u>Utilities, Service Systems, and Energy</u>		
Impact 4.16-1: The CLRDP, in conjunction with other existing development and probable future growth in the service territory of the SCWD, would result in a demand for potable water that would require development of new water supply sources, and the development of these sources could result in significant adverse impacts.	**General Mitigation Measure 4.16-1a:** All toilets, urinals, showers, and washing machines installed as part of this project shall be specified as low-flush and low-flow in order to reduce onsite water consumption. The University shall install low-flow toilets and urinals that are 1.6 gallon/flush or less and low-flow showers that are 2 gallons per minute (gpm) or less in new development. Further, in all new residential uses washing machines must be certified by the Consortium on Energy Efficiency (CEE) to be water- and energy-efficient (such as those with the Energy Star® label).	SU

* This impact remains significant and unavoidable because the mitigation may be infeasible and/or the University cannot guarantee its implementation (see Section 4.15 for further discussion).

SU = Significant and Unavoidable LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
4.16 Utilities, Service Systems, and Energy (cont.)		
Impact 4.16-1: (cont.)	**General Mitigation Measure 4.16-1b:** If and when the City adopts policies requiring all projects (or all similar institutional or commercial projects) within the water system to offset new water demand or any other water demand reduction policies, the University will consider voluntary compliance with the policy, with appropriate credit being given to account for UCSC's previous water conservation activities (in excess of that accomplished by the similar institutional and/or commercial entities covered by the City policy). **General Mitigation Measure 4.16-1c:** For projects proposed by non-UC entities on the campus, non-UC entities shall be required, through contracts and agreements, to implement General Mitigation Measure 4.16-1a to minimize water usage. **General Mitigation Measure 4.16-1d:** The City can and should identify and develop new water supplies to reliably accommodate increases in water supply due to UCSC Marine Science Campus CLRDP-related growth and other background growth during normal and drought conditions.	

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LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
B. SIGNIFICANT BUT MITIGABLE IMPACTS		
4.3 <u>Air Quality</u>		
Impact 4.3-1: Construction activities associated with development under the CLRDP could generate substantial amounts of fugitive dust, which would result in potential health and nuisance impacts in the immediate project vicinity. This would be a temporary significant impact.	**Project Specific Mitigation Measure 4.3-1:** The University shall require construction contractors to implement a dust abatement program to reduce the contribution of project construction to local respirable particulate matter concentrations. Elements of this program shall include the following as appropriate for each project: • Water all active construction areas at least twice daily. Frequency shall be based on the type of operation, soil, and wind exposure. • Cover all trucks hauling soil, sand, and other loose materials, or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer). • Pave, apply water two times daily, or apply non-toxic soil stabilizers to all unpaved access roads, parking areas, and construction staging areas. • Sweep daily with water sweepers any paved access roads, parking areas, and staging areas at construction sites. • Sweep streets daily with water sweepers if visible soil material is carried onto adjacent public streets. • Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas or previously graded areas left inactive for ten days or more. • Enclose, cover, water twice daily or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).	LS

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LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
4.3 <u>Air Quality</u> (cont.)		
Impact 4.3-1: (cont.)	• Limit traffic speeds on unpaved roads to 15 miles per hour. • Install sandbags or other erosion control measures to prevent silt runoff to public roadways. • Replant vegetation in disturbed areas as quickly as possible. • In the event that grading and excavation at two or more large project sites is proposed to occur concurrently (large sites defined as involving more than 2 acres), install wheel washers at the entrance of the construction sites. • Phase construction projects in such a manner that minimizes the area of surface disturbance (e.g., grading, excavation) and the number of vehicle trips on unpaved surfaces.	
4.5 <u>Cultural Resources</u>		
Impact 4.5-1: Construction activities associated with development in the upper terrace, middle terrace, and lower terrace development areas could disturb previously undiscovered human burial sites of Native American groups, a potentially significant impact.	**Project-Specific Mitigation Measure 4.5-1:** If human remains are discovered during the construction of a development project under the CLRDP, the University and/or its employees shall notify the Santa Cruz County Coroner's Office immediately. Upon determination by the County Coroner that the remains are Native American, the Coroner shall contact the California Native American Heritage Commission, pursuant to subdivision (c) of Section 7050.5 of the Health and Safety Code, and the County Coordinator of Indian Affairs and appropriate Native American consultation shall be conducted, as outlined by PRC 5097.98. Implementation Measure 3.9.1, Construction Monitoring, as identified in the CLRDP, shall also apply. UCSC will be responsible for implementing this mitigation measure.	LS

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LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
4.7 <u>Hazards and Hazardous Materials</u>		
Impact 4.7-1: Implementation of the CLRDP could increase use of hazardous materials by non-UC entities on campus, which could create hazards to the public or the environment under routine and/or non-routine conditions. This represents a potentially significant impact.	**Project-Specific Mitigation Measure 4.7-1:** For projects proposed by non-UC entities on campus that involve laboratories, non-UC entities shall be required, through contracts and agreements, to implement programs and controls that provide the same level of protection required of campus laboratories and departments. • Non-UC entities shall provide to campus EH&S copies of all required environmental reports to local, state, and federal environmental and safety regulators. • Non-UC entities shall submit the qualifications of designated laboratory directors to UC Santa Cruz EH&S Office prior to commencing laboratory operations. Such documentation shall be in the form of educational and professional qualifications/experience. • Non-UC entities shall submit a copy of applicable regulatory environmental documents prior to commencing on-site research. Applicable documents may include a Hazardous Materials Business Plan, an EPA Hazardous Waste Generator ID Number, a Wastewater Discharge Permit, and air permits regulating fume hood exhaust or emissions from other equipment. Copies of revisions or updates to regulatory documents shall be submitted to EH&S in a timely manner. • Non-UC entities shall submit certification of compliance with NIH biosafety principles to the UC Santa Cruz EH&S Office prior to commencing on-site research or pilot plant manufacturing activities. Non-UC entities shall submit copies of completed medical waste management plans, biosafety management plans, inventories of infectious or genetically modified agents, applicable permits and updates.	LS

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LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
4.7 <u>Hazards and Hazardous Materials</u> (cont.)		
Impact 4.7-1: (cont.)	• Non-UC entities shall submit proof of license with Department of Health Services Radiological Health Branch prior to commencing on-site research or pilot plant manufacturing activities involving the use of ionizing radiation or radiation producing machines, or alternatively request to be permitted under UCSC's Radioactive Material License. In either case, Non-UC entities shall submit copies of proposed radioactive material or radiation use protocols to the UCSC Radiation Safety Committee for their review and approval before any radioisotopes or radiation producing machines are brought on site. • If hazardous material quantities are proposed to be increased above applicable threshold quantities as defined in California Code of Regulations, Title 19, Division 2, Chapter 4.5, non-UC entities shall implement a Risk Management Plan/California Accidental Release Prevention Plan (RMP/Cal-ARP), which discusses the handling and storage of acutely hazardous materials on site. The RMP/Cal-ARP shall be approved by the CUPA and filed with the UC Santa Cruz EH&S Office prior to commencing proposed operations. • Non-UC entities shall submit certification to the UC Santa Cruz EH&S to verify that applicable requirements for handling and disposal of hazardous wastes have been met prior to commencing on-site research or pilot plant manufacturing activities. Non-UC entities shall submit copies of management plans for handling and disposal of hazardous wastes, and written verification of contracts with licensed waste disposal firms.	

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LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
4.11 <u>Noise</u>		
Impact 4.11-1: Development of the UCSC Marine Science Campus under the CDLRP could locate noise sources and sensitive receptors in close proximity on the campus, creating the potential to expose persons to, or generate, noise levels in excess of noise/land use compatibility standards. This would be a potentially significant impact.	**General Mitigation Measure 4.11-1:** Prior to developing marine research and education facilities on the middle terrace east of McAllister Way, or additional support housing on the upper terrace, the University shall conduct a project-specific noise analysis. Project-level mitigation measures shall be incorporated into the design of these facilities to reduce potentially significant noise impacts, if necessary.	LS
Impact 4.11-2: Operation of HVAC equipment that is part of the USGS Western Coastal and Marine Geology Facility, if not properly designed, could generate noise levels that exceed the normally acceptable OPR standard at the 42 Apartment/Townhouse Units proposed on the middle terrace.	**Project-Specific Mitigation Measure 4.11-2:** As part of the design of USGS Western Coastal and Marine Geology Facility, the University shall implement noise control measures in the design of the HVAC systems to reduce the resulting noise levels to 65 DNL or lower at the 42 Apartment/Townhouse units. Control measures for HVAC noise could include, but would not be limited to, the following: use of quiet HVAC models, use of sound barriers around the equipment, and/or orientation of HVAC systems away from sensitive receptors.	LS
Impact 4.11-3: Sound levels generated by delivery activity at the Shared Campus Warehouse and Laydown Facility could potentially affect residents of future campus housing planned for the upper terrace. This could be a potentially significant impact if the residences are located within 75 feet of the Shared Campus Warehouse and Laydown Facility, where they would be exposed to sound levels above the OPR "normally acceptable" noise standard of 65 dBA for multi-family residences.	**Project-Specific Mitigation Measure 4.11-3:** As part of the design of the Shared Campus Warehouse and Laydown Facility, the University shall implement noise control measures to reduce the resulting noise levels to 65 DNL or lower at future campus housing planned for the upper terrace development area. Control measures incorporated into the design and location of the Shared Campus Warehouse and Laydown Facility may include but not be limited to the following: • The University shall orient the warehouse so as to shield noise generated by activity at the Shared Campus Warehouse and Laydown Facility, from potential sites of future campus housing on the upper terrace development area. • The University shall incorporate an easy turn-around for trucks such that they can avoid maneuvering in reverse and thus minimize back-up alarm noise.	LS

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LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
4.11 <u>Noise</u>		
Impact 4.11-3: (cont.)	• Once the future campus housing planned for the upper terrace becomes inhabited, the University shall limit noisy outdoor activities (such as those involving the use of heavy equipment) at the warehouse and laydown area from 10:00 PM to 6:00 AM all days of the week. • The University shall construct a wall around the laydown area, consistent with CLRDP guidelines, to attenuate noise levels at future campus housing planned for the upper terrace development area. The wall shall be completed before the future campus housing planned for the upper terrace is occupied.	
Impact 4.11-4: Noise generated by construction activity under the CLRDP may substantially increase noise levels at nearby sensitive receptors, resulting in temporary and localized noise impacts. This would be a potentially significant impact.	**General Mitigation Measure 4.11-4:** Prior to the initiation of construction, the University shall approve a construction noise mitigation program including but not limited to the following: • The University shall require that construction activities be limited to a schedule that minimizes disruption to noise-sensitive uses on the project site and in the vicinity through implementation of the following: – Construction activities during daytime and evening hours (7:00 AM to 10:00 PM) shall not occur within 150 feet of sensitive receptors, when feasible. Construction activities within 500 feet of sensitive receptors activities shall not occur during nighttime hours (10:00 PM to 7:00 AM). – Whenever possible, academic and administrative staff, as well as residents who will be subject to construction noise, shall be informed one week before the start of each construction project. – Loud construction activity as described above within 150 feet of an academic or residential use shall, to the extent feasible, be scheduled during holidays, spring break, or summer break.	LS

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LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
4.11 Noise		
Impact 4.11-4: (cont.)	• To reduce noise impacts from construction, the University shall require that construction contractors muffle or otherwise control noise from construction equipment through implementation of the measures below. The effectiveness of these measures is quantified in Table 4.11-4 above. – Internal combustion engines used for any purpose at the construction sites shall be equipped with a muffler of a type recommended by the manufacturer. – Equipment used for construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically-attenuating shields or shrouds, wherever feasible); – Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or electrically powered wherever feasible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used. Such mufflers can lower noise levels from the exhaust as much as 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures such as using drilling equipment rather than impact equipment shall be implemented whenever feasible. – Stationary noise sources shall be located as far from sensitive receptors as feasible. If they must be located near sensitive receptors, they shall be muffled to the extent feasible and/or, where practicable, enclosed within temporary sheds.	

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LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
4.11 Noise		
Impact 4.11-4: (cont.)	• The University shall require that a temporary wooden wall be placed around construction activity areas that are within 150 feet of sensitive receptors to provide additional noise attenuation, where feasible. The wall should impede the direct line of site between the noise sources and sensitive receptors. • The University shall require that construction-related material haul trips access the campus via Natural Bridges Drive and Delaware Avenue in order to minimize noise exposure to residential land uses. • The University shall identify potential noise impacts related to construction of long-term projects proposed under the CLRDP, and develop project-specific noise mitigation measures as may be necessary. The University shall take into account the location of the five campus facilities that will have been developed in the near-term as well as off-campus developments nearby. The analysis shall also take into account the sequence in which long-term projects are to be constructed and shall identify appropriate mitigation, as may be required. These future facilities may be sensitive receptors or may act as barriers to noise approaching other sensitive receptors.	
Impact 4.11-5: Noise generated by nighttime construction of the Shared Campus Warehouse and Laydown Facility could potentially exceed the 70 dBA Leq threshold at nearby residents along Shaffer Road and north of the railroad tracks. This is a potentially significant impact.	**Project-Specific Mitigation Measure 4.11-5:** The University shall require that construction contractors limit construction activity for the Shared Campus Warehouse and Laydown Facility to the hours between 7:00 AM and 10:00 PM all days of the week.	LS

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LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
4.11 Noise		
Impact 4.11-6: Noise generated by the construction of the USGS Western Coastal and Marine Geology facility would exceed the 80 dBA Leq threshold at the 42 Apartment/ Townhouse Units that are also proposed for the near-term development on the middle terrace. This potentially significant impact would only occur if the 42 Apartment/ Townhouse Units are developed and occupied before construction of the USGS facility.	**Project-Specific Mitigation Measure 4.11-6:** If the 42 Apartment/Townhouse Units are developed and occupied before construction of the USGS Western Coastal and Marine Geology facility, the University shall require that construction contractors implement the following measures: • Contractors shall notify all residents of the 42 Apartment/Townhouse Units that will be subject to construction noise from the development of the USGS facility one week before the start of construction activity. • To the extent feasible, loud construction activity (i.e., jackhammering, concrete sawing, asphalt removal, and large-scale grading operations) within 150 feet of the 42 Apartment/Townhouse Units shall occur during daytime hours (7:00 AM to 5:00 PM). • To reduce noise impacts from construction, contractors shall muffle or otherwise control noise from construction equipment through implementation of the measures below. – Internal combustion engines used for any purpose at the construction sites shall be equipped with a muffler of a type recommended by the manufacturer. – Equipment used for construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically-attenuating shields or shrouds, wherever feasible);	LS

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LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
4.11 Noise		
Impact 4.11-6: (cont.)	– Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or electrically powered wherever feasible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used. Such mufflers can lower noise levels from the exhaust as much as 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures such as using drilling equipment rather than impact equipment shall be implemented whenever feasible. – Stationary noise sources shall be located as far from sensitive receptors as feasible. If they must be located near sensitive receptors, they shall be muffled to the extent feasible and/or, where practicable, enclosed within temporary sheds. • The University shall require contractors to install a temporary wooden wall around construction activity areas that are within 150 feet of inhabited residences to provide additional noise attenuation, where feasible. The wall should impede the direct line of site between the noise sources and first floor sensitive receptors.	

SU = Significant and Unavoidable
LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
C. LESS THAN SIGNIFICANT IMPACTS FOR WHICH MITIGATION MEASURES ARE PROPOSED		
4.2 <u>Agricultural Resources</u>		
Impact 4.2-1: With the inclusion of CLRDP policies and implementation measures, development under the CLRDP would not result in substantial pressures that could lead to the conversion of adjacent Farmland to other uses. The impact is therefore considered less than significant.	**General Mitigation Measure 4.2-1:** • UCSC will install a four-foot-high landscaped fence along the Younger Ranch property line that will extend from the bend in the existing access road, northward along the property line. The fence will be sited and constructed to have a uniform gap of 16 inches between a smooth wire defining the bottom of the fence and the ground. This will assure that wildlife passage can continue to occur through the fence. • UCSC will install tree and shrub landscaping approximately 25 feet inside the fence (to minimize shading effects on Younger Ranch crops), consisting of an indigenous, drought-resistant mosaic of mid-level shrubs and taller trees to help dissipate dust generation from the west. Tree and shrub choices will be made in conjunction with the landscape architect experienced in the use of native plants and vegetation. Trees and shrubs will be selected for non-invasive character. Native blackberries are recommended, as they would serve as an access barrier. • UCSC will install the fence and landscaping prior to groundbreaking of any CLRDP project components.	LS

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LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
4.4 <u>Biological Resources</u>		
Impact 4.4-1: Implementation of the CLRDP would not affect CLRF breeding habitat and would avoid impacts on dispersing CRLF by setting development back from off-site areas where the species has previously been observed. The impact on the species would be considered less than significant.	**Project-Specific Mitigation Measure 4.4-1:** For all projects proposed in the upper terrace under the CLRDP, the University will implement the following: • A preconstruction survey for CRLF will be conducted of all areas proposed for grading and construction by a qualified biologist, approved by the USFWS. If CRLF are observed, grading activities shall be postponed and USFWS shall be consulted to determine appropriate actions to avoid impact. Consultation with the USFWS will result in either a determination of the need to obtain a permit or in the identification of measures to avoid take of the individual(s). • The biological monitor shall also conduct meetings with the contractor(s) and other key construction personnel to describe the importance of the species, the need to restrict work to designated areas, and to discuss procedures for avoiding harm or harassment of wildlife encountered during construction.	LS
Impact 4.4-2: Development on, and restoration of, annual grassland and coastal scrub on the middle and upper terrace development zones could cause a lost of nesting raptors that may be present, primarily through the direct effects of ground disturbance and the indirect effects of increased human activity and noise. Because raptor nesting records are limited for the site, and due to abundant alternate and protected habitat in the region, the probability of this impact is low and the degree of impact is considered less than significant.	**Project Specific Mitigation Measure 4.4-2:** UCSC shall ensure that construction activities avoid disturbing nests of raptors (and other special-status birds). If ground-disturbing activities are scheduled to occur during the breeding season (February 1 through August 31), the following measures are required to avoid potential adverse effects on nesting special-status raptors and other birds: • A qualified wildlife biologist will conduct preconstruction surveys of all potential nesting habitat. For burrowing owls, such surveys will follow the most recent CDFG *Burrowing Owl Survey Protocol and Mitigation Guidelines*.	LS

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LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
4.4 Biological Resources (cont.)		
Impact 4.4-2: (cont.)	• If active raptor nests are found during preconstruction surveys, a no-disturbance buffer acceptable in size to CDFG will be created around active raptor nests and nests of any other special-status birds during the breeding season, and maintained until it is determined that all young have fledged. Raptor or other bird nests initiated during construction are presumed to be unaffected, and no buffer is necessary. However, the "take" of any individuals will be prohibited. • If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied during the construction/restoration period, no further mitigation is required. Trees and shrubs that have been determined to be unoccupied by special-status birds or that are located outside the no-disturbance buffer for active nests may be removed.	
Impact 4.4-3: Construction of expanded seawater system facilities could cause a direct loss of nesting black swift not now known to nest, but with the potential to do so in any given year, an adverse but less than significant impact.	**Project Specific Mitigation Measure 4.4-3:** UCSC will ensure that construction/operation activities avoid disturbing nests of black swift. If construction activities are scheduled to occur during the breeding season (June 1 through September 30), the following measures will be implemented to avoid potential adverse effects: • UCSC will conduct pre-construction surveys to determine presence of active black swift nests within the project area. Published literature suggests that the optimal survey time is the final two hours of daylight, when chick provisioning rates may increase and adults are returning to the colony to roost. Targeting surveys for the last hours of daylight should also maximize the probability of counting breeding as opposed to nonresident foraging individuals. • If active nests are found during preconstruction surveys, UCSC will delay construction until after fledging occurs. If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied, no further mitigation is required.	LS

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LS = Less than Significant

TABLE 2-1 (Continued)
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance After Mitigation
	•	
4.15 Transportation / Traffic		
Impact 4.15-2: The addition of project-generated pedestrians to Delaware Avenue could result in an increase in hazards by increasing the potential for pedestrian conflicts with vehicles and bicyclists. This impact would occur on the 900-foot portion of the north side of Delaware Avenue when there is no sidewalk. Due to low level of pedestrian activity, the impact is considered less than significant.	**General Mitigation Measure 4.15-2:** UCSC will contribute its fair-share (see page 4.15-33 for definition of fair share) towards construction of a separate pedestrian path on the north side of Delaware Avenue from Shaffer Road to the existing sidewalk west of Natural Bridges Drive. This improvement could be as simple as installing a raised asphalt curb approximately five to six feet away from the existing curb or edge of pavement with openings to maintain existing drainage. Design and construction of this improvement to close the existing gap in pedestrian facilities in this area can and should completed by the City of Santa Cruz since Delaware Avenue is under its jurisdiction.	LS

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LS = Less than Significant

CHAPTER 3

PROJECT DESCRIPTION

The project reviewed in this EIR consists of two components: (1) a Coastal Long Range Development Plan (CLRDP) for the University of California, Santa Cruz (UCSC) Marine Science Campus; and (2) specific development plans for five near-term projects within the Marine Science Campus, which are part of the CLRDP.

A. EXISTING SITE CONDITIONS

The University of California, UCSC Marine Science Campus (project site) is located on the central California coast adjacent to the Monterey Bay National Marine Sanctuary, one of the largest protected marine areas in the world. The project site lies approximately 65 miles south of San Francisco and 40 miles north of Monterey. It is within the coastal zone at the western edge of the City of Santa Cruz. The project site consists of approximately 98 acres of land owned by UCSC and is located about three miles south of the UCSC Main Campus, which is in the hills to the northwest of downtown Santa Cruz (see Figure 3-1, Project Location). The project site consists of Assessor's Parcel Numbers 3-32-03, 3-32-08, 3-32-09, 3-32-10, and 3-32-12.

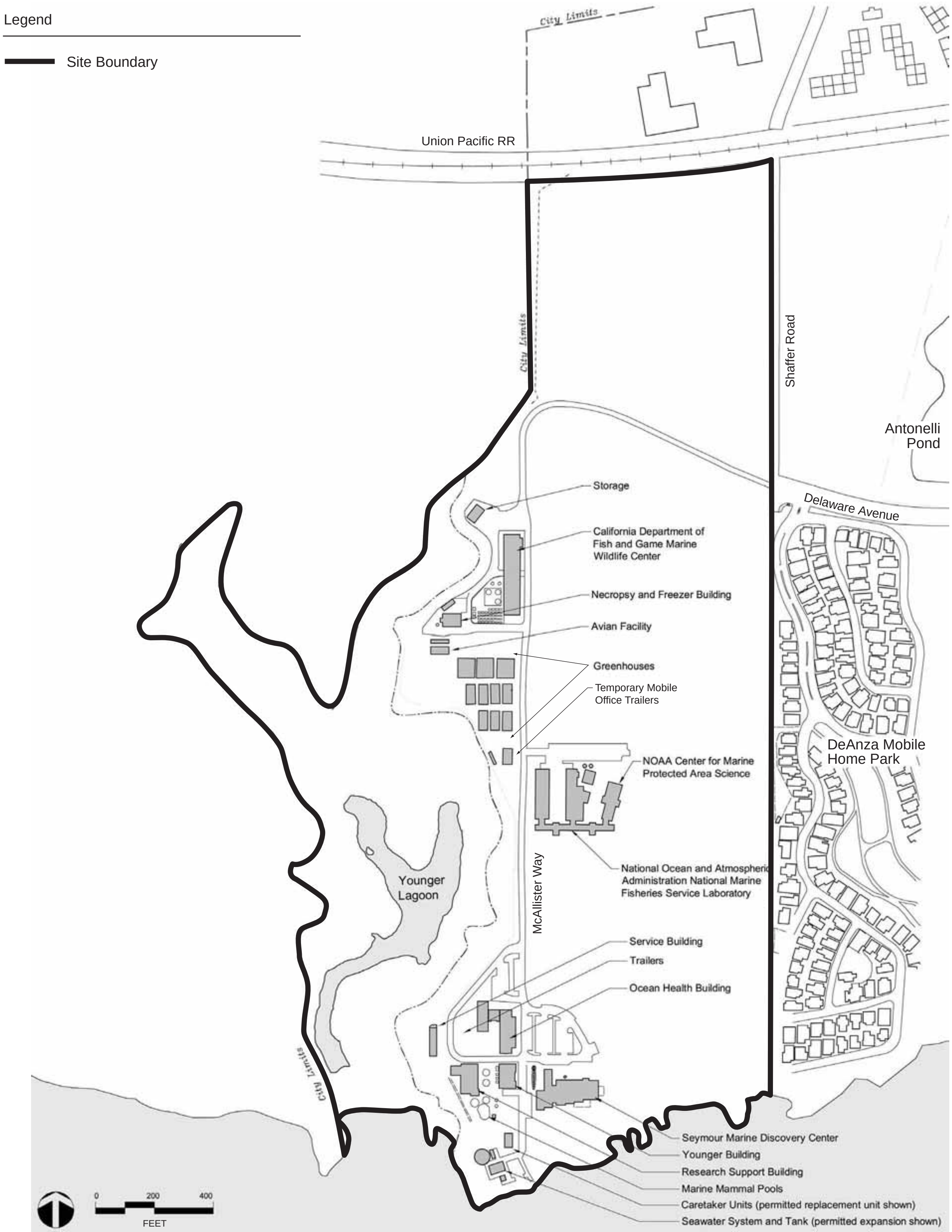
The UCSC Marine Science Campus comprises the Younger Lagoon Reserve (YLR) (about 24 acres), the original Long Marine Laboratory (LML) complex (about 16 acres), and the majority (57.5 acres) of the mostly undeveloped upland site formerly known as Terrace Point (see Figure 3-2, Project Site and Existing Facilities). The YLR is part of the University of California's Natural Reserve System and is managed by the University for teaching and research purposes. LML is a key facility of the Institute of Marine Sciences, an interdisciplinary research unit of the UCSC.

The northern edge of the Marine Science Campus is about one-quarter mile south of Highway 1. The western perimeter of the site adjoins agricultural lands that are within the jurisdiction of the County of Santa Cruz. The De Anza Santa Cruz residential community and Shaffer Road border the eastern edge of the Marine Science Campus, as do a community garden on undeveloped residential property and public open spaces including Antonelli Pond. Natural Bridges State Beach is located farther east. Industrial operations that include Raytek and Santa Cruz Biotechnology are located to the north and northeast. The Pacific coastline forms the southern border of the site. (See additional discussion of existing land uses in Section 4.9, Land Use and Planning, of this EIR.)

The 98-acre Marine Science Campus occupies the lowest and southernmost of a series of marine terraces that rise from sea level along the coastal flank of Ben Lomond Mountain. The project site slopes downward gently (one to two percent) to the south, varying in elevation from 51 feet above sea level at the northern edge to 37 feet above sea level at the southern edge, where the coastal bluff drops sharply to the intertidal beaches below. Seacliffs along the southern edge of

SOURCE: California State Automobile Association; Environmental Science Associates

Figure 3-1
Project Location



SOURCE: Draft CLRDP

Figure 3-2
Project Site and Existing Facilities

the site are in their natural form and are not protected with structural devices[1] along the shoreline. The average rate of retreat of the seacliff at the project site is less than 0.5 feet/year due to a resistant bedrock platform in the Santa Cruz Mudstone located at the base of the seacliff.

The project site is underlain by the Santa Cruz Mudstone geologic formation, which is overlain with soils of varying thickness and texture. Watsonville Loam is predominant on the southern and northern portions of the site, while Elkhorn Sandy Loam is found on the central portion. Onsite seasonal wetlands are found on both soil types, some of which drain directly to the Younger Lagoon. The 140-acre Younger Lagoon watershed drains largely agricultural lands to the west of the site and the northern and westernmost portions of the Marine Science Campus. The terrace is primarily a closed drainage system, with only limited offsite flows entering the site through a small north-south drainage culvert under the railroad tracks. The terrace is not a perched water table system. Rather, on the terrace, water infiltrates through the soil column at varying rates based on local soil conditions until it reaches bedrock, whereupon it moves laterally to the ocean cliffs and steep slopes above Younger Lagoon. In some areas, due to local soil conditions, water ponds on the surface to form seasonal wetlands and a seasonal pond.

The existing LML complex is located on the coastal terrace east of and immediately adjacent to the YLR and generally west of McAllister Way, except for two buildings located to the east on the mostly undeveloped upland terrace portion of the site (previously known as the Terrace Point site). The developed area is mostly separated from the YLR by a 10- to 12-foot-high berm and a 6-foot-high fence. The undeveloped portion of the site consists primarily of non-native grassland habitat and ruderal vegetation. Seasonal wetlands are also present on the upland terrace portion of the site.

The YLR portion of the project site consists of Younger Lagoon and the slopes bordering the lagoon, which are divided into two arms north of a point just south of the center of the reserve. Eleven distinct habitat types occur in the YLR, seven of which are found in the lowlands and four of which occur in the upland portion of the YLR. The YLR is included in the University's Natural Reserve System and is managed by UCSC for teaching and research uses.

EXISTING FACILITIES AND USES ONSITE

Existing development in the 16-acre LML complex consists of a combination of permanent buildings, temporary and ancillary support structures, and outdoor space (as described below), for a net total of 108,604 gross square feet (gsf) (see Table 3-1, Existing Long Marine Lab Facilities, below).

The approximately 20,000-gsf Seymour Marine Discovery Center (Seymour Center) is a marine education center located east of McAllister Way, on about three acres at the southern end of the LML complex. The Seymour Center is open to the public and features an interpretive exhibit and aquarium area, a wet and dry laboratory for K-12 school programs, a University marine biology teaching laboratory, a meeting room, and staff offices. Four buildings (the Center for Ocean Health, the Research Support building, the Younger building, and the Service building),

1 There is a small area of old concrete slabs that may have been placed there many years ago; no engineered shoreline protection structures are in place.

TABLE 3-1
EXISTING LONG MARINE LAB FACILITIES

Existing Facility	Size (gross square feet)
Seymour Marine Discovery Center	20,000
Center for Ocean Health Building	23,000
Research Support Building	6,200
Younger Building	3,700
Service Building	2,300
Temporary Trailers	3,000
Avian Facility	2,160
Greenhouses (temporary)	26,844
Caretaker Housing	1,400
CDFG Marine Wildlife Center	20,000
Total Existing	**108,604**

SOURCE: Draft CLRDP

the Avian Facility, greenhouses, caretakers' units, and improved outdoor marine mammal pools and yard space provide the core of the original LML research facilities, along with the Seymour Center.

The Center for Ocean Health building is an approximately 23,000-gsf, two-story facility located in the center of the original LML complex that provides laboratory, office, and administrative support space, and meeting and teaching rooms. The approximately 6,200-gsf Research Support building contains offices and wet and dry laboratories with fume hoods, and is located adjacent to the earth berm that separates LML facilities from the YLR. The approximately 3,700-gsf Younger building forms the eastern boundary of the marine mammal outdoor research yard, and contains wet and dry laboratories, including general access procedure laboratories for marine mammals, multi-user seawater laboratories, and individual researcher laboratories. The approximately 2,300-gsf Service building houses service shops and field science support facilities for boat operations and SCUBA diving, and is located northwest of the Research Support building. Four temporary trailers (3,000 gsf) are located adjacent to the Ocean Health building, and provide surge office space for the above buildings. The caretakers' units (1,400 gsf) are located on the southernmost portion of the site adjacent to the marine mammal pools.

Several affiliates of the UCSC Institute of Marine Sciences are also located within facilities at the project site. The approximately 20,000-gsf Marine Wildlife Center, operated by the California Department of Fish and Game (CDFG), is currently located in three single-story structures at the northern end of the LML complex. This facility treats birds and mammals that may be affected by oil spills. The Avian Facility (Oiled Seabird and Predatory Bird Facility) is a recently completed adjunct to the CDFG Marine Wildlife Center and consists of two office trailers that provide office and dry laboratory research space for a total of about 2,160 gsf. In addition to the office trailers, three greenhouses (11,484 gsf) provide storage and staging space, and a large outdoor paved area provides flexible temporary space for both research and oil-spill response needs. Eight other greenhouses (15,360 gsf) are located nearby and are currently leased to a commercial testing operation (Toxscan) and an organic plant propagation business.

Outdoor support facilities include an outdoor research yard (17,000 sf) located between the Research Support building and the Younger building. This yard contains five large and five small permanent marine mammal pools, as well as space for a variety of small temporary tanks and pools, and 58,000 gallons of seawater storage in two 35-foot-high tanks. A 14,000-sf service/boat yard located between the Service building and the Ocean Health building is used as a staging area for fieldwork and provides open space for parking boats and trailers and for storing field equipment.

In addition to the facilities described above and listed in Table 3-1, the project site contains a federal inholding that is not owned or controlled by the University. The National Marine Fisheries Service (NMFS) Laboratory, managed by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), is housed in a two-story, 53,400-sf building in the center of the site.

EXISTING CIRCULATION, PARKING, AND PUBLIC ACCESS

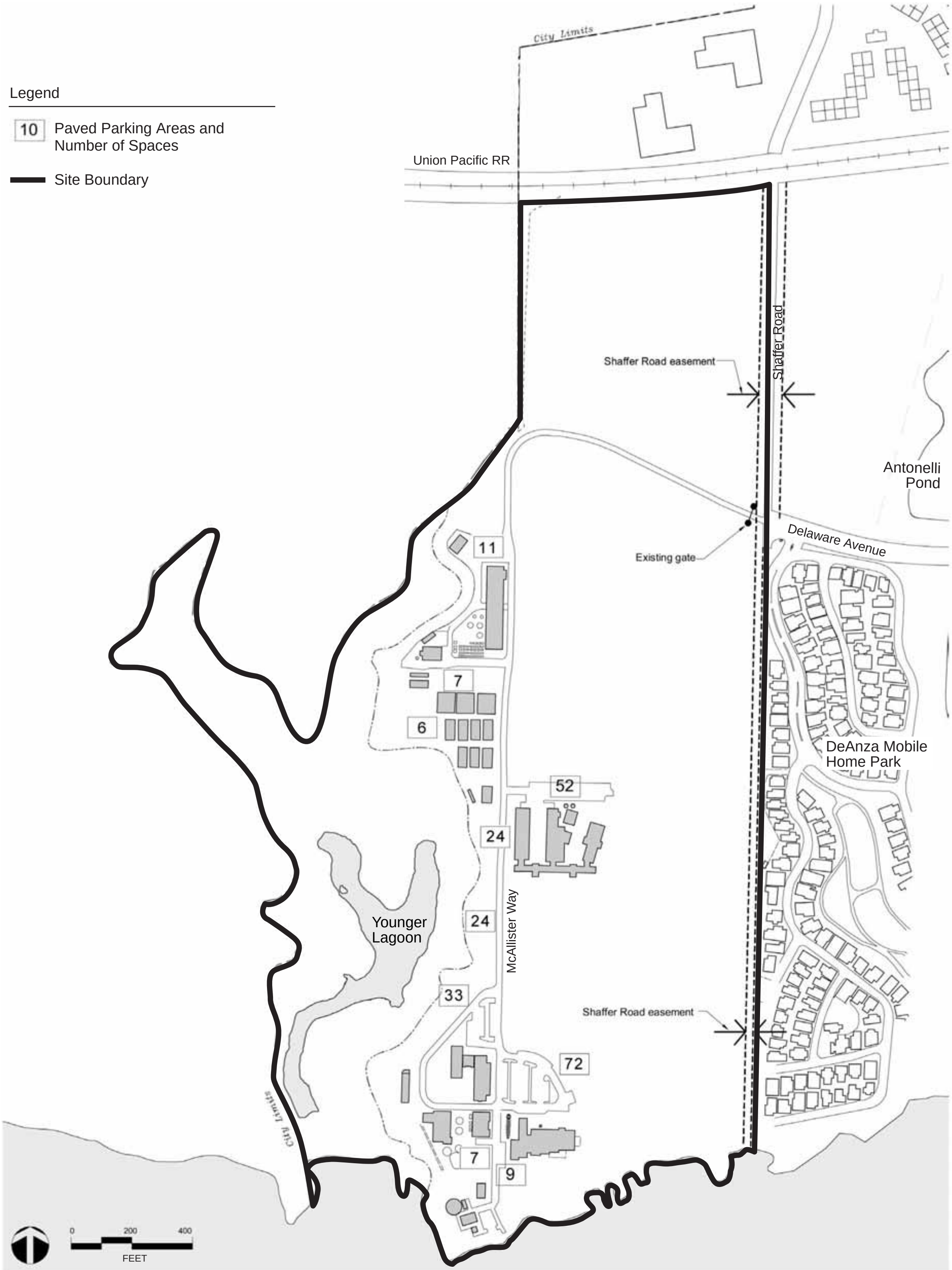
The only developed vehicle access road to the site begins at the Delaware Avenue/Shaffer Road intersection on the eastern edge of the site. This road traverses the property along a previous access easement alignment and connects to McAllister Way, a 20-foot-wide oil and gravel road that runs north-south along the edge of the original LML site. This road provides onsite access to gravel-surfaced service roads, yards, and paved parking areas. Existing onsite pedestrian and bicycle circulation is on an “ad hoc” basis, with a few pathways and courtyards developed with gravel or other compacted earth. The Delaware Avenue/Shaffer Road intersection also serves as the primary access route for pedestrians and bicyclists.

Currently, a security gate with keyed access at Delaware Avenue restricts public access after hours (see Figure 3-3, Existing Roads and Parking Onsite).

A total of 245 parking spaces are provided in paved and unpaved lots serving the existing onsite facilities. At the present time, parking is not assigned and permits are not required.

Shuttle bus service between the UCSC Main Campus and the Marine Science Campus was initiated in April 1998. Twelve passenger vans operated by the Biology Department provide transportation between the Main and Marine Science Campuses for students and faculty taking classes or attending seminars. In addition, a Santa Cruz Metropolitan Transit District bus route, Route 3B, provides service between the site and downtown Santa Cruz via Mission Street and Delaware Avenue.

The majority of the project site is publicly accessible during daylight hours via the access road or trails. While access to research facilities and the YLR area is controlled, access and interpretation of these areas is provided through docent-guided tour programs offered by the Seymour Marine Discovery Center. In addition, three public-access overlooks to the YLR and the ocean are located onsite. Two of the overlooks are adjacent to the YLR, and the third overlook is at the southern end of McAllister Way (see Figure 3-4, Existing Public Access and Overlooks).



SOURCE: Draft CLRDP

Figure 3-3

Existing Onsite Roads and Parking

SOURCE: Draft CLRDP

Figure 3-4
Existing Public Access and Overlooks

EXISTING UTILITIES

The project site is served by public and private utility systems, including water, seawater, sanitary sewer, electrical, natural gas, and communications. These services are provided through existing onsite easements and connections, as described below.

Water is supplied to the project site through a City-owned 12-inch water main in Delaware Avenue at Shaffer Road, at a static pressure of 90 pounds per square inch (psi). A 10-inch water main currently distributes water to the facilities onsite. There are currently no restrictions for providing water service to the site.

The existing seawater system draws up to 1,000 gallons per minute (gpm) of raw seawater from the surf zone at the southern end of the project site. Two 10-inch intake lines, supported on steel beams at the base of the sea cliff, draw the seawater into a 40-foot tall caisson, which was drilled through the roof of a natural sea cave that is exposed to the surf. The caisson houses the primary pumps that convey the seawater through underground pipes to a filter system, then into two 36-foot tall storage tanks. Seawater is distributed from the storage tanks to the developed portion of the site. An expansion of the existing seawater system was recently approved and is now under construction. The expansion includes construction of a new ocean intake, a new, larger primary storage tank, expanded filtration, and a new distribution system at the southern end of the site. The expansion combined with the existing system would provide the capacity to pump a total of 2,000 gpm.

Sanitary sewer service to the southern portion of the original LML complex is provided through use of a 10,000-gallon holding tank and lift station that, in turn, pumps to a second lift station adjacent to the 2.5-acre federal inholding property. Existing buildings located at the northern portion of the LML complex are served by gravity sewer lines to the second lift station that pumps to the City-owned system on Shaffer Road at Delaware Avenue. Wastewater treatment occurs at the City-owned treatment plant at Neary Lagoon.

The project site is served by a combination of overhead and underground primary electrical lines. The electrical system has recently been upgraded to 21,000 volts. The PG&E system distributes power to the existing facilities in the southern portion of the original LML complex through two transformers and underground lines, and in the northern portion through three transformers and underground lines.

Natural gas service to the project site extends from PG&E’s underground gas main in Delaware Avenue at Shaffer Road, along the same utility alignment shared by the water and sanitary sewer lines, to the facilities onsite.

Telephone service is provided by Pacific Bell through a combination of overhead and underground lines, as well as by a private, University of California-owned and -operated microwave telephone system. A T-1 data communication line is leased from Pacific Bell by the University to provide high-speed data service from the site to the main UCSC campus. Additionally, high capacity fiber optic cabling currently serves the site’s facilities.

B. PROJECT OBJECTIVES

The purpose of the proposed CLRDP is to facilitate the orderly, flexible, and environmentally sensitive expansion and development of the UCSC Marine Science Campus in support of the academic, research, and public service mission of the University of California. The UCSC Institute of Marine Sciences and the UC Natural Reserve System, which share responsibility for managing the UCSC Marine Science Campus lands, seek to promote the health of the oceans and their coasts by conducting and supporting marine science instruction and research and by facilitating the application of that knowledge for public education, environmental awareness and decision making.

The University's objectives for the CLRDP are as follows:

<u>Planning for 20 Years of Growth</u>

- Develop a world-class marine research, education, ocean health, and public service campus with the scope, diversity, and excellence in program and facilities necessary to respond to the growing need for marine science, to establish the University's leadership in the field, and to attract sustained funding.

- Develop a marine science campus with access to large volumes of fresh seawater and proximity to the ocean environment for research, education, ocean health, and public service activities.

- Develop a marine science campus sufficiently close to the main UCSC campus to enable integration with programs on the main campus and utilization of support services that do not require location close to the ocean.

- Develop an affordable campus that makes cost-effective use of the limited public funds available for research, education, and ocean health activities by expanding existing facilities on the Marine Science Campus and attracting governmental, non-profit, and private research and education affiliates that bring additional financial resources to the campus.

- Maximize the efficient use of land resources on the Marine Science Campus for coastal-dependent uses, coastal-related uses, and support facilities, consistent with identified resource constraints so as to reduce the future need for development of coastal lands in the service of marine research and education.

- Remedy space and program deficiencies that existed in 2003 at the Marine Science Campus through the expansion and enhancement of University and affiliated facilities.

- Create a campus with opportunities for new marine research, education, and ocean health activities that: (1) are proximate to the ocean environment and thereby allow the keeping of marine plants and animals in an environment that approximates their natural setting, (2) can be undertaken adjacent to existing facilities on the Marine Science Campus to promote interaction and collaboration, (3) complement and broaden existing research, education, and ocean health activities, (4) have access to large volumes of fresh seawater, and (5) are provided sufficient expansion area to meet anticipated demand for 20 years.

- Create a campus that promotes round-the-clock immersion in the research environment and extends interaction and collaboration among scientists, students, and administrators beyond formal work settings by providing support housing for researchers, educators, students, caretakers, and visitors that is adjacent to coastal-dependent activities and of sufficient capacity to support approximately 20 percent of projected campus population.

- Create a campus with the functionality to provide support to scientists, students, and administrators who need meals, meeting places, and lecture halls.

- Create a campus with the functionality necessary to support a wide range of marine research and education and ocean health activities by providing equipment storage, maintenance, and outdoor laydown areas that are within easy and quick access of campus laboratories, offices, and classrooms, and of sufficient size to maintain and equip ocean vessels with scientific instrumentation.

- Provide public access and recreation opportunities on the Marine Science Campus where campus users and coastal visitors may exercise, recreate, and enjoy coastal resources.

- Provide a seawater system capable of delivering and discharging large amounts of fresh seawater for use in research, education and ocean health activities.

- Maintain and enhance natural resources at Younger Lagoon Reserve for teaching and research.

- Facilitate the development of complementary state, federal and private programs at the campus.

- Develop the Marine Science Campus in a manner that maximizes the clustering of similar or complementary uses in order to: (1) enhance opportunities for interaction and collaboration among researchers, educators, and students, (2) provide convenient access to essential research and teaching facilities, (3) provide convenient access to support facilities (e.g., food service, conference facilities, meeting rooms, etc.), and (4) support a sense of a campus community.

- Site new development to provide for convenient access to existing utility infrastructure (e.g., seawater, water, sewer, etc.) thereby reducing cost and site disturbance to the extent feasible.

<u>Protecting Natural Resources on the Site</u>

- Avoid or minimize adverse effects on the natural physical setting where it is feasible to do so, consistent with the resource protection provisions of the California Coastal Act and other environmental regulations, and consistent with achieving the growth objectives described above.

- Rely on infill and clustering of facilities to provide for efficient use of the land while minimizing development of undeveloped lands to the extent feasible.

- Protect environmentally sensitive habitat areas.

- Site development in areas with similar uses to support pedestrian travel and to minimize vehicle use for circulation within the site.

Protecting Offsite Resources

- Avoid or minimize adverse effects on adjacent land uses, the local community and the region where it is feasible to do so, consistent with the California Coastal Act and the growth objectives described above. Enrich the quality of life in the local and regional community by providing a facility that interprets marine research at the University and promotes understanding of the central California coastal marine environment.

- Maximize public access to onsite coastal resources to the extent feasible and consistent with protection of fragile resources, while ensuring the security of the campus.

- Provide a mix of uses on the project site and incorporate design features that support transportation alternatives in order to minimize traffic impacts on local roadways.

- Provide on-site housing to accommodate some of the project-related housing demand in order to minimize housing impacts on the community.

- Maintain views of the ocean and the mountains from important public vantage points in order to minimize visual impacts on the community.

- Develop a site plan that is compatible with existing and planned development in the area.

- Limit infrastructure and other measures to foster establishment of a stable urban boundary at the City limit.

C. PROJECT CHARACTERISTICS

As indicated earlier, the project reviewed in this EIR consists of two components: a CLRDP for the Marine Science Campus, and specific development plans for five projects that are part of the CLRDP and are expected to be implemented in the near term. This section describes the proposed CLRDP and the five near-term projects. The CLRDP is incorporated by reference for purposes of elaborating on the project description provided here.

COASTAL LONG RANGE DEVELOPMENT PLAN

The proposed CLRDP is a physical development and land use plan intended to guide and control future development, land use, and resource protection at the UCSC Marine Science Campus for a 20-year period. It is intended to supersede the most recent planning documents for the LML site, including the current Master Plan and Interim Access Plan. The CLRDP was prepared over a period of about three years and involved an advisory committee of approximately 20 people who represented the University, the City of Santa Cruz, and California Coastal Commission staff.

Under the proposed CLRDP, approximately 409,100 sf[2] of new building area would be constructed on the Marine Science Campus, and approximately 31,244 sf of existing building area would be removed and replaced, resulting in 377,856 sf of net new building area. In addition, the proposed CLRDP would allow approximately 152,000 sf of outdoor development and approximately 550 additional parking spaces (see Table 3-2).

The chapters of the CLRDP that are relevant for EIR analysis include Site Planning Considerations and Constraints, Long Range Land Use Development Plan, Design Guidelines, and Implementation Program. These chapters are further described below. The anticipated population of the Marine Science Campus that would result from full development under the CLRDP is also identified.

SITE PLANNING CONSIDERATIONS AND CONSTRAINTS CHAPTER

The CLRDP includes a discussion of the site planning considerations and constraints that helped shape the plans and policies contained in the CLRDP (see Figure 3-5, Combined Development Constraints Onsite). Development under the CLRDP would be influenced by various physical conditions present at the project site, including land resources, climate, topography, geology and coastal erosion, hydrology, biotic resources, scenic resources and visual characteristics, and agricultural resources. These topic areas, among others, are addressed in detail in Chapter 4, Environmental Setting, Impacts, and Mitigation Measures.

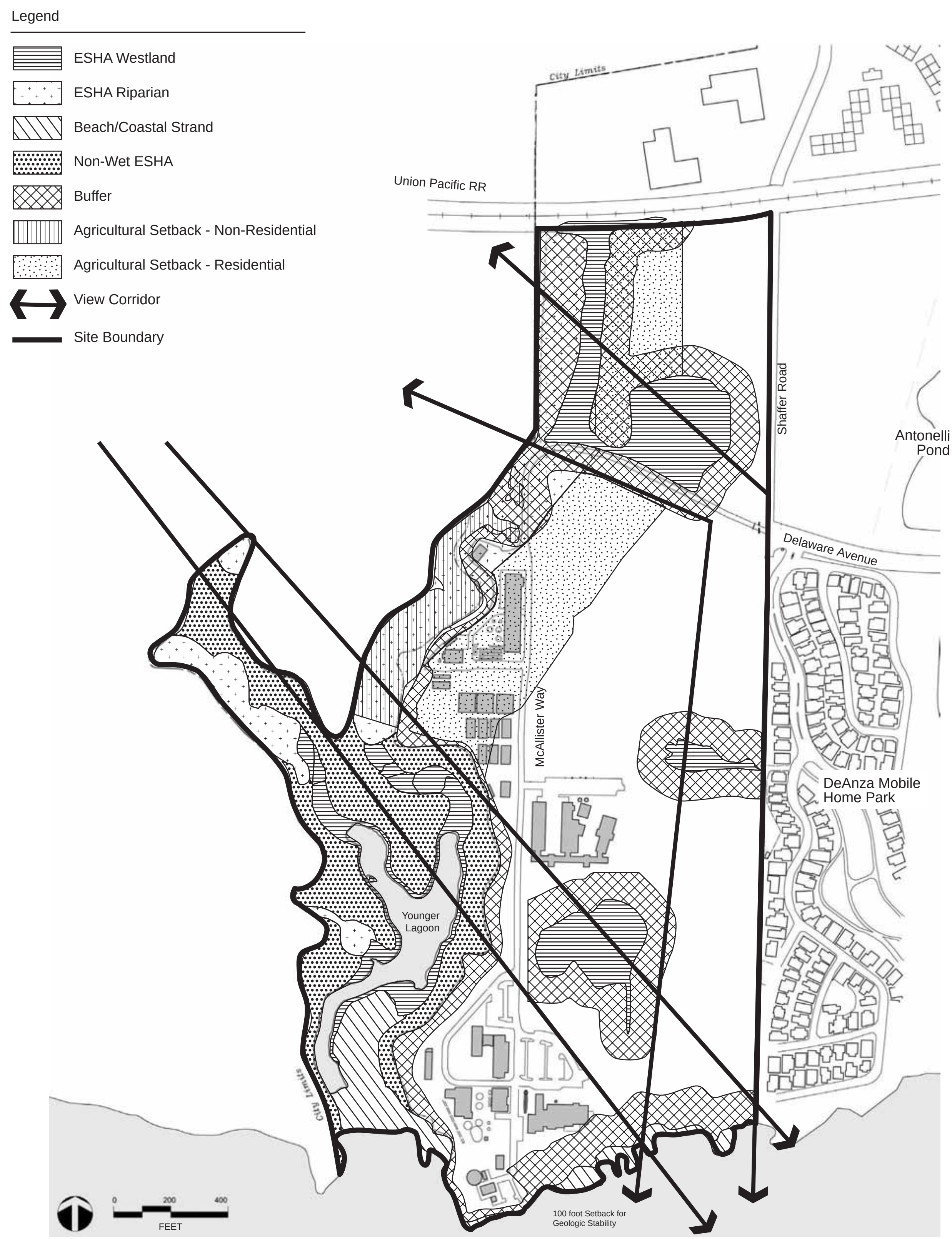
LONG RANGE LAND USE DEVELOPMENT PLAN CHAPTER

The CLRDP Long Range Land Use Development Plan chapter contains eight sections: application of the long range land use development plan, land use, resource protection, scenic and visual qualities, circulation and parking, public access and recreation, hydrology and water quality, and utilities. These sections provide the governing standards for the planning and approval of subsequent, individual development projects on the UCSC Marine Science Campus. The provisions, policies, and implementation programs contained within the eight sections are summarized below.

Section on Application of the Plan

This section explains the relationships among the Long Range Land Use Development Plan chapter and other CLRDP chapters in order to ensure conformity with Chapter 3 of the California Coastal Act. A policy in this section provides that a specific development proposal will be deemed to conform with the CLRDP if that proposal (1) is consistent with the provisions of the Long Range Land Use Development Plan chapter, (2) implements the design guidance of the Design Guidelines chapter, and (3) is in substantial conformity with the prototype site plan and, to the extent applicable, the character of the buildings shown in the prototype building studies in the Prototype Plans and Building Studies chapter.

[2] Unless noted otherwise, all building area space reported in this EIR is in gross square feet.



SOURCE: Draft CLRDP

Figure 3-5
Combined Development Constraints Onsite

Land Use Section

The land use section sets forth the general plan for land use on the Marine Science Campus, including the building program, land use designations, and land use policies.

Building Program

The CLRDP provides a building program that describes eight types of space needs that could be accommodated on the site in order to meet the objectives of the project. These space needs are marine research and education, outdoor research area, support facilities, support housing, equipment storage and maintenance facilities, public access and recreation facilities, seawater system, and parking facilities. The program includes the approximate square footage of development (or, in the case of parking, the number of spaces) anticipated for each type of space. The eight building program components are further described below, and the building program is summarized in Table 3-2.

TABLE 3-2
PROPOSED COASTAL LONG RANGE DEVELOPMENT PLAN
BUILDING PROGRAM

	Size (square feet)
New Buildings	
Marine Research and Education	254,500
Support Facilities	19,000
Support Housing	
80 Apartments and/or Townhouses	82,000
10 Visitor/Overnight Accommodations	2,500
30 Researcher Housing Rooms	12,000
2 Caretaker Replacement Housing Units	1,600
Equipment Storage and Maintenance	
Centralized Warehouse	37,500
SUBTOTAL	409,100
Existing Facilities To Be Removed	
Temporary Office Trailers	-3,000
Caretaker Housing	-1,400
Greenhouses	-26,844
SUBTOTAL	-31,244
Total Net New Building Space (with Removal of Existing Facilities)	**377,856**
Outdoor Development	
Outdoor Research Area	70,000
Equipment Storage and Maintenance	
Open Laydown Yards	70,000
Seawater System Expansion (4,000 gallons per minute)	12,000
SUBTOTAL	152,000
Additional Parking	550 spaces

SOURCE: Draft CLRDP

Marine Research and Education. The CLRDP would allow for the development of up to 254,500 sf of additional marine research and education space to accommodate future growth in UCSC and affiliated programs. Marine research and education space would house the major activities associated with the operation of a marine science campus, which typically require proximal access to the ocean and seawater and encompass wet and dry laboratories, public education facilities and other teaching and seminar rooms, support offices, and minor storage and operational areas.

Outdoor Research Area. The CLRDP would allow for the development of up to 70,000 sf of additional outdoor area to be used in conjunction with marine research and education activities. The outdoor research area may include outdoor pools, minor storage and operational areas, and other organized outdoor research facilities.

Support Facilities. The CLRDP would allow for up to 19,000 sf of support space to provide for necessary conference, meeting room, and dining space to serve the Marine Science Campus. Specifically, the building program identifies the need for up to 5,000 sf of auditorium space (with up to 350 seats), 2,500 sf of meeting room space (with up to 200 seats), 3,500 sf of food service space, and 8,000 sf of paved and unpaved outdoor court sports areas (e.g., for basketball and volleyball). The auditorium space would be used for seminars, lectures, presentations, conferences, workshops, and community education activities, and the meeting room space would be used for smaller events and gatherings. In addition, the food service space would reduce the need for onsite researchers, staff, and students to leave the campus for meals.

Support Housing. The CLRDP would allow for the development of up to 98,100 sf of support housing space to provide for necessary residential and visitor accommodations to serve the Marine Science Campus. Specifically, the CLRDP program identifies the need for up to: (a) 82,000 sf of housing (up to 80 apartment/townhouse units) for visiting scientists, graduate students, and new faculty and researchers; (b) 2,500 sf of overnight accommodations (up to 10 visitor rooms) for visiting scientists; (c) 12,000 sf of group housing (up to 30 rooms) to accommodate visiting teachers and students during summer residence programs and teacher immersion programs; and (d) 1,600 sf of caretaker quarters (up to 2 units) that would replace the existing caretaker units on the site. Support housing would provide onsite accommodations for visiting and resident Marine Science Campus scientists and students, whose learning experience or research requires or would be enhanced by their presence on the campus during extended hours. All of the support housing on the site is intended to provide for the temporary housing needs of the Marine Science Campus. No long-term or for-sale housing is anticipated under this program area.

Equipment Storage and Maintenance Facilities. The CLRDP would allow for up to 107,500 sf of equipment storage and maintenance space to accommodate the continued onsite outfitting of ocean-going research vessels, and the storage, maintenance, and repair of highly specialized equipment. Specifically, the CLRDP program identifies the need for up to 37,500 sf of centralized warehouse and storage space, and 70,000 sf of open laydown yard space.

Public Access and Recreation Facilities. The CLRDP would allow for public access and recreation space to serve the visitors and occupants of the campus. Specifically, the CLRDP program identifies the need for an expanded network of public trails and controlled-access trails to existing, new, or improved overlook points at the ocean, the YLR, and other natural resource areas.

Seawater System. The CLRDP would allow for improvements to the seawater system facilities on the site to provide for the adequate intake, storage, and discharge of seawater to serve proposed CLRDP development. Specifically, the CLRDP proposes to increase the current capacity of the seawater system, located on the lower terrace portion of the site, to accommodate a total system capacity of 6,000 gallons per minute (gpm), an increase of approximately 4,000 gpm. Utility pipes carrying the seawater may be extended to the middle and upper terrace areas of the site. This expansion would be in addition to the expansion that is currently under construction (see "Existing Utilities" above).

Parking Facilities. The CLRDP would allow for up to 550 new parking spaces to accommodate parking needs in proportion to the development of new building space, including parking for visitor-oriented facilities such as the Seymour Marine Discovery Center. Of these spaces, 50 would be designated for dual use (i.e., either campus visitor or public coastal access parking) and 10 would be designated solely for public coastal access parking. The total amount of parking on the project site would be 795 spaces (245 existing spaces plus 550 new spaces).

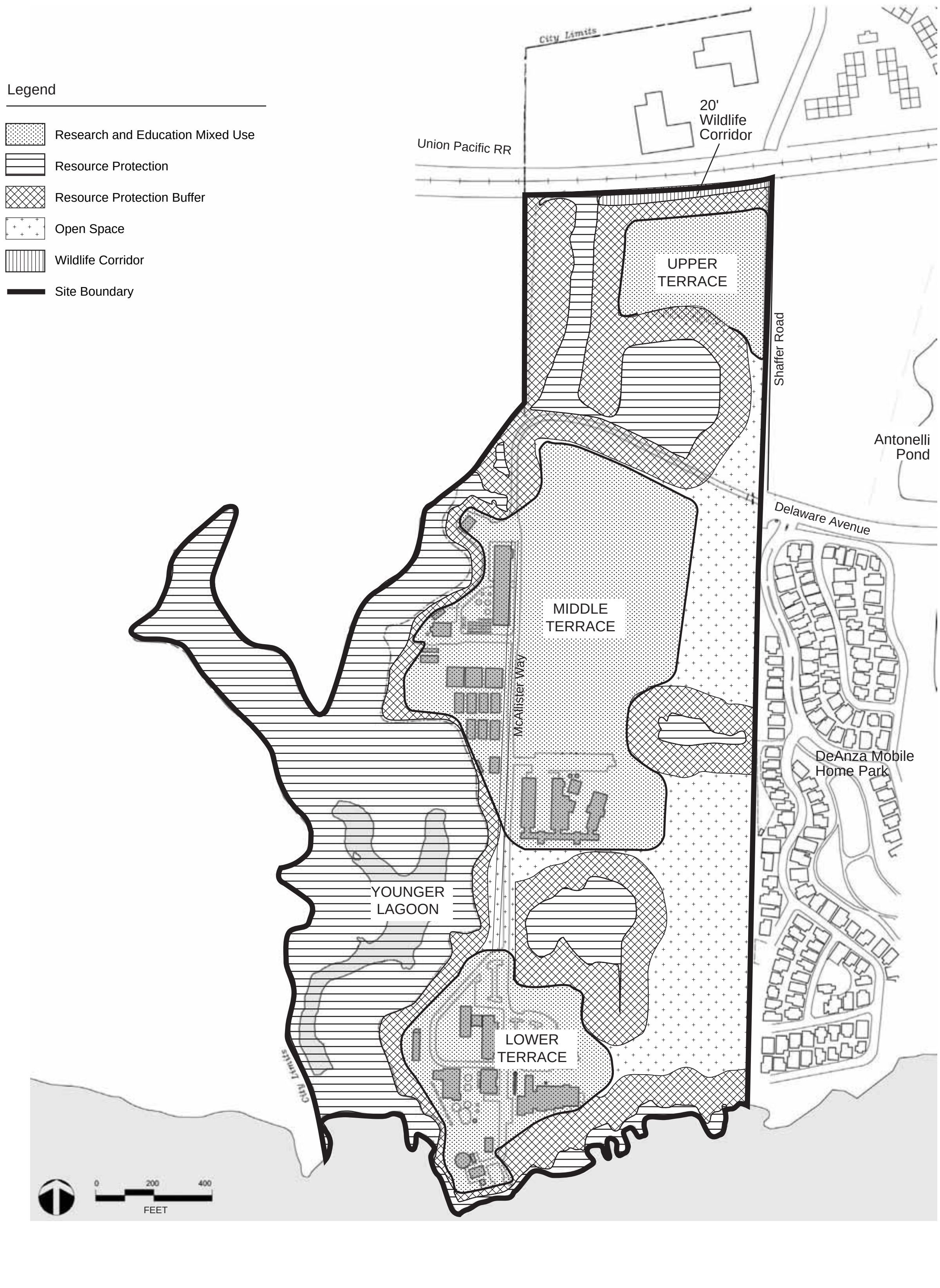
Land Use Designations

The CLRDP identifies five land use designations for the UCSC Marine Science Campus: (1) Research and Education Mixed Use, (2) Resource Protection, (3) Resource Protection Buffer, (4) Wildlife Corridor, and (5) Open Space. The CLRDP land use diagram shows the geographic location of these designations on the campus (see Figure 3-6, Land Use Diagram). The land use diagram limits buildings to three areas that are designated Research and Education Mixed Use: the 4.2-acre upper terrace, the 20.81-acre middle terrace, and the 7.93-acre lower terrace. The land use diagram designates the rest of the site as open space in the Resource Protection, Resource Protection Buffer, Wildlife Corridor, and Open Space land use designations.

In a separate chapter, the CLRDP includes a Prototype Site Plan that provides an example of how development described in the CLRDP building program and designated for the Research and Education Mixed Use areas could occur (see Figure 3-7, Prototype Site Plan). The building footprints depicted in the Prototype Site Plan include sites for five potential future projects that could be constructed in the early phase of project development (see further discussion under Near-term Projects, below).

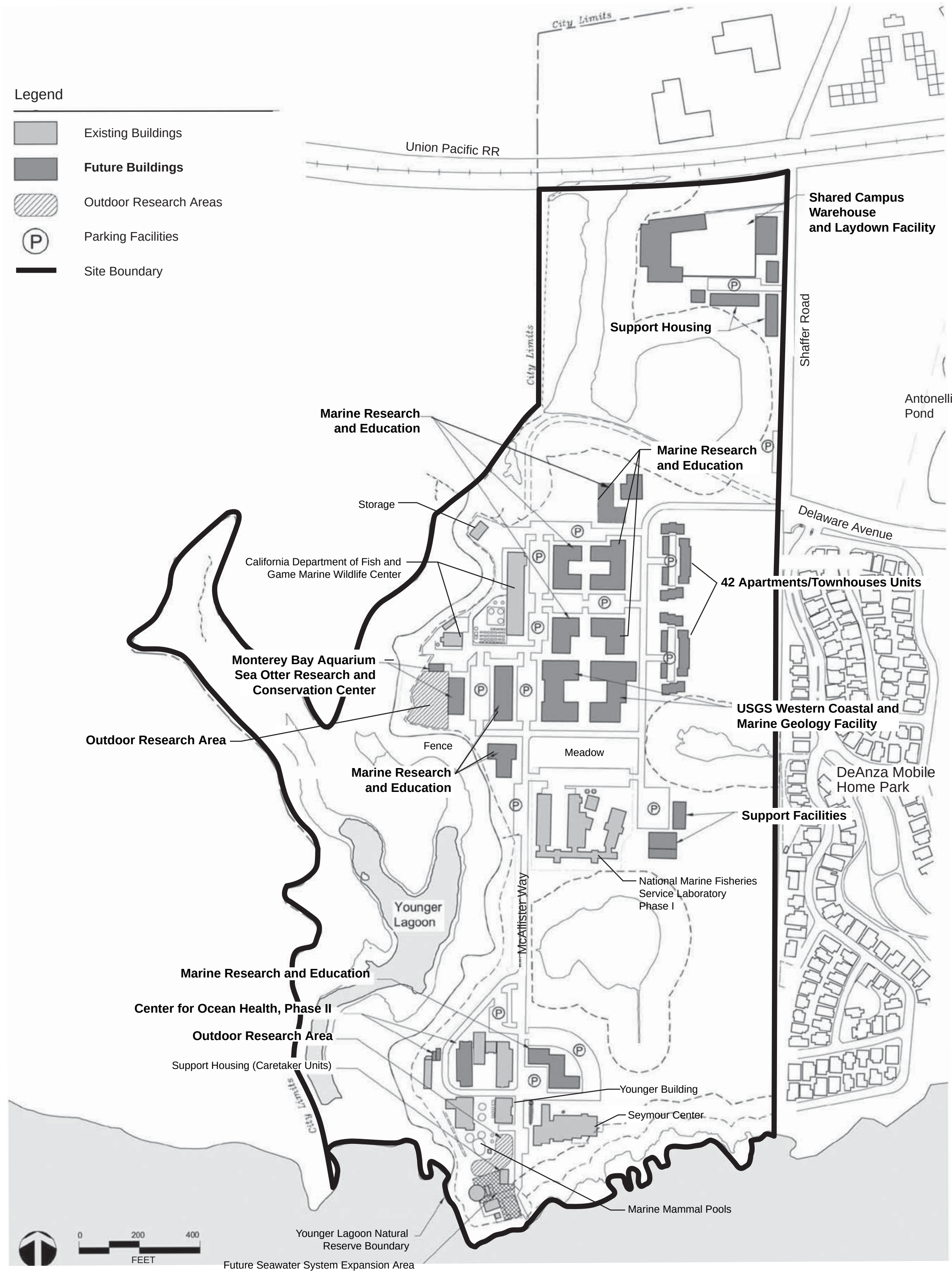
Research and Education Mixed Use. The primary purpose of the Research and Education Mixed Use designation is to accommodate the building program, described above. The building program elements and maximum densities allowed in each of the three designated development areas (upper terrace, middle terrace, and lower terrace) are specified in Table 3-3, Allowed Uses and Intensities Proposed by CLRDP, below. Additionally, utilities, lighting, signage, trails, drainage facilities, and landscaping would be allowed in the Research and Education Mixed Use designation.

Resource Protection. The primary purpose of the Resource Protection designation is to protect wetlands and Environmentally Sensitive Habitat Areas (ESHAs). Areas designated by the CLRDP as Resource Protection include the entirety of the YLR, intertidal areas along the coast, and the delineated seasonal wetlands on the upland terrace. Uses permitted in the Resource Protection designation are limited to habitat creation, enhancement, and restoration; scientific and education study; nature study; the existing trail in the vicinity of the De Anza Santa Cruz residential community drainage; existing underground utility corridors; seawater systems in the coastal cliff



SOURCE: Draft CLRDP

Figure 3-6
CLRDP Land Use Diagram



SOURCE: Draft CLRDP

Figure 3-7
CLRDP Prototype Site Plan

TABLE 3-3
ALLOWED USES AND INTENSITIES PROPOSED BY CLRDP

Building Program Element	Lower Terrace Area	Middle Terrace Area	Upper Terrace Area
Marine Research and Education	No locational restrictions for this building program item.		
Outdoor Research Area	Limited to existing uses, plus 10,000 sf of additional outdoor research area.	Limited to existing uses, plus in the middle and upper terrace a combined total of 60,000 sf of additional outdoor research area.	
Support Facilities	Limited to existing facilities.	In the middle and upper terrace, limited to a combined total of one 5,000 gross sf seminar auditorium with 350 seats, 2,500 gross sf of meeting rooms with a total of 200 seats, 3,500 gross sf of food service, and 8,000 sf of paved and unpaved outdoor sport courts. All support facilities will be located east of McAllister Way.	
Support Housing	Two caretakers' units only.	In the middle and upper terrace, limited to a combined total of 30 rooms of researcher housing, 80 apartments and/or townhouses, and 10 visitor/overnight accommodations; if located in the middle terrace, support housing will be located east of McAllister Way.	
Equipment Storage and Maintenance Facilities	Limited to existing facilities, except for minor facilities developed as part of Marine Research and Education above.	Limited to existing facilities, plus minor facilities developed as part of Marine Research and Education are allowed without restriction.	In the upper terrace, a total of 37,500 sf of centralized warehouse, storage facilities, and workshops and 70,000 sf of open laydown yard. Minor facilities developed as part of Marine Research and Education are allowed without restriction.
Public Access and Recreation Facilities	See Coastal Access and Recreation Diagram (Figure 3-9 of this EIR)		
Seawater System	There are no locational restrictions for this building program item.		
Parking Facilities	There are no locational restrictions for this building program item.		

SOURCE: Draft CLRDP

area; stormwater discharge facilities; repair and maintenance of other existing and future facilities allowed by the CLRDP, including trails, underground utilities, and seawater systems; and other resource-dependent activities.

Resource Protection Buffer. The primary purpose of the Resource Protection Buffer designation is to protect ESHAs from impacts that would significantly degrade them. Areas designated Resource Protection Buffer are located next to areas designated Resource Protection.

The buffers are 100 feet wide unless a different width is designated on the CLRDP land use diagram (see Figure 3-6, Land Use Diagram). Buffers are narrower where existing roads or other site features interfere; where the use of berms, fencing, and building design have historically supported a smaller buffer; and where elevation differences provide vertical separation. Buffers are also narrower for the proposed wildlife corridor, where, in conjunction with management measures, 80 feet is determined to be the appropriate maximum width.

The Resource Protection Buffer designation allows for all uses allowed in designated Resource Protection areas, as well as new and improved overlooks that are sited to prevent any significant adverse impact on habitat values; existing streets and trails; a new pedestrian trail in the vicinity of the coastal cliff to replace the existing cliff trail; and interpretive panels and signage.

Wildlife Corridor. The primary purpose of the Wildlife Corridor designation is to establish a corridor along the northern perimeter of the Marine Science Campus that accommodates and enhances wildlife movement between onsite Resource Protection areas and Moore Creek/ Antonelli Pond located east of the project site. Permitted uses are limited to habitat creation, enhancement, and restoration; scientific and educational study; nature study; interpretive panels and signage; and stormwater discharge facilities and necessary repair and maintenance activities.

Open Space. The primary purpose of the Open Space designation is to maintain and enhance the scenic and visual quality of the Marine Science Campus. Open Space areas include all other areas of the campus not contained in one of the above-described designations. Uses permitted in the open space designation include all uses allowed in areas designated as Resource Protection Buffer, as described above; streets and trails as shown in the CLRDP circulation and parking diagram (see Figure 3-8 below); interpretive panels and signage; and lighting for safety and navigation.

Land Use Policies

The land use section includes a policy and related implementation measures for ensuring that housing on the campus would be developed solely for use by the University[3] and would be for rental or short-term lease only, subject to UCSC's campus-wide policy that currently limits temporary housing arrangements to three years. In order to give locational priority to coastal-dependent uses, residential uses would be limited to sites in the middle and upper terrace areas, except for replacement caretakers' residences allowed in the lower terrace area.

In addition, the land use section includes a policy and related implementation measures for creating a stable urban/rural boundary by limiting the size of utility lines onsite to serve only the projected needs of the campus, and by establishing a utility prohibition zone where new sewer or water utility lines would not be allowed. Other policies and implementation measures call for protecting adjacent agricultural resources by limiting utility capacity and maintaining 200- to 300-foot-wide setbacks for non-residential development and 500-foot-wide setbacks for new residential development; clustering development and maintaining at least 30 percent of land free of impervious surfaces in the three Research and Education Mixed Use areas (i.e., the lower, middle, and upper terraces); and preserving open space outside these three designated development areas, in the form of agricultural setbacks, habitat buffers, natural habitats, view corridors, and open space areas.

[3] All housing on the Marine Science Campus would be used by people working on the site or involved in University marine research programs. Other lower priority University housing needs may be accommodated on an interim basis only as needed to guarantee occupancy.

Resource Protection Section

The resource protection section includes policies that apply to the terrace and the YLR portions of the project site, respectively, as well as to the coastal bluffs, adjacent agricultural resources, potential cultural resources, hazardous materials management, air quality, and energy. For the terrace portion of the site, the resource protection policies, summarized below, rely on the detailed management measures identified in the CLRDP Appendix B, Marine Science Campus Resource Management Plan (Resource Management Plan). For the YLR portion of the site, which is a component of the University's Natural Reserve System, the resource protection policies will be implemented and augmented by provisions of the Younger Lagoon Reserve Management Plan, which provides detailed provisions for the management of the reserve. In any future amendment by the Natural Reserve System, the Younger Lagoon Reserve Management Plan would remain consistent with the CLRDP.

General Policies

Policies and measures designed to protect the marine environment and habitat areas include the following provisions.

Marine resources would be maintained, enhanced, and where feasible, restored, with special protection given to areas and species of special biological or economic significance. Use of the marine environment would be carried out in a manner that would sustain the biological productivity of coastal waters and maintain healthy populations of all species of marine organisms. To carry out this policy, the University would maintain and expand its seawater system as provided in the CLRDP building program (see above).

To protect and restore habitat areas, the University would consolidate, expand, and enhance wetlands in the northern part of the site; protect and enhance seasonal wetlands in accordance with the management measures contained in the CLRDP; establish a corridor for unimpaired movement of wildlife along the northern boundary of the site; protect special status species through protection and enhancement of wetland habitats and grassland/scrub-grassland habitats outside of development areas and through other management measures contained in the CLRDP; develop and manage trails; manage natural areas (i.e., areas other than those designated Research and Education Mixed Use); protect water quality through the Stormwater Concept Plan contained in the CLRDP; and develop long-term maintenance and monitoring programs for terrace habitats.

The CLRDP specifies that diking, filling, or dredging of open coastal waters and wetlands would be allowed where there is no feasible less environmentally damaging alternative and where feasible mitigation measures have been provided. Such diking, filling, or dredging would be limited to (1) incidental public service purposes (e.g., burying cables and pipes), (2) restoration purposes, and (3) nature study or similar resource-dependent activities. Diking, filling, or dredging of existing wetlands must maintain or enhance the functional capacity of the wetland. Fill of the small isolated non-ESHA wetland depressions near the northeast corner of the site would be carried out only as part of a wetland restoration program, and the University would replace filled wetland at a ratio of 2:1. These actions would be undertaken in compliance with applicable state and federal regulations.

Environmentally sensitive habitat areas would be protected through buffering provisions as well as development restrictions that regulate the location of windows, lighting, access, signage, and noise-generating equipment. Noise sources would be required to be located at least 100 feet from the ESHA located in the terrace area. To protect the YLR, noise from human activity in the terrace area would not be allowed to exceed 60 dBA CNEL, as measured at the boundary of the YLR.

Younger Lagoon Reserve Policies

The policies and measures designed to protect and enhance the native plant and animal habitats of the YLR include continuing to provide special protection for the property by retaining it as part of the University's Natural Reserve System. The University would protect and enhance the YLR habitats by controlling weeds, planting native species, revegetating areas where exotics have been removed, implementing the Stormwater Concept Plan, maintaining the existing security fencing, and limiting access by humans and non-native animal species. The University would protect stream and riparian areas by minimizing the effects of stormwater discharges, controlling runoff, preventing depletion of groundwater supplies, maintaining vegetation buffers, and minimizing alteration of natural streams. The University would provide visual access for the public through development of overlooks, and would limit physical access to the YLR to authorized management, emergency, research, or student personnel consistent with the CLRDP diagram and policies. A long-term maintenance and monitoring program for the YLR would also be developed.

Coastal Bluff Policies

To protect the coastal bluffs, the University would generally maintain a 100-foot setback for development and would prohibit any development that would require coastal protection structures.[4]

Agricultural Resources Policies

To minimize and/or avoid potential conflicts with neighboring agricultural uses, the University would work cooperatively with adjacent agricultural users and would enter into an indemnification and hold harmless agreement with the owners of the adjacent Younger Ranch.

Cultural Resources Policies

To protect and conserve cultural resources, the University would implement a construction monitoring program for the protection of archaeological resources that may be encountered during construction activities on the campus.

Hazardous Materials Management Policies

To protect the campus environment from contamination caused by the use of hazardous substances, the University, through its Office of Environmental Health and Safety, would manage hazardous materials in compliance with applicable federal and state regulations. The University would install appropriate features around the perimeter of maintenance and laydown areas to ensure that accidental spills of hazardous materials do not enter the stormwater drainage system or groundwater.

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4 Development in the setback would be limited to existing streets, existing and proposed pedestrian and bicycle pathways, and infrastructure improvements such as seawater system facilities that are consistent with the CLRDP.

Air Quality and Energy Consumption Policies

To minimize air quality and energy consumption effects, the University would incorporate sustainable development practices, wherever feasible, in the design and construction of campus facilities. The University would foster air quality and energy conservation by providing on-campus support housing to reduce travel demand, carrying out measures to limit the number of single-occupant vehicles traveling to the campus, controlling parking to discourage auto trips, promoting alternative transportation use (i.e., walking, bicycling, and using transit), and providing for transportation demand management measures.

Scenic and Visual Qualities Section

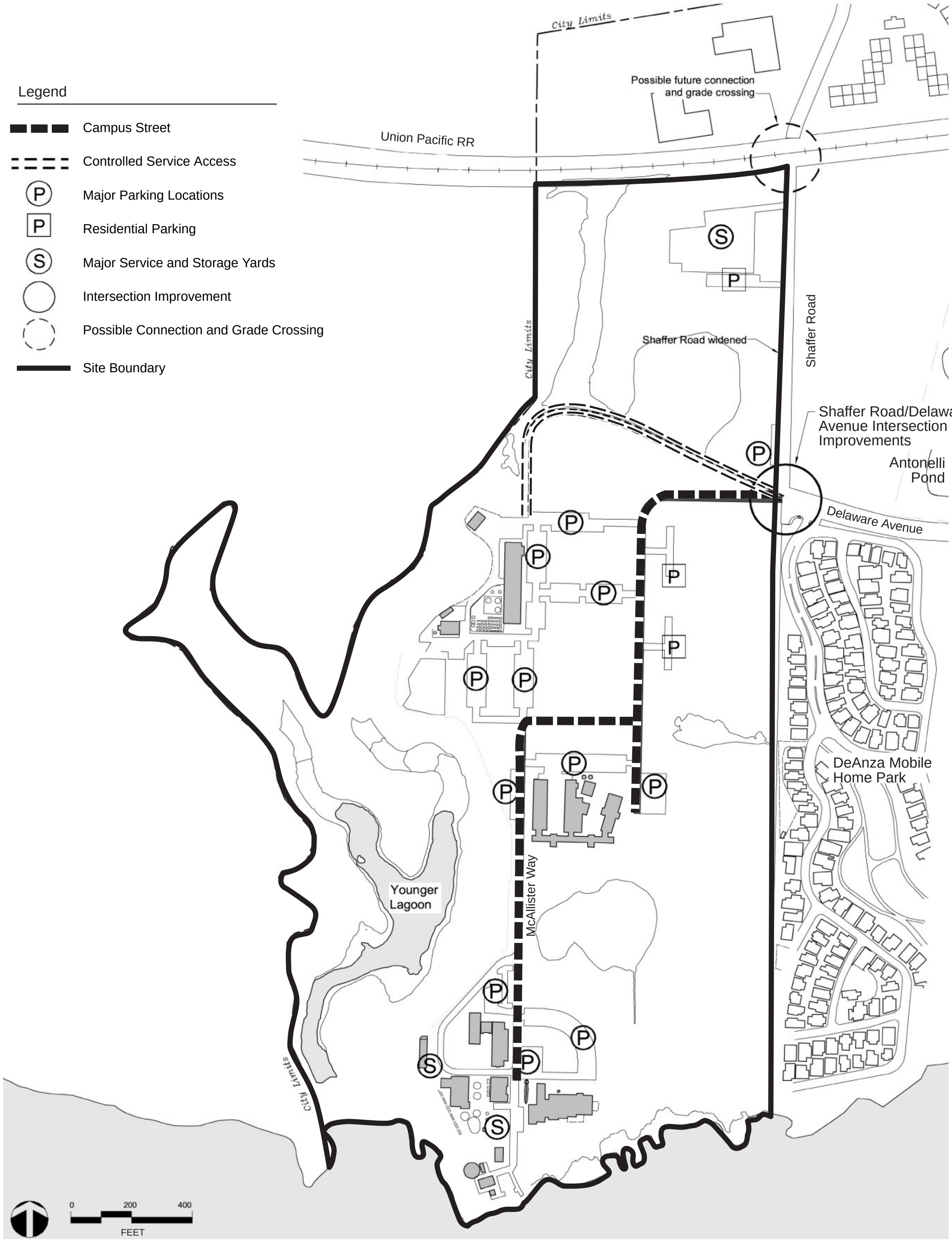
The scenic and visual qualities section indicates that the CLRDP Land Use Diagram locates development and open space areas so as to protect significant public view corridors to the ocean, the agricultural coastline, and surrounding hillsides (see Figure 3-6, Land Use Diagram). In addition, building heights of new development would be limited to protect the site's visual character.

To protect scenic quality, the University would follow the design guidelines and building prototypes provided in the CLRDP (see further discussion below). Unless otherwise shown in the prototypes, buildings would be two stories (36 feet) tall. In the middle terrace, buildings would be stepped down in height as they approach the eastern, northern, and western edges of the development zone so that building segments located along these edges are 30 feet tall. Additionally, to ensure design consistency in the built environment, the University would use similar construction materials for all buildings, would maintain a minimum 15-foot setback from roads and parking areas, and would limit building lengths to no more than 175 contiguous feet adjacent to a road. In addition, the University would underground all utility lines.

Exterior lighting on the campus would be provided at the lowest levels necessary to achieve safety and efficient movement and would be designed to be consistent with the protection of onsite habitats. Building and parking lot lighting would be limited to the three development zones, and would be designed so as not to interfere with or be directly visible to the wildlife of the YLR or terrace wetlands. Buildings and parking lots constructed next to the YLR would be designed so that activity and direct light would be out of the sightlines of the YLR. Buildings and parking lots would be designed so that activity and direct light are no closer than 100 feet from the ESHA located in the terrace portion of the campus. Street lighting would also be limited to the three development zones. Maintenance yard, trail, and sign lighting would be provided at the lowest levels necessary to achieve safety and design objectives and, similar to all exterior lighting onsite, would be directed downward and/or cut-off type lighting.

Circulation and Parking Section

The CLRDP identifies two types of roadway classifications: Campus Street and Controlled Service Access (see Figure 3-8, Circulation and Parking Diagram). The Campus Street classification is intended to accommodate access to the Marine Science Campus by motor vehicles and bicycles through the use of paved, public-use corridors with two undivided travel



SOURCE: Draft CLRDP

Figure 3-8
Circulation and Parking Diagram

lanes (one in each direction) and limited on-street parking. The maximum allowable width of the corridor would be 22 feet; generally, no curbs would be provided along a Campus Street. This classification would apply to all campus streets except controlled service accessways. The Controlled Service Access classification is intended to accommodate bicycle and pedestrian use, oversized service vehicles, special event parking, and occasional vehicle access for habitat management activities. This designation is limited to the portion of McAllister Way between Shaffer Road and the CDFG facility, which would be reclassified as Controlled Service Access to limit use (see Figure 3-8) and would not allow widening or other capacity improvement. This road would serve as an overflow parking area during special events. Up to 45 vehicles could be parallel-parked along this road segment in a single row, leaving adequate pavement for use by bicycles and pedestrians.

The CLRDP also provides for construction of a new entry road and up to 550 new parking spaces, 10 of which would be designated for coastal access parking and 50 of which would be designated for dual-use parking (i.e., either campus visitor or public coast access parking). These provisions are generally identified on Figure 3-8.

Auto Circulation Policies

The CLRDP provides that: (1) the University would construct a new circulation system on the Marine Science Campus; (2) the Shaffer Road/Delaware Avenue intersection would be improved; (3) Shaffer Road adjacent to the campus would be widened consistent with the City of Santa Cruz General Plan and public improvement standards; (4) in the event that Shaffer Road is opened for access across the railroad tracks, the University would support construction of a culvert under Shaffer Road designed to facilitate wildlife movement; and (5) the existing access road (McAllister Way between Shaffer Road and the CDFG facility) would be abandoned as a campus street and used instead for bicycle and pedestrian access, controlled access for oversized service vehicles and special event parking, and occasional access for habitat management activities.

Travel Mode Split Policies

To encourage the use of alternative modes of transportation, the University would implement demand management measures in order to pursue a goal of having at least 30 percent of all person-trips made by using alternatives to the single-occupant vehicle. (Note: This goal is lower than the Main Campus trip-reduction goal since the Marine Science Campus serves a more diverse group of users including students, employees, and visitors, some of whom are more short-term users than Main Campus students, faculty, and staff.) Demand management measures include limiting parking, and promoting bicycle and transit use, carpool and vanpool use, and walking, as further described below.

Parking Policies

The University would construct parking as development proceeds only if warranted based on demand. No new parking spaces would be developed until existing parking spaces in a given parking activity zone are 90 percent used (on average). (The CLRDP indicates that parking activity zones would correspond to the three development areas identified in the land use plan [i.e., lower terrace, middle terrace, and upper terrace].) Parking would be regulated through the use of parking permits, and additional parking management strategies (e.g., carpools and vanpools, possible installation of a security booth, strategies for special events) would be implemented on a regular basis. The University would enforce parking regulations on the campus.

Pedestrian and Bicycle Facilities Policies

To promote bicycle use and walking, the University would provide secure bicycle racks outside major building complexes and lockers and showers in a convenient, central location, and would work with the City of Santa Cruz to identify and market bike routes to the campus. The University would design and construct pedestrian crossings (e.g., crosswalks at intersections or parking area entrances, raised crosswalks at mid-block crossings) in accordance with Federal Highway Administration regulations.

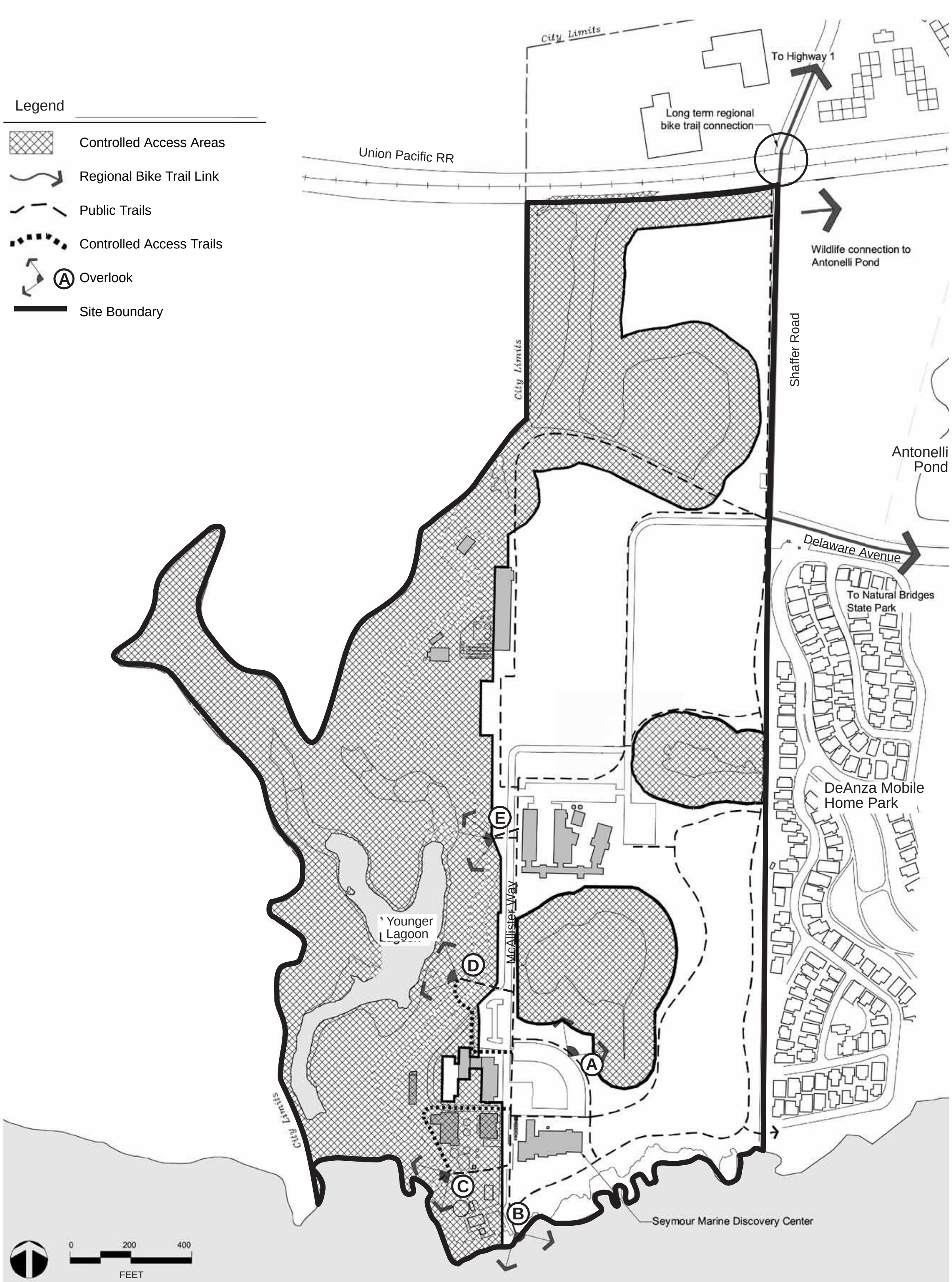
Transit Policies

To promote the use of University and public transit, the University would work with the Santa Cruz Metropolitan Transit District (SCMTD) to increase the frequency of transit service to points adjacent to the campus (as warranted by demand), would provide expanded UCSC Transportation and Parking Services (TAPS) shuttle service between the UCSC Main Campus and the Marine Science Campus (as warranted by demand), and would develop onsite transit infrastructure, such as covered transit stops. (Note: TAPS can provide UC employees with fully-subsidized SCMTD transit passes. Whether this benefit is extended to all Marine Science Campus staff has not been determined. Generally, staff paying parking fees to obtain permits at their worksite would be eligible for fully-subsidized or discounted bus passes.)

Public Access and Recreation Section

The CLRDP identifies four public access classifications for the campus: Public Trails, Overlooks, Controlled Public Access Areas, and Controlled Access Trails (see Figure 3-9, Coastal Access and Recreation Diagram, below). The Public Trails designation is intended to provide pedestrian and bicycle access to scenic areas of the campus where access restrictions are not needed for protection of coastal resources, public safety, or maintenance of security of sensitive University activity. The Overlooks classification is intended to provide points of visual access to the ocean, the YLR, and the seasonal pond north of Seymour Marine Discovery Center. The Controlled Public Access Areas designation is intended to provide pedestrian and bicycle access to scenic and coastal resource areas of the campus, consistent with safety, security, and protection of sensitive coastal resources and research areas; only authorized personnel, authorized visitors, and members of the public on a supervised tour would have access to these areas. The Controlled Access Trails designation is intended to provide pedestrian access to overlooks located in controlled access areas of the campus; only authorized personnel or members of the public on a supervised tour would have access to these trails.

The access improvements proposed as part of the CLRDP include: (1) improvement of the existing public access trails (i.e., widening to a minimum of five feet); (2) improvement of an existing overlook (Overlook D) (i.e., provide a closed observation blind, an ADA-accessible path, and associated drainage redesign) and construction of two new overlooks (Overlooks A and E); (3) construction of new public access trails (i.e., provide for a minimum width of five feet, materials include decomposed granite or similar permeable materials); and (4) construction of a new public access road, trail, and overlook signage and other media. These improvements are generally identified on Figure 3-9.



SOURCE: Draft CLRDP

Figure 3-9

Coastal Access and Recreation Diagram

The CLRDP states that the University would provide maximum public access to the coastal resources of the campus to the extent consistent with public safety, fragile coastal resources, implementation of the educational and research missions of the campus, and security of sensitive facilities and research activities. The University would establish procedures for admission of members of the public, provide coastal access parking, construct and maintain overlooks, and provide for docent-led tours and educational programs (e.g., the Seymour Center, programs for pre-college students).

Access to Resource Protection Areas, as designated on Figure 3-6, Land Use Diagram, above, would be limited to authorized personnel, with public access allowed with the University's written authorization. In Resource Protection Buffer Areas, the public would be allowed to use established roads and trails. Access outside these roads and trails would be limited to authorized personnel, with public access allowed with the University's written authorization. The University would provide access to the coastal bluff through existing and new overlooks, and would limit access down the coastal bluff face to authorized personnel. The University would provide public access to laboratories and research areas through supervised tours only. The University would maintain caretakers' residences and lab security onsite, and may limit the hours of public access to the site and/or establish a controlled entryway at Delaware and Shaffer Roads. The University would allow the use of bicycles on the campus, except on Controlled Access Trails. Public access signage would be used to provide information about coastal resources, public trails (including Controlled Access Trails), environmental dangers, and supervised tours. No cats, dogs, or other domestic pets that could pose a threat to wildlife would be allowed on the campus.

Hydrology and Water Quality Section

The hydrology and water quality section of the CLRDP consists of a Stormwater Concept Plan and a series of policies designed to minimize impacts on natural resource areas. The plan for controlling drainage, hydrology, and water quality on the project site is contained in CLRDP Appendix D, Stormwater Concept Plan. The plan calls for the correction of various existing drainage deficiencies on the campus (e.g., deposition of eroded soil on the bluffs of the YLR adjacent to the NMFS facility) and protection of sensitive habitat areas through a combination of natural drainage systems (which are referred to as Best Management Practices) and engineered filtration systems.

The Stormwater Concept Plan is based upon the policies and implementation measures of the hydrology and water quality section. These policies and measures provide that the University would (1) design the stormwater system using a combination of good site planning, source control and treatment best management practices, and engineered stormwater treatment systems; (2) maintain pre-development peak flows during the 2-, 5-, 10-, and 25-year storm event in the post-development drainage system; (3) maintain groundwater recharge at pre-development levels to the maximum extent practicable; (4) ensure that seawater pumped onto the site is contained and discharged; (5) ensure that any water used for landscape irrigation does not cause significant erosion and that any chemicals used for fertilizer and weed and pest control do not enter habitat areas or the ocean in sufficient concentrations to harm wildlife or habitat; (6) maintain and monitor stormwater to provide control of water quality and quantity; and (7) improve existing discharge points as necessary to correct existing erosion and/or other problems and to ensure that discharge facilities that drain into the YLR are designed to accommodate the 100-year storm event.

Utilities Section

The utilities section is designed to address the new and/or expanded service requirements of the new development proposed under the CLRDP. The program consists of six distinct utility systems: water, seawater, sanitary sewer, electrical, natural gas, and communication systems. The CLRDP identifies three utility use classifications for the campus: Utility Corridor, Utility Connection Point, and Utility Prohibition Zone (see Figure 3-10, Utilities Diagram, below). The Utility Corridor classification is intended to accommodate the utility systems listed above. The University would route all utility trunk lines through Utility Corridors, and would size all lines according to demand associated with the new development. The Utility Connection Point classification prescribes the location at which sewer and water utilities would be connected to City sewer and water lines. The Utility Prohibition Zone classification identifies an area through which the extension of sewer and water utility lines would be prohibited.

Water System

The improvements to the onsite water system proposed as part of the CLRDP include the expansion of mainline water pipes, as needed, to support the fire suppression demands of new structures. New mainline pipe sizes would be 6, 8, or 10 inches in diameter and would be located within campus roadways and easements. No offsite improvements would be required to accommodate the projected water demand. (See further discussion in Section 4.16, Utilities, Service Systems, and Energy.)

Seawater System

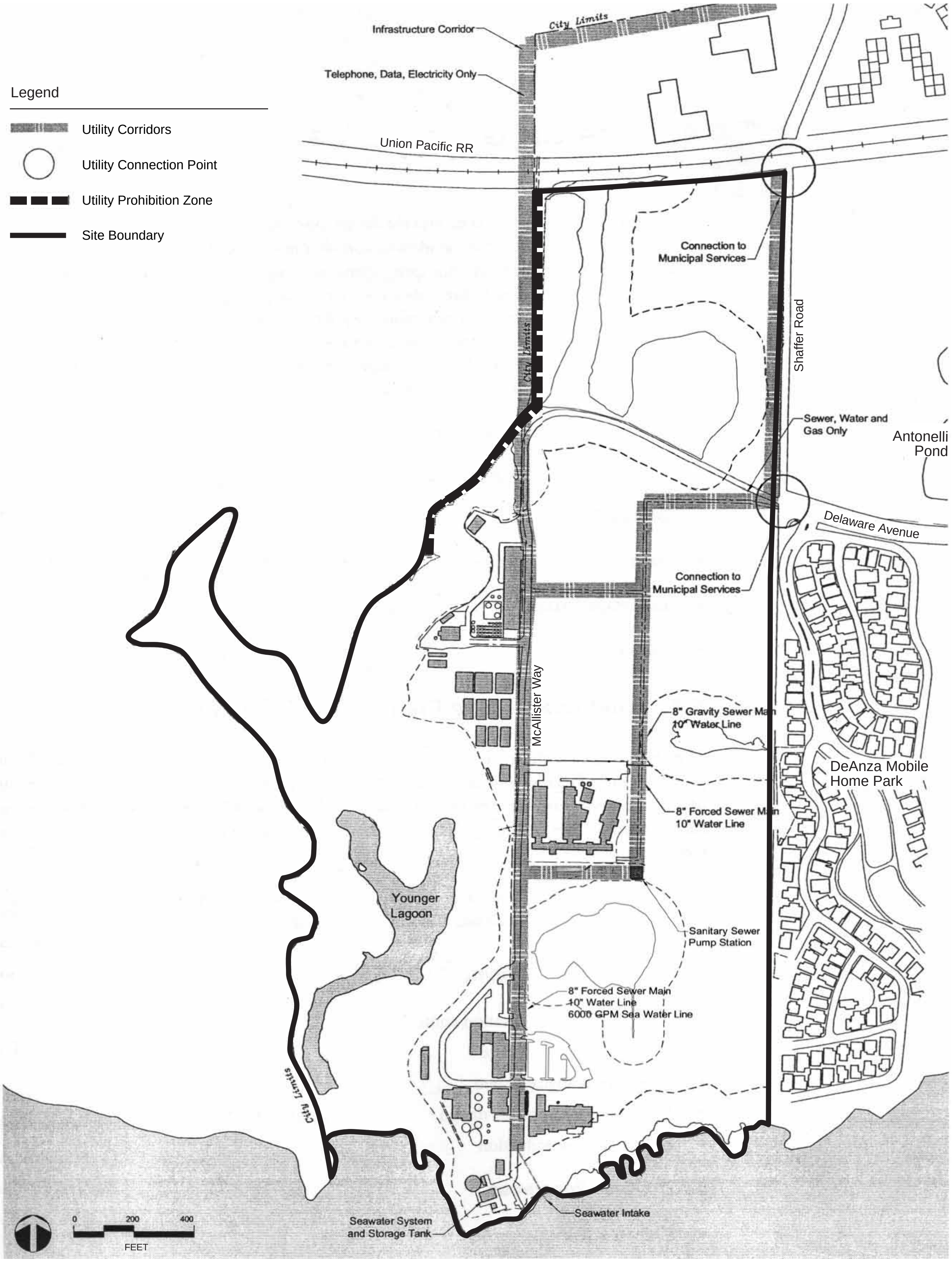
Expanded seawater capacity would be provided to the Marine Science Campus and, as needed, to uses outside the campus but within the City of Santa Cruz. The demand for seawater on the Marine Science Campus is projected to be about 6,000 gpm. The additional capacity is expected to be provided through reconstruction of the existing intake lines or construction of new intake lines at the southern edge of the site, near the existing lines, along with expanded seawater storage tanks, filtration and treatment facilities, and distribution improvements. Development under the CLRDP may require expansion of the existing seawater discharge system, which would be accomplished by increasing the size of existing discharge pipes or adding new pipelines. The expanded seawater capacity would be provided through utility corridors as shown in Figure 3-10.

Sanitary Sewer System

The improvements to the onsite sanitary sewer system proposed as part of the CLRDP include extension of sewer pipes to new structures and possible upgrades to an existing pump station adjacent to the NMFS facility. The extended sewer pipes would be provided through existing utility corridors. Pipe installation may require the utility companies involved to obtain encroachment permits from the City of Santa Cruz.

Electrical System

Expanded electrical service would be provided through the PG&E electrical grid. The existing underground utility corridor located along the western edge of the site would be used to accommodate the projected electrical power needs. Onsite improvements would consist of new transformers and the extension of underground services from existing and new transformers to



SOURCE: Draft CLRDP

Figure 3-10
Utilities Diagram

the new structures. New meters may also be required. Improvements to offsite power lines may include pulling new conductors through existing conduit or replacing existing conduit with larger conduit to accommodate the projected electricity demand.

Natural Gas System

Expanded natural gas service would be provided from PG&E's underground gas main in Delaware Avenue at the intersection of Shaffer Road (along the same utility alignment shared by water and sewer). Onsite improvements would include the extension of underground gas service to new structures from the existing gas mains. No offsite improvements are required to accommodate the projected natural gas demand. The University estimates an additional demand for natural gas of approximately 405,000 therms per year for research and education uses and 31,000 therms per year for support housing and visitor accommodations.

Communication Systems

Expanded telephone and data service would be provided to the new structures, as needed, through the existing underground utility corridor located along the western edge of the site. Onsite improvements would include the extension of telephone and data lines to the new structures through new conduits. No offsite improvements are required to accommodate the increased demand.

Utilities Policies

The utilities section contains policies and implementation measures providing that new or expanded public works facilities be limited to accommodate needs generated by development or uses consistent with the CLRDP building program. The section provides that, where existing or planned public works facilities can accommodate only a limited amount of new development, services to coastal-dependent land use, essential public services and basic industries vital to the economic health of the region, state, or nation, public recreation, commercial recreation, and visitor-serving land uses would not be precluded by other development. The University would install new underground utility lines and facilities through wetlands and riparian corridors only when there is no feasible less environmentally damaging alternative and where feasible mitigation measures have been provided. The University would operate the expanded seawater system in a manner that would protect against spillage and sustain the biological productivity and quality of coastal waters, streams, and wetlands.

DESIGN GUIDELINES CHAPTER

New development on the Marine Science Campus proposed under the CLRDP would be subject to design guidelines intended to carry out the design principles, land use concepts, policies, and implementation measures of the CLRDP. The CLRDP design guidelines chapter addresses the design of buildings, campus streets, parking, public trails, landscapes, lighting, and site signage.

Building Design

The building design guidelines are intended to establish a building design aesthetic at the Marine Science Campus that fits the existing character of the site and reduces the visual impact of the buildings. An overriding objective is to minimize the visual impact of buildings to the extent feasible consistent with program needs. This aim would be achieved by limiting building mass and height, using vernacular architectural forms such as the coastal barn as inspiration, and using materials and colors traditionally seen in the coastal rural setting. The guidelines are intended to reinforce the conception of the site as a transition zone between the rural/agricultural coastal landscape to the west and north and the developed urban area to the east. The building design guidelines address building arrangements, outdoor spaces and courts, building profile, appropriate construction materials and colors, and achievement of LEED Silver Rating[5] for the design and performance of new facilities.

Campus Street Design

The campus street design guidelines are intended to ensure that streets and the vehicles traveling on them are as unobtrusive within the overall site environment as possible. The guidelines address street design and setbacks from streets and parking lots.

Parking Design

The parking design guidelines are intended to minimize the visual impact of parking areas, protect water quality, limit negative effects of associated noise and lights, integrate parking into the overall site appearance, and use materials that would result in the least environmental impact. The guidelines address parking area layout, materials, and screening.

Public Trails Design

The public trails design guidelines are intended to make trails as unobtrusive and natural-appearing as possible while also providing functional pedestrian circulation that is attractive to use in all seasons and weather conditions, thereby encouraging people to walk the site rather than traveling by car. The guidelines address trail widths and materials, and the design of major and minor trails.

Landscape Design

The landscape design guidelines are intended to establish the appropriate use of plant materials onsite. The guidelines apply to landscaping natural drainage features and areas adjacent to, connecting, and within development zones. They promote use of plant material that is native to the Northern and Central California coast, drought-tolerant, non-invasive, low maintenance, fire-retardant, and from the same local gene pool. The guidelines for planting at the campus are specific to four general types of landscape areas that would be found onsite: drainage basins and swales, structural landscape, transitional landscape, and ornamental planting.

Lighting Design

The lighting design guidelines are intended to provide the lowest levels of lighting necessary to achieve safety and efficient wayfinding, avoid spilling light into natural habitat areas (particularly the YLR) and surrounding neighborhoods, and minimize artificial light interference with views of the coastal night sky. The guidelines address lighting for buildings, streets, parking areas, pathways, and special areas and features.

[5] The Leadership in Energy and Environmental Design (LEED) Green Building Rating System is administered by the U.S. Green Building Council and provides a building industry standard to gauge the environmental stewardship quotient of a project.

Site Signage Design

The site signage design guidelines are intended to minimize the visual impact of signage and to avoid clutter onsite through providing the minimum amount of signage necessary to convey information to site users. Site signage is to be used to provide information to control traffic, provide directions for visitors, identify buildings, denote pedestrian pathways, inform site users regarding restricted areas, and educate campus users and visitors about the natural history and character of the site.

CAPITAL IMPROVEMENT PROGRAM CHAPTER

This chapter of the CLRDP sets forth a schedule for certain infrastructure improvements at the Marine Science Campus. The chapter addresses the timing of the following types of improvements:

- Public access improvements (public and controlled access trails, overlooks, coastal access parking);
- Habitat enhancements and maintenance (wetland restoration, creation and management of wildlife corridors, management of natural areas);
- Circulation improvements (Shaffer Road, realigned campus road, Shaffer Road/Delaware Avenue intersection improvements); and
- Stormwater system improvements (repair of drainage pipe to De Anza Santa Cruz residential community, overflow protection of seasonal pond, repair of drainage adjacent to the NMFS facility, reconstruction of the stormwater outfall to the YLR, and construction of the new discharge facility).

The capital improvement program generally links the timing of these improvements to construction of buildings, road improvements, or other improvements in specific areas of the site. With the exception of public access improvements, the capital improvement program does not address the scheduling of elements of the Marine Science Campus building program (see Table 3-2 above). The elements of the building program would be pursued as funding is available and research and education partnerships are formed.

ANTICIPATED MARINE SCIENCE CAMPUS POPULATION

Implementation of the CLRDP building program would introduce additional persons to the Marine Science Campus. Table 3-4 shows the anticipated population associated with each CLRDP building program item, based on the estimated design capacity and average daily occupancy of space. The development program would result in building space with capacity for approximately 1,537 people, or a net new population of approximately 1,500, taking into account changes in occupancy. The average daily occupancy of the new space would be approximately 797 people, or a net new population of approximately 888, taking into account changes in occupancy. The potential effects of this population increase are addressed in detail in Chapter 4, Environmental Setting, Impacts, and Mitigation Measures.

TABLE 3-4
MARINE SCIENCE CAMPUS DESIGN CAPACITY AND AVERAGE DAILY OCCUPANCY[a,b]

		Design Capacity By Use						Average Daily Occupancy By Use					
CLRDP Program Item	Size	Offices/Lab Workstations	Housing (beds)	Class-rooms	Group Space	Visitor Space	Total	Offices/Lab Workstations	Housing (beds)	Class-rooms	Group Space	Visitor Space	Total
Existing Facilities													
Seymour Marine Discovery Center	20,000	14	0	24	0	480	**518**	13	0	24	0	160	**197**
Ocean Health, Phase I	23,000	84	0	36	0	0	**120**	76	0	36	0	0	**112**
Other Primary Long Marine Lab Buildings	15,200	43	0	0	0	0	**43**	39	0	0	0	0	**39**
Avian Facility	2,160	5	0	0	0	0	**5**	5	0	0	0	0	**5**
Greenhouses	26,844	6	0	0	0	0	**6**	5	0	0	0	0	**5**
Temporary Caretaker Housing	1,400	4	0	0	0	0	**4**	4	0	0	0	0	**4**
CDFG Marine Wildlife Center	20,000	10	0	0	0	0	**10**	9	0	0	0	0	**9**
NMFS Inholding	53,400	60	0	0	0	0	**60**	54	0	0	0	0	**54**
Subtotal	**162,004**	**226**	**0**	**60**	**0**	**480**	**766**	**205**	**0**	**60**	**0**	**160**	**425**
CLRDP Building Program													
Marine Research and Education	254,500	553	0	80	0	0	**633**	498	0	112	0	0	**610**
Outdoor Research Area	70,000	0	0	0	0	0	**0**	0	0	0	0	0	**0**
Support Facilities													
Seminar Auditorium	5,000	0	0	0	88	262	**350**	0	0	0	NA	13	**13**
Meeting Rooms	2,500	0	0	0	88	87	**175**	0	0	0	NA	11	**11**
Food Service	3,500	5	0	0	90	10	**105**	5	0	0	NA	NA	**5**
Sports Courts	8,000	0	0	0	0	0	**0**	0	0	0	0	0	**0**
Support Housing													
Apartments and Townhouses	82,000	0	190	0	0	0	**190**	0	110	0	0	0	**110**
Visitor/Overnight Accommodations	2,500	0	10	0	0	0	**10**	0	5	0	0	0	**5**
Group Housing	12,000	0	60	0	0	0	**60**	0	30	0	0	0	**30**
Caretaker Replacement Housing	1,600	0	4	0	0	0	**4**	0	4	0	0	0	**4**
Equipment Storage & Maintenance													
Shared Warehouse	37,500	10	0	0	0	0	**10**	9	0	0	0	0	**9**
Shared Laydown Yard	70,000	0	0	0	0	0	**0**	0	0	0	0	0	**0**
Public Access and Recreation (trails/overlooks)	N/A	0	0	0	0	0	**0**	0	0	0	0	0	**0**
Seawater System Expansion	12,000	0	0	0	0	0	**0**	0	0	0	0	0	**0**
Subtotal	**561,100**	**568**	**264**	**80**	**266**	**359**	**1,537**	**512**	**149**	**112**	**0**	**24**	**797**
Changed Occupancy of Existing Building													
Seymour Marine Discovery Center	0	0	0	0	0	0	**0**	0	0	10	0	96	**106**
Ocean Health (increased use)[c]	0	0	0	0	0	0	**0**	0	0	18	0	0	**18**
Original LML Building (trailer removal)	-3,000	-27	0	0	0	0	**-27**	-24	0	0	0	0	**-24**
Temporary Caretaker Housing (removal)	-1,400	0	-4	0	0	0	**-4**	0	-4	0	0	0	**-4**
Greenhouses (removal)	-26,844	-6	0	0	0	0	**-6**	-5	0	0	0	0	**-5**
Subtotal	**-31,244**	**-33**	**-4**	**0**	**0**	**0**	**-37**	**-29**	**-4**	**28**	**0**	**96**	**91**

TABLE 3-4 (Continued)
MARINE SCIENCE CAMPUS DESIGN CAPACITY AND AVERAGE DAILY OCCUPANCY

		Design Capacity By Use						Average Daily Occupancy By Use					
CLRDP Program Item	**Size**	**Offices/Lab Workstations**	**Housing (beds)**	**Class-rooms**	**Group Space**	**Visitor Space**	**Total**	**Offices/Lab Workstations**	**Housing (beds)**	**Class-rooms**	**Group Space**	**Visitor Space**	**Total**
Total New (By Program Category)													
Buildings													
Marine Research and Education	254,500	553	0	80	0	0	**633**	498	0	112	0	0	**610**
Support Facilities	19,000	5	0	0	266	359	**630**	5	0	0	NA	24	**29**
Support Housing	98,100	0	264	0	0	0	**264**	0	149	0	0	0	**149**
Equipment Storage & Maintenance	37,500	10	0	0	0	0	**10**	9	0	0	0	0	**9**
Subtotal	409,100	568	264	80	266	359	**1,537**	512	149	112	0	24	**797**
Outdoor Facilities													
Outdoor Research Area	70,000	0	0	0	0	0	**0**	0	0	0	0	0	**0**
Equipment Storage & Maintenance	70,000	0	0	0	0	0	**0**	0	0	0	0	0	**0**
Public Access and Recreation	0	0	0	0	0	0	**0**	0	0	0	0	0	**0**
Subtotal	140,000	0	0	0	0	0	**0**	0	0	0	0	0	**0**
TOTAL	549,100	568	264	80	266	359	**1,537**	512	149	112	0	24	**797**
NET INCREASE (with changed occupancy)	529,856	535	260	80	266	359	**1,500**	483	145	140	0	120	**888**
TOTAL NET NEW PLUS EXISTING	**691,860**	**761**	**260**	**140**	**266**	**839**	**2,266**	**688**	**145**	**200**	**0**	**280**	**1313**

[a] Capacity of existing and future marine research space was provided by the Institute of Marine Sciences. Future capacity was based on estimates of the amount of square feet per person required for likely future projects that could be built under the CLRDP. Capacity of the auditorium complex, the dorm rooms, and the visitor overnight accommodations were derived from information provided by Ove Arup & Partners. Capacity of the other housing was derived from average occupancy rates for on-campus faculty housing, provided by UCSC Housing Services. Average Daily occupancy was based on estimates of average occupancy for particular uses provided by the Institute of Marine Sciences. Further detail about methodology for determining capacity and occupancy is provided in “UCSC Marine Science Campus: Program, Capacity, and Occupancy Detail,” September 24, 2002.

[b] As appropriate, the impact analyses in this EIR use various components of the design capacity and average daily occupancy estimates for quantitative analysis. For example, population and housing impacts do not count daytime or overnight visitors, but analysis of transportation impacts does count visitors.

[c] Increased average daily occupancy for the Ocean Health classroom space exceeds existing design capacity. Additional occupancy would be accommodated by reconfiguring classroom space and/or by conducting more than one class per day.

NEAR-TERM PROJECTS

The CLRDP Prototype Site Plan (Figure 3-7) depicts development sites and building footprints for five near-term projects that are expected to be built in the early phases of the building program (by about 2010). The CLRDP also provides prototype building studies for these five projects. The near-term projects are based on early project planning efforts that are currently underway. The projects are: (1) Shared Campus Warehouse and Laydown Facility, (2) 42 Apartment/Townhouse Units, (3) United States Geological Survey Western Coastal and Marine Geology Facility, (4) Sea Otter Research and Conservation Center, and (5) Center for Ocean Health Phase II (including new and improved overlooks). These five projects receive project-level CEQA review in this EIR, as described in Chapter 1, Introduction. Specific information for the five projects is provided below. Table 3-5 presents the anticipated population based on estimated design capacity and average daily occupancy of each of the near-term projects.

SHARED CAMPUS WAREHOUSE AND LAYDOWN FACILITY

A Shared Campus Warehouse and Laydown Facility, consisting of two buildings providing approximately 37,500 sf of shared warehouse space and 70,000 sf of shared laydown yard, is tentatively planned for construction on the upper terrace. The approximately 35-foot-tall shared warehouse, storage, and maintenance facility would allow for continued onsite outfitting of ocean-going research vessels, as well as maintenance and repair of equipment (see Figure 3-11, Shared Campus Warehouse and Laydown Facility Site Plan and Elevations). The building complex would include a repair shop, warehouse space, and some offices and laboratories, and would have a design capacity for approximately 10 people (see Table 3-5). The average daily occupancy of this facility would be approximately 9 people. The laydown yard would provide additional open storage space for ocean-going vessels and would not increase the campus population.

The Shared Campus Warehouse and Laydown Facility would be included under the Equipment Storage and Maintenance portion of the CLRDP building program, which allows for shared warehouse and equipment yards.

42 APARTMENT/TOWNHOUSE UNITS

Approximately 43,050 sf of support housing is proposed to provide onsite temporary residential accommodations for visiting and resident Marine Science Campus scientists and students, whose learning experience or research requires or would be enhanced by their presence on the campus.

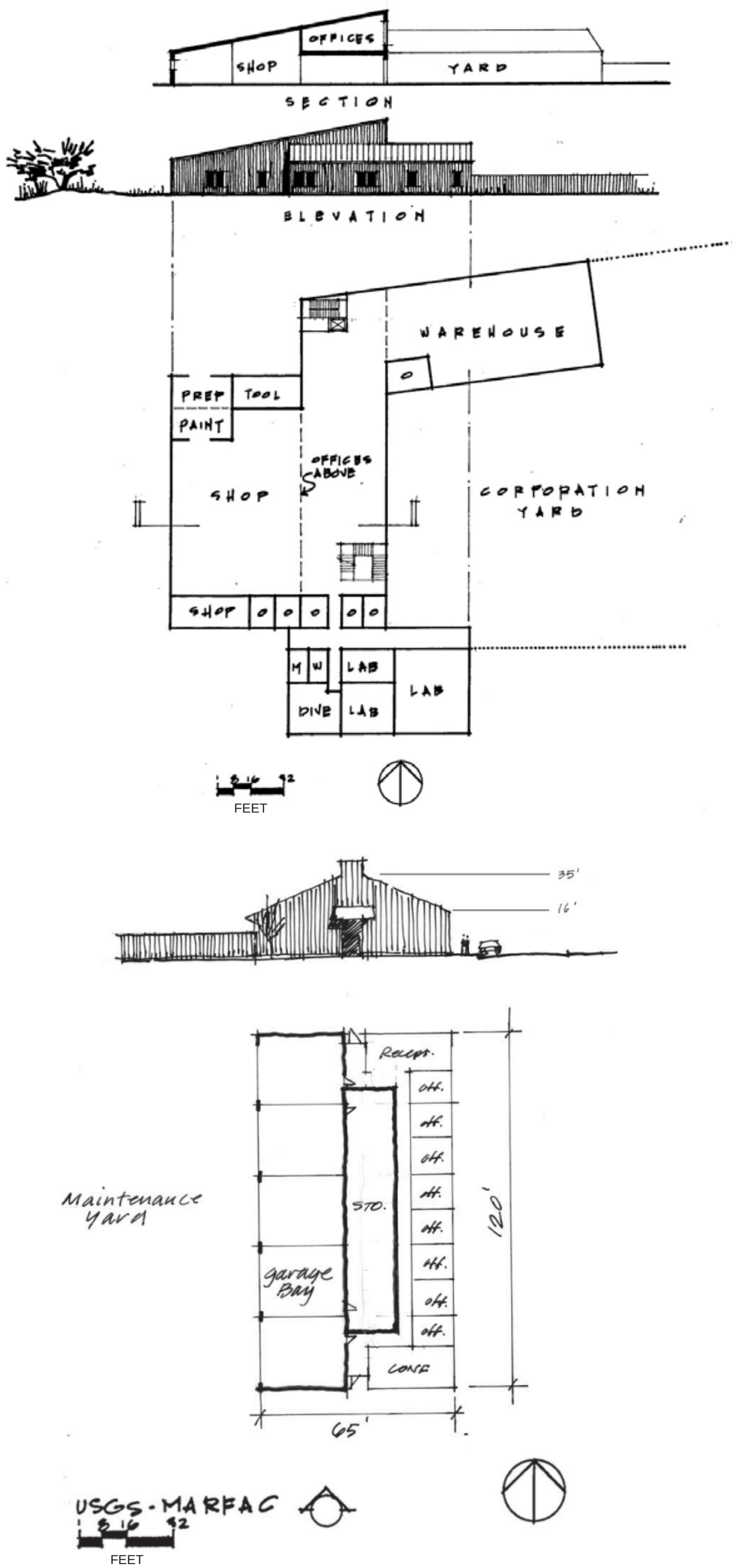
The support housing would consist of 42 apartment and townhouse units on the middle terrace, northeast of the NMFS facility and about 300 feet west of the De Anza Santa Cruz residential community perimeter wall. The apartment/townhouse units would be approximately 25 feet in height and would be designed according to relevant CLRDP policies, implementation programs, and design guidelines (see Figure 3-12, 42 Apartment/Townhouse Units Project Site Plan and Elevations).

TABLE 3-5
DESIGN CAPACITY AND AVERAGE DAILY OCCUPANCY FOR NEAR-TERM PROJECTS

		DESIGN CAPACITY BY USE						AVERAGE DAILY OCCUPANCY BY USE					
NEAR-TERM PROJECTS	**SIZE (sf)**	**Offices/ Labs**	**Housing (beds)**	**Class-rooms**	**Group Space**	**Visitor Space**	**Total**	**Offices/ Labs**	**Housing (beds)**	**Class-rooms**	**Group Space**	**Visitor Spaces**	**Total**
Shared Campus Warehouse and Laydown Facility	107,500	10	0	0	0	0	10	9	0	0	0	0	9
42 Apartment/Townhouse Units	43,050	0	100	0	0	0	100	0	58	0	0	0	58
USGS Facility	78,500	144	0	0	0	0	144	130	0	0	0	0	130
SORACC	10,000	20	0	0	0	0	20	18	0	0	0	0	18
Ocean Health Phase II (includes overlooks)	18,000	60	0	30	0	0	90	54	0	42	0	0	96[b]
Subtotal	**257,050**	**234**	**100**	**30**	**0**	**0**	**364**	**211**	**58**	**42**	**0**	**0**	**311**

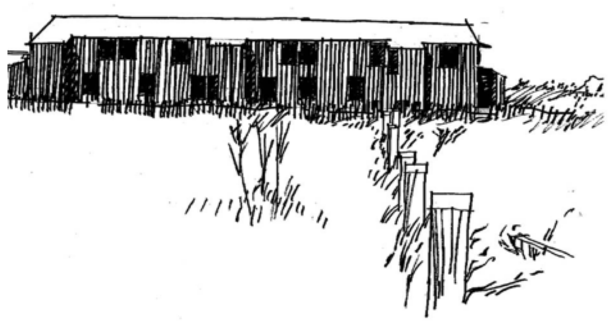
[a] As appropriate, the impact analyses in this EIR use various components of the design capacity and average daily occupancy estimates for quantitative analysis. For example, population and housing impacts do not count daytime or overnight visitors, but analysis of transportation impacts does count visitors.

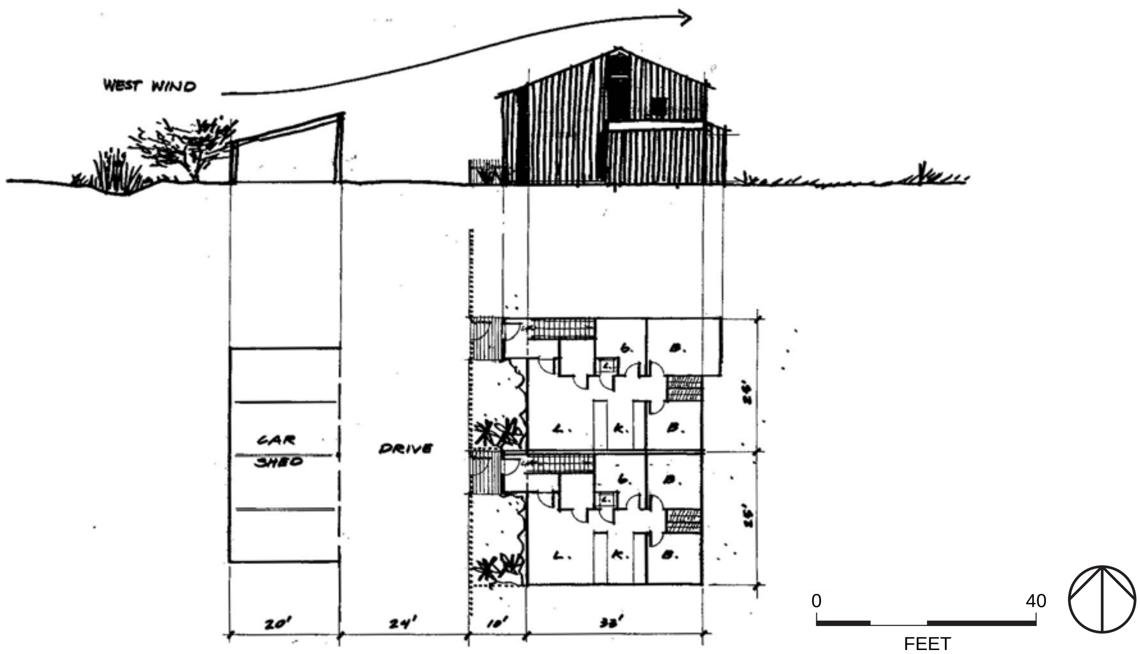
[b] Because there would be more than one class held in the Ocean Health II classroom on certain days, the average daily occupancy for the facility is higher than the design capacity.



SOURCE: BMS Design Group

Figure 3-11
Shared Campus Warehouse and Laydown Facility Site Plan and Elevations





SOURCE: Draft CLRDP

Figure 3-12
42 Apartment/Townhouse Units
Project Site Plan and Elevations

The 42 support housing units would have a design capacity for approximately 100 people. The average daily occupancy of these units would be approximately 58 people (see Table 3-5).[6]

The apartment/townhouse project would be included under the Support Housing portion of the CLRDP building program, which allows for apartment and townhouse units. The apartment/townhouse project would be intended to help carry out the CLRDP intent for support housing, e.g., "achieving a fully integrated education and research environment involving different types of scientists and students" and "creation of on-site work-live capabilities for those whose learning experience or research requires or would be enhanced by their presence on campus during extended hours" (CLRDP, page IV-7).

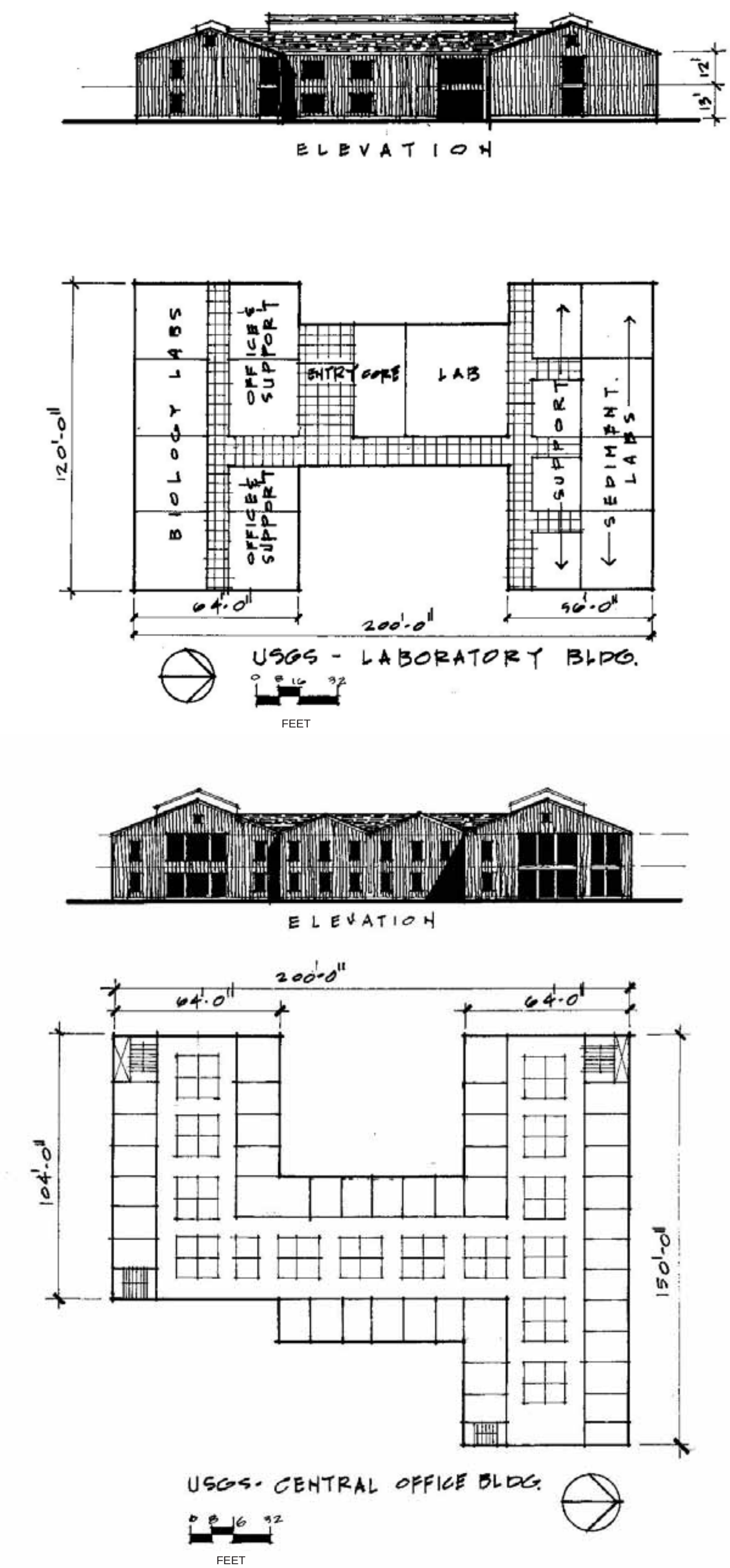
UNITED STATES GEOLOGICAL SURVEY WESTERN COASTAL AND MARINE GEOLOGY FACILITY

The United Stated Geological Survey (USGS) has been working with the University for 10 years to relocate some of its marine-related functions to the UCSC Marine Science Campus in an approximately 78,500 sf, two-story USGS Western Coastal and Marine Geology Facility. The new facility would likely be located on the middle terrace, north of the approximately 2.5-acre NMFS inholding. The new facility would consist of a central office building and a laboratory building to accommodate a combination of marine biologists, hydrologists and geologists from the USGS Biological Resources Division, Water Resources Division, and Coastal and Marine Group. The buildings would be about 34 feet in height and their design would comply with relevant CLRDP policies, implementation programs, and design guidelines to help ensure appropriate use of construction materials and lighting, as well as adherence to standard building setbacks and lengths (see Figure 3-13, USGS Western Coastal and Marine Geology Facility Site Plan and Elevations). The facility would have a design capacity for approximately 144 people. The average daily occupancy of this building would be approximately 130 people (see Table 3-5).

The USGS Western Coastal and Marine Geology Facility would be included under the Marine Research and Education portion of the CLRDP building program, which allows for laboratories, teaching and seminar rooms, offices, and storage facilities related to marine research and education.

The USGS facility may be constructed and owned by USGS, by the University, or by a third-party developer. If the University did not construct and own the facility, the University would retain ownership of the land and enter into a ground lease of the land to either USGS or a third-party developer. The terms of the ground lease would include all of the design criteria included in the CLRDP, financial obligations, campus policy requirements, and, if necessary, conditions to ensure implementation of any mitigation measures that are identified in the EIR for the USGS project.

[6] To prevent double counting, the average daily occupancy for these units considers only those residents that are not occupying other space on the Marine Science Campus.



SOURCE: BMS Design Group

Figure 3-13
USGS Western Coastal and Marine Geology
Facility Site Plan and Elevations

SEA OTTER RESEARCH AND CONSERVATION CENTER

The Monterey Bay Aquarium has expressed an interest in developing a Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) on the middle terrace, adjacent to the YLR and just south of the existing CDFG Marine Wildlife Center. The new facility would focus on research and conservation of the Southern sea otter and would include space for administrative offices and sea otter critical-care and support uses. The two buildings would be about 24 feet in height and their design would comply with relevant CLRDP policies, implementation programs, and design guidelines to help ensure appropriate use of construction materials and lighting, as well as adherence to standard building setbacks and lengths (see Figure 3-14, Sea Otter Research and Conservation Center (SORACC) Site Plan and Elevations). The SORACC facility would have a design capacity for approximately 20 people. The average daily occupancy of this facility would be approximately 18 people (see Table 3-5).

The SORACC facility would be included under the Marine Research and Education portion of the CLRDP building program, which allows for laboratories, teaching and seminar rooms, offices, and storage facilities related to marine research and education.

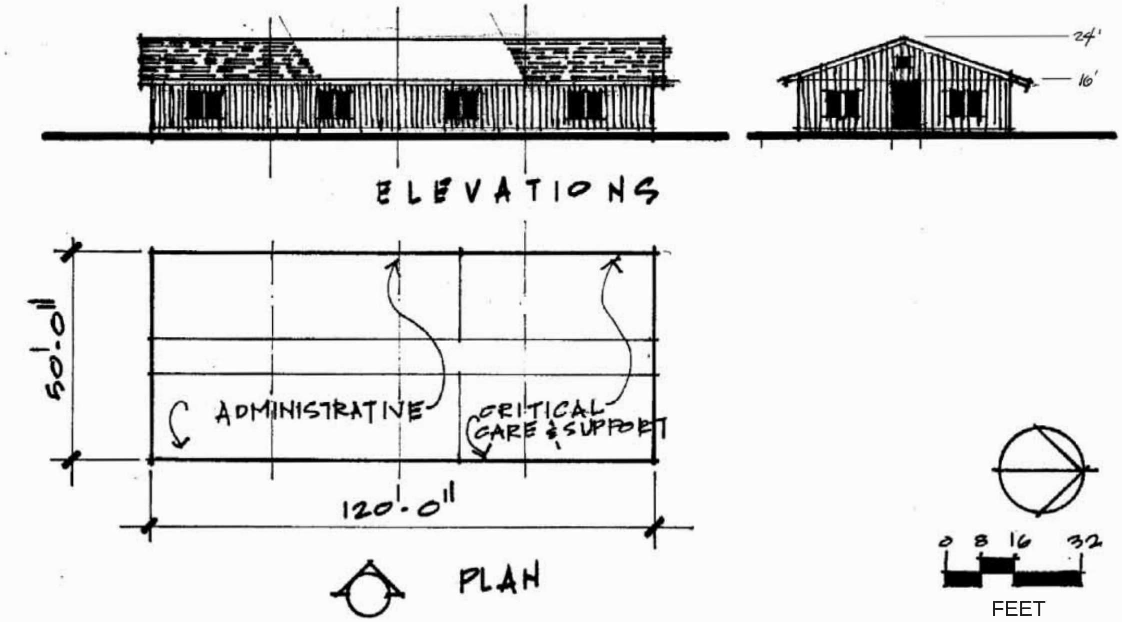
The SORACC facility may be constructed and owned by Monterey Bay Aquarium, by the University, or by a third-party developer. If the University did not construct and own the facility, the University would retain ownership of the land and enter into a ground lease of the land to either Monterey Bay Aquarium or a third-party developer. The terms of the ground lease would include all of the design criteria included in the CLRDP, financial obligations, campus policy requirements, and, if necessary, conditions to ensure implementation of any mitigation measures that are identified in the EIR for the SORACC project.

CENTER FOR OCEAN HEALTH PHASE II

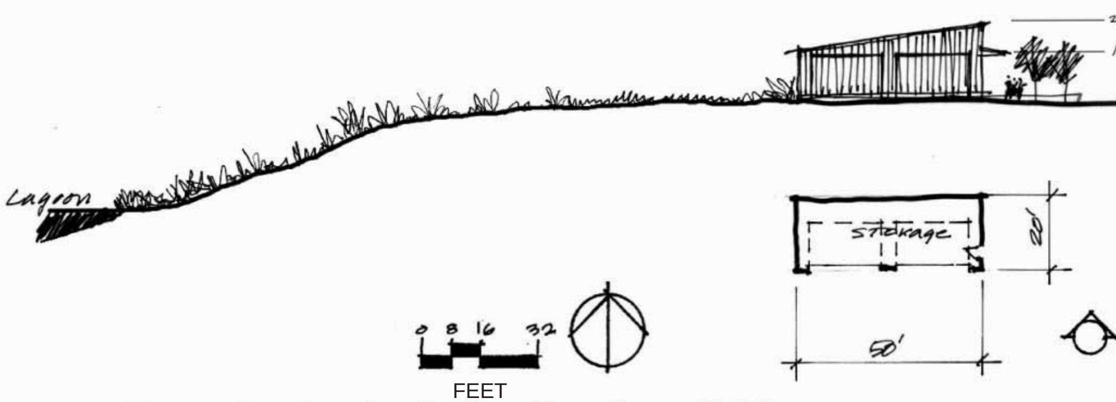
The existing Center for Ocean Health building is the core research and administration facility for LML. The Center for Ocean Health is located on the lower terrace, just north of the Younger building, and consists of laboratory and office space, administrative support space, and meeting and teaching rooms within an approximately 34-foot-tall building. Completed in mid-2001, the center is already operating at capacity, as are four mobile office units in the adjacent service yard.

The proposed project (Center for Ocean Health Phase II) would expand the existing building by approximately 18,000 sf, allow for permanent replacement of the four mobile units, and increase the number of available laboratories plumbed with seawater. The building addition would also be approximately 34 feet tall and would incorporate design elements that are intended to blend with the existing building and campus-wide design (see Figure 3-15, The Center for Ocean Health Phase II Site Plan and Elevation). The Center for Ocean Health Phase II building would have a design capacity for approximately 90 people. The average daily occupancy of this building would be approximately 96 people (see Table 3-5).[7]

[7] Because there would be more than one class held in the Ocean Health II classroom on certain days, the average occupancy for the facility is higher than the design capacity.



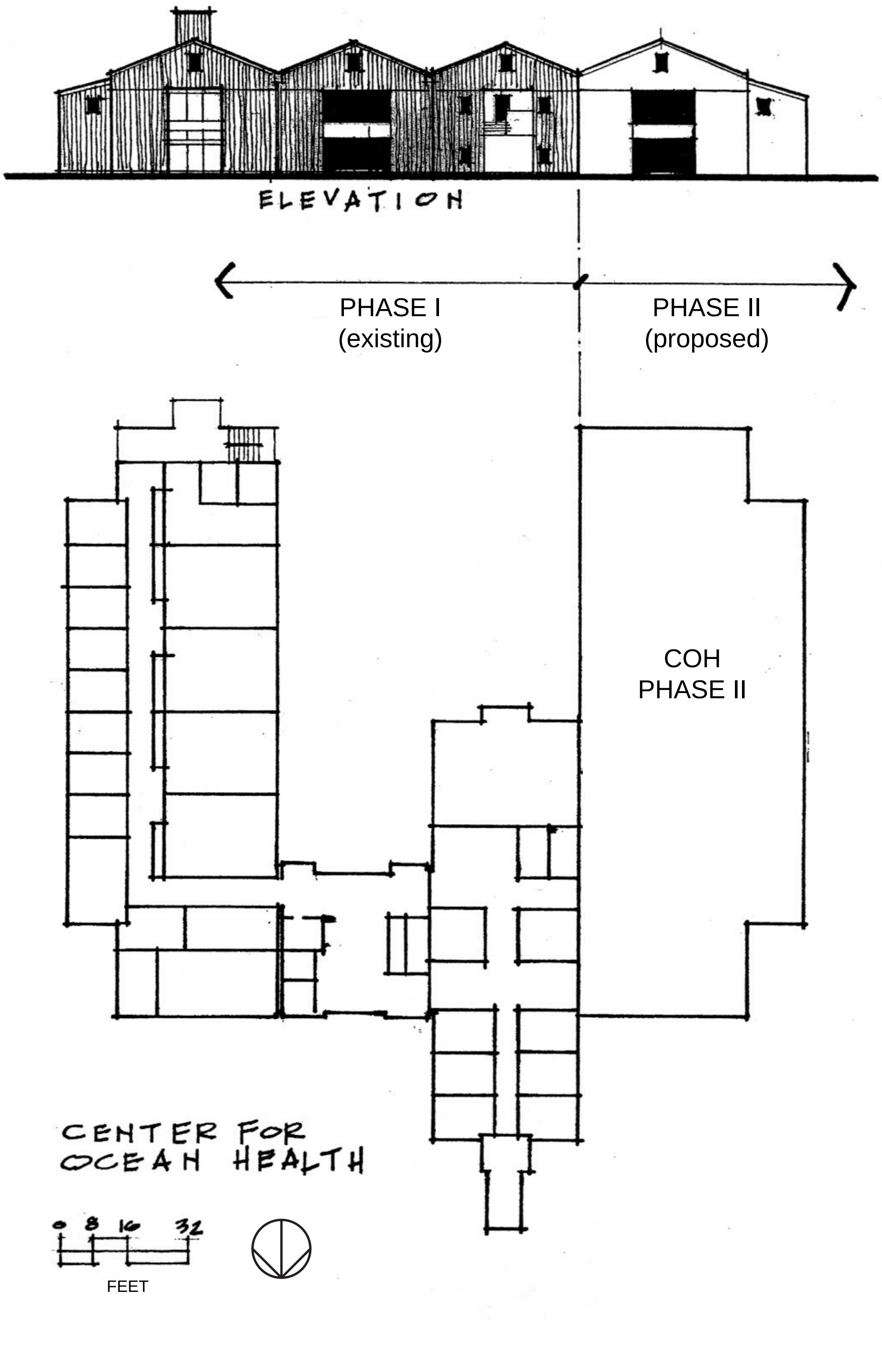
Monterey Bay Aquarium Sea Otter Center



Monterey Bay Aquarium Sea Otter Center Storage Building

SOURCE: Draft CLRDP

Figure 3-14
Sea Otter Research and
Conservation Center (SORACC)
Site Plan and Elevations



SOURCE: Draft CLRDP

Figure 3-15
The Center for Ocean Health
Phase II Site Plan and Elevation

The Center for Ocean Health Phase II building would be included under the Marine Research and Education portion of the CLRDP building program, which allows for laboratories, teaching and seminar rooms, offices, and storage facilities related to marine research and education.

Additionally, the proposed project would include the construction of two new public-access overlooks and improvement of an existing overlook, as described in more detail in CLRDP Appendix C.[8] The first new overlook (Overlook A) would be developed adjacent to the northern edge of the Seymour Marine Discovery Center parking lot and would permit viewing of the seasonal wetland located just north of this parking lot. The second new overlook (Overlook E) would be developed adjacent to the eastern edge of the YLR, just west of the NMFS facility, and would permit viewing of the main section of the lagoon and the agricultural fields beyond. An existing overlook (Overlook D), located north of the Center for Ocean Health building on the Younger Lagoon side of the earthern berm, would be improved to provide an enclosed observation blind to allow for viewing of the lagoon wildlife. Each overlook would provide interpretive panels that would identify the major natural features of the landscape.

D. CLRDP APPROVAL

The process for approval of the CLRDP involves review and decision by both The Regents of the University of California and the California Coastal Commission. The long range development plan for the UCSC campus, adopted in 1989, does not include the Marine Science Campus. With enlargement of the Marine Science Campus site and adoption of plans for an expanded marine science program has come the need for long range development planning by the University.

The California Coastal Act (the Coastal Act)[9] establishes goals and policies that must guide development within the state's coastal zone. The Marine Science Campus lies entirely within the coastal zone. For state universities, the policies of the Coastal Act may be implemented in either of two ways: through Commission review of individual projects, or through University review of projects under a long range development program that has been certified by the Commission. To date, the University has relied on Commission review of individual project proposals that were based on a Master Plan for the Long Marine Laboratory covering only the original 16-acre LML site.[10] The CLRDP would bring together and harmonize the University's plans for the enlarged campus and the policies of the Coastal Act. If the CLRDP is approved by The Regents and the Coastal Commission, primary development review authority will be exercised by the University, with limited review by the Coastal Commission, which may impose conditions to assure consistency with the Coastal Act.

In their role as lead agency under CEQA, The Regents must consider and certify the EIR as compliant with the requirements of CEQA and adopt a mitigation monitoring program prior to approval of the CLRDP. The Coastal Commission, as a responsible agency under CEQA, then must consider the EIR and review the CLRDP in light of Coastal Act standards. Under Sections 30605, 30512, and 30513 of the Coastal Act, the CLRDP must be consistent with and adequate to carry out the relevant policies of the Coastal Act. In preparing the CLRDP, the University must also coordinate and consult with local governments so as to make the plan consistent to the fullest extent feasible with the appropriate local coastal program (LCP).

8 The California Coastal Commission required as a condition of its approval for the existing Center for Ocean Health building (Permit No. 3-83-76 A13) that improved public access to YLR, and the site in general, be provided.
9 California Public Resources Code, Division 20.
10 UCSC, *Institute of Marine Sciences Long Marine Laboratory Master Plan*, 1992, Revised 1993.

Although the project site lies within the City of Santa Cruz and is covered by its General Plan, the City's LCP excludes this area and identifies it as an "area of deferred certification." Moreover, under Article IX, Section 9 of the California Constitution, the University land is exempt from local land use regulation. Nevertheless, the City's LCP contains provisions relevant to development of the Marine Science Campus, and the CLRDP has been structured to be consistent to the fullest extent feasible with these LCP provisions as well as relevant provisions of the County of Santa Cruz LCP. Section 4.9, Land Use and Planning, further describes the coastal development process and evaluates project consistency with relevant Coastal Act and LCP provisions.

E. CLRDP IMPLEMENTATION

After certification of the CLRDP by the Coastal Commission and assumption of primary permit authority by the University, individual development projects will be reviewed by the University for consistency with the CLRDP. Upon approval of a project and before start of construction, the University must notify the Commission and interested persons. The Commission may then hold a hearing on the matter and impose conditions it finds necessary to bring the project into accordance with the Coastal Act. See CLRDP, Section 8, Development Procedures, and Public Resources Code Sections 30605-30607.

The foregoing post-CLRDP certification process will govern approval of the five near-term development projects for which this Draft EIR serves as a project-level EIR (Shared Campus Warehouse and Laydown Facility, 42 Apartment/Townhouse Units, USGS Western Coastal and Marine Geology Facility, the SORACC, and Center for Ocean Health Phase II). The Draft EIR provides information concerning environmental effects of the five projects for use by agency decision-makers and the public.

The University of California is the lead agency for approval of the five near-term projects covered by this Draft EIR and is expected to be lead agency for all subsequent development projects carried out under the CLRDP. All other responsible or trustee agencies with responsibility for natural resources affected by the project were notified of the preparation of this Draft EIR, and their review and comments were addressed in the document.

Agencies that have permit approval or review authority over the proposed project include the following:

- University of California (approval and adoption of both the CLRDP and CLRDP EIR); and
- California Coastal Commission (certification of the CLRDP).

Permits from and/or consultation with the following agencies would also likely be required:

- U.S. Army Corps of Engineers;
- Monterey Bay Air Pollution Control Board;
- Regional Water Quality Control Board;
- State Lands Commission; and
- Monterey Bay National Marine Sanctuary.

CHAPTER 4

ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

This chapter of the EIR presents the potential environmental impacts of the proposed CLRDP. The analysis addresses both the entire development program (i.e., the CLRDP building program and other improvements such as trails and stormwater facilities) and the five near-term projects. The overall scope of the analysis and key attributes of the analytical approach are presented below to assist readers in understanding the manner in which the impact analysis has been conducted in this EIR.

Sixteen resource areas identified in the CEQA Environmental Checklist are examined in the sections that follow. For each resource area, the EIR describes the existing and future setting, the potential for the proposed project to cause significant impact within the resource area, and mitigation measures that could reduce or avoid potentially significant impacts.

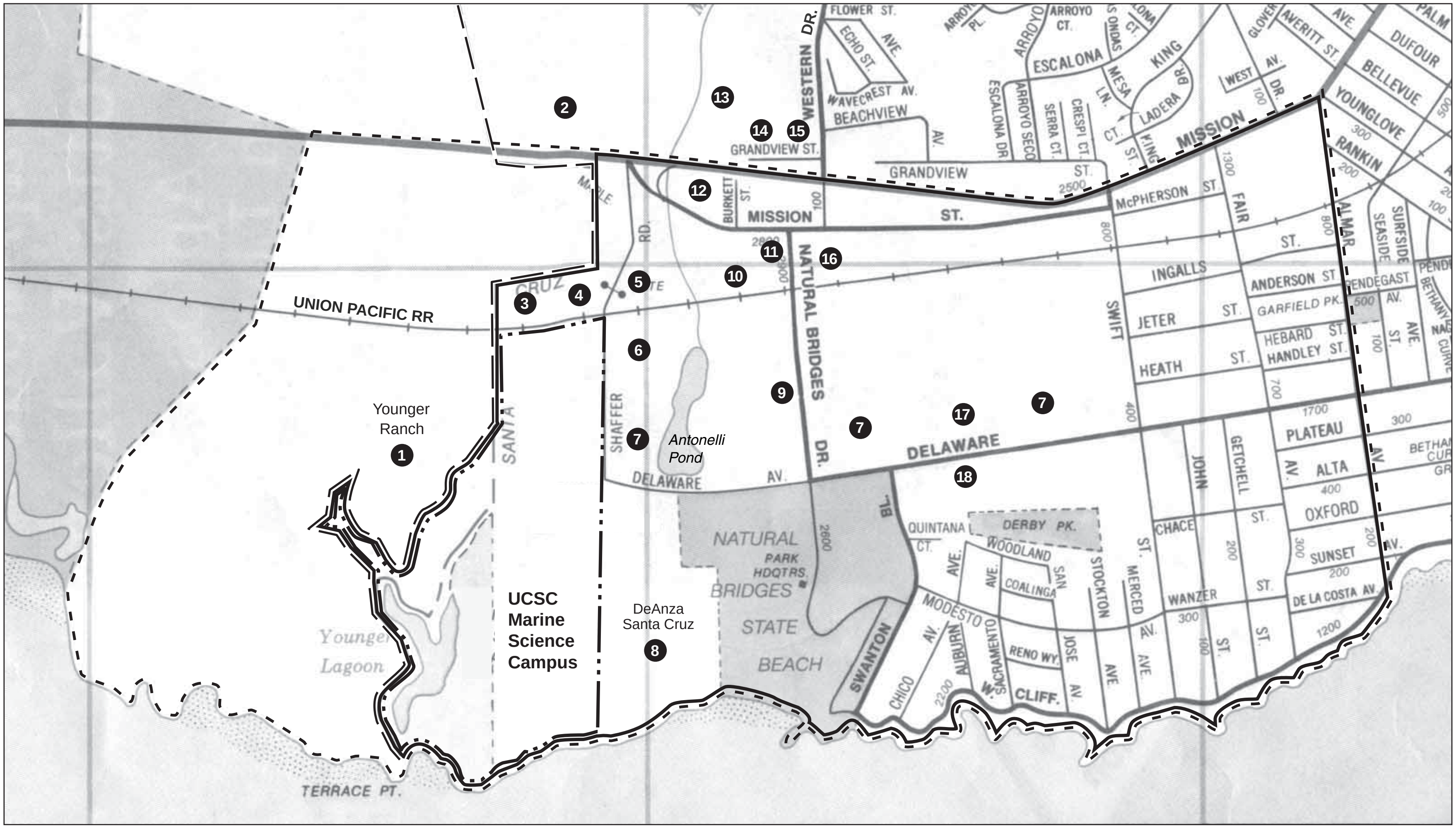
DEFINITION OF BASELINE

The environmental setting sections describe the baseline physical environmental conditions. For purposes of the analyses in this EIR, baseline conditions are generally those that existed in late 2003, except where otherwise noted.

DEFINITION OF STUDY AREA

The extent of the environmental setting area evaluated (the study area) varies among resource areas and environmental topics depending on the locations where impacts would be expected. For example, traffic impacts due to the proposed CLRDP are assessed for the regional roadway network, whereas cultural resource impacts from the CLRDP are assessed for the project site only.

Several of the sections that follow refer to the “Westside Study Area” as an appropriate geographic context for discussion of cumulative environmental impacts. For the purposes of this EIR, the “Westside Study Area” generally includes the portion of the City of Santa Cruz that is south of Highway 1 and west of Almar Street, and a portion of the Younger Ranch, which is in Santa Cruz County and immediately west of the project site (see Figure 4.0-1). For purposes of this EIR, the portion of the Westside Study Area that is within the City of Santa Cruz is referred to as the “Santa Cruz westside study area.” The setting sections describe both local resources and regional resources that occur throughout the broader geographic area.



0 1000
FEET

1 Younger Ranch
2 Moore Creek Preserve
3 Reber Construction Company
4 Raytek International Headquarters
5 Pacific Shores Apartments (Monarch Village)
6 Community Garden
7 Undeveloped
8 De Anza Santa Cruz Residential Community
9 Texas Instruments (former)
10 Santa Cruz City Schools District Office
11 2901 Mission Street (occupied commercial)
12 Dascon Research Park
13 Southview Terrace (occupied apartments)
14 Undeveloped (application for 21 condos pending)
15 Undeveloped (application for 21 townhouses pending)
16 University Business Park
17 Harmony Food / Lipton
18 Pumatech / Arc / TKO

Santa Cruz City Limits
Project Site
Westside Study Area
Santa Cruz westside study area

SOURCE: Draft CLRDP; California State Automobile Association; Environmental Science Associates

Figure 4.0-1
Westside Study Area

BASIS OF IMPACT ANALYSIS

The analyses of impacts in this EIR are based primarily upon one of two factors, depending on the primary cause of the impact. Impacts related to geologic, hydrological, cultural, and biological resources, for example, are analyzed primarily on the basis of the location and acreage of ground disturbance that is projected to occur as a result of the implementation of the CLRDP. Impacts related to traffic, air quality, noise, utilities, and public services, on the other hand, are analyzed primarily on the basis of the total population associated with full development under the CLRDP.

YEAR OF IMPACT ANALYSIS

Impacts are typically evaluated in terms of changes that would be attributable to implementation of the CLRDP as compared to existing conditions (see Definition of Baseline above) as well as relative to conditions that would exist without the project in 2020. Although the planning horizon for the CLRDP is 2024, that is about 20 years from approval, impact analyses in this EIR assume that full development under the CLRDP would occur by 2020. Year 2020 is used as the horizon year because reliable data are available only through 2020. Superimposition of full development under the CLRDP on 2020 conditions does not result in an understatement of environmental impacts. Rather, environmental impacts are likely overstated. This is because if the campus grows at the rate envisioned by the CLRDP, the campus would not be fully developed in 2020 as evaluated in this EIR and the campus' contribution to an impact in that year would be smaller than estimated in this EIR.

For evaluation of impacts of the near-term projects, 2010 is used as the horizon year, as these five projects are likely to be constructed and fully operational by that year.

CUMULATIVE IMPACTS

In addition to the impacts of the CLRDP, the sections that follow also discuss the cumulative impacts of the CLRDP in combination with the related impacts of other projects. The California Environmental Quality Act (CEQA) defines cumulative impacts as two or more individual effects which, when considered together, are substantial or which compound or increase other environmental impacts. CEQA Guidelines require that an EIR discuss the cumulative impacts of a project where the project's incremental effect is cumulatively considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

Where a cumulative impact would occur, the geographic extent of the past, current, and probable future projects with which the project would combine to cause the cumulative impact would vary by environmental topic and impact. However, some generalizations can be made about impacts and their likely geographic scale. For example, in the case of aesthetics, non-reactive air pollutants (including most air toxics, and a portion of construction and operational emissions), land use and planning, noise, and utility distribution systems, impacts generally are of local effect, and the cumulative projects would most likely be those in the immediate vicinity of the proposed project. Impacts related to reactive air pollutants, geology and soils, hazards and hazardous materials, mineral resources, population and housing, public services and utility supply systems tend to be more regional in scope.

CEQA Guidelines Section 15130(b) indicates that either of the following elements is necessary to an adequate discussion of significant cumulative impacts:

- A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, projects outside the control of the lead agency; or
- a summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document that has been adopted or certified, which describes or evaluates regional or areawide conditions contributing to the cumulative impact.

Although the use of a summary of projections is generally considered more appropriate when evaluating cumulative impacts of a long range development project such as the CLRDP, this EIR employs a hybrid approach that uses a list of projects to supplement and update the regional as well as City of Santa Cruz population and land use projections, especially those relative to the Santa Cruz west side area.

Table 4.0-1 presents a list of recent and probable future projects in the City of Santa Cruz. One potential future project, a potential City of Santa Cruz desalination plant to supplement its water supply, is not included in this list nor considered in cumulative impact analysis. The City has prepared an Integrated Water Plan (IWP) that examines alternate ways, including a desalination plant, to secure additional potable water for its service area. Environmental review of the plan is underway at this time and a specific water supply option has not been selected. If the desalination option is selected, the plant would be constructed in one of three areas under consideration by the city in the Santa Cruz west side area. According to the Notice of Preparation for the IWP Program EIR, the UCSC Marine Science Campus is one of the three potential areas for the siting of the desalination plant. The desalination plant is not considered in the cumulative impact analysis in this EIR because it is unknown whether the City will select desalination as its preferred water supply option. Furthermore, details about the desalination project are not available at this time nor is a site for that facility selected. In the absence of this information, it would be speculative for this EIR to include that project in the evaluation of cumulative impacts.

Table 4.0-2 presents a list of land uses and acreages that is contained in the current City of Santa Cruz General Plan and Local Coastal Program. The list represents a summary of projections of future land uses in the City of Santa Cruz. Tables 4.12-2 and 4.12-4, which appear in Section 4.12, Population and Housing, present summaries of projections of future population, housing, and employment in the City of Santa Cruz and in Santa Cruz County.

The cumulative impact analyses that follow in individual sections of this chapter are based upon one or more of the following assumptions regarding past, present, and probable future cumulative growth and development:

- The project site will develop as described in the Marine Science Campus CLRDP (see Chapter 3, Project Description).
- The Younger Ranch, to the west and north of the project site will remain in cultivated agricultural use (see Section 4.2, Agricultural Resources).
- Existing developed land uses in the vicinity of the project site will generally continue in their current uses (see Section 4.9, Land Use and Planning, Figure 4.9-2).

TABLE 4.0-1
RECENT AND PROBABLE FUTURE PROJECTS IN THE CITY OF SANTA CRUZ

Name/Address	Description	Status
Southview Terrace	52 single-family units (see Figure 4.0-1, No. 13)	Built
Chestnut/Laurel Apts	96 multi-family units and ground floor commercial	Built; commercial partially vacant
502/506 Soquel	37 single room occupancy units and 500 square feet commercial	Built
401 Pacific	45,700 square-foot three-story building containing 70 single room occupancy units, a manager's apartment, and a 38-space garage.	Built
1008-1012 Soquel	15-unit single room occupancy apartment complex with 238 square feet of commercial space	Built
208 Bay	10 condominium units	Built
136 Leibrandt Avenue Nueva Vista	48 apartments	Built
1280 Shaffer Rd Pacific Shores	206 apartment units (see Figure 4.0-1, No. 5)	Under construction; partially occupied
121 Market Street	4 detached single-family units	Under construction
1010 Pacific Ave	113 units and 7,000 square feet of ground floor retail	Under construction
630 Water Branciforte Commons	48 single room occupancy units and 5 apartments and 1,000 square feet of office/retail	Under construction
211 Gault Street	37 senior apartments	Under construction
Homeless Services Center expansion	Family shelter	Under construction
1111A River St	7 live/work units	Under construction
126 Hunolt	2 units	Under construction
350 Coral	Convert 21,298 square feet of an existing industrial building to an indoor soccer field	Under construction (T.I.)
Costco Expansion	12,770-square-foot expansion and new gas station	Gas station built/expansion approved
1375 Pacific Avenue	36,177 square feet retail 54,265 square feet office	Approved
1463 High	Tentative map to create a 10-lot subdivision of detached homes on a 3.49-acre site	Approved
	Proposal to reapply for 25-28 attached single-family units (would replace 10-lot subdivision)	Pending
195 Harvey West	14 apartment units and 8,750 square feet of commercial	Approved
175 Belvedere Terrace	6 multi-family units	Approved
404 Soquel Avenue	Remodel of Chevron gas station	Approved
225 Button	9 detached single-family units	Approved
215 Beach La Bahia	Remodel 44-unit apartment building to 118-unit hotel	Approved
269 Goss	8 detached single-family units	Approved
2027 N. Pacific	3,720 square feet commercial	Approved
555 Pacific Avenue	77-room hotel	Approved
251 High	10 apartment units	Approved

TABLE 4.0-1 (Continued)
RECENT AND PROBABLE FUTURE PROJECTS IN THE CITY OF SANTA CRUZ

Name/Address	Description	Status
705 Woodrow	1,040 square feet addition to public library	Approved
2931 Mission	Convert school district office to Housing Authority offices (see Figure 4.0-1, No. 10)	Approved
2222 East Cliff (Harbor)	Add 2,325 square feet to existing commercial building; expand restaurant use by 1,400 square feet; other site improvements	Approved
125 River Street/N. Pacific	70 condos and 5,522 square feet of commercial (replaces approved 104,500 square feet office and 6,500 square feet retail)	Approved
350 Soquel	Rebuild 4 multi-family units and commercial (destroyed in fire)	Approved
201 West Cliff Drive (Sea and Sand)	Demolish 1,423-square-foot single-story, five-room wing of an existing motel and replace with a 3,471-square-foot, two-story seven-room motel wing in the same location	Approved
230 Fern	14,250 square feet manufacturing	Approved – BP expired
719 Water (Water/Reed)	28,500 square feet office	Approved – not built
	18 single-family units and 1 ADU (would replace office proposal)	Pending application
250 Cardiff	46 single room occupancy units, 4 apartment units and 1,767 square feet of commercial space	Pending application
230 Grandview	21 condominium units (see Figure 4.0-1, No. 145)	Pending application
219 Western/221 Grandview	20 townhome units (see Figure 4.0-1, No. 15)	Pending application
605/635 Pacific Ave	15-room hotel and 2 multi-family units	Pending application
708-716 Frederick St	22 condos + 1,600 square feet office	Pending application
106 Younger Way	Demolish single-family residential and replace with 4 townhomes	Pending application
1226 Soquel Ave	9 townhomes	Pending application
119/125 Blaine St	13 condominiums	Pending application
350 Ocean St	Remodel existing MF complex (5 studios, 7 1-bedrooms, 1 single-family unit) into 19 studios and 9 1-bedrooms	Pending application
170 West Cliff Drive	Remodel historic single-family residential to B&B	Pending application
Almar Center Expansion	Proposal to demolish and replace Safeway	Preapplication
340 Highland Ave	Demo 13 multi-family units and replace with 25 condos	Preapplication
550 Second	13-room addition to existing 21-room hotel	Preapplication
121, 131, 134 Kennan St	14 townhouses	Preapplication
115 Dubois	48 single room occupancy units and a manager unit	Application denied – on appeal
927 Soquel	3-story structure with 2,360 square feet of ground floor retail and 2 floors of 24 single room occupancy units and a 26 space parking lot	Denied (no action)
Swenson site	80 units potential in General Plan (see Figure 4.0-1, Nos. 6 and 7)	No application pending

SOURCE: City of Santa Cruz Planning Department, December 2003.

TABLE 4.0-2
GENERAL PLAN LAND USE DESIGNATIONS AND ACREAGES

Land Use Category	Acres
Residential	3,133.0
Commercial	331.0
Industrial/Coastal-Dependent	357.6
Open Space	2,432.0
Public Facilities	216.0
UCSC	526.0

SOURCE: City of Santa Cruz General Plan and Local Coastal Program, 1993.

- Specific probable future projects for which development applications have been filed, which are in review, which have been approved, or which are under construction, will be completed and occupied (see Table 4.0-1).
- Undeveloped properties in the vicinity of the project site will develop over time in a manner that is consistent with the land use designations of the Santa Cruz General Plan and Local Coastal Program (see Section 4.9, Land Use and Planning, Figure 4.9-1).
- Total student enrollment at the UCSC Main Campus and Marine Science Campus will be approximately 19,000 in 2020 (see Section 4.12, Population and Housing, Table 4.12-5).
- Cumulative future population, housing, and employment in the City of Santa Cruz and Santa Cruz County will be as described in the summaries of projections, presented in Section 4.12, Population and Housing (see Tables 4.12-2 and 4.12-4).
- Future cumulative land use in the City of Santa Cruz will approximately correspond to the summary of land use designations and acreages shown in the City General Plan and Local Coastal Program (see Table 4.0-2).

The projects and projections that are considered in the cumulative impact discussions in the following sections of this EIR are identified in the cumulative impact discussions in each section, rather than in a universal project list or forecast. In general, the cumulative projects considered in the various cumulative analyses may range from a relatively small number of discrete development projects on and near the CLRDP project site, to existing and planned land uses in the western portion of the City of Santa Cruz and adjacent areas of Santa Cruz County (see Figures 4.9-1 and 4.9-2), to the full scope of regional development anticipated in AMBAG projections.

Where the combined cumulative impact associated with the project’s incremental effect and the effects of other projects is not significant, the EIR indicates why the cumulative impact is not significant and is not discussed in further detail in the EIR.

Where the EIR identifies a significant cumulative impact, but finds that the project's contribution to that impact will be less than considerable, an explanation for that conclusion is provided.

The discussions of cumulative effects reflect the severity of the impacts and their likelihood of occurrence, but do not provide as great detail as is provided for the effects attributable to the project alone.

4.1 AESTHETICS

This section evaluates the impacts of the CLRDP and five near-term projects on the visual resources of the UCSC Marine Science Campus and its environs. The section focuses on scenic vistas from surrounding areas, scenic resources on the project site, the visual characteristics of the site and vicinity, and light and glare. The analysis of the project's potential visual effects is based on field observations of the project site and surroundings conducted in July 2001, September 2002, and July 2003, and on a review of computer-generated visual simulations from representative offsite public vantage points prepared by BMS Design Group, September 2002. Additional information in this section is derived from the *Draft Environmental Impact Report Long Marine Laboratory Master Plan*, UCSC Office of Campus Facilities, July 1993, and the *Draft Environmental Impact Report Terrace Point Specific Plan*, Strelow Consulting, March 1994.

Based on CEQA criteria, a project would generally be considered to have a significant adverse effect on the environment if it would:

- Have a substantial adverse effect on a scenic vista.
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, or historic buildings within a scenic highway.
- Substantially degrade the existing visual character or quality of the site and its surroundings.
- Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.

This analysis assumes that the five near-term projects will be built by 2010, while full development of the CLRDP building program will occur by 2020. The analysis uses the above criteria to assess whether the CLRDP or the five near-term projects would result in an adverse effect on the aesthetic environment. This section includes a cumulative impact analysis that examines the CLRDP in the context of the existing visual environment and other potential changes to that environment that could occur in the vicinity of the Marine Science Campus as the result of development through the year 2020.

To aid the reader in conceptualizing anticipated changes in the visual environment, eight computer-generated simulations illustrating "before" and "after" visual conditions from representative vantage points near the Marine Science Campus are presented as part of this analysis. Digitized photographs and computer modeling and rendering techniques were utilized to prepare the simulation images, which are based on building prototype massing studies included in the CLRDP.

For purposes of this analysis, a "scenic vista" is the scenic, relatively extensive view available from a scenic vantage point, scenic overlook, or scenic highway as designated by a state or local plan or policy. A "scenic resource" is a landscape pattern or feature, either built or natural, that is visually and aesthetically pleasing, and that therefore contributes to and helps define a distinct community or region. A "viewshed" or "view corridor" is the total area visible from a vantage point. Relevant viewpoints and resources are identified in the sections below.

SETTING

REGULATORY CONTEXT

California Coastal Act

The California Coastal Act establishes goals and policies that guide development within California's coastal zone. These provisions seek, among other things, to protect the scenic and visual resources of coastal areas. Section 30251 of the Coastal Act states the guiding policy as follows:

> "The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural landforms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local governments shall be subordinate to the character of its setting."

Under the CLRDP process, the University's CLRDP is required to be consistent with relevant policies of the Coastal Act. The CLRDP must also be consistent with the appropriate Local Coastal Program (LCP) to the fullest extent feasible (see further discussions below under County and City LCPs). The Land Use section of this EIR evaluates project consistency with Coastal Act policies and applicable LCPs. This section utilizes Coastal Act policies and local LCPs to help identify "scenic vistas" and "scenic resources" for the purpose of evaluating the proposed project with respect to the CEQA criteria for visual resources.

California Scenic Highway Program

The California Scenic Highway Program, administered by the California Department of Transportation (Caltrans), was created in 1963 to "preserve and protect scenic highway corridors from change which would diminish the aesthetic value of lands adjacent to highways."[1] According to Caltrans regulations, when a city or county nominates an eligible scenic highway for official designation, it must identify and define the scenic corridor of the highway. The city or county must also adopt ordinances to preserve the scenic quality of the corridor or document such regulations that already exist in various portions of local codes. The following are required as part of a scenic highway protection program:

- Regulation of land use and density of development
- Detailed land and site planning
- Control of outdoor advertising (including a ban on billboards)
- Careful attention to and control of earthmoving and landscaping
- Careful attention to design and appearance of structures and equipment

In general, a scenic corridor is the land adjacent to and visible from the highway, using a motorist's line of vision.

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1 California Department of Transportation website, "The California Scenic Highway Program," accessed August 2003.

On June 25, 1976, a 26.2-mile segment along Highway 1 that stretches from the Santa Cruz County line to the south city limit of Half Moon Bay within San Mateo County was designated a California scenic highway. Highway 1 parallels the narrow northern margin of the project site at about ¼ mile distance. The portion of Highway 1 closest to the site, about one-quarter mile north (inland) of the site is just within the City of Santa Cruz, and is not included within the state scenic highway designation. In this area the road has been excavated below the natural grade for about 2,000 feet, and thus affords no coastal views. The state scenic highway designation begins at the City-County boundary, just over ¼ mile northeast of the site. Portions of the Marine Science Campus site can be viewed from some stretches of Highway 1 northeast of the site that fall within the scenic highway designation.

County of Santa Cruz General Plan and Local Coastal Program

Although the project site is located entirely within the Santa Cruz city limits, the Santa Cruz County General Plan and Local Coastal Program (County General Plan/LCP) provides policies relevant to the protection of significant visual resources and public vistas within the immediate vicinity of the site. The CLRDP should be consistent to the fullest extent feasible with these plans (see Section 4.9, Land Use and Planning); moreover County LCP policies help define "scenic vistas" and "scenic resources" for this impact analysis. The Conservation and Open Space Element of the General Plan/LCP discusses policies pertinent to visual quality, including the following:

- Recognize that visual resources of Santa Cruz County possess diverse characteristics and that the resources worthy of protection may include, but are not limited to, ocean views, agricultural fields, wooded forests, open meadows, and mountain hillside views. Require projects to be evaluated against the context of their unique environment and regulate structure height, setbacks and design to protect these resources consistent with the objectives and policies of this section (Policy 5.10.2*, Development Within Visual Resource Areas).[2]

The undeveloped terrace portion of the project site, with its open grasslands and coastal scrub vegetation set against the backdrop created by the interchange of ocean and sky, is visible from important vantage points within the county, and is therefore considered a "scenic resource" for purposes of this impact analysis. Moreover, the views of this scenic resource available from important[3] offsite vantage points are considered "scenic vistas."

- Protect significant public vistas as described in Policy 5.10.2 from all publicly used roads and vista points by minimizing disruption of landform and aesthetic character caused by grading operations, timber harvest, utility wires and poles, signs, and inappropriate landscaping and structure design. Provide necessary landscaping to screen development which is unavoidably within these vistas (Policy 5.10.3*, Protection of Public Vistas).

- In the viewsheds of rural scenic roads, require new discretionary development, including development envelopes in proposed land divisions, to be sited out of public view, obscured by natural landforms and/or existing vegetation. Where proposed structures on existing lots are unavoidably visible from scenic roads, identify those visual qualities worthy of protection (see Policy 5.10.2) and require the siting, architectural design and landscaping to

[2] For purposes of this EIR, coastal land use policies within the County General Plan/LCP are identified by an asterisk (*), above.
[3] The term "important" is used here to describe those vantage points where a large number of viewers (as opposed to just a handful) would be able to see the site, and specifically those that are identified within a local LCP.

mitigate the impacts on those visual qualities (Policy 5.10.11*, Development Visible from Rural Scenic Roads).

The Conservation and Open Space Element of the County General Plan/LCP also identifies Highway 1 from San Mateo County to Monterey County as a Scenic Road, and states that "the public vistas from [scenic] roads shall be afforded the highest level of protection" (Policy 5.10.10, Designation of Scenic Roads). Highway 1 immediately north (inland) of the project site is not part of the County LCP-designated scenic highway; however the project site is visible from a vantage point on a portion of Highway 1 under County jurisdiction northwest of the project site (marker # 21.51). This EIR therefore considers that vantage point to provide public access to a "scenic vista." Views of the site from Highway 1 are discussed further below.

See Section 4.9, Land Use and Planning, for a discussion of project consistency with County LCP policies, including the visual resource policies identified above.

City of Santa Cruz General Plan and Local Coastal Program 1990–2005

The City of Santa Cruz General Plan and Local Coastal Program (City General Plan/LCP) provides policies relevant to the aesthetic quality of both the natural and the built environment.

- Protect the Monterey Bay National Marine Sanctuary and the shoreline and views to and along the ocean, recognizing their value as natural and recreational resources (Program CD 2.1.3*).

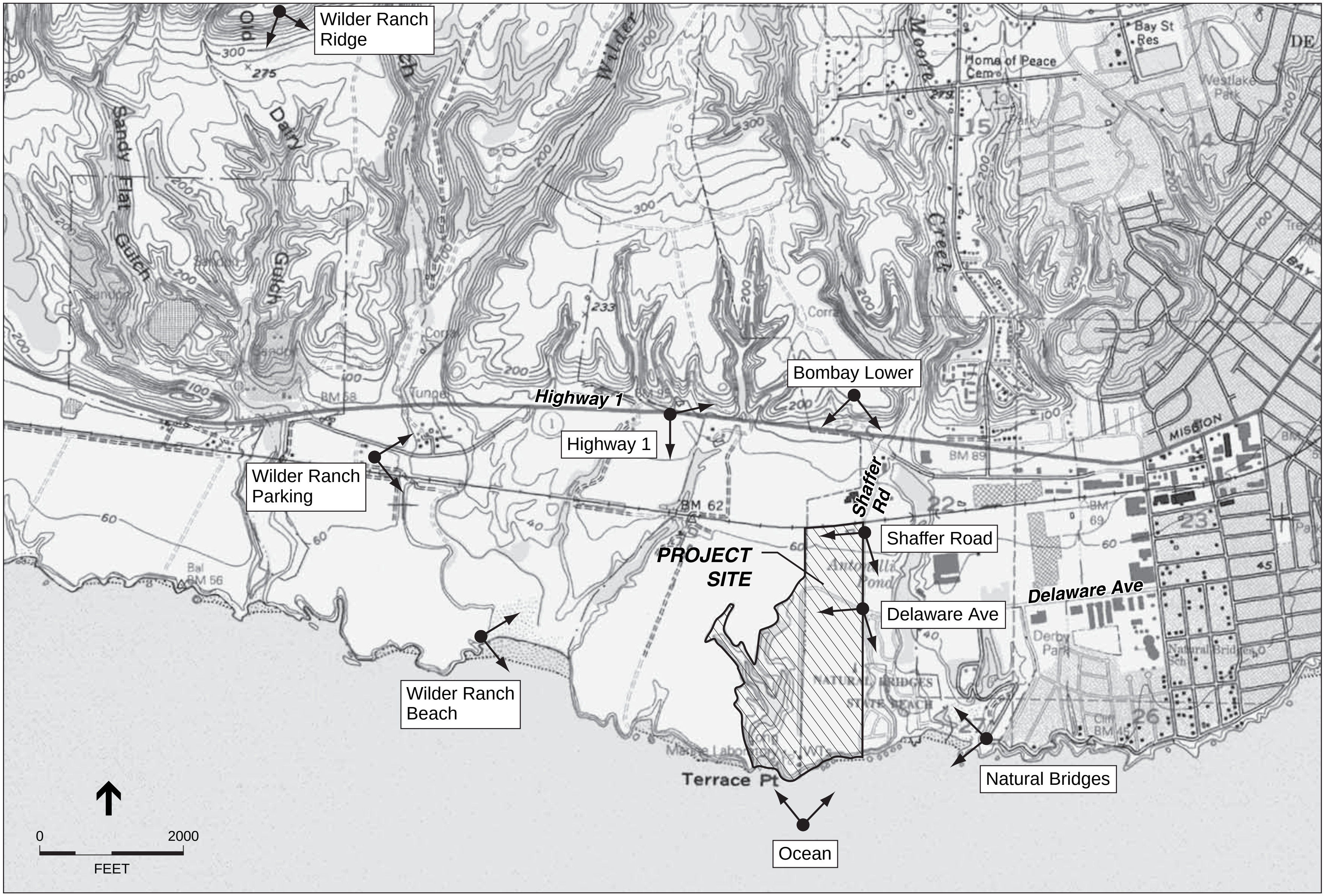
The project site is adjacent to the Monterey Bay National Marine Sanctuary and shoreline. Views that include an ocean backdrop or other ocean view across the project site from important city vantage points, such as from the Natural Bridges State Beach parking lot, the lower terrace of the Bombay greenbelt property, and from the parking lot, beach, and upper ridge of Wilder Ranch State Park, are therefore recognized as "scenic vistas" for purpose of this impact analysis. Views from these vantage points are described further, below.

- Develop siting, scale, landscaping, and other design guidelines to protect visually sensitive areas and ensure that development is compatible with the character of the area. Areas to be protected include: open space land uses, foothills, bluffs, scenic coastal areas, Beach Hill, Pogonip, Far West Side, Mission Hill, Moore Creek, DeLaveaga Park, and San Lorenzo River (Program CD 2.2.1*). A second policy states that development near the western entrances of the city should take into account the rural/urban transition and protect natural views (Program CD 5.4.1*).

The project site is located within the Far West Side area, and is near the western entrances of the city, addressed above. The undeveloped, open space areas of the site, such as the undeveloped portions of the terrace property and the YLR, are therefore considered "scenic resources" for purposes of this impact analysis.

The City of Santa Cruz General Plan/LCP also identifies an important vantage point from Highway 1, just west of the city limit line, to the ocean. This vantage point is shown in Figure 4.1-1, Key to Vantage Point Locations, and is considered to provide public visual access for the purpose of this analysis.

See Section 4.9, Land Use and Planning, for a discussion of project consistency with City LCP policies, including the visual quality policies and programs identified above.



SOURCE: BMS Design Group

Figure 4.1-1
Key to Vantage Point Locations

Summary

Based on a consideration of the regulations and policies discussed above, this EIR considers the following views from important offsite vantage points (shown in Figure 4.1-1) to constitute "scenic vistas":

- Highway 1 (marker # 21.51) (State Scenic Highway Program, County LCP, City LCP);
- Bombay greenbelt property lower terrace (City LCP);
- Wilder Ranch State Park parking lot, beach, and upper ridge (City LCP); and
- Natural Bridges State Beach parking lot (City LCP).

Also based on a consideration of the regulations and policies discussed above, this EIR considers the following landscape features to constitute "scenic resources":

- The undeveloped, open space areas of the project site, including the undeveloped portions of the terrace and the YLR (City LCP); and

- The open grasslands of the terrace set against an ocean backdrop (County LCP, City LCP).

REGIONAL CONTEXT

The project site is located at the western edge of the city of Santa Cruz, in an area that is transitional from the urban development to the east of the site to the rural and agricultural uses to the west and north of the site. The area to the west of the site and south of Highway 1 is generally characterized by agricultural fields planted in row crops on the coastal terraces. Inland (north and west) from Highway 1, the terrain becomes hilly, gradually rising to form the Santa Cruz Mountains.

The existing character of the immediate site vicinity is defined by a combination of residences, vacant land, and agricultural, commercial, industrial, and natural resource and open space uses. The project site is bordered on the west by unincorporated county agricultural lands immediately adjacent to the Younger Lagoon Reserve (YLR). Wilder Ranch State Park is located farther west. To the immediate north of the site are the Union Pacific Railroad tracks, industrial uses including the Raytek research facility, and Highway 1. The undeveloped Swenson property, currently in use as a community garden, and the De Anza Santa Cruz residential community are both located immediately to the east. Farther east of the site is Antonelli Pond and Natural Bridges State Beach. Bordering the southern edge of the site is the Pacific Ocean and coastline. There is no formal access route from the Marine Science Campus down the onsite bluff face to the beaches below.

The visual characteristics of the area surrounding the project site are varied. In the immediate vicinity, the De Anza Santa Cruz residential community is the primary development. This development is surrounded by the open space uses of Natural Bridges State Beach to the east and Antonelli Pond to the northeast. The industrial uses along Delaware Avenue to the east of the project site, referred to in the City's General Plan/LCP as the Natural Bridges Industrial Park, provide further visual context and definition to the city's urban development boundary east of the project site. Other industrial uses are located north of the site. West of the project site, the visual quality of the area is characteristically rural and agricultural. The mostly flat agricultural fields adjacent to the western border of the site are interrupted by occasional farm structures and stands of trees, many of which serve as windbreaks for the farming operations. The grassy and undeveloped uplands to the north of Highway 1 create a picturesque backdrop to the coastal and rural setting in the foreground seen in long-range, panoramic views from the site. The College 8 facility at the UCSC Main Campus and several residences are also visible in the distance to the north. The coastline in the Santa Cruz area, including that along the southern edge of the Marine Science Campus site, is characterized by a low bluff that drops to a narrow beach and rock shelf, providing for generally unobstructed views of the ocean. Highway 1, a state-designated scenic highway and a county-designated scenic road northwest of the site, provides numerous scenic coastal views to motorists traveling eastbound and westbound, although for about 2,000 feet immediately north of the project site, Highway 1 has been excavated below the natural grade and provides no coastal views.

PROJECT SITE

Scenic Vistas

The project site is visible from a number of important vantage points, including portions of Highway 1 to the immediate northwest, Wilder Ranch State Park to the west, the Bombay property (part of the City of Santa Cruz greenbelt) farther north, and Natural Bridges State Beach to the east. Views of the site are also available from adjacent areas, including from Delaware Avenue, near the De Anza Santa Cruz residential community, from the Shaffer Road extension adjacent to the community garden, and from the ocean immediately south of the site. Short-range views of the interior of the site are somewhat limited by the dense patches of vegetation and tall grasses on the terrace. For purposes of analysis in this EIR, views of the site are categorized into three types: short-range (less than one-half mile from the site), medium-range (one-half mile to one mile from the site), and long-range (more than one mile from the site).

Images of existing conditions, and simulations of proposed conditions, from eight vantage points are provided below to facilitate visualization of existing conditions and the proposed project at full build-out (by about 2020). These images are presented on the following pages and are referenced in the discussion below. Figure 4.1-1, Key to Vantage Point Locations, depicts the locations of the selected vantage points; Figures 4.1-2 through 4.1-9 provide images from the eight representative vantage points. As described above, the views of the project site available from Highway 1 (marker # 21.51), from Wilder Ranch State Park parking lot, beach, and upper ridge, from the lower terrace at the Bombay greenbelt property, and from the Natural Bridges State Beach parking lot are considered “scenic vistas” in this analysis, based on state and local visual resource policies. The views of the site from Shaffer Road, Delaware Avenue, and the Pacific Ocean by boat are not considered “scenic vistas” for purposes of this analysis, for the reasons described below. Photographs taken in September 2002 provide the images of existing conditions. Each is accompanied by a computer-simulated image that shows a representation of the proposed project facilities inserted into the original photograph. The proposed facilities are shown as building blocks illustrative of facility scale and mass, but without architectural detail. The visual changes that would be introduced by the project, as demonstrated by a comparison of the images, are discussed below.

The simulations focus on general building massing and height and show sufficient detail to assess the potential visual impacts; they are not intended to present a full and precise illustration of individual buildings, structures, or aesthetic and architectural detail, such as exterior colors, construction materials, or window placement. The colors used in the simulation for the proposed buildings were selected for their high contrast with the existing setting, to allow readers to see the changes in the views readily. As described on page 4.1-26 and in Section 3, Project Description, the color palette that will actually be used will be consistent with the project's coastal rural setting. Although design details represented in the simulations could change over the course of development of each individual project, the final design details would not affect the analysis or change the conclusions concerning the project's impact upon visual quality as long as the general height, mass, and location of future development are similar to those modeled. The simulations are adequate for analyzing visual quality impacts related to the development upon views, but are not intended to represent precise indications of what the project would look like once fully constructed.

Short-Range Views of the Site

Short-range public views from offsite vantage points less than one-half mile from the site are available at Shaffer Road adjacent to the railroad tracks and the community garden, as well as from the Delaware Avenue terminus adjacent to the De Anza Santa Cruz residential community. In addition, the site is visible from the Natural Bridges State Beach parking area to the east of the De Anza Santa Cruz residential community, and from the Pacific Ocean by boat. These views are described further, below.

Short-Range Vantage Point: Shaffer Road

Portions of the project site are visible from the segment of Shaffer Road immediately adjacent to the eastern boundary of the site and just west of the undeveloped Swenson property, currently in use as a community garden (see Figure 4.1-2a). Shaffer Road, at this location, is closed to through traffic from Highway 1 to the north. Southwesterly views from this vantage point incorporate the upper terrace in the foreground, including the site's perimeter wire fence and prominent coastal scrub grassland habitat. Large stands of coyote brush and tall native and non-native grasses partially screen the LML complex, which is visible in the middleground, although the roofline of the CDFG Marine Wildlife Center and the mass of the NMFS Phase I facility are visible above the intervening terrain and vegetative cover. The sky forms the background from this vantage point. The ocean and the majority of the middle and lower terraces, including all other LML structures, as well as the YLR, are not visible due to intervening terrain and vegetation. This vantage point does not offer unimpeded views of the ocean across the site. Further, Shaffer Road does not connect to Highway 1, and the number of visitors to the area is limited. Shaffer Road therefore is not considered an important vantage point. Therefore, based on the local regulatory policies identified above, the view of the project site from this vantage point is not considered a "scenic vista." It is described here to provide general contextual information only.

Short-Range Vantage Point: Delaware Avenue

At the Delaware Avenue terminus at the project site entrance, adjacent to the northwest corner of the De Anza Santa Cruz residential community, portions of the middle terrace and the existing LML complex west of McAllister Way are visible (see Figure 4.1-3a). Southwesterly foreground views from this vantage point incorporate the dominant grassland and coyote brush vegetation typical of the middle terrace, as well as several informational signs and wooden bollards. In the middleground, the roofline of the CDFG Marine Wildlife Center and the adjacent storage structure as well as the NMFS Phase I facility are visible above the intervening terrain and tall coyote brush and grasses. The sky forms the background. The ocean and the remainder of the southern portions of the site, including the lower terrace, all other LML structures, and the YLR are screened within this view as a result of intervening terrain and vegetative cover. This vantage

Figure 4.1-2a Existing view of site from northwest corner of Shaffer Road (not on UCSC property), near train tracks, looking southwest.

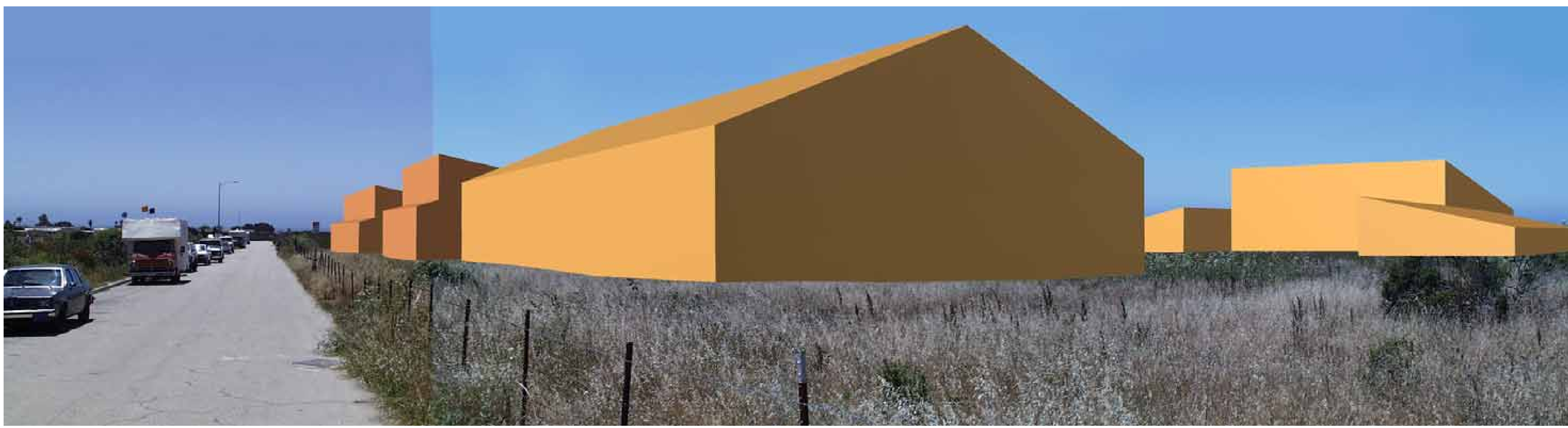


Figure 4.1-2b Proposed view of site from northwest corner of Shaffer Road (not on UCSC property), near train tracks, looking southwest.

SOURCE: BMS Design Group

Figure 4.1-2
Existing and Proposed Views

Figure 4.1-3a Existing view of site from Delaware Avenue terminus, adjacent to De Anza Mobile Home Park, looking southwest.

Figure 4.1-3b Proposed view of site from Delaware Avenue terminus, adjacent to De Anza Mobile Home Park, looking southwest.

SOURCE: BMS Design Group

Figure 4.1-3
Existing and Proposed Views

point does not offer unimpeded views of the ocean across the site, and as the Delaware Avenue terminus does not connect to Highway 1, the number of visitors to the area is limited. The Delaware Avenue terminus, thus is not considered an important vantage point. Therefore, based on the local regulatory policies identified above, the view of the project site from this vantage point is not considered a “scenic vista.” It is described here to provide general contextual information only.

Short-Range Vantage Point: Natural Bridges State Beach Parking Area

Figure 4.1-4a presents the view of the project site from the Natural Bridges State Beach parking area. As shown, from this viewpoint the De Anza Santa Cruz residential community and the Pacific Ocean and shoreline are in the foreground, establishing the primary visual component from this vantage point. The LML portable trailers, several water tanks, the Seymour Marine Discovery Center and The Center for Ocean Health Phase I building, all located on the southernmost portion of the project site, establish the background views. In addition, the rooftop of the two-story NMFS Phase I building is partially visible above the De Anza Santa Cruz residential community. However, the remainder of the project site, including the YLR, is shielded behind the De Anza Santa Cruz residential community in this view and is therefore not visible from the Natural Bridges State Beach parking area. The view of the project site from this vantage point is considered a “scenic vista,” based on the local regulatory policies identified above.

Short-Range Vantage Point: Pacific Ocean by Boat

Short-range, panoramic views of the southernmost portion of the project site are available from boats on the Pacific Ocean (see Figure 4.1-5a). From this perspective, the project site appears in the middleground, with the forested ridges and rolling grassland habitat characteristic of the Santa Cruz Mountains in the background. Some residences and the UCSC College 8 facility appear nestled into the hillside in the background. The most prominent visual element in this view is the white, partially vegetated bluff – face formed by the southern end of the Marine Science Campus and adjacent coast, which offers an element of verticality to the flat expanse of ocean in the foreground. The southern facades of the LML structures on the Marine Science Campus lower terrace, including the Seymour Marine Discovery Center, the Research and Younger buildings, and the Center for Ocean Health Phase I building, are visible and offer a cohesive built landscape unit in contrast to the natural openness of the terrace portion of the property. The sand beach and mouth of the YLR are also visible from this vantage point and add to the coastal bluff landscape that dominates the view. The LML development on the middle terrace, including the NMFS Phase I facility, the greenhouses, and the CDFG Marine Wildlife Center, as well as the coastal scrub grassland habitat that typifies the upper terrace, is partially screened by the development in the foreground as well the site’s natural terrain. Based on the local and state regulatory policies identified above, the view of the project site from this vantage point is not considered a “scenic vista,” but is described to provide general contextual information.

Short-Range Vantage Point: Private Views

Private views of the project site (not shown in a figure) are available from the De Anza Santa Cruz residential community adjacent to the eastern edge of the site. However, westerly views from these residences are generally limited to the roofline of the taller LML buildings, due to an approximately four- to five-foot-high concrete masonry perimeter fence and mature landscaping that separate the project site from the De Anza Santa Cruz residential community.

Figure 4.1-4a Existing view of site from Natural Bridges State Beach parking area looking west.

Figure 4.1-4b Proposed view of site from Natural Bridges State Beach parking area looking west.

SOURCE: BMS Design Group

Figure 4.1-4
Existing and Proposed Views

Figure 4.1-5a Existing view of site from Pacific Ocean looking north.

Figure 4.1-5b Proposed view of site from Pacific Ocean looking north.

SOURCE: BMS Design Group

Figure 4.1-5
Existing and Proposed Views

Short-range, private views of the site are also available from the south-facing windows and surface parking areas associated with the industrial uses immediately north of the site. Southerly views from this vantage point are mostly unobstructed and encompass both the existing LML development and the primarily open and undeveloped grasslands set against the visually distinct and prominent horizon created by the interplay between ocean and sky. As the number of persons viewing the project site is limited from these locations, the views of the project site from these vantage points are not considered "scenic vistas," based on the local and state regulatory policies identified above, but are described to provide general contextual information.

Medium-Range Views of the Site

Medium-range views of the project site from offsite public locations about one-half mile to one mile from the site are available from several vantage points. Views are available at the western entrance to the city of Santa Cruz for motorists traveling along Highway 1, as well as from the lower terrace of the Bombay greenbelt property to the north and the Wilder Ranch State Park beach area to the west of the site. These views are described further, below.

Medium-Range Vantage Point: Highway 1

The portion of Highway 1 closest to the site, about one-quarter mile north (inland) of the site and within the City of Santa Cruz, is not designated a state scenic highway. In this area the road has been excavated below the natural grade for about 2,000 feet, affording no coastal views. The state scenic highway designation begins at the City-County boundary, just over ¼ mile northeast of the site, and includes stretches of highway that provide views of portions of the site.

Views of the site from Highway 1 are intermittent due to a sequence of elevated berms and rows of Monterey pines along the road edge. The site is most visible from vehicles traveling southbound into the city of Santa Cruz, although the duration of the views is relatively short (a few seconds). The project site first becomes visible from Highway 1 approximately one mile west of the site, and remains visible until trees and an earthen berm along the highway interrupt the line of sight. However, a little over one-half mile before reaching the intersection at Shaffer Road, another brief glimpse of the site is available (see Figure 4.1-6a). This vantage point is near an identified scenic vantage point within the city's General Plan/LCP. At this vantage point, agricultural fields dominate the foreground views, while the ocean and distant rural grassland hillsides dominate and frame the background views. The LML development on the middle and lower terraces, including the greenhouses, Avian Facility, NMFS Phase I facility, Ocean Health Phase I building, Seymour Marine Discovery Center, and Younger building, is visible in the middleground across the flat, open expanse of agricultural fields. The visible LML facilities appear weathered. The buildings incorporate design elements characteristic of low-profile, rural, coastal architecture, such as board-and-batten siding and gray-colored roofs. The open grassland terrace portion of the property is not visually distinct at this distance, and the YLR is not visible at all due to the natural topography of the lagoon and the intervening windbreak vegetation in the foreground. The existing development at the project site appears to blend with the surrounding coastal agricultural landscape. The view of the project site from this vantage point is considered a "scenic vista," based on the local and state regulatory policies identified above.

Views of the site are more limited for motorists traveling northbound on Highway 1 from downtown Santa Cruz. Upon approaching the site east of Western Drive, views from Highway 1 are dominated by urban development along the highway and by the large buildings associated with the Westside industrial area. Views are blocked by vegetation and topography for more than

Figure 4.1-6a Existing view of site from Highway 1 looking southeast.

Figure 4.1-6b Proposed view of site from Highway 1 looking southeast.

SOURCE: BMS Design Group

Figure 4.1-6
Existing and Proposed Views

one-half mile west of Shaffer Road, where the viewshed becomes characterized by agricultural fields and distant ocean views to the west. The project site is not within direct view from Highway 1 in this direction, as motorists must turn southward to see the site.

Medium-Range Vantage Point: Santa Cruz Bombay Greenbelt Property - Lower Terrace

The Bombay greenbelt property is a little more than one-half mile north of the project site across Highway 1. Figure 4.1-7a illustrates the view looking south towards the project site at an elevation of about 200 feet above mean sea level (msl). This location provides a panoramic view, including scenic vistas of the project site and adjacent coastal agricultural lands, Natural Bridges State Beach, and the Pacific Ocean.

Features visible in the foreground include mature vegetation from the southern Bombay property line, Highway 1, Shaffer Road, the Mission Street extension, dense vegetation associated with Moore Creek, vacant land, agricultural land, the Raytek research facility, the De Anza Santa Cruz residential community, and the project site. The entirety of the project site is clearly visible, including the outline, steep sides, and upper vegetation of the YLR, the grassland terrace portion of the site, and the roofline and northerly facades of the existing LML structures. The project site typifies a rural agricultural landscape, with a unified built environment that appears clustered around the two-lane McAllister Way. The buildings incorporate such design elements as pitched, low-profile roofs, weathered board-and-batten siding, and neutral exterior colors such as gray-blue, green, and tan. The NMFS Phase I facility is visually prominent, but all onsite development, including the greenhouses, is visible in the middleground. The terrace portion of the site that is unbuilt appears as a continuous and natural environment. The Union Pacific Railroad tracks at the northern edge of the site and the community garden bordering a portion of the eastern edge of the site are also visible in the middleground. Generally unobstructed, panoramic views of the Pacific Ocean provide the background for this view. The view of the project site from this vantage point is considered a “scenic vista,” based on the local regulatory policies identified above.

Medium-Range Vantage Point: Wilder Ranch State Park Beach Area

Figure 4.1-8a illustrates the view available from Wilder Ranch State Park beach area, located over three-quarters of a mile west of the project site. The most dominant visual element from this easterly vantage point toward the project site and the Monterey Bay coastline is the flat stretch of beach and ocean in the foreground and the white bluff face and coastal scrub vegetation in the middleground. The project site at this distance appears to blend into the backdrop created by the Pacific Ocean and coastline. The low-profile roofline of the LML structures on the middle terrace, including the greenhouses, Avian Facility, and CDFG Marine Wildlife Center, are partially visible above the intervening terrain and vegetation. The agricultural lands adjacent to the beach are not visually distinct or separated from the project site due to the marine terrace topography, which also blocks views of the YLR. Utility lines associated with nearby residential development are also visible in the background. The view of the project site from this vantage point is considered a “scenic vista,” based on the local regulatory policies identified above.

Long-Range Views of the Site

Long-range, or background, views of the site from vantage points greater than one mile away are available from the Wilder Ranch State Park parking area to the west of the site, as well as from the upper terrace of the Wilder Ranch State Park property. Long-range views of the site from the Bombay greenbelt property are not available.

Figure 4.1-7a Existing view of site from the Bombay Property's lower terrace looking south.

Figure 4.1-7b Proposed view of site from the Bombay Property's lower terrace looking south.

SOURCE: BMS Design Group

Figure 4.1-7
Existing and Proposed Views

Figure 4.1-8a Existing view of site from Wilder Ranch State Park beach looking east.

Figure 4.1-8b Proposed view of site from Wilder Ranch State Park beach looking east.

SOURCE: BMS Design Group

Figure 4.1-8
Existing and Proposed Views

Long-Range Vantage Point: Wilder Ranch State Park Parking Area

Figure 4.1-9a illustrates the long-range view available at the Wilder Ranch State Park parking area, located over one mile west of the project site. The view southeast toward the project site and Monterey Bay coastline encompasses flat agricultural fields, with some visual interruption offered by farm structures and tree plantings. The project site at this distance appears to blend into the backdrop created by the coastal grassland terraces, the rising, forested Santa Cruz Mountains, and the ocean horizon. The NMFS Phase I facility is the most prominent built structure on the middle terrace, although the bulk is partially screened by the onsite vegetation and topography. Other development located on the middle and lower terraces, including the Ocean Health Phase I building, Seymour Marine Discovery Center, Avian Facility, greenhouses and CDFG Marine Wildlife Center are also visible in this view. The YLR is not visible at this distance, however, due to intervening topography and vegetation. The view of the project site from this vantage point is considered a "scenic vista," based on the local regulatory policies identified above.

Long-Range Vantage Point: Wilder Ranch State Park – Upper Ridge

Figure 4.1-10 illustrates the long-range view available from the forested ridge to the north of Dairy Gulch on the Wilder Ranch State Park property. At this distance, the visual prominence of the built elements of the project site are not visually prominent in height or bulk when viewed against the wide expanse of ocean and sky in the background. No identifiable onsite building is distinguishable at this range. In addition, the grassland vegetation located on the mostly undeveloped terrace portion of the site provides a visual connection to the coastal agricultural landscape adjacent to the site. The view of the project site from this vantage point is considered a "scenic vista," based on the local regulatory policies identified above.

Scenic Resources

As described above, the open, undeveloped grasslands of the terrace property set against the ocean/sky backdrop, and the other undeveloped portions of the project site, such as the YLR, are considered scenic resources in this EIR, based on the state and local scenic resource policies identified above.

The terrace portion of the project site is vegetated in some native and non-native grasses and coyote brush. These features provide visual continuity with the forested hills across Highway 1 to the north, as well as the agricultural fields to the west and other open space areas farther east of the project site. As described above, the openness and low vegetation of the terrace set against the ocean/sky backdrop figure prominently into scenic views available from important offsite vantage points such as those from the Bombay greenbelt property, Wilder Ranch State Park, Natural Bridges State Beach, and Highway 1.

The YLR is hidden from view from most viewpoints due to intervening topography, built features, and mature vegetation, but when visible, the YLR presents one of the few remaining visual aspects of pristine wetland environments located along the California Coast. As described above, the view from the Pacific Ocean by boat incorporates nearly all of the natural features of the YLR, including the expanse of pooled surface water, sand barrier along the beach, vertical cliffs, and natural vegetation.

Figure 4.1-9a Existing view of site from Wilder Ranch State Park parking area looking southeast.

Figure 4.1-9b Proposed view of site from Wilder Ranch State Park parking area looking southeast.

SOURCE: BMS Design Group

Figure 4.1-9
Existing and Proposed Views

SOURCE: BMS Design Group

Figures 4.1-10
Existing View from Wilder Ranch State Park
Upper Ridge

Visual Character and Quality of the Site

The existing visual character of the project site is determined by the attributes (color, form, texture) of specific site features and by the patterns that the features have assumed as a result of natural processes and human uses. The existing visual character of the site is also influenced by daily weather conditions, such as sun, rain, and fog, and by seasonal changes in the natural vegetation onsite. The description of the visual attributes and patterns of the project site is organized according to the following general categories: site location, spatial orientation, and landform; built features; and, natural features. The built and natural features of the project site are further determined to have "low" or "high" visual quality based on their overall contribution to the scenic nature of the project site and vicinity. For example, the open grasslands of the undeveloped terrace portion of the site are considered "scenic resources" according to local regulatory policy, as described above, and therefore are considered to have "high" visual quality.

Site Location, Spatial Orientation, and Landform

The Marine Science Campus is located on the lowest and southernmost of a series of marine terraces that rise from sea level along the coastal flank of Ben Lomond Mountain. The project site slopes gently to the south, where the coastal bluff drops sharply to the intertidal beaches below. The project site includes three visually distinct landscape units:

- The approximately 57-acre mostly undeveloped uplifted grassland marine terrace that rises from the southern edge of the site to elevations of about 51 feet above sea level at the northern edge.

- The built environment of the original 16-acre LML site, generally located to the west of McAllister Way on the lower and middle terraces, with the exception of two facilities located immediately east of the road.

- The approximately 25-acre YLR, which consists of the lagoon and the sharply sloping sides of the water body.

Built Features

The partially developed portion of the marine terrace is mostly covered with native and non-native grasses and seasonal wetland plants in localized areas. This portion of the site is also occupied by the existing LML complex, the two-story NMFS Phase I facility on the federal inholding in the middle terrace and the two-story Seymour Marine Discovery Center on the lower terrace, and associated parking lots. The majority of the site is open to public access during daylight hours on informal trails, including some 800 feet of bluff-top trail at the southern edge of the site and a single trail that borders the eastern and northern sides of the Seymour Center and parking lot.[4] An undocumented resource, the mast of the shipwreck *La Feliz* (see Section 4.5, Cultural Resources), is wedged against the bluff face of the lower terrace, and an overlook point with informational signage has been established above the mast on the cliff edge. An oil and gravel, two-lane road (Delaware Avenue Extension) separates the upper and middle terraces along a generally east-west axis from the entrance at Delaware Avenue. This road then turns due south, becoming McAllister Way, and extends to the southernmost edge of the site.

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[4] While access to research laboratory areas and the YLR area is controlled, access and interpretation of these areas is provided through docent-led tour programs provided by the Seymour Marine Discovery Center.

About 16 acres of the site are developed with the original LML complex, which consists of a combination of permanent buildings, temporary and ancillary support structures, and outdoor space located on the lower and middle terrace areas, for a total of about 162,000 square feet (sf) of development. An earthen berm, about 10 to 20 feet tall and 40 to 50 feet wide, is located along most of the boundary between the LML development and the YLR. Four buildings (Ocean Health, Research Support, Younger, and Service buildings), the Avian Facility, greenhouses, caretakers' units, and improved outdoor pool and yard space provide the core of the LML research facilities, along with the approximately 20,000-sf Seymour Marine Discovery Center. The Center for Ocean Health Phase I building, an approximately 23,000-sf, two-story facility, is located in the center of the LML complex. The approximately 6,200-sf Research Support building is adjacent to the earthen berm that separates LML facilities from the YLR. The approximately 3,700-sf Younger Building forms the eastern boundary of the marine mammal outdoor research yard. The approximately 2,300-sf Service building houses service shops and field science support facilities for boat operations and SCUBA diving. The Avian Facility (Oiled Seabird Facility), located adjacent to the 20,000-sf CDFG Marine Wildlife Center, an affiliate of the LML, consists of two office trailers for a total of about 2,160 sf. In addition to the office trailers, three greenhouses provide storage and staging space, and a large outdoor paved area provides flexible temporary space for both research and oil-spill response needs. Eight other existing greenhouses are located nearby. The caretakers' units (1,400 sf) are located on the southernmost portion of the site adjacent to the marine mammal pools.

The complex of onsite buildings is an assemblage of weathered buildings with board-and-batten siding and gray-colored roofs. The newer buildings on the site have been designed to complement the materials and aesthetic quality of the initial complex through exterior finishes that reflect the colors in the site landscape, including blues, grays, greens, and tans. The buildings generally complement the rural-agricultural architectural vernacular, taking the barn structure as a prototype, and are one to two stories in height. The original LML buildings are generally clustered to the west of McAllister Way, thereby allowing the open grassland portions of the terrace to appear as a continuous natural landscape.

The highest quality built feature on the project site may be considered to be the Seymour Marine Discovery Center and its landscaped environs, as the building incorporates exterior materials, colors, and landscaping that blend with the overall natural landscape and provides public visual access to the ocean and shoreline through designated overlooks. The temporary structures located nearest the YLR, including the greenhouses in the middle terrace development area and the portable trailers and caretakers' units within the lower terrace development area, are considered to be of lower visual quality, as many of these buildings, such as the greenhouses, have been allowed to deteriorate and currently show signs of disrepair that conflict with the surrounding natural or built environment.

Natural Features

Seven distinct habitat types exist on the undeveloped terrace portion of the site that are not associated with human activity or recent heavy or repeated human disturbance. These are non-native grassland, coyote brush scrub-grassland, coastal bluff community (with two phases: mixed and ice plant), seasonal pond, freshwater marsh-coastal terrace, herb community dominated by willow-herb and *Baccharis douglasii*, and moist meadow. Three additional habitat types on the site are associated with human activity and intensive disturbance: ruderal, developed/ruderal, and planted berm. Non-native grassland and coyote brush scrub-grassland cover most of the terrace and are visually dominant on the site. The coastal bluff community occurs only in a very narrow zone along the southern edge of the site. The seasonal pond occurs south of the NOAA facility in the central portion of the site. Three small freshwater marsh habitats occur on the site: one just north of the CDFG Marine Wildlife Center, one just north of the access road near the western boundary of the site, and one along the northern boundary of the site near the northwestern corner. The herb community dominated by willow-herb and *Baccharis douglasii* habitat type is a specialized wetland assemblage that occurs only in a small patch within the grassland in the east-central portion of the site. These areas exhibit seasonal changes in color, bright green in winter and drying to a tawny brown in summer and fall. The seasonal change in grassland color is important in establishing the distinctive summer pattern on the coastal terrace of light-colored, fine-textured open grasslands leading to a muted blue-gray horizon in the background created by the blending of ocean and sky. During the spring, the terrace is a visual mix of bright green grasses spotted with colorful wildflower blooms.

The vegetation throughout the existing LML building complex reflects these coastal scrub-grassland characteristics that dominate the visual environment of undeveloped land onsite. Some non-native and ornamental plantings are also located at building entrances and along the bluff trail adjacent to the Seymour Center, which leads to an ocean overlook.

Seasonal wetlands on the marine terrace portion of the project site appear similar in form and color to adjacent grassland habitats and are generally shielded from view from most onsite and offsite locations due to the dense vegetation that surrounds the wetlands.

The YLR portion of the project site consists of Younger Lagoon and the slopes bordering the lagoon. The most visually distinct surface water body on the project site is the Younger Lagoon. During most of the year, the action of ocean waves and littoral drift promotes the development of a barrier beach at the mouth of the lagoon; however, flushing during winter storms does occur periodically to create alternating conditions, and therefore alternating vegetation habitats, in the lower lagoon. Views of the lagoon’s water features are obstructed, however, by a landscaped earthen berm or fenceline located along the majority of the reserve’s eastern edge as well as by intervening buildings and mature grassland vegetation. Two overlooks are situated at higher elevations along the earthen berm to allow for views of the open water, including one looking southwest over the mouth of the lagoon towards the ocean and sand, and one at a central location on the western side of the berm, looking northwest over the lagoon toward the agricultural fields.

Eleven distinct habitat types occur in the YLR, seven of which occur in the lowlands and four of which occur in the uplands portion of the YLR. In the lowland portion of the site, coastal strand occurs at the south end, nearest the ocean, and a dense mat of coastal salt marsh (pickleweed) borders the open water of the lagoon continuously throughout the lagoon and up both arms beyond the upper end of the open water. According to the season, the pickleweed may appear as a vibrant orange-red mat, which offers a distinct contrast to the greens and tans characteristic of the other lagoon habitat types. Central coast arroyo willow riparian forest occurs in the uppermost reaches of the lagoon’s arms, while three freshwater marsh habitats, including cattail, bur-reed, and Pacific oenanthe, are present in the central portions of both arms. Coastal scrub and coastal scrub-grasslands habitats, similar to the vegetation found on the marine terrace portion of the site, occur in the uplands portion of the reserve and offer visual continuity to the remainder of the site.

The higher quality natural features of the project site that contribute to the overall scenic nature of the area include the YLR, with its pristine waters and distinct vegetation that provide a visual and physical connection to the ocean south of the site and the hills north and northwest of the site, as well as the open grassland areas of the terrace. Portions of the marine terrace appear undisturbed and offer a generally unimpeded view to the ocean/sky backdrop in the distance.

Light and Glare

The existing sources of light and glare on the project site are generally limited to the interior and exterior lights associated with development at LML, including all facilities, parking lots, and access roads. All onsite buildings and parking areas are currently equipped with outdoor, downward-directed light fixtures for nighttime lighting and security. The publicly accessible trail along the perimeter of the terrace does not have light fixtures. In addition, cars and trucks accessing the site are a potential source of glare. Other light sources in the project vicinity include the streetlights located along Shaffer Road and Delaware Avenue, and the exterior and interior light fixtures associated with the Raytek facilities to the north of the site and the De Anza Santa Cruz residential community to the east.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP building program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new development of 377,856 square feet (sf) at the Marine Science Campus by about 2020 (529,856 sf including all outdoor facilities). The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education; 70,000 sf for Outdoor Research Area; 19,000 sf for Support Facilities; 98,100 sf for Support Housing; 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for Seawater System Expansion. The CLRDP building program would also include the removal of the following uses: 3,000 sf of Temporary Office Trailers; 26,844 sf of Greenhouses; and 1,400 sf of Caretaker Housing.

The CLRDP also identifies other site improvements, including modifying and extending public access trails and roadways, constructing parking, providing utility services, installing stormwater management systems, expanding the seawater system, developing new public access overlook areas, installing lighting, installing landscaping and signage, and implementing resource management measures to protect and enhance remaining habitat onsite. While most of the above development activities would occur within the three development areas, some improvements and/or activities would also occur outside of these areas. These improvements and/or activities include limited parking, utility improvements, stormwater management systems, the intake and discharge portion of an expanded seawater system, public access overlooks, lighting for safety and wayfinding, signage, and resource management activities.

The exact locations for buildings within the development areas have not been mandated by the CLRDP. However, the CLRDP includes a prototype site plan (see Figure 3-7) that provides an example of how and where development described in the CLRDP building program could occur. Development and open space areas would be sited so as to protect significant public view corridors to the ocean, the agricultural coastline, and surrounding hillsides, as described further below. In addition, building heights of new development would be limited to two stories (36 feet tall), with top plate heights at a maximum of 26 feet above the first floor level to protect the site's visual character. In the middle terrace, buildings would be stepped down in height as they approach the eastern, northern, and western edges of the development zone so that building segments located along these edges would be 30 feet tall to the midpoint of the roof pitch.

The CLRDP includes policies that would guide site development in a manner that would protect important public view corridors, design new development to be compatible with surrounding areas, design development on the terrace portion of the site to minimize activity around and avoid directing light into ESHAs, and provide lighting at the lowest necessary levels to achieve safety and efficient wayfinding consistent with the protection of habitat values onsite. (See Measures Proposed as Part of the Project, below, for further details about these policies.)

The CLRDP includes design guidelines to ensure that all new development projects implement the CLRDP design principles and land use concepts and are consistent with the binding CLRDP policies and measures. These guidelines address the following seven areas of design: building design, campus street design, parking design, public trail design, landscape design, lighting design, and site signage design. (See Measures Proposed as Part of the Project below for further details about these guidelines.)

The CLRDP building design guidelines are intended to establish a building design aesthetic that would minimize the visual impact of buildings to the extent feasible consistent with program needs by (1) limiting building mass and height, (2) using vernacular architectural forms such as the coastal barn as inspiration, and (3) using materials and colors traditionally seen in the coastal rural setting. The CLRDP campus street design guidelines address designing streets to make them and the vehicles traveling along them as unobtrusive as possible. The CLRDP parking design guidelines address the design of parking areas onsite that minimize visual impact, protect water quality, limit the negative effects of associated noise and lights, integrate parking into overall site appearance, and utilize materials that will result in the least environmental impact. The CLRDP public trails design guidelines address the design of trails that are unobtrusive and natural in appearance, while providing functional pedestrian circulation that is attractive to use in all seasons and weather conditions. According to the CLRDP landscape design guidelines, new plantings within the natural drainage features and within areas adjacent to, connecting, and within the three proposed development areas would be designed according to four general types of landscape areas found onsite, including drainage basins and swales, structural landscape, transitional landscape, and ornamental plantings. The new plantings would be native to the Northern and Central California coast, from the same gene pool, drought-tolerant, non-invasive, low-maintenance, and fire-resistant. The CLRDP lighting design guidelines address the provision of onsite lighting at the lowest levels necessary for safety and wayfinding, avoidance of spilling light into natural habitat areas and surrounding neighborhoods, and minimizing artificial light interference with views of the coastal night sky. Finally, the site signage design guidelines address providing the minimum amount of site signage necessary to convey information to site users while minimizing the visual impact and clutter of signage onsite.

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program. These five near-term projects would be constructed according to the illustrative building studies/prototypes included in the CLRDP (see CLRDP Chapter VII). The building prototypes embody design principles and land use concepts discussed in Chapter IV of the CLRDP.

Amongst the building locations depicted in the CLRDP prototype site plan, specific sites for these five near-term projects are shown in Figure 3-7 and are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area. The Shared Campus Warehouse and Laydown Facility would be housed in two structures with pitched roofs that would vary in height from about 24 to 35 feet.

- 42 Apartment/Townhouse Units consisting of two two-story structures with a combined building space of 43,050 sf would be constructed on the middle terrace development area, about 300 feet west of the De Anza Santa Cruz residential community.

- The United States Geological Survey (USGS) Western Coastal and Marine Geology Facility would include about 78,500 sf of new office and laboratory space within two two-story buildings on the middle terrace development area east of McAllister Way. Both the proposed laboratory and the office building would be approximately 34 feet in height.

- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area adjacent the YLR. The SORACC project would be accommodated in two buildings that would be about 24 feet in height.

- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area. The Phase II facility would include one building constructed adjacent to the existing buildings, and consistent with the existing Center for Ocean Health facilities, it would be 34 feet tall to the highest point on its roof. Additionally, this proposed project would include the construction of two new public access overlooks and improvement of an existing overlook.

Construction of each of these projects would involve excavation and other ground disturbing activities, such as those described above for the CLRDP building program. As for the CLRDP program overall, these projects would include landscaping for screening and aesthetic purposes, and would be designed in accordance with the CLRDP design guidelines and other relevant CLRDP policies to ensure that new development would contribute to and would not diminish the overall scenic qualities of the project site and vicinity.

MEASURES PROPOSED AS PART OF THE PROJECT

To protect and maintain scenic and visual resources found on the project site, the CLRDP has delineated development areas and open space areas on the Land Use Diagram (see Project Description, Figure 3-7) to allow significant view corridors to the ocean and surrounding hillsides and coastline to remain open. The scenic and visual qualities section of the CLRDP states that "[t]he University will site new development at the Marine Science Campus in a manner that protects the public view corridors depicted in [CLRDP] Figure 3.16" (Policy 4.1, Protection of Scenic Corridors). To achieve this goal, the following implementation measure is proposed:

- <u>Implementation Measure 4.1.1 – Location of Development</u>: The University will cluster development on the Marine Science Campus so as to leave ample open space that protects significant public view corridors. For this purpose, the University has designed the Land Use Diagram as shown in [CLRDP] Figure 5.2, and development consistent with this diagram will be considered fully consistent with Policy 4.1 and this implementation measure.

To protect the scenic quality of the project site and surrounding area, “[t]he University will design new development at the Marine Science Campus to be compatible with surrounding areas” (Policy 4.2, Protection of Scenic Quality). The following implementation measures are proposed in support of this policy:

- Implementation Measure 4.2.1 – Design Guidelines and Prototypes: The University will use the design guidelines contained in [CLRDP] Chapter 6 and the prototypes of [CLRDP] Chapter 7 to guide decisions on siting, materials, height, clustering, and other aspects of design.

- Implementation Measure 4.2.2 – Alteration of Natural Land Forms: Development will be sited and designed to minimize the alteration of natural landforms. For this purpose, the University has included a Prototype Site Plan in [CLRDP] Chapter 7, and development consistent with this prototype will be considered to be fully consistent with this implementation measure.

- Implementation Measure 4.2.3 – Building Heights: Unless otherwise shown in [CLRDP] Chapter 7, Prototype Plans and Building Studies, buildings on the Marine Science Campus will be two stories tall, and the height of a two-story building will be 36 feet, with top-plate heights at a maximum of 26’-0” above the first floor level. Mechanical equipment that is appropriately located on the roof may exceed this height limit. In the Middle Terrace, buildings will be stepped down in height as they near the eastern, northern, and western edge of the development zone so that building segments along these edges are 30’-0”. Building height will be measured from the average site grade to the midpoint of the roof pitch. Building heights may be reduced to the extent that the University has determined height reduction to be necessary to better meet the program needs of the Marine Science Campus.

- Implementation Measure 4.2.4 – Construction Materials: The University will use stained vertical wood siding, roughcast concrete, high-quality shingle roofing, or other materials with compatible appearances for all buildings on the Marine Science Campus.

- Implementation Measure 4.2.5 – Building Setbacks: The University will allow new buildings on the Marine Science Campus to be constructed to within 15 feet of campus streets.

- Implementation Measure 4.2.6 – Building Length Limitations: New building sections constructed on the Marine Science Campus will not exceed 175 feet in continuous building length adjacent to a street setback line.

- Implementation Measure 4.2.7 – Placement of Utility Lines Underground: All utility lines serving the Marine Science Campus will be located underground.

To limit visual intrusion into sensitive onsite habitats, the University proposes that “[d]evelopment on the terrace portion of the Marine Science Campus will be designed so that activity and direct light will not significantly disrupt wildlife in ESHA” (Policy 4.3, Visual Intrusion). To achieve this objective, the following implementation measures are proposed:

- Implementation Measure 4.3.1 – Visual Intrusion into YLR: Buildings and parking lots constructed adjacent to YLR will be designed so that activity and direct light will be out of the sightlines of YLR.

- Implementation Measure 4.3.2 – Visual Intrusion into Terrace EHSA: Buildings and parking lots will be designed so that activity and direct light extend no closer than 100 feet from EHSAs located in the terrace portion of the Marine Science Campus.

Furthermore, to ensure that lighting on the project site remains consistent with the protection of onsite habitat values, the University proposes to provide lighting "at the lowest levels necessary to achieve safety and efficient navigation," and would not allow lighting "to interfere with the biology of the YLR inhabitants" (Policy 4.4, Lighting). The following CLRDP implementation measures are proposed in support of this policy:

- Implementation Measure 4.4.1 – Building Lighting: Exterior lighting will be located only at entries and usable interior courtyards. No other exterior lighting of buildings, such as facade or accent lighting, will be allowed, except where necessary for safety. Direct light from a lighting fixture located in the interior or exterior of buildings immediately adjacent to the YLR or terrace wetlands will not be visible in the YLR or the adjacent terrace wetlands.

- Implementation Measure 4.4.2 – Street and Trail Lighting: Streets on the Marine Science Campus will be lighted only within the development zones of the campus. Trails will be lighted as needed for safety. Only low-height, wood bollards (i.e., up to 36") will be used for trail lighting, and all trail lighting will be downward directed.

- Implementation Measure 4.4.3 – Parking Lot and Maintenance Yard Lighting: Lighting in parking lots and maintenance yards will be the lowest levels necessary to provide safety and a sense of security. Only parking areas within the building development zones perimeter will be lighted. All parking lot and maintenance yard lighting will be cut-off type lighting and will be downward directed. Pole mounted lighting will not exceed 12 feet in height. Direct light from a lighting fixture located in a parking lot immediately adjacent to YLR or terrace wetlands will not be visible in YLR or the adjacent terrace wetlands.

- Implementation Measure 4.4.4 – Sign Lighting: Sign lighting on campus will be limited to signs identifying important destinations, restricted areas, or dangerous terrain. All sign lighting will be the minimum necessary to achieve design objectives. No backlighting of signs or use of neon will be allowed.

The CLRDP includes design guidelines for new development on the project site to ensure a harmonious architectural scheme appropriate to the purposes of the buildings and their setting. The design guidelines contain both prescriptive elements (those embodied in the policies and implementation measures identified above) as well as non-prescriptive elements that are intended to influence final designs while maintaining overall flexibility in implementation of the building program. The CLRDP design guidelines contain seven subsections that address specific areas of design: building design, campus street design, parking design, public trail design, landscape design, lighting design, and site signage design.

The building design guidelines prescribe a palette of forms, scales, colors, and materials to reinforce the site as a transition zone between the rural/agricultural coastal landscape to the west and north and the developed urban fabric to the east. Buildings proposed under the CLRDP would be clustered and designed to create useful, sheltered outdoor space. Building heights would be limited to two stories, and no more than 36 feet to the midpoint of the roof pitch as stated above in Implementation Measure 4.2.3; however, many support facilities would only be one story, or 15 to 20 feet in height, and would generally be clustered at the edges of the development areas. Construction materials under the CLRDP design guidelines would be required to blend into the surrounding coastal landscape rather than contrast with it, as seen with the existing LML buildings, and would likely include stained vertical wood siding, roughcast concrete, and high-quality shingle roofing, as stated above in Implementation Measure 4.2.4. In addition, the design and performance of new facilities onsite would be measured against the LEED Rating System's Silver Rating to ensure an overall sustainable design.

The campus street, parking, and public trail design guidelines address the design of streets, roadways, parking areas, and public trails at the project site in order to minimize their visual impact, integrate them into the overall site appearance, and ensure use of appropriate all-weather materials. Campus streets would be designed to accommodate two-way traffic flow; however, to minimize pavement area and to reduce speeding, all streets would be no more than 22 feet in width, and would be constructed without curbs. As feasible, drainage swales adjacent to streets would be used. Standard building setbacks would be 15 feet from campus streets and parking lots, as stated above in Implementation Measure 4.2.5. Building setbacks would increase to 30 feet where necessary to accommodate drainage swales and basins. According to the parking design guidelines, general parking areas would be located within the Research and Education Mixed Use areas on campus, would generally not be located along streets that cross the open upland grassland areas, would be distributed around the site in discrete areas as opposed to large lots, as feasible, and would be screened from view. Public trails onsite would be designed according to intended use,[5] with larger widths (up to 12 feet wide) and low-level pedestrian lighting designated for major pedestrian trails, and narrower widths (a minimum of 6 feet wide to ensure ADA compliance) and no night lighting provided unless needed for safety, designated for minor visitor use trails.

In addition, the design guidelines presented in the CLRDP propose landscape design, lighting, and site signage criteria to maintain and preserve the character of the coastal rural/agricultural landscape. Specifically, where new plantings are proposed at the project site, plant materials are to be native to the Northern and Central California coast, from the same gene pool, as well as drought-tolerant, non-invasive, low-maintenance, and fire-resistant. The planting design guidelines are organized according to four general types of landscape areas proposed for the site. The lighting design guidelines generally provide that all light fixtures have cut-off or indirect fixture types, with no visible source of light, that all fixtures are mounted at as low a height as possible to avoid spillover light, that fixtures be consistent with the rural/agricultural and campus character, and that all site lighting be uniformly designed throughout the site and constructed of natural or natural-looking materials. Lighting guidelines are also presented according to specific areas and features, including building facilities, roadways, parking areas, pathways, and special areas and features, such as the site entry and maintenance yards, as stated above in Implementation Measures 4.4.1 through 4.4.3. The site signage design guidelines are intended to minimize the visual impacts and potential clutter of onsite signage while conveying necessary information to site users. A standard design or set of designs would be developed to facilitate ease of recognition according to use onsite and to ensure that signs employ the same letter type and size and the same pallet of materials and are installed at the same height. Signage would be fabricated of natural or natural-looking materials to the maximum extent feasible, and would be integrated with architecture or other site features and consolidated to limit the number of freestanding poles or other structures devoted exclusively to signage. Sign lighting would be limited to signs identifying important destinations, restricted areas, or where needed for safety and would be provided at the minimum necessary, as stated above in Implementation Measure 4.4.4.

[5] The CLRDP public trails design guidelines state that walks and trails on campus have two primary uses: daily use by site faculty, staff, and students to access site facilities; and visitor use for coastal access, docent-led tours, and informal interpretive walks.

PROJECT IMPACTS AND MITIGATION MEASURES

This section evaluates impacts on "scenic vistas" and "scenic resources," as described in the Setting section. It also evaluates whether the project would cause a substantial degradation of "visual character" or substantial adverse lighting effects on day or nighttime views in the area. This discussion of visual impacts, although subjective by nature, addresses the CEQA criteria presented at the beginning of this section.

SCENIC VISTAS

Entire Development Program

Several scenic vistas would potentially be affected by the implementation of the CLRDP, including views available from Highway 1 (marker # 21.51) to the northwest of the site, from the lower terrace of the Bombay greenbelt property to the north, from Wilder Ranch State Park to the west of the site, and from Natural Bridges State Beach to the east. These are discussed below.

Natural Bridges State Beach Parking Area

Figure 4.1-4b, above, presents the proposed view of the project site from the Natural Bridges State Beach parking area. By 2020, the CLRDP would generally result in new buildings with rooftops that, from this viewpoint, would be visible slightly above the rooflines of De Anza Santa Cruz residential community and also between and to the southwest of these homes. The new rooflines would become a nearly indiscernible part of the scenic vista viewed from the Natural Bridges State Beach parking area, and would not obscure views of the Pacific Ocean or the hills to the northwest. The rooftops of the Shared Campus Warehouse and Laydown Facility along the eastern edge of the upper terrace would also be visible. Moving southward, the eastern rooflines of the Support Housing (42 Apartment/Townhouse Units) in the middle terrace development area would be visible. Moving southward (and to the left in Figure 4.1-4b), the rooflines of the Marine Research and Education center and the USGS labs and office would also be slightly visible above the De Anza Santa Cruz residential community rooflines and behind the Support Housing. In general, because of their locations along the western edge of LML, more distant from the viewpoint, and due to intervening vegetation, the Monterey Bay Aquarium Sea Otter Research and Conservation Center, the Center for Ocean Health Phase II, and most of the USGS labs and office (Phase I) would not be visible. On the promontory to the far left of the photograph, a narrow rooftop edge of the Support Housing (caretakers' units), which is located on the western side of the promontory in the lower terrace development area overlooking the Pacific Ocean, would also be visible. In the simulation (illustrated in bright yellow), the seawater facilities already approved as a separate project, and the caretaker housing that is part of the proposed CLRDP appear as a cluster in this area. (see Figure 4.1-4b).

As shown, the De Anza Santa Cruz residential community and the Pacific Ocean would remain the primary visual components in the foreground of the view from this viewpoint. However, the new development on the lower terrace, as well as the rooflines of the new buildings proposed for the middle and upper terraces, would factor more prominently in the foreground view, above the De Anza Santa Cruz residential community. The existing LML portable trailers visible on the lower terrace would be replaced with new, permanent buildings in the coastal vernacular that would be a visual improvement over the existing lower quality, temporary structures currently in place. The site would appear more intensively developed from this vantage point, as the new development would extend across the width of the view. However, the components of the scenic vista that give it scenic quality, including visual access to the Pacific Ocean and coastline in the foreground and the hillsides in the background, would not be obstructed or significantly altered. Additionally, due to the height limitations proposed as part of the project, the new development would appear similar in height to the existing LML development, and because of the CLRDP design guidelines, a building design aesthetic that reinforces the concept of the site as an urban to rural transition zone and that fits the character of the existing buildings would be established. For these reasons, the project would not have a significant adverse effect on this scenic vista.

Highway 1

As shown in Figure 4.1-6b, above, the new buildings in the middle and lower terrace development areas would be visible to motorists traveling southbound along Highway 1. By 2020, views of the middle terrace development area (see Figure 4.1-6b, to the right of trees in the foreground), visible across existing vegetation along an unnamed drainage, would include the western portions of the Marine Research and Education facilities, as well as the Monterey Bay Aquarium Sea Otter Research and Conservation Center, and the USGS labs and offices. Because these facilities are clustered together, views in this direction would include a larger mass of buildings than on the lower terrace development area. However, the scale of these facilities appears minute when compared to the scale of the vast panoramic views of the Pacific Ocean and the horizon, or when compared to the vegetation and open farmlands in the foreground – views that would be retained unobstructed by the CLRDP. By 2020, views of the lower terrace development area from Highway 1, across the vegetation along an existing drainage, would include the rear portion of the Center for Ocean Health Phase II buildings on the promontory overlooking the Pacific Ocean. However, because of the small scale of buildings against the panoramic views of water and the ocean-sky horizon, the CLRDP would not adversely affect views across the lower terrace development area (see Figure 4.1-6b). The Marine Research and Education facilities in the lower terrace development area and the Support Housing (caretakers' units) would be obscured by existing buildings and facilities and would not figure in the views.

In addition, due to the existing and proposed landscape trees along the development zone's western boundary, the new buildings would be partially obscured, and the new development in the upper terrace would not be visible at all from the Highway 1 viewpoint. From this vantage point, agricultural fields would continue to dominate the foreground views, with the ocean horizon remaining visually accessible in the background. The Raytek facilities north of the site as well as the existing LML development would blend with the Marine Research and Education facilities proposed to be located on the middle and lower terraces. With the project, buildings would extend across the open grassland portion of the site in the middleground view and would fill in some of the open space presently visible between the existing buildings, and thus could increase the site's perceived density. However, the view corridor (see Figure 3-5) would be maintained with the project. Moreover, the new development would be similar in height to the existing LML buildings and would be designed to blend visually with the coastal rural landscape through appropriate use of exterior materials, colors, landscaping, and architectural treatments, as described above. The YLR would still not be visible due to the natural topography of the lagoon and the intervening windbreak vegetation in the foreground. The important components of the vista that give it scenic quality, including the agricultural fields and trees in the foreground and the ocean-sky horizon in the background, would not be obstructed or significantly altered along the southern edge of the site.

For the reasons stated above, the project would not have a significant adverse effect on this scenic vista.

Bombay Property – Lower Terrace

As shown in Figure 4.1-7b, above, the proposed project would be clearly visible from this location. Existing development north of the project site would obscure some of Shared Campus Warehouse and Laydown Facility, as well as some of the Support Housing (38 units) on the upper terrace development area (foreground of Figure 4.1-7b). However, nearly all of the Marine Research and Education facilities, the USGS labs and offices (Phase I), the Sea Otter Research and Conservation Center, and the Support Housing (42 Apartment/Townhouse Units), all in the middle terrace development area, would be visually prominent, along with the open space along the eastern edge of the middle terrace development area. In the lower terrace development area, closer to the ocean, the Center for Ocean Health Phase II and the Support Housing (caretakers' units) would be visible on the promontory, as will the seawater facilities already approved as a separate project (and shown in brighter yellow on the simulation). Views of the site would continue to appear as part of the background, dominated by the vegetation and open lands in the foreground and to the west, and the vast water and sky views in the background to the south, southeast, and southwest. The CLRDP would not reduce or in any way obscure the panoramic views in either the foreground or the background (see Figure 4.1-7b).

Existing scenic vistas of the coastal agricultural lands, Natural Bridges State Beach, and the Pacific Ocean would not be affected by implementation of the proposed project. At this elevation, most of the buildings would continue to appear below the ocean-cliff horizon, and the scenic quality of the coastal landscape would be largely unaltered. Moreover, large open spaces and view corridors (see Figure 3-6) would be preserved throughout the site through the designation of development areas, clustered development patterns, and appropriate landscaping. The low-density development would increase the number of built features on the project site, particularly on the undeveloped portion of the terrace, which currently appears as a continuous and natural landscape feature. However, the majority of the site, including the YLR, terrace wetlands, wildlife corridor, and associated buffer areas would be preserved and would remain open, thereby offering a visual break and connection to the surrounding open agricultural fields.

For the reasons stated above, the project would not have a significant adverse effect on this scenic vista.

Wilder Ranch State Park Beach Area

Figure 4.1-8b, above, illustrates the view from the Wilder Ranch State Park beach area with project development. By 2020, views would include the western edge of the entire development program, including facilities on the upper, middle, and lower terrace development areas, although most of these facilities would be at least partially screened behind the existing berm Partial views of new buildings also would be visible between existing and new buildings. From this perspective, building clusters in the middle and upper terrace development areas appear separated by only a short distance, and there appears to be a nearly continuous length of buildings that include the Sea Otter Research and Conservation Center, the USGS labs and offices (Phase I), and portions of the Marine Research and Education facilities, visible behind existing buildings, as well as portions of the Shared Campus Warehouse and Laydown Facility, and the Support Housing (38 units). While views of the middle terrace development area would obscure views of a continuous row of trees in the distance, the scale of these buildings is diminished by the views in foreground of beach, the expanse across the YLR, the Pacific Ocean, and the cliffs along the lower terrace development area, as well as the vast background views of open sky (see Figure 4.1-8b). In some instances, particularly on the lower terrace, individual buildings would not be discernible; these buildings would include the western walls of the Center for Ocean

Health Phase II buildings and the Support Housing (caretakers' units), which would blend into views of existing buildings or be hidden by existing berms. Buildings on the lower terrace appear small in scale when compared to the scale of the cliffs of the promontory overlooking the Pacific Ocean.

The flat, sandy stretch of beach and the ocean in the foreground of this view would remain a dominant visual element. With the project, however, buildings would extend across the relatively open terrace, in the middleground, and would fill in much of the open space presently visible between the existing buildings, thus increasing the site's perceived density. The new development would be similar in height to the existing LML buildings and would be designed to blend visually with the coastal rural/agricultural landscape through appropriate use of exterior materials, colors, landscaping, and architectural treatments. The YLR would still not be visible due to the natural topography of the lagoon and the intervening bluff. The components of the view that provide scenic quality, particularly the beach and coastline in the foreground, would not be obstructed or significantly altered.

For the reasons stated above, the project would not have a significant adverse effect on this scenic vista.

Wilder Ranch State Park Parking Area

As shown in Figure 4.1-9b, above, the agricultural fields and coastal scrub vegetation as well as the wooden fence at the edge of the parking area would continue to influence and frame the foreground view. With project implementation, the built environment on the site would create an increasingly distinct visual presence in the middleground view from this vantage point. The development proposed for the upper terrace, particularly the Shared Campus Warehouse and Laydown Facility would be visible in the middleground view, as would the bulk of new buildings proposed for the middle terrace (Marine Research and Education facilities, the USGS labs and offices (Phase I), the Monterey Bay Aquarium Sea Otter Research and Conservation Center), and the Support Housing (42 Apartment/Townhouse Units), although the existing and proposed onsite vegetation and topography would further soften and partially screen the visual plane of the buildings. The YLR would continue to remain hidden from view due to the intervening terrain and vegetation. Although the site would appear more intensely developed from this vantage point, important visual corridors toward the ocean would remain open and relatively unaltered by the project. Additionally, the preserved open space areas on the terrace would maintain the visual integrity of the surrounding rural/agricultural coastal landscape. For these reasons, the project would not have a significant adverse effect on this scenic vista.

Wilder Ranch State Park – Upper Ridge

As shown in Figure 4.1-10, above, the long-range view of the project site is negligible when viewed against the wide expanse of ocean and sky in the background. No building is clearly distinguishable from this vantage point, and no new building would likely be distinguishable at this distance. With the project, the grassland vegetation and open space proposed for preservation would continue to provide a visual connection to the coastal agricultural landscape to the west and north of the site. For these reasons, the project would not have a significant adverse effect on this scenic vista.

Shaffer Road

As shown in Figure 4.1-2b, above, the new development proposed for the upper terrace development area, including the Shared Campus Warehouse and Laydown Facility and Support Housing (including the 38 units), would alter the view of the site from this location. The projected post-development view from Shaffer Road adjacent to the train tracks and community garden, although not considered to be a "scenic vista" for purposes of this analysis, is described below for informational purposes. Portions of the previously open and relatively undisturbed grassland seen in the foreground would be replaced with several one- and two-story buildings that would generally block visual access to the southernmost portions of the site, including segments of the ocean-sky horizon that forms the background to this view. However, as new development would be clustered and set back at least 15 feet from Shaffer Road, an unimpeded view corridor looking south along Shaffer Road through the site to the ocean would be preserved. The CLRDP design guidelines would help to ensure that individual structures are designed to be visually sensitive to the surrounding environment. The exterior materials and aesthetic and architectural treatments would be selected from the palette of colors that occurs naturally onsite, including tans, greens, and blues, and would be designed to harmonize with the surrounding coastal-rural landscape. The buildings would be limited to 36 feet in height (and the currently proposed Shared Campus Warehouse and Laydown Facility would be only approximately 35 feet in height). Landscaping proposed as part of the project, when mature, would soften and partially screen the bulk of the structures. Additionally, the remainder of the upper terrace, including a 20-foot-wide wildlife corridor along the northern edge of the site, as well as a drainage ditch, two seasonal wetlands, and associated buffer areas, would be preserved as open space.

Delaware Avenue

At the Delaware Avenue terminus, new development proposed for the middle terrace, particularly the Support Housing (including the 42 Apartment/Townhouse Units), Support Facilities, and the Marine Research and Education facilities would alter the view (see Figure 4.1-3b, above). The view from the Delaware Avenue terminus, although not considered a "scenic vista" for purposes of this analysis, is described below for informational purposes. The dominant grassland and coyote brush vegetation would remain relatively untouched in the foreground, as would the informational signs and wooden bollards located along a public trail. An important view corridor across the site to the agricultural land and hills to the northwest would be preserved within the CLRDP, as would the generally unimpeded view south to the ocean along the Shaffer Road easement. The new buildings, particularly the Support Housing, would dominate the middleground of the view, and at two stories tall (up to 36 feet in height) would intrude into the land-sky horizon in the distance. However, the remainder of the site, including the existing and proposed new development within the lower terrace, the middle terrace development west of McAllister Way (including the Monterey Bay Aquarium Sea Otter Research and Conservation Center), and the YLR in its entirety, would remain screened as a result of intervening development, natural topography, and proposed and existing vegetation. In accordance with CLRDP policy, the new development would be clustered within the middle terrace development area, and buildings would be stepped down in height as they near the eastern, northern, and western edge of this area so that buildings are no more than 30 feet to the midpoint of the roof pitch along the edges. Ample open space would be preserved, and would effectively protect significant public view corridors across the site to the ocean. Buildings would also include setbacks and length restrictions. The CLRDP policies, implementation measures, and design guidelines, described above, would help to ensure that the new development blends with the surrounding environment through sensitive architectural treatments. Additionally, landscaping proposed for the site would help to soften and partially screen the building masses.

Pacific Ocean

Short-range, panoramic views of the southernmost portion of the project site from the ocean would remain relatively unchanged with implementation of the proposed project (see Figure 4.1-5b, above). The view from this vantage point, although not considered a “scenic vista” for purposes of this analysis, is described here for informational purposes. From this perspective, the southern facades of the LML structures on the lower terrace, including the Seymour Marine Discovery Center, the Research and Younger buildings, the Service Building, and the Center for Ocean Health Phase I building, would continue to appear in the middleground to the extent that they were visible above the existing bluff-edge berm. This existing development and the existing berm effectively block visual access to the remainder of the site. The forested ridges and rolling grassland habitat of the Santa Cruz Mountains would remain visually accessible in the background, and the foreground view would continue to be dominated by the white, partially vegetated bluff face. Additionally, the view of the sand beach and mouth of the YLR would remain unchanged.

In summary, the policies, implementation measures, and design guidelines proposed as part of the project and described above would generally limit any potential visual intrusion effects of the project upon public views from important vantage points. The CLRDP provides specifications for articulated building masses, exterior finishes, and colors that would be compatible with the natural landscape and would minimize any perceived contrast between the structures and the surrounding visual environment. The delineation of development zones and open space areas as well as restrictions on building heights would retain significant view corridors toward the ocean, coastline, and hillsides. Therefore, implementation of the proposed development program would not have a significant adverse effect on a scenic vista.

Near-term Projects

For the reasons noted above for the entire development program and summarized below, none of the near-term projects would result in significant adverse effects on scenic vistas.

The rooftops of the Shared Campus Warehouse and Laydown Facility would be visible from the Natural Bridges State Beach parking area but would not significantly obstruct or alter scenic views from this location (see Figure 4.1-4b). The facility would not be visible from Highway 1 west of the project site due to the existing and proposed landscape trees (see Figure 4.1-6b). Portions of the facility would be visible from the Bombay Property’s lower terrace, but the facility would not reduce or obscure panoramic views in either the foreground or background (see Figure 4.1-7b). Portions of the facility would be visible from the Wilder Ranch State Park beach area, but the scale of the buildings would be diminished by foreground views of the beach, the expanse across the YLR, the Pacific Ocean, the cliffs along the lower terrace development area, and vast background views of open sky (see Figure 4.1-8b). The facility would be visible in the middleground view from the Wilder Ranch State Park parking area, but important views toward the ocean would remain open and relatively unaltered by the project (see Figure 4.1-9b). The facility would not be distinguishable in the long-range view from the upper ridge of Wilder Ranch State Park (see Figure 4.1-10b). While the facility would alter the view from Shaffer Road at the project site entrance, this view is not considered a “scenic vista,” and an unimpeded view looking south along Shaffer Road through the project site to the ocean would be preserved (see Figure 4.1-2b).

The 42 Apartment/Townhouse Units would be visible from the Natural Bridges State Beach parking area but would not significantly obstruct or alter scenic views from this location (see Figure 4.1-4b). The units would be at least partially visible from Highway 1 west of the project site, but would appear minute compared with the scale of the vast panoramic views of the Pacific Ocean and the horizon, as well as the vegetation and open farmlands in the foreground (see Figure 4.1-6b). Nearly all of the project would be visible from the Bombay Property's lower terrace, but the project would not reduce or obscure panoramic views in either the foreground or background (see Figure 4.1-7b). Portions of the project would be visible from the Wilder Ranch State Park beach area, but the scale of the buildings would be diminished by foreground views of the beach, the expanse across the YLR, the Pacific Ocean, the cliffs along the lower terrace development area, and vast background views of open sky (see Figure 4.1-8b). Portions of the project would also be visible in the middleground view from the Wilder Ranch State Park parking area, but existing and proposed onsite vegetation and topography would help soften and partially screen the view, and important views toward the ocean would remain open and relatively unaltered (see Figure 4.1-9b). The project would not be distinguishable in the long-range view from the upper ridge of Wilder Ranch State Park (see Figure 4.1-10b). While the project would alter the view from the Delaware Avenue terminus, this view is not considered a "scenic vista," and the views across the site to agricultural land and hills to the northwest, as well as south to the ocean along Shaffer Road, would be preserved (see Figure 4.1-3b).

The roofline of the USGS Western Coastal and Marine Geology Facility would be slightly visible from the Natural Bridges State Beach parking area but would not significantly obstruct or alter scenic views from this location (see Figure 4.1-4b). The western portion of the facility would be visible from Highway 1, but would appear minute compared with the scale of the vast panoramic views of the Pacific Ocean and the horizon, as well as the vegetation and open farmlands in the foreground (see Figure 4.1-6b). Nearly all of the facility would be visible from the Bombay Property's lower terrace, but the facility would not reduce or obscure panoramic views in either the foreground or background (see Figure 4.1-7b). Portions of the facility would be visible from the Wilder Ranch State Park beach area, but the scale of the facility would be diminished by foreground views of the beach, the expanse across the YLR, the Pacific Ocean, the cliffs along the lower terrace development area, and vast background views of open sky (see Figure 4.1-8b). Portions of the facility would also be visible in the middleground view from the Wilder Ranch State Park parking area, but existing and proposed onsite vegetation and topography would help soften and partially screen the view, and important views toward the ocean would remain open and relatively unaltered (see Figure 4.1-9b). The facility would not be distinguishable in the long-range view from the upper ridge of Wilder Ranch State Park (see Figure 4.1-10b).

The Monterey Bay Sea Otter Research and Conservation Center (SORACC) would generally not be visible from the Natural Bridges State Beach parking area due to its location and intervening vegetation (see Figure 4.1-4b). The western portion of the SORACC would be visible from Highway 1, but would appear minute compared with the scale of the vast panoramic views of the Pacific Ocean and the horizon, as well as the vegetation and open farmlands in the foreground (see Figure 4.1-6b). Nearly all of the SORACC would be visible from the Bombay Property's lower terrace, but the SORACC would not reduce or obscure panoramic views in either the foreground or background (see Figure 4.1-7b). Portions of the SORACC would be visible from the Wilder Ranch State Park beach area, but the scale of the buildings would be diminished by foreground views of the beach, the expanse across the YLR, the Pacific Ocean, the cliffs along the lower terrace development area, and vast background views of open sky (see Figure 4.1-8b). Portions of the SORACC would also be visible in the middleground view from the Wilder Ranch State Park parking area, but existing and proposed onsite vegetation and topography would help soften and partially screen the view, and important views toward the ocean would remain open and relatively unaltered (see Figure 4.1-9b). The SORACC would not be distinguishable in the long-range view from the upper ridge of Wilder Ranch State Park (see Figure 4.1-10b).

The Center for Ocean Health Phase II facility may be visible from the Natural Bridges State Beach parking area but would not significantly obstruct or alter scenic views from this location (see Figure 4.1-4b). From Highway 1, views across the vegetation along an existing drainage would include the rear of the Ocean Health Phase II facility; the facility would not adversely affect these views, however, due to its small scale against the panoramic water views and views of the ocean-sky horizon (See Figure 4.1-6b). From the Bombay Property's lower terrace, the facility would be visible on the promontory but would not reduce or obscure panoramic views in either the foreground or background (see Figure 4.1-7b). The western walls of the facility would be visible from the Wilder Ranch State Park beach area, but would blend into views of existing buildings and appear small in scale compared to the scale of the promontory cliffs overlooking the Pacific Ocean (see Figure 4.1-8b). The facility would be visible in the middleground view from the Wilder Ranch State Park parking area, but important views toward the ocean would remain open and relatively unaltered by the project (see Figure 4.1-9b). The facility would not be distinguishable in the long-range view from the upper ridge of Wilder Ranch State Park (see Figure 4.1-10b).

See further discussion under Entire Development Program, above.

SCENIC RESOURCES

Entire Development Program

Scenic resources may be impaired by the introduction of a visual feature that is aesthetically offensive in itself, by the degradation of an existing visual feature that has aesthetic significance, or by the introduction of elements that contrast with the existing site elements and are therefore perceived as intrusive. Physical changes in the scale, form, color, and texture of natural and cultural (manmade) visual features may impair the quality of scenic resources. Such changes may result from new land uses, new structures, grading and excavation, elimination of existing vegetation, changes in the alignment or area of surface waters, or landscaping. Scenic resources for the purposes of this analysis include the open grasslands located on the terrace portion of the site, particularly those set against an ocean backdrop, and the YLR. The proposed new development would not, however, result in such impacts, for the reasons discussed below.

As new development under the CLRDP would be contained within three development areas, much of the mostly undeveloped terrace property, including the drainage ditch, two seasonal wetlands, and associated buffer areas in the upper terrace, and the drainage swale, seasonal pond and associated buffers in the middle terrace, would remain preserved as open space under the CLRDP. In addition, a 100-foot-wide buffer along the southern edge of the site would be preserved, as would large contiguous sections of open grassland. New buildings would be clustered within each of the development areas, and building heights and lengths would be limited in accordance with CLRDP Implementation Measures 4.2.3 and 4.2.6, and designed to be compatible with the surrounding areas. In addition, buildings would be set back from the streets and from adjacent sensitive habitats on the terrace, lighting would be designed "to provide the lowest levels necessary to achieve safety and efficient navigation, and would be designed consistent with the protection of habitat value on the campus" (Policy 4.4, Lighting), and new development would be designed in accordance with the CLRDP design guidelines, thereby helping to ensure site-sensitive development where natural land forms are mostly undisturbed.

The YLR would continue to be managed for long-term preservation under the CLRDP, and development proposed adjacent to the YLR would be designed so as to avoid potentially significant impacts on biological resources. The CLRDP includes policies and implementation measures, to be used in conjunction with the UCSC Marine Science Campus Resource Management Plan, for the protection and enhancement of biological resources, management of special-status wildlife, public access, long-term maintenance, and long-term monitoring of the YLR and other non-developed areas of the coastal terrace. The CLRDP also includes preservation and enhancement of areas for viewing the YLR scenic resources, through the provision of viewing platforms on overlooks near the YLR (see Section 4.14, Recreation and Public Access, for more information).

In summary, the policies, implementation measures, and design guidelines proposed as part of the project would help to ensure that the visual effects of the project upon scenic resources would be less than significant. The CLRDP provides specifications for site-sensitive development, including clustering new development within the three development areas, providing lighting at the lowest level feasible, limiting building heights and lengths, and preserving much of the existing open space to minimize any perceived contrast between the structures and the surrounding visual environment. In addition, important view corridors to the ocean, hills, and agricultural land (see Figure 3-5) would be preserved. The YLR would continue to be managed for long-term preservation, and any new development adjacent to YLR would be subject to height, and lighting restrictions to ensure that impacts on sensitive habitats and species are avoided. Therefore, implementation of the proposed development program would not have a significant impact on scenic resources.

Near-Term Projects

For the reasons noted above for the entire development program, none of the near-term projects would have a significant impact on onsite scenic resources.

VISUAL CHARACTER AND QUALITY OF THE SITE

Entire Development Program

The existing visual character of the site and surroundings is determined by the attributes of specific features and of the patterns the features have assumed. Evaluation of potential project impacts on the visual character of the project area and surroundings requires analysis of the elements of the project and how introduction of those elements (separately and collectively) would affect the character of the area and views of it from offsite locations. Given the project site's current location in an urban-to-rural transition area, as well as the scenic character of the coastal area in the vicinity of the project site, inappropriately designed development on the site could result in a significant impact on the existing visual character or quality of the site or its surroundings.

The visual character of the project site and vicinity is that of a mix of urban development, including industrial, low- and medium-density residential uses, open space resources, and agricultural uses. The De Anza Santa Cruz residential community, a low-profile residential development, is adjacent to the eastern boundary of the site, while larger box-shaped industrial buildings are found north of the site along Shaffer Road, and along Delaware Avenue and the Mission Street extension to the north and northeast of the site. Existing open space provided by Antonelli Pond, Natural Bridges State Beach, and the currently undeveloped terrace portion of the project site provide a visual break and transition zone to the predominantly rural and agricultural uses to the west and north of the site. The forested ridges and grassland-covered hillsides north of the site, including the city's Bombay greenbelt property, as well as the Pacific Ocean and terraced coastline south of the site, create dramatic and picturesque backdrops to the site and vicinity.

The existing buildings associated with the LML complex are generally low-profile, one- and two-story structures with pitched and articulated rooflines, board-and-batten siding, and neutral exterior colors. The buildings are generally clustered to the west of McAllister Way, the existing two-lane, oil and gravel access road, with the exception of the NMFS Phase I facility and Seymour Marine Discovery Center. Collectively, these facilities present a unified coastal rural appearance. Several temporary structures, however, including the greenhouses on the middle terrace development area and the portable trailers and caretakers' units on the lower terrace development area, do not contribute positively to the overall scenic appearance. These structures do not appear well-maintained; this is particularly true of the greenhouses which currently display uncovered pipe frameworks, broken pieces of glass, and torn plastic covers. Site improvements, such as informational signage, wooden bollards, unimproved public-access trails, and oil and gravel roadways and parking areas, are generally not visible from offsite public locations.

Implementation of the entire development program would introduce several new one- and two-story buildings (up to 35 feet in height) within three development areas onsite (upper, middle and lower terraces) and would contribute to the developed nature of the area by infilling portions of the mostly open grassland terrace property and extending low-density development to the city's edge. The greenhouses, portable trailers, and caretakers' units would be replaced with new, permanent structures intended to improve the overall appearance of the site. Any new development on this portion of the site, specifically within the upper and middle terrace development areas, would increase the intensity compared to vacant land. However, large portions of the project site, including the drainage ditch, two seasonal wetlands, wildlife corridor, and associated buffer areas within the upper terrace development area, as well as several additional wetlands, open grassland, and buffers within the middle and lower terrace development areas, would be preserved as open space as part of the proposed project. Important view corridors across the site to the agricultural fields and hills to the north and northwest, and to the ocean to the south, would also be preserved. In addition, the YLR would be managed to ensure that this sensitive habitat is preserved and maintained. Preservation of onsite open space, and implementation of CLRDP design guidelines for new development within the three designated development areas, would help maintain a graduated visual transition from urban uses east of the site to the rural/agricultural uses west and northwest of the site.

The CLRDP design guidelines would ensure that sensitive site and architectural planning, including appropriate scale and massing, architectural designs, and landscaping, are adequately reflected in the final designs for all new development proposed for the project site.

Scale and Massing

The CLRDP design guidelines reinforce the site as a unified landscape unit that transitions between urban and rural uses through prescribed building arrangements, height and length limits, standard setbacks, and design elements such as use of subdued exterior colors and avoidance of certain materials (i.e., reflective surfaces). These standards would ensure that overall building scale and massing are compatible with the character of the site and surroundings.

The proposed development program would be similar in scale to existing structures onsite and nearby, with building heights between 15 feet and 36 feet. These heights would be the same as or slightly less than the heights of the tallest LML buildings (NMFS facility and Seymour Center).

To provide a transition between the new development proposed for the middle terrace and adjacent residential uses, all new buildings along the eastern, northern, and western edges of the middle terrace, including the 42 Apartment/Townhouse Units and Support Facilities, which would be sited closest to the De Anza Santa Cruz residential community perimeter wall (300 feet away), would be limited to a height of 30 feet to the midpoint of the roof pitch. In addition, transitional landscaping such as small trees and large shrubs would be planted along the length of the eastern edge of the 42 Apartment/Townhouse Units to soften the perceived length and bulk of the structures.

Other measures intended to break down the perceived bulk of the built elements from important offsite vantage points, such as from Highway 1, include clustered building arrangements, designation of open space areas that preclude future development, as well as articulated architectural treatments, muted colors, and landscaping. In addition, several existing view corridors available from offsite vantage points across the site to the ocean and/or agricultural fields adjacent to the site, which have been determined by the CLRDP to be significant, would be preserved.

Architectural Designs

The CLRDP includes building design guidelines that are intended to create a unified aesthetic based on the coastal architectural vernacular, including the coastal barn form, as seen in the existing LML buildings. The guidelines establish appropriate building arrangements, outdoor spaces and courts, building heights, materials, colors, and other architectural treatments to ensure that all new development appears consistent and unified, while allowing for flexibility and variety in final design. The building design guidelines are based on several design principles common to the rural/agricultural coastal landscape, including: tightly clustered building arrangements generally surrounded by open space; shallow roof profiles; prominent plant species that appear to be a simple contiguous landscape unit; windbreak and hedgerow plantings, generally associated with building clusters to provide weather shelter; building scale reduction through plantings of large shrubs and small trees; natural drainage features, such as swales and seasonal wetlands; buildings that are visually compatible with the character of the surrounding areas; site fencing and signage that is constructed out of natural materials; and, buildings that are designed to avoid impacts to ecological areas in terms of noise, lights, and other visual impacts.

Landscaping

Landscaping with native trees and vegetation indigenous to the Northern and Central California coastal zone is planned along the development zone edges and throughout the site to further soften building mass and to enhance the character of the coastal landscape. The CLRDP landscape design guidelines identify appropriate plantings for the four general types of onsite landscape areas: drainage basins and swales, structural landscape, transitional landscape, and ornamental planting. The drainage basins and swales landscape area is intended to reinforce the natural dendritic pattern of the coastal landscape that is both naturally occurring and found along rural roadways. The new drainage basins and swales would be planted with materials that both assist in stormwater treatment and are complementary to the surrounding natural landscape. The YLR and the enhanced system of drainage basins and swales are two of the three major components that would form the structural landscape onsite. The third element is the addition of large-scale linear plantings. Most prominent would be continuous single and/or double rows of large-scale trees, such as Monterey Cypress, planted at close spacing in a north-south direction, parallel to primary site circulation. The rows of trees would reinforce views toward the ocean, dissipate strong westerly winds, and screen or reduce the scale of new and existing buildings. The transitional landscape plantings would range in height from 6 to 12 feet, thereby reducing the apparent scale of buildings by visually "removing" the ground floor, and would provide a planted buffer between buildings and natural areas. The ornamental planting landscape area would provide variety for the courtyards and open spaces within the campus. The ornamental planting would be non-invasive and appropriate to the rural/agricultural coastal character.

In summary, the height and scale of the proposed development would be compatible with the height and scale existing development at the site, and the final design of future buildings would reflect the coastal architectural style prescribed in the CLRDP design guidelines, policies, and implementation measures. In addition, the establishment of open space areas and the proposed landscaping would create a graduated visual link to adjacent rural areas. As such, implementation of the proposed development program would not cause significant adverse impacts on the visual character or quality of the site and its surroundings.

Near-term Projects

The near-term projects would be developed consistent with the proto types presented in the CLRDP, with respect to scale and massing, architectural design, and landscaping. Specific descriptions of each near-term project follow.

The building design for the two two-story Shared Campus Warehouse and Laydown Facility buildings (Figure 3-11), located in the upper terrace development area, would conform to a building profile described in the CLRDP design guidelines that would include multi-level rooflines and extended one-story floors. A fenced laydown/service yard would extend east of the building. Using the vernacular style of coastal architecture, the exterior of the facility would consist of stained vertical wood siding and shingle roofing. Windows would extend across the first level along the southern elevation. Constructed on an east-west axis, the varied roofline would permit views across its one-story extension and allow direct but screened access to the yard from Shaffer Road. Fencing and landscaping would screen activities in the laydown yard and much of the first floor.

The one-story, 120-foot-long, 50-foot-wide Sea Otter Research and Conservation Center (SORACC) main building (Figure 3-14) would be located near the western edge of the middle terrace development area, which overlooks the YLR. Stained vertical wood siding and a pitched shingle roof would characterize this building, which would be constructed on a north-south axis and include a row of equally spaced windows. An additional smaller building would be located immediately northwest of the main building.

East of the SORACC and also in the middle terrace development area, two two-story USGS Western Coastal and Marine Geology buildings would face each other on an east-west axis (Figure 3-13). In conformance to the CLRDP design guidelines, both buildings would feature an exterior of vertical wood siding, pitched roofs, and a modified "H" floor plan. With a 200-foot width, the longer "leg" of the building on the eastern side would span 150 feet, while the shorter leg would extend 104 feet. Also with a 200-foot width and featuring multi-depth facades, both legs of the building on the western side would extend 120 feet. Landscaping would screen the north and south elevations.

Along the western edge of the middle terrace development area, 42 two-story Apartment/ Townhouse Units (Figure 3-12) would be constructed in two clusters adjacent to an open space area that extends to the eastern edge of the project site. Each cluster would include one long building that would face the open space area, as well as smaller buildings that face north and south. The units would conform to the CLRDP design guidelines, with wooden vertical siding, and would feature pitched roofs and one-story car sheds to the west with "lean-to" roof lines. Each 25-foot-wide unit would extend 33 feet with an additional 10-foot-deep courtyard/deck area. Transitional landscaping such as small trees and large shrubs planted along the eastern edge of the units would screen this portion of the middle terrace development area from the De Anza Santa Cruz residential community to the east, and provide additional vegetative buffer between the residences and the buffer around a wetland to the south.

The Center for Ocean Health Phase II facility would consist of an addition to the west side of the existing Center for Ocean Health building, located in the lower terrace development area, north of the SORACC. This addition (Figure 3-15) would continue the design of the existing two-story building, and would extend along a north-south axis. The existing building conforms to the CLRDP design guidelines.

In summary, for the reasons noted above for the entire development program, and based on the descriptions of the near-term projects, none of the near-term projects would significantly degrade the existing visual character or quality of the site and its surroundings.

LIGHT AND GLARE

Entire Development Program

The increase in intensity of use at the site as a result of new development would increase the amount of light and glare produced at the project site, some of which would be visible from offsite vantage points as well as from the site itself. This additional light and glare could also contrast with the surrounding open space character and result in a deterioration of nighttime views from neighboring uses. "Spill light" (light that falls on offsite receptors, causing unwanted illumination) could be produced from exterior lights on the proposed buildings; from lighting around open operation areas (such as the shared laydown yard); from the headlights of vehicles entering and exiting the site; from street, parking lot, public-access trail, and informational signage lighting; and from the reflection of these sources of light on the proposed buildings and paved areas. As the project site is located in a transitional area between urban and rural uses, increased spill light could further reduce the perceived open space boundary that separates the uses, and could contribute to the perception of extension of urbanized areas to the city limit line. It is not expected however, that implementation of the proposed development program would cause significant adverse lighting effects, for the reasons presented below.

Policy 4.4, Lighting, of the CLRDP establishes that "lighting on the Marine Science Campus will be provided at the lowest levels necessary to achieve safety and efficient navigation and will be designed consistent with the protection of habitat values on the campus. No lighting will be allowed to interfere with the biology of the YLR inhabitants." To this end, and to ensure that both project-related spill light and glare associated with building lighting, street and trail lighting, parking lot and maintenance yard lighting, and sign lighting are minimized, the CLRDP identifies Implementation Measures 4.4.1, 4.4.2, 4.4.3, and 4.4.4, respectively. According to Implementation Measure 4.4.1, building lighting would be located only at entries and usable interior courtyards, and except where necessary for safety, no façade or accent lighting would be allowed. In addition, direct lighting from a fixture located adjacent to the YLR or terrace wetlands would not be visible from these locations. Under Implementation Measure 4.4.2, streets on the campus would be lighted only within the development areas, while trails would only be lighted as needed for safety with low-height wood bollards and downward directed fixtures. Lighting in the parking lots and maintenance yards, including the Shared Laydown Yard in the upper terrace, would be provided at the lowest levels necessary for safety and only the parking areas within the perimeters of the development areas would be lighted (Implementation Measure 4.4.3). All lighting fixtures would be cut-off type lighting and downward directed, whereas pole-mounted lighting would not exceed 12 feet in height. In addition, sign lighting throughout the site would be limited to signs identifying important destinations, restricted areas, or dangerous terrain, and no backlighting or use of neon would be allowed (Implementation Measure 4.4.4).

The CLRDP also includes lighting design guidelines to help ensure that new development avoids spilling light into natural habitat areas, particularly the YLR, and surrounding neighborhoods, as well as to minimize artificial light interference with views of the coastal night sky. The lighting design guidelines include specific standards that apply to building facilities, streets, parking areas, pathways, and special areas and features. Building facilities lighting would only be located at entries and usable interior courtyards, with no exterior façade or accent lighting allowed. Accent lighting of ornamental plantings and other features may be allowed, provided it is wholly within the building cluster or courtyard and does not illuminate areas outside the development areas. Interior lighting that is visible outside the building development area would be made to minimize its visibility and intensity. Streets would be lighted only within the development area, or where needed for safety. Parking area lighting would be provided at the lowest levels necessary for safety, and only those parking areas within the development areas would be lit. For this purpose, bollard lighting is preferred, although pole lighting may be allowed with cut-off type fixtures. Pathway lighting would only be located on primary pathways connecting major development areas and within the building development areas and a single unified bollard light design would be used throughout the site, as possible. For special areas and features, unique lighting treatments would be provided and would be designed so as to avoid spillover effects.

Implementation of the policies and measures, described above, and adherence to the proposed lighting design guidelines would ensure that any additional light or glare associated with development of the project would not have the potential to result in significant adverse impacts to daytime or nighttime views in the area. (See Section 4.4, Biological Resources, for discussion of indirect impacts on sensitive onsite habitats due to light and glare from the proposed project.)

Near-term Projects

The Shared Campus Warehouse and Laydown Facility would introduce light sources to the upper terrace development area, where there are no existing light sources. This facility would be oriented toward Shaffer Road, and direct access to its corporation yard from Shaffer Road would be provided behind a fenced area that would partially screen some of the light. The CLRDP design guidelines state that lighting design is intended to "[m]inimize artificial light interference with views of the coastal night sky (Design Guideline 6.6.1), and that "[a]ll light fixtures will have cut-off or indirect fixture types with no visible source of light" (Design Guideline 6.6.2). Because of its proximity to Shaffer Road, light from the facility would be located near Shaffer Road, which already contains street lights. The Shared Campus Warehouse and Laydown Facility would therefore direct light toward Shaffer Road, a source of existing light, and away from the center of the site, where there is currently no light.

The SORACC would be located near the YLR. As noted above, however, direct lighting from a fixture located adjacent to the YLR or terrace wetlands would not be visible from these locations. The 42 Apartments/Townhouse Units in the middle terrace development area would face the De Anza Santa Cruz residential community. As noted above, however, building facilities lighting would only be located at entries and usable interior courtyards, with no exterior façade or accent lighting allowed (Design Guideline 6.6.3) and all lighting would be downwardly directed or bollard-type lighting, mounted at as low a height (not to exceed 12 feet if pole top lighting is used) as feasible to avoid light spill and visibility of light source (see Design Guidelines 6.6.1, 6.6.2, and 6.6.3). For these reasons, and for the reasons noted above for the entire development program, none of the near-term projects would create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

The policies, implementation measures, and design guidelines proposed as part of the project would minimize the effects of the CLRDP and the five near-term projects on scenic vistas, scenic resources, and the visual character and quality of the site, as well as the effects of light and glare, and the impact on aesthetic resources would be less than significant.

CUMULATIVE IMPACTS

ENTIRE DEVELOPMENT PROGRAM

The proposed CLRDP would result in increased development on approximately 30 of the site's 98 acres, including portions on the existing 16 acres of LML development and partially developed open grassland area. While the campus site is visible from several scenic viewpoints and while its visual character would be altered to some degree by development, because the development of the site would take view corridors into account and would be guided by design guidelines that restrict height, mass, and lighting and preserve open space and habitat buffers, the aesthetic impacts of the CLRDP and of each of the proposed near-term projects would be less than significant.

The following section assesses the nature of cumulative impacts of regional development with respect to scenic vistas and view corridors, visual character, visual quality, and light and glare, and the contribution that would be made to any such impacts by development of the CLRDP and its near-term projects. 2020 is used as the assessment year for cumulative impacts, as explained above. The cumulative study area for this assessment is the Santa Cruz westside study area (see Figure 4.0-1), which includes the project site. The cumulative analysis assumes development of remaining undeveloped parcels in the Santa Cruz westside study area consistent with existing City of Santa Cruz General Plan land use designations (see Figures 4.9-1 and 4.9-2 in Section 4.9, Land Use and Planning, which illustrate General Plan land use designations and existing land uses in the area.) Although the General Plan is currently being updated, it is assumed that under the new plan the undeveloped parcels in the Santa Cruz westside study area will be developed at similar intensities and densities as those described under the current General Plan. The City of Santa Cruz General Plan/LCP designates a substantial part of the land east and northeast of the Marine Science Campus as Low Density Residential and Low Medium Density Residential. In addition, the lands east of Moore Creek and north of Highway 1 are also designated Low Medium Density Residential (see Figure 4.9-1). The existing development of these areas is consistent with these designations. Development in the study area also includes light industrial facilities, including some fairly large paved areas. In general, the visual character of much of the Westside study area is that of an urbanizing area, where some parcels have been developed while some are not. The current visual character of the Marine Science Campus is that of an urban/rural margin.

The standards of significance that apply to the cumulative impact analysis are the same as those that apply to the project-level analysis. These standards address the potential for cumulative development to have an adverse effect on scenic vistas, substantially damage scenic resources, substantially degrade existing visual character, or create new sources of substantial light and glare that would adversely affect day or nighttime views.

The City of Santa Cruz General Plan (Community Design Element) identifies and evaluates important scenic resources, vantage points, and vistas. In the project vicinity, an important vantage point from Highway 1 toward the ocean is identified just west of the city limit (marker # 21.51). The CLRDP project site is visible from this vantage point, as described above, and its development would constitute a less-than-significant impact in this view. Much of the remainder of the Westside study area is screened from this scenic vista by tall trees, and in any case would appear as distant views. From the Bombay Greenbelt viewpoint discussed above, development of areas east of the CLRDP site would also be screened by topography to a great extent. Cumulative development would not block ocean and skyscape views from either the Highway 1 or the Bombay Greenbelt viewpoint. Similarly, viewpoints from Wilder Ranch State Park do not provide sweeping views over the westside study area, although there is a wide view of the Marine Science Campus. From Natural Bridges State Beach, views over the westside study area would be screened by existing development close to the State Beach. For these reasons, the impact of cumulative development on scenic vistas from these viewpoints would also be less than significant.

Furthermore, the policies, implementation measures, and design guidelines proposed as part of the CLRDP and identified above would reduce the visual intrusion effects of the proposed new development on the project site on scenic views from offsite locations. Moreover, as new development on the project site would occur only within the designated development areas, would be clustered, and would present a visually unified architectural theme and landscape, the important view corridors and open space areas identified within the CLRDP would be preserved. The project site would continue to provide substantial interconnected open space that is in turn visually connected with the agricultural lands to the west. With respect to other development in the City's westside study area, that entire area is within the City's LCP and the City of Santa Cruz General Plan Community Design Element identifies policies intended to guide development in this area to ensure that a clearly defined urban boundary is maintained, that the natural setting and scenic resources are protected, that new development is built to a human scale, and that scenic views are protected. Development on remaining vacant parcels within the Santa Cruz Westside study area would be required to adhere to the relevant policies and would be subject to the City's design review process. Implementation of these policies would ensure the protection of the scenic view corridors located at the western entrance to the City of Santa Cruz. For these reasons, the impact of cumulative development on scenic view corridors and scenic vistas would be less than significant.

With respect to changes in visual character, buildout of the Santa Cruz westside study area would be expected to result in a more intensively developed and urbanized appearance and character. The visual character of the westside study area is not pristine, as low- and moderate-density development has already occurred throughout the area and contributes to its existing visual character, which includes elements of both an urbanizing area and an urban/rural margin. Although there will be an incremental loss of open space in the westside study area as infill progresses, the scale, mass, height and types of future development would not be expected to differ substantially from existing uses. The change in visual character of this area is not considered a cumulatively significant adverse visual impact because the area has already been altered by urbanization and most future projects would be built as infill adjacent to already developed areas. Although the proposed project would also add buildings to the westside study area and thereby contribute to the incremental buildup of the area, the CLRDP includes measures that emphasize the preservation of open space as natural habitat and clustering of development. As a result, the campus site would not appear as dense urban development and would continue to provide an impression of an urban/rural margin. The project would therefore ameliorate the effect of the buildout of the remaining parcels in the westside study area by decreasing density of development at the City's western most margin.

Relative to visual quality, both the CLRDP and the City of Santa Cruz General Plan include design guidelines that regulate building height, scale, mass and density. CLRDP design guidelines would direct the development of buildings that are consistent with the agricultural heritage of the area in design and finish. Design within the City of Santa Cruz would be subject to individual approvals by the City, which would ensure consistency with General Plan guidelines. These measures would ensure that cumulative development does not result in a loss of visual quality, and the cumulative impact on the visual quality of the study area would be less than significant.

Similarly, design aspects that contribute to light and glare impacts are regulated by both the City of Santa Cruz General Plan and by the proposed CLRDP. These design guidelines would minimize the increase in regional light and glare that would result from cumulative development to the extent possible, and the cumulative impact associated with light and glare in the study area would be less than significant.

NEAR-TERM PROJECTS

For the reasons described above for the CLRDP as a whole, none of the near-term projects in conjunction with other regional development would result in significant cumulative impacts on visual resources.

Based on the information presented above, the buildout of the City's westside study area, including the proposed project, would not result in cumulatively significant adverse impacts on visual resources.

4.2 AGRICULTURAL RESOURCES

This section evaluates the potential impacts of the CLRDP and the five near-term projects on regional and site-specific agricultural resources, including prime farmland and land zoned for agricultural use or under Williamson Act contract. Data were obtained from the *U.S. Department of Agriculture (USDA) Soil Survey*, the 1995 "Agricultural Suitability Study" prepared by Sage Associates, application of the 1997 California Agricultural Land Evaluation and Site Assessment (LESA) Model as formulated by the California Department of Conservation, interviews with land owners and public agency representatives, and onsite field evaluations. Additional information regarding land use policies and site planning was provided by UCSC.

The project would normally have a significant effect on the environment if the project 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.
- Involve other changes in the existing environment which, due to their location or nature, could result in the conversion of Farmland to non-agricultural use.

SETTING

REGULATORY CONTEXT

The following discussion provides the regulatory context for agricultural resources at the project site and in the vicinity.

California Department of Food and Agriculture

The California Department of Food and Agriculture through the Santa Cruz County Agricultural Commissioner's Office regulates the use of restricted pesticides.[1] Pesticide use on agricultural land may affect surrounding land uses unless the uses are adequately buffered. Use of pesticides may vary yearly based on crop types and farming preference. All pesticides must be registered for use in California, and permits are issued for restricted pesticide use by the Agricultural Commissioner's Office. The pesticide applicator must evaluate the spray equipment to be used, the weather conditions, the property to be treated, and the surrounding properties to determine the likelihood of harm or damage before and while applying the pesticide. Pesticide drift must be prevented. A pesticide must not be applied when there is a reasonable possibility of contaminating people, animals, public or private property, or damaging non-target crops. Misuse of a pesticide may result in civil or criminal penalties.

[1] The term "pesticides" may include herbicides, fungicides, and rodenticides.

California Land Conservation Act (Williamson Act)

The California Land Conservation Act (LCA or Williamson Act) provides for property taxation based on agricultural productivity and not on surrounding urban land values for those lands that are under Williamson Act contracts. The project site is not under Williamson Act contract, nor is the adjacent Younger Ranch at this time. The Wilder Ranch, located west of the project site, is owned by the State of California.

California Coastal Act

The project site is located within the coastal zone, where all development is governed by provisions of the California Coastal Act and must be consistent with that Act. For land owned by state universities, the Act provides for project-by-project approval by the Coastal Commission or approval by the University under a Commission-approved CLRDP. The University has developed the subject CLRDP for the latter purpose. As required by the Act, the University has consulted and coordinated with the City of Santa Cruz in order the make the CLRDP consistent to the fullest extent feasible with the City's Local Coastal Program (LCP). Although the City's LCP has does not cover the project site directly, it does contain relevant provisions pertaining to agriculture. Similarly, the CLRDP has been coordinated for consistency with County of Santa Cruz LCP provisions pertaining to agriculture. Section 4.9, Land Use and Planning, discusses in detail CLRDP consistency with relevant provisions of these two LCPs as well as the Coastal Act.

City of Santa Cruz LCP and General Plan

The project site is located entirely within the Santa Cruz city limits. The site is not included in the City's LCP but is covered by the City's General Plan, although state university land is constitutionally exempt from local land use regulation. The General Plan designates land south of the Delaware Avenue extension, including the existing Long Marine Laboratory (LML) site, as coastal-dependent/coastal-related. The General Plan defines coastal-dependent lands as "lands utilized for coastal-dependent industries such as marine research and education, agriculture, aquaculture, mariculture, and attendant facilities that require direct proximity to the ocean." Land north of the Delaware Avenue extension is designated low-medium density residential, 10 to 20 units per acre. City Land Use Policy 3.1.3 states support of County of Santa Cruz policies and programs aimed at preservation of agricultural/grazing lands.

County of Santa Cruz LCP

Immediately west of the project site is agricultural land within the County (Younger Ranch). The County LCP contains regulatory policies concerning protection of coastal agriculture.

REGIONAL CONTEXT

The 2001 Agricultural Commissioner's Office Crop Report for Santa Cruz County indicated that, in the year 2000, the gross agricultural production value in Santa Cruz County totaled $351,949,000, an increase of 16.8 percent over the 1999 value. The top 15 valued crops grown in Santa Cruz County in 2000 were strawberries, raspberries, head lettuce, landscape plants, other vegetables (such as artichokes, beans, spinach, tomatoes, etc.), miscellaneous plants, field flowers, timber, leaf and romaine lettuce, hybrid tea roses, bushberries, apples, indoor potted plants, Brussels sprouts, and cauliflower.

In Santa Cruz County, 1,374 acres were in Brussels sprouts production in 1998, 1,396 acres in 1999, 1,080 acres in 2000, and 1,190 acres in 2001. Approximately 60 acres of the project site were farmed in Brussels sprouts when the land was last farmed in 1988.

LOCAL CONTEXT

Project Site

Existing land uses on the project site include the Seymour Marine Discovery Center, the Long Marine Laboratory (LML), National Marine Fisheries Service (NMFS) Laboratory, Oiled Seabird Facility, U.S. Geological Survey (USGS) Coastal & Marine Group, the California Department of Fish and Game (CDFG) offices, and a leased greenhouse operation. These uses involve laboratories, offices, research facilities, public visitor-serving facilities, parking, and bicycle and pedestrian traffic along an established access road. These land uses occupy a net total of 162,004 gross square feet of building area.

Farmland Status and Soils Information

The entire project site has been mapped as Unique Farmland that contains lesser quality soils. Three soil types occur on the terrace portion of the project site – Elkhorn sandy loam #132, Elkhorn sandy loam #133, and Watsonville loam #178. Of these three soil types, only Elkhorn sandy loam #132 soils are classified as prime soils by the California Department of Conservation, Division of Land Resource Protection, provided that they are irrigated.[2] Elkhorn sandy loam #132 soils occupy about 26 acres, and occur on the eastern 1/3rd of the upper terrace and the majority of the middle terrace area.

Prior to 1976, the entire terrace portion of the site, including the area west of McAllister Way, was actively farmed. While areas to the west of McAllister Way were converted from agriculture in 1976 (and again in 1986 and 1988) from agricultural use to marine laboratory use with about 1/3rd acre retained in greenhouses, the remainder of the site east of McAllister Way remained in active agricultural production until 1988 and produced Brussels sprouts.[3,4] Since that time, the land has remained fallow.

There is a complex of 11 industrial greenhouses on the middle terrace west of McAllister Way that was originally developed for aquaculture uses which since then have been discontinued. Three of the greenhouses are permitted for use as an Avian Facility (UCSC Oiled Seabird Facility), although only one greenhouse is currently in use for that purpose. One of the greenhouses is currently used by a marine bioassay company under a lease from the campus and seven greenhouses, with about 13,860 square feet of space (about 1/3 acre), are leased to an organic seed propagation company. No other agricultural use has occurred on the remainder of the project site since farming ceased in 1988.

Although the project site has not been farmed in 15 years or more, substantial information concerning its suitability for agriculture is available and is provided in the subsection below.

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2 California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program, Map Categories, Criteria and Uses, http://www.consrv.ca.gov/dlrp/fmmp/mccu/prime_soils.htm, 2004.

3 California Coastal Commission, adopted comments on the CLRDP Issue Identification, December 14, 2000.

4 Sage Associates, "Final Agricultural Suitability Study," 1995.

Agricultural Suitability of the Site

The project site was surveyed and, following the California Department of Conservation Land Evaluation and Site Assessment (LESA) Model analysis, a determination of agricultural suitability was conducted for the 54.5-acre terrace property acquired by the University and added to the Marine Science Campus. Five agricultural scenarios were evaluated by the LESA Model in order to demonstrate potential agricultural uses ranging from no-restrictions farming to 500-foot pesticide setbacks. In each scenario, the project site was shown to be a less-than-significant agricultural resource. Appendix B contains information on the LESA analysis. A further agricultural viability analysis was conducted that compares anticipated crop production costs and revenues with the water supply and infrastructure costs. That analysis (also detailed in Appendix B) showed that the project site was not economically viable for agriculture due to high water-related costs. The following text presents additional information on the limitations on agriculture at the project site based on previous studies conducted for the property and more recent data.

In 1995, a "Final Agricultural Suitability Study" was prepared for the original 60-acre Terrace Point property.[5] The report included 10 laboratory soil tests to determine soil capability and overall agricultural suitability of the property. The suitability analysis was conducted for the portion of property then not owned by the University, while that property was under prior ownership and was proposed for development. The salient points of that report are presented below:

- Due to major constraints to agriculture, 28 acres of the site were designated as having a lower agricultural suitability due to farming constraints. An additional 32 acres were considered to be unsuitable for agricultural production. Severe soil limitations, poor drainage/wetland, water availability, and urban land use limitations were considered to be major factors in the assessment of potential agricultural suitability of the property in 1995.

- The property contains three soil series as identified by the USDA Soil Survey for Santa Cruz County. Prime soils are considered to have a capability class of I or II or a Storie Index of 80 to 100. The capability class assesses the ability of the soil to be used for field crops such as beans, sugar beets, grains, etc. The Storie Index portrays the soil suitability for overall crop production.

  – The Elkhorn sandy loam #132 includes about 26 acres, has 0 to 2 percent slope, and is considered to be Class I, but only if irrigated as defined by the USDA Soil Survey. If not irrigated, the soil is considered to be Class III non-prime. No irrigation water sources have existed on the property since 1988 when the irrigation water well collapsed. Because of drainage constraints this soil has a non-prime Storie Index of 73. Since no agriculture irrigation water source exists on the site, the soil is considered by definition to be non-prime.

  – The Elkhorn sandy loam #133 includes about 8 acres, 2 to 9 percent slope, is considered to be Class IIIe non-prime with or without irrigation. Soil erosion potential is a limiting factor to crop production. The Storie Index is a non-prime 66.

  – The Watsonville loam #178 includes about 26 acres, 0 to 2 percent slope, is considered Class IIIw non-prime with or without irrigation. Soil wetness is a limiting factor to crop production. The Storie Index is a non-prime 50.

[5] Ibid.

Soil testing of soil textures conducted in 1995 indicated that soil capability was non-prime in all but two locations. Two tests along the western portion of the 60-acre property showed two areas to have prime soil textural characteristics. However, because irrigation water was not available, the entire 60-acre site was determined to be non-prime farmland.

- Major factors that adversely affected agricultural productivity in 1995 were analyzed and used as the basis to determine that 28 acres of the site had a lower agricultural suitability because of severe soil limitations, poor drainage/wetland, reduced crop production potential, lack of water availability, lack of Williamson Act eligibility, and incompatible surrounding land uses. Higher suitability land would not have these constraints, and therefore the land was considered to have a lower suitability for farming practices. A minimum of 40 acres of prime farmland would be required for Williamson Act eligibility.

  Irrigation water was previously obtained from an onsite well and reservoir that are no longer in existence. The 1995 report further stated that water quality for irrigated crops was marginal, with a sodium absorption ratio of 25.8 and chlorides of 390 parts per million (ppm). Severe limitations to agricultural production occur with sodium absorption ratios above 9 and chlorides above 355 ppm.

  The 28 acres of lower suitability land included all land except wetland, 100-foot seacliff buffers, and 30-foot pesticide use buffers along the access road and adjacent to neighboring urban uses. These wetlands and buffers are considered unsuitable for agricultural use.

- The 60-acre Terrace Point property was designated as Unique Farmland on the California Department of Conservation's 1992 Important Farmlands Map. Survey data were collected prior to 1990, about the time of the last onsite farming operation. Unique Farmland is defined as land with lesser quality soils that is characteristically used for specific high-value crops; has an adequate moisture or irrigation water supply; has favorable soil, climate, and market conditions; and excludes low yield crops such as irrigated pasture or abandoned orchards or vineyards. Based on the above requirements, without existing irrigation water, it is questionable if the land could qualify as Unique Farmland. In comparison, the Younger and Wilder Ranch farmland is designated as Prime or of Statewide Importance due to superior soil conditions, existing irrigation water, and existing high-income crop production.

- The Santa Cruz County Farm Advisor[6] for vegetable crops indicated that winter drainage problems on the site would limit site productivity to one crop per year, instead of the two crops per year that are grown in the area on land with good soil drainage. Brussels sprouts grown on the project site would produce one crop per year.

- Both the Santa Cruz County Farm Advisor and the previous onsite farmer indicated that poor soil drainage constrained the productivity and farmability of the site. Production on other well-drained soils averages two crops per year. Production on the site averaged one crop per year because early Brussels sprout varieties must be planted to avoid wet soil conditions in the winter.

- Site productivity was limited to one crop per year primarily because of poor soil drainage. The soil is therefore considered to have a lower suitability for crop production. This soil was not considered "unsuitable" in the 1995 study.

[6] Welch, N.C., "Brussels Sprout Production in the Central Coast District," 1985, and personal communication, 1995.

The 1995 report was reviewed by the Younger Ranch owners, and while they did not agree with the soils analysis, they did state in a 1997 letter to the City of Santa Cruz Planning Commission that the "…table on economic analysis gives the Planning Commissioners and the City leaders a correct picture of Brussels sprouts farming. It is economically difficult at this time in history."

All of the conclusions noted above from the 1995 study apply to the 54.5 acres of terrace land that lie east of McAllister Way and constitute the majority of the project site. Also since 1995, the NMFS and the Seymour Discovery Center were constructed on those portions of the 60-acre Terrace Point site that had the best soil suitability for farming, and the presence and public use of these facilities further limits the agricultural suitability of the remaining 54.5 acres of the terrace land.

With respect to the 16 acres of terrace land that lies between McAllister Way and the YLR, the northern two-thirds of that land is underlain by Elkhorn sandy loam (series #132) that are considered prime (Class I) soils if irrigated, whereas the southern one-third has Watsonville loam (series #178). This land has not been farmed since 1976. Even though the northern two-thirds of this land has soils that are suitable for agriculture if irrigated, reestablishment of agriculture on this land is considered infeasible because of a number of factors including the presence of both permanent structures such as the California Department Fish and Game (CDFG) Marine Wildlife Center and temporary structures such as trailers and greenhouses, the fragmented nature and irregular shape of the land parcel flanked on the one side by YLR and on the other by McAllister Way, and the lack of irrigation water since the on-site irrigation water well collapsed in 1988 and is no longer available.

Adjacent Agricultural Properties

Agricultural land uses adjoin only the western boundary of the project site. Urban land uses adjoin the site to the east and north, and Monterey Bay adjoins the site to the south.

Adjacent and Nearby Agricultural Operations

The agricultural uses to the west consist of agricultural production on the Younger Ranch adjoining the site and, approximately 2,000 feet farther west, the Wilder Ranch State Park.

The Younger Ranch adjoins the entire northwestern edge of the project site, but is separated from proposed development areas on the southwest by an arm of Younger Lagoon, an incised drainage course, the LML and related facilities along the southern two-thirds of the western property boundary. There are no existing physical barriers to prevent access to the Younger Ranch property from the northern one-third of the project site. The Younger Ranch produces Brussels sprouts on approximately 190 acres and also includes a horse boarding area. Brussels sprouts farming has been conducted on the property since the early 1950s. The conditions are uniquely favorable for Brussels sprouts, but not for other crops.[7]

The Wilder Ranch, owned and administered by the California State Parks system, is located more than 2,000 feet to the west of the project site. A tenant farmer on the Wilder Ranch produces Brussels sprouts on approximately 600 acres. Brussels sprouts are also the predominant crop on

[7] Goode, Helen, owner, Younger Ranch, Comment on Pacific Shores Draft EIR: City of Santa Cruz Planning Department, October 19, 2001, and personal communication, November 9, 2002.

the Wilder Ranch due to cool summer temperatures, although artichokes and peas have also been grown in the past.[8]

Both the Younger Ranch and Wilder Ranch are considered to be prime agricultural land due to their current agricultural production, production history, and soils that are classified as Prime or of Statewide Importance by the California Resources Agency Important Farmlands Mapping Program.

Agricultural production on both the Younger and Wilder Ranches may include the use of agricultural pesticides; may generate dust, odors, noise, and light; and may create targets for vandalism/theft, pilferage, and trespass/liability concerns.

Existing Conflicts with Adjacent Agricultural Operations

Conflicts between agricultural operations adjoining the project site and nearby urban uses, especially related to pesticide use and odors, are or may be a concern for the area. These conflicts are discussed below. All information has been supplied via interviews with Santa Cruz County Agricultural Commissioner's Office staff as stated below. No other specific information on the regional history of agricultural-related complaints was available, since the files are proprietary.

Use of Pesticides. The Santa Cruz County Agricultural Commissioner's Office has received complaints about Younger Ranch pesticide and fertilizer use, and odors from the neighboring industrial park to the north of the project site and downwind from the Younger Ranch.[9] Additional complaints have also been received from De Anza Santa Cruz residential community residents east of the project site. The Younger Ranch uses a professional pesticide application company that notifies the industrial park occupants prior to application, and only applies pesticides when it is neither windy nor nighttime. Pesticides are applied using ground application (rather than aerial application). Pesticide application can occur from April until harvest, depending on crop requirements. A restricted pesticide permit is required from the Agricultural Commissioner's Office. Based on the above information, the Younger Ranch appears to be making reasonable efforts to comply with the pesticide use permit conditions and pesticide labeling requirements.

Implementation of Agricultural Land Use Buffers. Land use buffers have become an important planning tool for the protection of agricultural land. In 1994, an agricultural land use thesis identified setback buffers from 20 feet to 800 feet in cities and counties sampled in California. Various examples are described below.[10]

In 1996, the County of San Luis Obispo proposed a buffer distance range by crop type that included 200 to 500 feet for irrigated vegetables and berries and up to 800 feet for vineyard and irrigated orchards.[11]

Santa Barbara County in 2002 had an ongoing setback requirement of 200 feet for the aerial application of pesticides.

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8 Roth, Victor, California State Parks Land Agent, personal communication, January 4 and 5, 2002.
9 Le Coump, Lisa, Agricultural Commissioner's Office Santa Cruz County, personal communication, January 11, 2002.
10 Handel, Mary, E., "Conflicts and Solutions when Agriculture Land Meets Urban Development: Community Development," Master of Science Thesis, University of California, Davis, 1994.
11 San Luis Obispo County, Agricultural Buffer Policies: Ag. And Open Space, 1996.

In 1998, Mintier & Associates[12] completed a phone survey for the City of Santa Cruz regarding agricultural setback buffers. Twelve counties were contacted. Row/vegetable crop setbacks included the following:

Santa Clara	= 25–100 feet
San Joaquin/Ventura/Yolo	= 100 feet
Sonoma	= 100–200 feet
Santa Cruz	= 200 feet
Santa Barbara	= 200 feet
San Benito/Monterey/Contra Costa	= Variable
San Luis Obispo	= 200–500 feet
Sacramento	= 300–500 feet

No definitions of variable buffers were given but presumably are based on the type of pesticide applied, the method of application (aerial or hand application), and the adjacent land uses. The "variable" designation means that setbacks vary based on specific pesticides used and the type of agricultural use on a case by case basis. Scenarios are numerous based on site-specific evaluation by the field inspector that issues the restricted pesticide permit.

The Santa Cruz County Agricultural Commissioner's Office does not specifically require pesticide-use buffers between urban/agricultural land uses. However, restricted material permits require that pesticide drift must be prevented, so any additional urban/agricultural buffer would reduce the risk of upset if pesticides should drift from an agricultural property. Pesticide labeling may require specific application avoidance areas or buffers, depending on land use and aquatic resource protection requirements.[13]

The County of Santa Cruz has required a 200-foot buffer setback between commercial agricultural land and non-agricultural uses involving occupied spaces, including dwellings, habitable accessory structures, and additions; and commercial, industrial, recreational, or institutional structures and their outdoor areas designed for public parking and intensive human use. Outdoor areas designed for intensive human use are defined as surfaced ground areas or uncovered structures designed for a level of human use similar to that of an occupied structure. The 200-foot agricultural setback must incorporate vegetative or other physical barriers, as determined necessary to minimize potential land use conflicts. The 200-foot setback appears to be an informal and flexible requirement that can be reduced based on site-specific analysis.

As of 2002, the Pacific Shores Apartments project was planned to have a 238-foot buffer. The Coastal Commission staff comments on the Pacific Shores DEIR stated:

> "Adequate buffers are necessary to ensure that continued agricultural cultivation is not threatened by proximity to nonagricultural uses should standard agricultural practices (such as chemical spraying and fertilizing) or ongoing agricultural by-products (such as dust and noise from machine operations – cultivating, spraying, harvesting, etc.) be seen as incompatible and/or a threat to nonagricultural uses. Appropriate buffers are particularly relevant in the area of the proposed project because of the high prevailing westerly winds that typically sweep across this area bringing noise, dust, and odors from adjacent farming operations to the site…LCP Land Use Policy 3.3.3 requires an appropriate buffer to agricultural fields in the County, but does not provide a specific buffer size. County LCP

[12] Mintier & Associates, Terrace Point – Survey Re: Passive Uses Within Buffers, 1998.
[13] Moeller, David, Agricultural Commissioner, Santa Cruz County, personal communication, January 11, 2002.

> policies prescribe a 200-foot buffer requirement...The Commission's recent development decisions have held open the possibility of a 500-foot agricultural buffer in the Terrace Point area (e.g., NMFS in 1998)…Accordingly, despite the 200-foot buffer proposed, the DEIR states that without mitigation, the potential for perceived land use conflicts to result in the conversion of the agricultural use would be significant."

In a 1997 letter to the City of Santa Cruz Planning Commission, the Younger Ranch owners stated that "Since the early stages of development planning for Terrace Point in 1993, the Younger Ranch owners have requested and argued for a 500-foot agricultural buffer as an essential mitigation." They have further stated that because of the unique high winds in the area, the buffer should not be occupied by people. The family has owned the land since 1890 and wishes to continue farming in the future. The Younger Ranch owners, in an October 19, 2001, Pacific Shores DEIR comment letter to the City of Santa Cruz Director of Planning, stated that a 500-foot agricultural buffer "…is the fairest protection of the farmers who are already working nearby."

In a December 5, 2001, Pacific Shores DEIR comment letter to the City of Santa Cruz Director of Planning, the Santa Cruz County Farm Bureau reiterated its policies regarding agricultural buffers. These policies included the following:

- In the case of the Terrace Point project, all farm groups supported the 500-foot buffer as the correct minimum for the unique windswept north coast.
- Buffers must be implemented as non-accessible to the public.
- Design of the buffer must have the farming operations protected first.
- Design must include drainage and erosion issues.
- Buffers require physical barriers such as solid masonry walls along the perimeters.
- Buffer zones require screening with proper vegetation that does not shade the adjacent agricultural operations but does provide a visual barrier.
- Private setbacks, yard areas, structures (excluding fences), pathways, sidewalks, parking areas, roads, and foot traffic shall not be permitted in the buffer zone.
- Agricultural buffers should be donated to an appropriate non-profit agency for permanent management.

Setbacks at the Younger Ranch. The Younger Ranch restricted materials permit specifies setbacks for pesticide application from occupied structures for the following three pesticides:[14]

- VAPAM, a soil fumigant usually applied in April, requires a 50-foot setback if applied on less than 20 acres and a 100-foot setback if applied on greater than 20 acres.

[14] Haro, Hilda, Inspector Agricultural Commissioner's Office, Santa Cruz County, personal communication, January 11, 2002. BASAGRAN, a soil fumigant, is a fourth pesticide specified in the Younger Ranch restricted materials permit. It can only be applied in May and does not require a specific setback.

- METASYSTOX-R, a plant pesticide that may be applied up to 7 to 21 days prior to harvest, requires a 100-foot setback for ground application and a 150-foot setback if it is applied aerially.

- TELONE II, a soil fumigant usually applied in April, requires a 300-foot setback if it is applied in multiple years (i.e., two or more consecutive years). (Note: The setback may be reduced to 100 feet in the future based on a pending decision by the Environmental Protection Agency.)

Therefore, based on probable pesticide uses and legally enforceable pesticide permit requirements, a setback of 300 feet from any occupied structure (the term used by the Agricultural Commissioner's Office and the pesticide label) would be necessary for the Younger Ranch. In order to protect the agricultural resources of the Younger Ranch, this setback would need to be on the adjacent property proposed for development, rather than on the ranch. The ability of a farmer to use a variety of pesticides in the future can be critical to long-term viability of the farm. While the Younger Ranch may not use Telone II (which requires a 300-foot setback) every year, the ranch may use this pesticide in certain multiple years depending on need. Pesticides, by law, must stay within the ranch boundary; a buffer offers "insurance" for health and safety in case pesticides drift off of the ranch.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP building program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new development (including outdoor development) of 529,856 square feet (sf) at the Marine Science Campus by about 2020. The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education; 70,000 sf for Outdoor Research Area; 19,000 sf for Support Facilities; 98,100 sf for Support Housing; 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for Seawater System Expansion.

The CLRDP prototype site plan (see Figure 3-7) shows clusters of development in the upper terrace, middle terrace, and lower terrace, with all but one new building set back a minimum of approximately 300 feet from the western property line adjoining the Younger Ranch. The project proposes one new occupied structure that would be sited within 300 feet of the Younger Ranch agricultural activities: a new building proposed in the southwest portion of the project site as part of the Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC). This building would be about 250 feet east of the Younger Ranch agricultural activities. This buffer is adequate in this area because existing occupied structures of the CDFG Marine Wildlife Center and the greenhouse industrial complex have existed in this area in the past. Younger Ranch pesticide uses would have had to take these occupied structures into account prior to this project. Additionally, the new building is physically separated from the Younger Ranch fields by an incised drainage course that feeds an arm of the Younger Lagoon.

The entire site has been mapped as Unique Farmland that contains lesser quality soils. The only prime soils are 26 acres of Elkhorn sandy loam #132, and these soils are considered prime only if they are irrigated. Any site development would be on Unique Farmland; however, as discussed below and in Appendix B, the Unique Farmland designation may not be valid without irrigation water and, according to the LESA evaluation, the agricultural resource on the site is not considered significant.

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program. Amongst the building footprints depicted in the CLRDP prototype site plan are specific sites for these five near-term projects (see Figure 3-7). The projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area. The CLRDP prototype site plan (Figure 3-7) indicates that the proposed facility would be set back a minimum of approximately 350 feet from the western property line adjoining the Younger Ranch.

- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area. The CLRDP prototype site plan (Figure 3-7) indicates that the proposed support housing units would be set back a minimum of approximately 600 feet from the western property line adjoining the Younger Ranch.

- The United States Geological Survey (USGS) Western Coastal and Marine Geology Facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area. The CLRDP prototype site plan (Figure 3-7) indicates that the proposed facility would be set back a minimum of approximately 450 feet from the western property line adjoining the Younger Ranch.

- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area. The CLRDP prototype site plan (Figure 3-7) indicates that the proposed SORACC buildings would be set back over 300 feet from the western property line adjoining the Younger Ranch, except for one building located in an area of existing occupied structures; this building would be about 250 feet east of the Younger Ranch (see discussion under Entire Development Program above).

- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area. Additionally, this proposed project would include the construction of two new public-access overlooks and improvement of an existing overlook. This facility, situated in the southern portion of the project site, would be separated from the Younger Ranch by the Younger Lagoon.

These projects would be developed on Unique Farmland, as described in the Setting subsection above. As discussed below and in Appendix B, however, the Unique Farmland designation may not be valid without irrigation water and, according to the LESA evaluation, the agricultural resource on the project site is not considered significant.

MEASURES PROPOSED AS PART OF THE PROJECT

To ensure the site's continued compatibility with the adjacent agricultural use, restrictions on proposed residential uses and agricultural setbacks would be incorporated into site design. The proposed residential uses would be limited to sites on the middle and upper terraces, with the exception of the caretakers' housing, which would continue to be on the lower terrace.

CLRDP Policy 2.1 (Creation of a Stable Urban/Rural Boundary) provides that "University development and uses of the site will be carried out in a manner consistent with the expectation that the campus will provide a stable limit to further westward urban development in this area." Implementation measures for this policy provide that the University would limit utilities to the size necessary to serve only the projected needs of the campus and would establish and maintain a one-foot utility prohibition zone at the western edge of the site wherein no new sewer or water utility lines will be allowed.

CLRDP Policy 2.2 (Fortifying the Urban Edge through the Protection of Adjacent Agricultural Resources) specifies that "the University will fortify the urban edge by minimizing and where feasible avoiding conflicts with adjacent commercial agricultural uses." Implementation measures provide that the University would maintain the following setbacks: (1) a 300-foot-wide setback in the northern one-third of the site (from the northern property line to the existing CDFG Marine Wildlife Center) to separate new occupied non-residential structures from the site's western boundary with Younger Ranch, unless at the time of development the Telone II setback requirement has been reduced, in which case the development setback would comply with the new requirement (and in no case would be less than 200 feet); (2) a 200-foot-wide setback at and south of the CDFG Marine Wildlife Center, to separate occupied non-residential structures from Younger Ranch; and (3) a 500-foot-wide setback to separate new residential development from adjacent agricultural use. Additionally, the residential uses would be developed solely for use by the Marine Science Campus and would not be sold or leased to other private parties.

CLRDP Policy 3.8 (Protection of Adjacent Agricultural Resources) provides that "the University will minimize and where possible avoid conflicts with adjacent agricultural uses." Implementation measures specify that the University would (1) work cooperatively with the adjacent agricultural users to identify means of minimizing or avoiding potential use conflicts, and (2) enter into an indemnification and hold harmless agreement with the owners of the adjacent Younger Ranch.

PROJECT IMPACTS AND MITIGATION MEASURES

DIRECT CONVERSION OF FARMLAND

Entire Development Program

The entire terrace site has been mapped as Unique Farmland. Unique Farmland by definition contains areas of lesser soils that are characteristically used for high-value crops and have adequate moisture or irrigation water supply. A portion of the project site contains prime soils but only if irrigated, which they are not, since no economically viable source of irrigation water exists.

The California Department of Conservation has developed the California LESA Model, which is designed to make determinations regarding the potential significance of a project's conversion of agricultural lands during the initial study phase of the CEQA review process. The model takes into account the farmability of the site based on soils, water availability, and land use constraints and therefore provides a better perspective regarding the significance of an agricultural resource. The five agricultural scenarios evaluated using the LESA Model (see Appendix B) show that the 54.5-acre terrace portion of the project site that was acquired by the University in 1999 and has been integrated into the Marine Science Campus, does not have agricultural resources that would be considered significant; therefore, the impact from the conversion of Unique Farmland due to the proposed project would not be significant.

With respect to the 16 acres of terrace land west of McAllister Way which was the original University holding at the site, much of this area is already developed with structures, including the LML and Center for Ocean Health facilities on the lower terrace, and the CDFG Marine Wildlife Center and the greenhouses on the middle terrace. Contiguous vacant land usable for agricultural use is not available in this area. The construction of SORACC would result in the removal of all the greenhouses in this area including about 13,860 square feet of greenhouse space that is still in agricultural production. The removal of the seven greenhouses that contain the seed propagation operations would be considered a less-than-significant impact based on the small size of the conversion. Furthermore, the conversion of the land underlying the greenhouses and the surrounding area west of McAllister Way to campus uses would not constitute a significant impact because even though Elkhorn sandy loam #132 underlies this area and is considered prime if irrigated, the absence of a viable irrigation water source, the fragmented nature of the land parcel due to existing development, and potential conflicts with existing development limit the usability of this land for agriculture. In summary, the conversion of this land to non agricultural uses and the removal of the greenhouses would not result in a significant impact.

Near-term Projects

As noted above, the project site contains Unique Farmland, which is considered Farmland as defined by the California Resources Agency. The site is not used for the production of any crops and does not have an irrigation water supply. However, multiple scenario LESA analyses showed that the area is not a significant farmland resource. Impacts of the five near-term projects related to direct conversion of farmland would therefore be less than significant.

IMPACTS ON LANDS UNDER AGRICULTURAL ZONING/WILLIAMSON ACT CONTRACT

Entire Development Program

The project would have no impact on Williamson Act lands, since the project site and the adjoining Younger Ranch are not under Williamson Act contract. The Younger Ranch is under agricultural zoning, but the project would not affect this zoning.

Near-term Projects

The near-term projects would have no impact on Williamson Act lands, since the project site and the adjoining Younger Ranch are not under Williamson Act contract. The Younger Ranch is under agricultural zoning, but the near-term projects would not affect this zoning.

OTHER CHANGES THAT COULD RESULT IN CONVERSION OF FARMLAND

Entire Development Program

Impact 4.2-1: With the inclusion of CLRDP policies and implementation measures, development under the CLRDP would not result in substantial pressures that could lead to the conversion of adjacent Farmland to other uses. The impact is therefore considered less than significant.

As described in the Setting subsection above, lands in agricultural use lie to the west of the Marine Science Campus. Younger Ranch adjoins the entire northwest edge of the project site. Except for a small levee and existing vegetation there are no existing physical barriers to prevent access to the Younger Ranch from the northern one-third of the project site. The southern two-thirds of the site, however, are separated from the Younger Ranch by the Younger Lagoon. Furthermore, there is an existing earthen berm that runs along the western edge of the lower terrace adjacent to Younger Lagoon and provides a visual barrier between the existing facilities on the lower terrace and the agricultural lands of the Younger Ranch.

Owners of the Younger Ranch have expressed concern that development under the CLRDP could constrain use of certain pesticides and generate complaints of nuisance, vandalism/theft, pilferage, and trespass/liability at the Younger Ranch, and that these pressures could increase costs of operation, impair productivity, and diminish the feasibility of continued agricultural production, possibly resulting in the eventual removal of adjacent land from agricultural use.

The primary concern relates to the project's effect on the ranch's continued use of certain pesticides that, due to labeling requirements, cannot be applied within 300 feet of an occupied structure. If new structures are constructed within 300 feet of the Younger Ranch under the CLRDP, the farmer may need to pull operations back to create the necessary buffer, potentially reducing the productivity of that farmland. Although most pesticides currently used at the Younger Ranch require setbacks of 50 to 100 feet, the ranch also has a permit to use Telone II, which currently requires a 300-foot-wide setback (although it is expected that the setback will be reduced to 100 feet when the State implements the changes to the labeling requirements for this pesticide that have been initiated by EPA). The CLRDP takes this existing condition into account and includes an implementation measure that requires new occupied non-residential structures in the northern one-third of the site (from the northern property line to the existing CDFG Marine Wildlife Center) to be at least 300 feet from the site's western boundary with the Younger Ranch unless, at the time of development, the Telone II setback requirement has been reduced, in which case the development setback would comply with the new requirement. In no case would the setback be less than 200 feet. The CLRDP also requires all new residential structures to be at least 500 feet from the Younger Ranch property line. As the CLRDP prototype site plan (Figure 3-7) shows, no structures in the northern portion of the site would be located within 300 feet of the Younger Ranch. This setback requirement does not apply to the area at and south of the CDFG Marine Wildlife Center and west of McAllister Way because the area is already developed with facilities and the Younger Ranch must already abide by pesticide-use labeling that requires a 300-foot-wide setback from existing occupied structures contingent upon the types of pesticides that are applied. Therefore new structures proposed in the area at and south of the CDFG Marine Wildlife Center would not restrict pesticide use on the ranch. (See further discussion under Near-term Projects below.)

Younger Ranch has also expressed a concern that, with an increase in onsite population at the Marine Science Campus under the CLRDP, the potential for vandalism/theft of farm equipment and damage to structures, pilferage of crops, and trespass/liability impacts could increase. In addition, there could be an increase in complaints regarding dust and odors. Agricultural/urban nuisance impacts could include agricultural generation of dust through tillage, harvesting, and access road use; odors caused by the use of fertilizers, mulch, pesticides, and crop residues; noise caused by the operation of farm machinery and equipment during any hour of the day or night; and light and glare caused by farm-related night lighting. The potential for such conflicts is considered low due to (1) the barrier presented by the Younger Lagoon, (2) the setbacks included in the CLRDP, and (3) CLRDP Implementation Measure 3.8.2, which requires that the University work with the adjacent land owners and enter into an indemnification and hold harmless agreement with the Younger Ranch that would be designed to protect adjacent agricultural operators from the economic burden of legal claims arising from normal and reasonable farming operations. The impact is therefore considered less than significant. In addition, the University would implement the following mitigation measure to further ensure that the adjacent agricultural property is not adversely affected.

General Mitigation Measure 4.2-1:

- **UCSC will install a four-foot-high landscaped fence along the Younger Ranch property line that will extend from the bend in the existing access road, northward along the property line. The fence will be sited and constructed to have a uniform gap of 16 inches between a smooth wire defining the bottom of the fence and the ground. This will assure that wildlife passage can continue to occur through the fence.**

- **UCSC will install tree and shrub landscaping approximately 25 feet inside the fence (to minimize shading effects on Younger Ranch crops), consisting of an indigenous, drought-resistant mosaic of mid-level shrubs and taller trees to help dissipate dust generation from the west. Tree and shrub choices will be made in conjunction with the landscape architect experienced in the use of native plants and vegetation. Trees and shrubs will be selected for non-invasive character. Native blackberries are recommended, as they would serve as an access barrier.**

- **UCSC will install the fence and landscaping prior to groundbreaking of any CLRDP project components.**

There would be no secondary impacts from the implementation of General Mitigation Measure 4.2-1. An impenetrable fence could have a secondary impact if it were to deter wildlife movement. As described above, however, the fence would be sited and designed to allow for wildlife movement. Furthermore, because the fence would be aligned in a north-south direction and would be relatively low, it would not interfere with scenic vistas or obstruct views of the bay.

With respect to conversion of farmland as a result of growth-inducing effects of the project, see Section 4.9, Land Use and Planning, and Section 6 of this EIR.

Near-term Projects

None of the near-term projects would result in any other changes that could result in conversion of farmland beyond those discussed above for the entire development program. Consistent with General Mitigation Measure 4.2-1, the University would install the boundary fence and landscaping before construction of the near-term projects begins. All near-term projects except the SORACC would be located more than 300 feet from the adjacent ranch. Although one building in the SORACC complex would be located about 250 feet from the Younger Ranch agricultural operations, the building site is within an area of existing occupied structures and pesticide use on the ranch takes the existing structures into account. Therefore, the SORACC would not impose a new restriction on ranch operations related to the application of pesticides. The proposed 42 Apartment/Townhouse Units would introduce residential uses that might be sensitive to noise, odors, and dust generation from the ranch. However, the housing units would be more than 500 feet from the ranch, and the University would enter into the agreement with Younger Ranch as described above, and would implement General Mitigation Measure 4.2-1 to further minimize any conflict between campus occupants and ranch operations. The impact of each near-term project would be less than significant.

Based on the CEQA criteria evaluated herein, the CLRDP building program and the five near-term projects as mitigated would not have a significant adverse impact on agricultural resources.

CUMULATIVE IMPACTS

ENTIRE DEVELOPMENT PROGRAM

Cumulative agricultural resource impacts associated with development of the Santa Cruz westside study area by about 2020, including the project site, are evaluated below. The analysis assumes development of remaining undeveloped parcels in the Santa Cruz westside study area according to existing City of Santa Cruz General Plan land use designations. (See Figures 4.9-1 and 4.9-2 in Section 4.9, Land Use and Planning, which illustrate general plan land use designations and existing land uses in the area.) Although the General Plan is currently being updated, it is assumed that the undeveloped parcels in the Santa Cruz westside study area will be developed at similar intensities and densities as those described under the current General Plan.

A review of land use maps in the City of Santa Cruz General Plan/LCP indicates that a substantial part of the land east and northeast of the site is designated as Low Density Residential and Low Medium Density Residential. In addition, the lands east of Moore Creek and north of Highway 1 are also designated Low Medium Density Residential (see Figure 4.9-1). Lands east of the project site are generally already developed (with some remaining undeveloped parcels), while lands west of the site are in agricultural use (see Figure 4.9-2).

The standards of significance that apply to the cumulative impact analysis are the same as those that apply to the project-level analysis. These standards address the potential for cumulative development to convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use; conflict with existing zoning for agricultural use, or a Williamson Act contract; or involve other changes in the existing environment that could result in conversion of farmland to non-agricultural use.

Most of the land in the Santa Cruz westside study area has already been converted to non-agricultural uses. The remaining undeveloped parcels are a few noncontiguous parcels, including the project site, land between Shaffer Road and Antonelli Pond south of the railroad tracks, and two parcels further east of Natural Bridges Drive. None of these parcels (except the northern portion of the land between Shaffer Road and Antonelli Pond which is under community gardens) is in active agricultural production. Based on the USDA Soil Survey for Santa Cruz, it appears that the soil types in the Santa Cruz westside study area are generally similar to those found at the Marine Science Campus. Therefore based on the soil types, some of the vacant lands may qualify as Prime Farmland if irrigation water were available or as Unique Farmland. However, it is considered likely that these undeveloped lands probably lack an irrigation water source and are also potentially not viable sites for renewed agricultural use due to urban conflicts and the economics of agriculture in the region. Furthermore, the City's General Plan envisions and allows for the conversion of this land to urban uses. Conversion of potential Farmlands to non-agricultural uses with the buildout of the Santa Cruz westside study area including the proposed project site, would not result in a cumulatively significant impact on agricultural resources. This is because even though some of the affected lands may qualify as Farmland under the Department of Conservation classification, there is no existing agricultural production associated with these lands, and establishment of agriculture on these lands would not be viable.

Because there are no lands under Williamson contracts in the Westside Study Area, there would be no cumulative impact on such lands.

With respect to potential conversion of agricultural land as a result of the introduction of non-agricultural uses close to agricultural use, the proposed project in conjunction with other regional development would not result in a significant cumulative impact on the agricultural lands to the west of the project site. This is because the land use patterns in the area are already established and with the exception of a small parcel adjacent to the Shaffer Road Apartments, there are no remaining undeveloped parcels immediately adjoining Younger Ranch. Although there are vacant parcels farther east of the project site, these are sufficiently distant that agricultural odors, dust and other conflicts would not be significant problems. Furthermore, implementation of the proposed CLRDP would create a perception buffer by placing urban uses between agricultural operations and these vacant parcels, and would in fact also benefit the existing De Anza Santa Cruz residential community in a similar manner. The buffering would be in the form of additional buildings on the campus site, which would tend to shield the views of agricultural uses to the west. In addition, the CLRDP policies and implementation measures, including setbacks and the indemnification and hold harmless agreement with adjacent agricultural land owners, would beneficially affect the area by reducing any conflicts between the campus and the adjacent agricultural operations to the extent that such conflicts may be considered to exist. Placement of the fence and landscaping along the campus's western property line would further serve to protect the agricultural lands compared to existing conditions. Therefore implementation of the proposed project in conjunction with other development in the vicinity of the Marine Science Campus would not result in a cumulatively significant adverse effect on agricultural lands to the west such that those lands could be converted to non-agricultural uses.

NEAR-TERM PROJECTS

For the reasons described above for the CLRDP as a whole, none of the near-term projects in conjunction with other development in the project vicinity would result in cumulatively significant adverse impacts on agricultural resources.

Based on the information presented above, the implementation of the proposed project in conjunction with other development in the vicinity of the Marine Science Campus would not result in cumulatively significant adverse impacts on agricultural resources.

4.3 AIR QUALITY

This section evaluates the potential impacts of the CLRDP and its five near-term projects on local and regional air quality from both stationary and mobile sources of air emissions. The analysis in this section is based on a review of existing documentation of air quality conditions in the region; air quality regulations administered by the U.S. Environmental Protection Agency (U.S. EPA), the California Air Resources Board, and the Monterey Bay Unified Air Pollution Control District (MBUAPCD), including *CEQA Air Quality Guidelines* established by the MBUAPCD, September 2002; and the *2000 Air Quality Management Plan for the Monterey Bay Region* also prepared by the MBUAPCD, May 2001.

Based on the following CEQA criteria, a project would generally be considered to have significant adverse air quality impact if it would:

- 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 pollution concentrations.
- Create objectionable odors affecting a substantial number of people.
- Exceed the probability of 10 in one million of a maximally exposed individual contracting cancer.
- Have ground level concentrations of non-carcinogenic toxic air contaminants which would result in a Hazard Index greater than one for the maximally exposed individual.

According to the *UC CEQA Handbook* by the UC Office of the President (2002), air quality impacts shall be analyzed using the current guidelines or procedures specified by the local air district.[1] These procedures are provided in the *CEQA Air Quality Guidelines* (2003) of the MBUAPCD, which is the local air district for the North Central Coast Air Basin that consists of Santa Cruz, San Benito, and Monterey counties. In its *CEQA Air Quality Guidelines* the MBUAPCD has established separate significance thresholds for determining construction impacts, operational impacts, as well as cumulative impacts and consistency with the current local Air Quality Management Plan. The significance thresholds and methodologies established by the MBUAPCD, therefore, address the significance criteria listed above.[2] These thresholds are presented below:

[1] The Environmental Checklist Form in Appendix G of the *CEQA Guidelines*, published by the Governor's Office of Planning and Research, also states that, where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to evaluate the significance criteria.

[2] With regard to the last bulleted significance criterion for project-level review, the CLRDP does not include any additional standards of significance.

CONSTRUCTION IMPACTS

EMISSIONS OF RESPIRABLE PARTICULATES (PM_{10})

Construction activities (e.g., excavation, grading, on site vehicles) that directly generate 82 pounds per day or more of PM_{10} (particulate matter that is 10 microns or less in diameter) would have a significant impact on local air quality when they are located nearby and upwind of sensitive receptors.

EMISSIONS OF PRECURSORS OF OZONE

Construction projects using typical construction equipment such as dump trucks, scrapers, bulldozers, compactors and front-end loaders that temporarily emit precursors of ozone (i.e., volatile organic compounds [VOCs] or oxides of nitrogen [NO_X]) are accommodated in the emission inventories of State- and federally-required air plans and would not have a significant impact on the attainment and maintenance of ozone Ambient Air Quality Standards (AAQS).

EMISSIONS OF TOXIC AIR CONTAMINANTS (TACS)

Construction activity that may cause or substantially contribute to the violation of other State or federal AAQS or that could emit TACs (carcinogenic or non-carcinogenic) could result in temporary significant health impacts. With regard to TACs, significance thresholds vary according to the toxicity of each particular TAC and are dependent on the level that would cause an adverse health impact at an offsite receptor. These thresholds, which are discussed in greater detail in the impacts analysis below, are based on toxicity values obtained from the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* published by the California Office of Environmental Health Hazard Assessment (2002). Rule 1000 of the Monterey Bay Unified Air Pollution Control District Permit Guidelines applies to new or modified stationary sources of TACs, and it excludes mobile sources related to a project. The Rule 1000 Part 3.4.2 does not allow emissions of TACs from the stationary sources related to a project to cause a net risk in excess of one cancer incidence per one hundred thousand population (10 in a million).

OPERATIONAL IMPACTS

Table 4.3-1 summarizes the project-level thresholds of significance for operational impacts by pollutant. An exceedance of any threshold would represent a significant impact on local or regional air quality. The thresholds in Table 4.3-1 apply to all indirect and direct emissions. Indirect emissions come from mobile sources that access the project site but generally are emitted offsite; direct emissions are emitted onsite (e.g., stationary sources, onsite mobile equipment).

Operational emissions of VOCs, NO_X, PM_{10}, SO_2, and CO are calculated using the computer program URBEMIS 2001. The URBEMIS 2001 program calculates indirect source emissions for VOC, NO_X, PM_{10}, and CO based on the latest emission factors established by the California Air Resources Board.

TABLE 4.3-1
THRESHOLDS OF SIGNIFICANCE
FOR CRITERIA POLLUTANTS OF CONCERN OPERATIONAL IMPACTS[a]

Pollutant	Threshold(s) of Significance
VOC	137 lb/day (direct + indirect)
NO_X, as NO_2	137 lb/day (direct + indirect)
PM_{10}	82 lb/day (on site)[b]
	AAQS exceeded along unpaved roads (off-site)
CO	LOS at intersection/road segment degrades from D or better to E or F or V/C ratio at intersection/road segment at LOS E or F increases by 0.05 or more or delay at intersection at LOS E or F increases by 10 seconds or more or reserve capacity at unsignalized intersection at LOS E or F decrease by 50 or more[c]
	550 lb/day (direct)[c]
SO_X, as SO_2	150 lb/day (direct)[b]

[a] Criteria pollutant emissions could also have a significant impact if they would alter air movement, moisture, temperature, climate, or create objectionable odors in substantial concentrations. When estimating project emissions, local or project-specific conditions should be considered.
[b] MBUAPCD-approved dispersion modeling can be used to refute a determination of significance if modeling shows that emissions would not cause or substantially contribute to an exceedance of state and federal AAQS.
[c] Modeling should be undertaken to determine if the project would cause or substantially contribute (550 lb/day) to exceedance of CO AAQS. If not, the project would not have a significant impact.

SOURCE: Monterey Bay Unified Air Pollution Control District

EMISSIONS OF VOCS

If a project generates 137 pounds per day or more of direct and indirect VOC emissions, it would result in substantial amounts of ozone precursors and would have a significant impact on regional air quality. Such projects would significantly affect attainment and maintenance of ozone AAQS.

EMISSIONS OF NO_X

If a project generates 137 pounds per day or more of direct and indirect NO_X emissions, it would generate substantial emissions and have a significant impact on regional air quality.

EMISSIONS OF PM_{10}

If a project generates 82 pounds per day or more of PM_{10} at the project site, it would result in substantial air emissions and have a significant impact on local air quality. In the event that the PM_{10} threshold is exceeded dispersion modeling can be used to refute a determination of significance if the modeling shows that the emissions would not cause or substantially contribute to an exceedance of State or federal AAQS (MBUAPCD, 2002).

EMISSIONS OF SO_2

If a project directly emits 150 pounds or more per day of SO_2, it would result in substantial air emissions and have a significant impact on air quality.

EMISSIONS OF CARBON MONOXIDE

If a project directly emits 550 pounds or more per day of CO, it would result in substantial air emissions and have a significant impact on local air quality. In the event that the CO threshold is exceeded dispersion modeling can be used to refute a determination of significance if the modeling shows that the emissions would not cause or substantially contribute to an exceedance of State or federal AAQS (MBUAPCD, 2002).

If a project would significantly affect levels of service (LOS) at intersections or road segments, it could cause or substantially contribute to violation of State or federal AAQS for CO. The following conditions would represent a potentially significant impact to intersections or road segments after mitigation:

- Intersections or road segments that operate at LOS D or better that would operate at LOS E or F with the project's traffic, or
- Intersections or road segments that operate at LOS E or F where the volume-to-capacity (V/C) ratio would increase 0.05 or more with the project's traffic, or
- Intersections that operate at LOS E or F where delay would increase by 10 seconds or more with the project's traffic, or
- Unsignalized intersections that operate at LOS E or F where the reserve capacity would decrease by 50 or more with the project's traffic (based on the turning movement with the worst reserve capacity), or
- The project would generate substantial traffic or generate substantial traffic near a major stationary source of CO.

For those intersections at which any of these scenarios would occur, CO modeling is undertaken to determine if indirect source emissions would cause an exceedance of State or federal AAQS at existing or reasonably foreseeable receptors. If modeling demonstrates that the project would not cause an exceedance of CO AAQS, the project would not have a significant impact on local air quality.

EMISSIONS OF TACS

Projects that may cause or substantially contribute to the violation of other State or federal AAQS or that could emit TACs (carcinogenic or non-carcinogenic) could result in significant health impacts. As stated above under Construction Impacts, TAC thresholds vary according to the toxicity of each particular TAC and are discussed in greater detail in the impacts analysis below.

Likewise, a project that would be located adjacent to a source of TACs may also result in significant impacts to human health and require modeling to determine the health effects.

OBJECTIONABLE ODORS

Projects that would emit pollutants associated with objectionable odors in substantial concentrations could result in significant impacts if odors would cause injury, nuisance, or annoyance to a considerable number of persons or would endanger the comfort, health, or safety of the public. Because people have mixed reactions to odors, the nuisance level of an odor varies.

CUMULATIVE IMPACTS

In accordance with the *CEQA Air Quality Guidelines* established by the MBUAPCD, the analysis of cumulative impacts on air quality focuses on localized PM_{10} emissions and localized CO emissions, as well as whether the project is found to be consistent with the local Air Quality Management Plan. The MBUAPCD's *CEQA Air Quality Guidelines* require that the methodology used in analyzing cumulative effects of PM_{10} emissions and CO emissions be the same as that used in evaluating project effects. The cumulative analysis of regional air pollutants focuses on the consistency of cumulative development with the local Air Quality Management Plan.

EMISSIONS OF PM_{10}

If ambient PM_{10} levels already exceed the State AAQS in the project area, the project would contribute substantially to the violation if it would emit more than 82 pounds per day. This would be considered a significant cumulative impact on local air quality, since the background concentration reflects the collective contribution of PM_{10} from nearby sources.

EMISSIONS OF CARBON MONOXIDE

For cumulative analyses of CO emissions, the traffic impact of the project would be combined with that of other closely related past, present, and reasonably foreseeable future projects. The cumulative impact would then be compared to the same criteria as project-level operational impacts above to determine if cumulative development could cause an exceedance of State or federal AAQS at existing or reasonably foreseeable receptors.

CONSISTENCY WITH THE AIR QUALITY MANAGEMENT PLAN

In the North Central Coast Air Basin a consistency analysis and determination serves as the assessment of the cumulative impact of a project on regional air quality. This analysis addresses potential cumulative impacts to regional air quality, including emissions of VOCs, NO_X, and $SO_{2.}$ If emissions from a project are determined to be inconsistent with or not accommodated by the AQMP, the project would be considered to have a significant cumulative air quality impact.

SETTING

POLLUTANT DESCRIPTIONS

A discussion of the air pollutants of interest to the regulatory agencies for their potential adverse impacts on the environment and sensitive receptors are described below.

Ozone

Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving ROG and NO_X. ROG and NO_X, which are emitted directly to the atmosphere, are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursor presence for approximately three hours in a stable atmosphere with strong sunlight. Ozone is a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production.

Short-term exposure to ozone can irritate the eyes and cause constriction of the airways.[3] Besides causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Carbon Monoxide

Carbon monoxide is formed by the incomplete combustion of carbon-containing material. Because it is directly emitted from combustion engines, carbon monoxide can have adverse localized impacts, primarily in areas of heavy traffic congestion. Because it is emitted directly and has limited dispersion characteristics, CO is considered a localized pollutant. Ambient CO concentrations normally are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. Carbon monoxide concentrations are also influenced by wind speed and atmospheric mixing. Under inversion conditions, CO concentrations may be distributed more uniformly over an area, out to some distance from vehicular sources.

When inhaled at high concentrations, carbon monoxide combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood.[4] This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia, as well as for fetuses.

Carbon monoxide concentrations are expected to continue to decline in the North Central Coast Air Basin into the future due to existing controls and programs as well as the continued retirement of older, more polluting vehicles from the mix of vehicles on the road network.

Suspended Particulate Matter (PM_{10} and $PM_{2.5}$)

PM_{10} and $PM_{2.5}$ consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. (A micron is one-millionth of a meter.) PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. One common source of $PM_{2.5}$ is diesel emissions. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Particulates also can damage materials and reduce visibility.

3 BAAQMD, 1999
4 BAAQMD, 1999

Nitrogen Dioxide

Nitrogen dioxide is the “whiskey brown” colored gas readily visible during periods of heavy air pollution. The major sources of nitrogen dioxide are vehicular, residential, and industrial combustion. Excessive nitrogen dioxide exposure can cause airway constriction for asthmatics and can cause sore throats, breathing difficulties, and respiratory infections.

Sulfur Dioxide

The major source of sulfur dioxide in the air basin is combustion of high-sulfur fuels. Excessive sulfur dioxide exposure can cause airway constriction for asthmatics and can cause sore throats, breathing difficulties, and respiratory infections.

Lead

Gasoline-powered automobile engines used to be the major source of airborne lead in urban areas. Excessive exposure to lead concentrations can lead to gastrointestinal disturbances, anemia, kidney disease, and in severe cases neuromuscular and neurologic dysfunction. The use of lead additives in fuel has been eliminated in California, and lead concentrations have subsequently declined substantially.

REGULATORY CONTEXT

The project site is located within the North Central Coast Air Basin. 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 primarily responsible for improving the air quality within the Air Basin are discussed below.

U.S. Environmental Protection Agency

The U.S. EPA is responsible for enforcing the 1990 amendments to the Federal Clean Air Act (CAA) and the Federal ambient air quality standards (AAQS) that the CAA establishes. These standards identify ambient (background) levels for six “criteria” pollutants that are considered the maximum safe levels, with an adequate margin of safety, to protect the public health and welfare. The six criteria pollutants are ozone, CO, nitrogen dioxide (NO_2—a form of NO_X), SO_2, respirable particulates (PM_{10}), and lead. The U.S. EPA also has regulatory and enforcement jurisdiction over emission sources beyond State waters (outer continental shelf), and those sources that are under the exclusive authority of the federal government, such as aircraft, locomotives, and interstate trucking.

In response to its enforcement responsibilities, the U.S. EPA requires each state to prepare and submit a State Implementation Plan that describes how the state will achieve the federal AAQS by specified dates, depending on the severity of the air quality within the state or air basin.

The North Central Coast Air Basin, in which the project site is located, was classified by the U.S. EPA as a non-attainment area for the federal ozone standard in 1978. The federal ozone standard was exceeded numerous times in the late 1980s. In 1990, however, the Air Basin met the federal standard to be reclassified as a Federal Maintenance Area. This designation, which became final on March 18, 1997, requires an area now in attainment to continue to implement measures from the State Implementation Plan to maintain the ambient pollutant levels below federal standards. With the exception of a violation of the federal PM_{10} standard in Davenport in 1995, there have been no recorded violations of federal standards for any other pollutants within the Air Basin. The Air Basin is designated as attainment or unclassified with respect to the federal ambient air quality standards for the other criteria air pollutants.

California Air Resources Board

The California Air Resources Board, a department of the California Environmental Protection Agency, oversees air quality planning and control throughout California. It is primarily responsible for ensuring implementation of the 1989 amendments to the California Clean Air Act (CCAA), responding to the federal CAA requirements, and regulating emissions from motor vehicles and consumer products within the State. The California Air Resources Board has established emission standards for vehicles sold in California and for various types of equipment available commercially. It also sets fuel specifications to further reduce vehicular emissions.

Like the U.S. EPA, the California Air Resources Board has established ambient air quality standards for the State (State standards) for the same six criteria pollutants as the federal CAA. The State standards are more stringent than the federal air quality standards. The amendments to the CCAA require air pollution control districts to achieve the State standards by the earliest practicable date.

Based on monitored pollutant levels, the CCAA divides ozone non-attainment areas into four categories—moderate, serious, severe, and extreme—to which progressively more stringent requirements apply. The North Central Coast Air Basin is classified as a moderate non-attainment area for ozone. Levels of PM_{10} also exceed State standards throughout the Air Basin and, therefore, it has been classified as a non-attainment area for this pollutant. The Air Basin is in attainment of the State standards for CO, NO_2, SO_2, and lead.

Monterey Bay Unified Air Pollution Control District

The management of air quality in the North Central Coast Air Basin is the responsibility of the Monterey Bay Unified Air Pollution Control District (MBUAPCD). The MBUAPCD is responsible for bringing and/or maintaining air quality in the Air Basin within federal and State air quality standards. Specifically, the MBUAPCD has the responsibility to monitor ambient air pollutant levels throughout the Air Basin and to develop and implement attainment strategies to ensure that future emissions will be within federal and State standards.

Air Quality Management Plan

As discussed previously, the federal and State Clean Air Acts require the preparation of plans to reduce air pollution to healthful levels. The MBUAPCD has responded to this requirement by preparing a series of Air Quality Management Plans (AQMPs), the most recent of which (2000 AQMP) was approved by the Governing Board of the MBUAPCD in May 2001. The next AQMP update will occur in early 2004.

The 2000 AQMP was designed to address attainment of the State standards for ozone. At this time, the Air Basin continues to exceed the State ozone standard. Because it has not violated the State ozone standard more than three times at any monitoring location within the district during the calendar year of 2000, the district is designated “nonattainment-transitional” for ozone by operation of law. The non-attainment of the State standards reflects the impact of emissions transported from the San Francisco Bay Area, uncertainties related to emission reduction estimates, and local meteorological conditions.

Attainment of State Standards

Photochemical modeling for existing and future ozone concentration was conducted by the MBUAPCD in order to develop a base case episode upon which additional analyses would be possible. The model also assesses the impact of transported and local emissions on ozone in the Air Basin, performs air flow trajectory analysis to determine regional source-to-receptor relationships, and includes a year 2010 ozone simulation projecting the effects of growth versus control on future air quality. A major objective of the project was to quantitatively assess the influence of transported versus local emissions on the air quality of the Air Basin.

The results of the modeling show that the area within the Air Basin exceeding the State ozone standard will be smaller by 2010. Results also indicate that while the severity and extent of ozone exceedances would be reduced in 2010 in comparison to 1990, some areas of the Air Basin still may not achieve the standard with current control measures in place. Transport of air pollutants from the San Francisco Bay Area and the San Joaquin Valley will also continue to influence the attainment status.[5] The results indicate that 50 percent of exceedances are the result of transport from the Bay Area, meaning that the exceedance would have occurred even with no emissions contribution from the Air Basin. Additional controls in both the San Francisco Bay Area and the Air Basin may be needed to avoid future exceedances, especially under adverse meteorological conditions.

In order to address the attainment of the State standards for PM_{10}, the MBUAPCD prepared the *1998 Report of Attainment of the California Fine Particulates Standard in the Monterey Bay Region.* This report found that existing controls on sources of NO_X emissions, which serve as precursors to PM_{10}, may lead to attainment and maintenance of the State PM_{10} standard through 2010.

MBUAPCD Rules and Regulations

The MBUAPCD is responsible for limiting the amount of emissions that can be generated throughout the Air Basin by various stationary and mobile sources. Specific rules and regulations adopted by the Governing Board limit the emissions that can be generated by various uses and/or activities, and identify specific pollution reduction measures that must be implemented in association with various uses and activities. These rules not only regulate the emissions of the six criteria pollutants, but also toxic emissions and acutely hazardous materials. They are subject to ongoing refinement by the MBUAPCD.

Emissions sources subject to these rules are regulated through the MBUAPCD's permitting process. Through this permitting process, the MBUAPCD also monitors generation of stationary emissions and uses this information in developing the AQMP. Any emissions sources that would be constructed as part of the CLRDP would be subject to the MBUAPCD rules and regulations.

5 California Environmental Protection Agency, Air Resources Board, *Final Regulation Order: Text of Adopted Regulation Identifying Areas which are Impacted by Transported Air Pollutants*, 2000.

MBUAPCD CEQA Air Quality Guidelines

In September 2002, the MBUAPCD prepared its *CEQA Air Quality Guidelines* as a guidance document to provide lead government agencies, consultants, and project proponents with uniform procedures for assessing air quality impacts and preparing the air quality sections of environmental documents for projects subject to CEQA. The *CEQA Air Quality Guidelines* is an advisory document and local jurisdictions are not required to use the methodology outlined therein. This document describes the criteria that the MBUAPCD uses when reviewing and commenting on the adequacy of environmental documents, such as this EIR. It recommends thresholds for use in determining whether projects would have significant adverse environmental impacts, identifies methodologies for predicting project emissions and impacts, and identifies measures that can be used to avoid or reduce air quality impacts. The air quality impact analysis in this EIR was prepared in accordance with the recommendations of the *CEQA Air Quality Guidelines*.

Association of Monterey Bay Area Governments

The Association of Monterey Bay Area Governments (AMBAG) is a council of governments for the counties of Santa Cruz, Monterey, and San Benito. AMBAG is a regional planning agency and 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 proposed 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 projects. Specifically, as the designated Metropolitan Planning Organization for Monterey, San Benito, and Santa Cruz counties, it is responsible, pursuant to §176(c) of the 1990 amendments to the CAA, for providing current population, employment, travel, and congestion projections for regional air quality planning efforts. It is required to quantify and document the demographic and employment factors influencing expected transportation demand, including land use forecasts. Pursuant to *California Health and Safety Code* Section 40460(b), AMBAG is also responsible for preparing and approving the portions of the Air Basin's Air Quality Management Plans relating to demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies.

Local Governments

Local governments, such as the City of Santa Cruz, have the authority and responsibility to reduce air pollution through their police power and land use decision-making authority. Specifically, local governments are responsible for the mitigation of emissions resulting from land use decisions and for the implementation of transportation control measures as outlined in the Air Quality Management Plan (AQMP). The AQMP assigns local governments certain responsibilities to assist the Air Basin in meeting air quality goals and policies. In general, a first step toward implementation of a local government's responsibility is identification of air quality goals, policies, and implementation measures in the local government's general plan. Through capital improvement programs, local governments can fund infrastructure that helps to improve air quality, such as ridesharing and park-and-ride facilities, bicycle facilities, and traffic signal timing improvements. In accordance with CEQA requirements and the CEQA review process, local governments assess air quality impacts, require mitigation of potential air quality impacts by conditioning discretionary permits, and monitor and enforce implementation of such mitigation.

REGIONAL CONTEXT

Meteorological and Topographical Conditions

The North Central Coast Air Basin is comprised of Santa Cruz, Monterey, and San Benito counties. The project site is situated in the northwest sector of the Air Basin, in an area topographically dominated by the Santa Cruz Mountains.

The topography and climate of the Air Basin combine to make it an area with smog[6] potential. During summer and fall months, onshore air currents push a marine layer of fog and relatively cool air into the coastal valleys. A warm air mass known as an inversion layer will frequently descend over the lower marine air layer, acting as a cap and inhibiting air pollutants generated near the ground from dispersing upward. Light summer and fall winds and surrounding mountains further limit the horizontal dispersal of the pollutants. Concentrating volumes of pollutants in this manner allows the summer and fall sunlight to generate high levels of smog. In the winter and spring, the general absence of deep, persistent inversion layers and occasional storms usually result in good air quality for the Air Basin.

The location of the City of Santa Cruz on the coastal plain results in generally good air quality.

Regional Air Quality

To establish ambient concentrations of the six criteria pollutants, the MBUAPCD operates 10 air quality monitoring stations throughout the Air Basin. These stations are located in Monterey, Moss Landing, Salinas, Hollister, Carmel Valley, Santa Cruz, Scotts Valley (with two monitoring stations), Davenport, and Watsonville. In addition, the National Park Service operates an eleventh monitoring station at the Pinnacles National Monument in San Benito County. The Santa Cruz monitoring station on Soquel Avenue is the closest to the project site, located about 5.7 miles northeast of the site. This station monitors ozone and PM_{10} levels.

Table 4.3-2 lists registered concentrations and violations of State and federal standards that have occurred at the Santa Cruz monitoring station from 1998 through 2002. As shown in Table 4.3-2, the Santa Cruz monitoring station registered values above the State ozone standard on one day during the 1998-2002 period, and no values above the State standard for PM_{10} over those five years. The federal standards for ozone and PM_{10} were not exceeded during that same time frame.

Local Air Quality

The project site vicinity is characterized by residential, commercial, agricultural, and light industrial (research and development) uses, as well as pubic open space. Emissions sources include stationary activities, such as space heating, cooking, and water heating; and mobile activities, such as automotive traffic, trains, and agricultural operations. Motor vehicles are the primary sources of air pollutants. Wind generally blows air across the site from west to east, giving the site some of the best air quality in the Air Basin.

6 Smog is a general term based on the words smoke and fog that is used to describe dense, visible air pollution. Although some air pollutants are colorless, smog is commonly used to describe the general concentrations of pollutants in the air. Smog is formed when combustion emissions and gaseous emissions, such as volatile organic compounds (VOC) and oxides of nitrogen (NO_x), undergo photochemical reactions in sunlight to form ozone. However, in the lower atmosphere where people live, ozone poses health risks and damages crops, rubber, and other materials. Particulates, such as soil and dust materials, and vehicle exhaust particulates often mix with ozone, carbon monoxide (CO), and other compounds and create a brownish haze in the air.

TABLE 4.3-2
AMBIENT AIR POLLUTANT CONCENTRATIONS REGISTERED AT THE SANTA CRUZ-SOQUEL AVENUE MONITORING STATION, 1998 – 2002

Pollutant	Standards[a,b]	Year				
		1998	**1999**	**2000**	**2001**	**2002**
OZONE (O_3)						
Maximum 1-hour concentration monitored (ppm)		0.08	0.10	0.08	0.08	0.08
Number of days exceeding federal standard	0.12 ppm	0	0	0	0	0
Number of days exceeding State standard	0.09 ppm	0	1	0	0	0
SUSPENDED PARTICULATE MATTER (PM_{10})						
Maximum 24-hour concentrations (µg/m^3)		34	47	30	35	41
Number of samples		96	100	99	100	-
Number of samples exceeding federal standard	150 µg/m^3	0	0	0	0	0
Number of samples exceeding State standard	50 µg/m^3	0	0	0	0	0
Percent of samples exceeding federal standard	150 µg/m^3	0.0	0.0	0.0	0.0	0.0
Percent of samples exceeding State standard	50 µg/m^3	0.0	0.0	0.0	0.0	0.0

[a] Parts by volume per million of air (ppm), micrograms per cubic meter of air (µg/m^3), or annual arithmetic mean (aam).
[b] Federal and State standards are for the same time period as the maximum concentration measurement unless otherwise indicated.

SOURCE: California Air Resources Board, *Air Quality Data Statistics* (http://www.arb.ca.gov/adam/welcome.html), 2003.

Sensitive Receptors

Land uses such as schools, hospitals, and convalescent homes are considered relatively sensitive to poor air quality because infants and children, the elderly, and people with health afflictions, especially respiratory ailments, are more susceptible to respiratory infections and other air-quality-related health problems than the general public.[7] Residential areas are also considered sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Industrial and commercial districts are less sensitive to poor air quality because exposure periods are shorter and workers in these districts are, in general, the healthier segment of the public.

The predominant existing sensitive receptors on or near the project site are the existing caretakers' units on the site and the De Anza Santa Cruz residential community immediately east of the site. The nearest school to the project site is Ark Alternative School (public elementary), located at 313 Swift Street approximately 0.7 mile east of the site. There are no hospitals or churches within one mile of the project site.

[7] MBUAPCD, 2002

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP building program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new building area of 377,856 square feet (sf) at the Marine Science Campus by about 2020. In addition, the proposed CLRDP would allow approximately 152,000 sf of outdoor development and approximately 550 additional parking spaces. The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education, 70,000 sf for Outdoor Research Areas, 19,000 sf for Support Facilities, 98,100 sf for Support Housing, 107,500 sf for Equipment Storage and Maintenance, and 12,000 sf for Seawater System Expansion. Implementation of the CLRDP would include construction of multiple facilities and some building demolition. Operation of the Marine Science Campus under the CLRDP would result in the addition of residential uses on the campus, increased vehicle traffic along access routes to the campus, and an overall increase in activity on the campus.

Operation of these facilities would increase vehicle trips (by employees, visiting researchers, and delivery trucks). By 2020, the CLRDP building program is expected to result in up to 3,128 additional daily vehicle trips. These additional trips would produce new air emissions.

Existing facilities to be demolished include greenhouses west of McAllister Way on the middle terrace (26,844 square feet), and office trailers (3,000 square feet) and caretakers' housing (1,400 square feet) on the lower terrace.

Construction associated with development under the CLRDP would further generate air pollutants such as NO_X, CO, and, SO_2 from the operation of diesel-powered equipment and PM_{10} from excavation and grading activities.

Fireplaces and wood-burning stoves are not planned for any of the support housing facilities on campus.[8]

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program with all of them expected to be built by 2010. Vehicle trips associated with operation of these five near-term projects (1,324 daily trips) would increase vehicle emissions in the area. Among the building footprints depicted in the CLRDP prototype site plan are specific sites for these five near-term projects. The projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area. The footprint of the project would be approximately 2.4 acres. As the focal point for delivery trucks, this location would experience an increase in diesel emissions. Operation of gas- or diesel-powered loading and unloading equipment could generate additional emissions.

[8] Lisel, Elise, UC Santa Cruz Housing Department, e-mail communication December 3, 2002. Inclusion of wood-burning stoves and/or fireplaces is not planned for any project facilities. The emission estimates calculated for this EIR therefore do not account for potential emissions from wood-burning stoves and fireplaces. In the event that wood-burning stoves and fireplaces are proposed for project facilities in the future, they would be subject to further environmental review prior to implementation.

- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf and a footprint of about 1.3 acres would be constructed on the middle terrace development area. The footprint of the project would be approximately 1.3 acres. Occupancy of campus support housing would result in increase emissions associated with vehicle trips, space heating, and cooking.

- The United States Geological Survey (USGS) Western Coastal and Marine Geology Facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area. The footprint of the project would be approximately 1.5 acres. Vehicle trips associated with operation of the USGS facility would also increase vehicle emissions in the area. To a lesser degree, fuel combustion associated with space heating would also increase emissions.

- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area. The footprint of the project would be approximately 0.7 acres. Vehicle trips associated with operation of the SORACC would increase vehicle emissions in the area. To a lesser degree, fuel combustion associated with space heating would also increase emissions.

- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area. The footprint of the project would be approximately 0.41 acres. Additionally, this proposed project would include the construction of two new public-access overlooks and improvement of an existing overlook. Vehicle trips associated with operation of the facility would increase vehicle emissions in the area. To a lesser degree, fuel combustion associated with space heating would also increase emissions as well.

MEASURES PROPOSED AS PART OF THE PROJECT

The CLRDP promotes the use of bicycles, walking, and University and public transit as a means of traveling to and from the Marine Science Campus (Policies 5.6 and 5.7). The University would provide secure bicycle racks outside major building complexes and lockers and showers in a convenient central location. In addition, paved areas for bus turnarounds and covered transit stops for public transit would be developed at logical locations throughout the campus and the University would work with the Santa Cruz Metropolitan Transportation District to increase the frequency of transit service to the campus. The University would also provide shuttle service connecting the Marine Science Campus to the UCSC Main Campus as demand warrants.

The CLRDP also contains policies promoting energy efficiency in new construction (Policy 3.11) and air quality and energy conservation through land use and transportation controls (Policy 3.12). The University would incorporate sustainable design practices and use sustainably produced materials in the construction of new facilities, as practicable. The CLRDP provides for on-campus support housing to reduce travel demand. Additional measures to foster better air quality and energy conservation would include programs to limit the use of single-occupant vehicles and promote walking, bicycling, and transit use. The University would coordinate a transportation demand management (TDM) program (Policy 5.8) that would include carpool and vanpool services, parking regulation, and transportation information for visitors, staff, faculty, and students.

PROJECT IMPACTS AND MITIGATION MEASURES

CONSTRUCTION IMPACTS – EMISSIONS OF PM_{10}

Entire Development Program

Construction associated with development under the CLRDP could generate substantial amounts of dust from "fugitive" sources (i.e., through means other than a stack or tailpipe), including PM_{10} and $PM_{2.5}$. Dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. A large portion of the total construction dust emissions would result from equipment and motor vehicle traffic over temporary roads and construction staging areas at the project site. Other sources of fugitive dust during construction could include excavation, earth movement, grading, and wind erosion from exposed surfaces.

Demolition of the existing greenhouses, office trailers, and caretakers' units on the project site would not result in a significant air emissions impact. None of these facilities predates 1985 and therefore they do not contain asbestos materials. The University would attempt to disassemble many of the building materials for recycling or reuse.

According to the MBUAPCD (2002), construction activity that includes minimal earthmoving on less than 8.1 acres per day, or construction activity that includes intensive earthmoving (grading, excavation) on less than 2.2 acres per day would typically result in less than 82 pounds per day of PM_{10}. Dust emissions from future projects that would be constructed at the Marine Science Campus under the CLRDP cannot be characterized, as details about all future projects are not available at this time. However, the five near-term projects are considered representative of future projects. As discussed above, the footprints of these five projects vary from about 2.4 acres for the Shared Warehouse and Laydown Facility to 0.4 acres for the Center for Ocean Health Phase II. Therefore, based on the acres disturbed, with the exception of the Shared Warehouse and Laydown Facility, none of the near-term projects would in dust emissions in excess of 82 lbs per day. With standard mitigation such as watering, emissions from that project would be reduced to levels that would not be considered significant. Most future projects at the Marine Science Campus are expected to be similar to these near-term projects and individually are not likely to result in a significant impact related to construction dust. However, if significant grading and earthmoving were underway at multiple project sites concurrently, the impact from PM_{10} emissions could be significant. For instance, if all five near-term projects were to be constructed simultaneously, with major grading underway for the Shared Warehouse and Laydown Facility, the 42 Apartment/Townhouse Units, and USGS (5.2 acres times 38 lbs/day/acre) and minor grading underway for the Center for Ocean Health and SORACC (1.1 acres times 10lbs/day/acre), the resulting dust emissions would be about 209 lbs per day which would represent significant quantities of dust (more than 82 lb/day), in the absence of mitigation. As a result, local visibility and PM_{10} concentrations may be adversely affected on a temporary and intermittent basis during the construction period. (See further discussion under Emissions of TACs below.)

<u>Impact 4.3-1</u>: Construction activities associated with development under the CLRDP could generate substantial amounts of fugitive dust, which would result in potential health and nuisance impacts in the immediate project vicinity. This would be a temporary significant impact.

Project-Specific Mitigation Measure 4.3-1: The University shall require construction contractors to implement a dust abatement program to reduce the contribution of project construction to local respirable particulate matter concentrations. Elements of this program shall include the following as appropriate for each project:

- **Water all active construction areas at least twice daily. Frequency shall be based on the type of operation, soil, and wind exposure.**
- **Cover all trucks hauling soil, sand, and other loose materials, or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).**
- **Pave, apply water two times daily, or apply non-toxic soil stabilizers to all unpaved access roads, parking areas, and construction staging areas.**
- **Sweep daily with water sweepers any paved access roads, parking areas, and staging areas at construction sites.**
- **Sweep streets daily with water sweepers if visible soil material is carried onto adjacent public streets.**
- **Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas or previously graded areas left inactive for ten days or more.**
- **Enclose, cover, water twice daily or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).**
- **Limit traffic speeds on unpaved roads to 15 miles per hour.**
- **Install sandbags or other erosion control measures to prevent silt runoff to public roadways.**
- **Replant vegetation in disturbed areas as quickly as possible.**
- **In the event that grading and excavation at two or more large project sites is proposed to occur concurrently (large sites defined as involving more than 2 acres), install wheel washers at the entrance of the construction sites.**
- **Phase construction projects in such a manner that minimizes the area of surface disturbance (e.g., grading, excavation) and the number of vehicle trips on unpaved surfaces.**

Best management practices described in Project-Specific Mitigation Measure 4.3-1 above would reduce construction-related emissions of PM_{10} and shall be made conditions of agreements with contractors. Implementation of Project-Specific Mitigation Measure 4.3-1 would reduce temporary and localized air quality impacts from construction activities to a less than significant level.

Near-term Projects

Best management practices described in Project-Specific Mitigation Measure 4.3-1 above would reduce PM_{10} emissions associated with development of the five near-term projects on the Marine Science Campus. For all five near-term projects, implementation of Project-Specific Mitigation

Measure 4.3-1 would reduce temporary and localized air quality impacts from construction activities to a less than significant level.

CONSTRUCTION IMPACTS – EMISSIONS OF PRECURSORS OF OZONE

Entire Development Program

Construction activities would also generate lesser amounts of other criteria air pollutants, primarily from operation of heavy equipment. Construction emissions sources other than fugitive dust sources are generally included in the emissions inventory that is the basis for regional air quality plans and would not be expected to impede attainment or maintenance of ozone and carbon monoxide standards in the Air Basin.[9] Therefore, construction-related emissions, other than dust, would not be significant.

Near-term Projects. Construction emission sources other than fugitive dust sources are generally included in the emissions inventory that is the basis for regional air quality plans and would not be expected to impede attainment or maintenance of ozone and carbon monoxide standards in the Air Basin. Therefore, construction-related emissions of VOCs and NO_X would not be significant.

CONSTRUCTION IMPACTS – EMISSIONS OF TACS

Entire Development Program

Emissions of TACs during construction can occur from fugitive dust during clearing and grading operations, because the soil contains pesticide residue or heavy metals. TAC emissions would also occur from diesel engines that would be used during construction. These TAC emissions would be in the form of diesel particulate matter (diesel PM).

Construction emissions were evaluated for development under CLRDP through 2020. For the worst-case construction scenarios, it was assumed that clearing and grading operations would occur at each site for 12 hours per day, six days per week over a two-month period. Details of the emission assumptions for the construction scenarios are given in Appendix C.

Maximum offsite concentrations of TACs associated with construction dust were determined by first modeling PM_{10} emissions from clearing and grading operations and then determining TAC ambient concentrations by fractionating the PM_{10} levels according to the results of the soils analysis. The maximum short-term average incremental PM_{10} concentration during construction was determined from the modeling to be 26 micrograms per cubic meter ($\mu g/m^3$), and the maximum annual average concentration was estimated to be 1.0 $\mu g/m^3$.

Acute and chronic exposure levels of TACs from fugitive dust were estimated for those substances with acute or chronic health effects. TACs contained in the soil with potential acute health effects include the pesticides DDT, DDD, and DDE, as well as the TACs arsenic and nickel. For chronic exposure, the TACs of concern that were measured in the soil include arsenic, nickel, and lead.

9 As explained under Methodologies of the Introduction, the MBUAPCD's *CEQA Air Quality Guidelines* (2002) states that calculating VOC and NOx emissions from typical construction equipment is not necessary because temporary emissions of these ozone precursors have been accommodated in State- and federally-required air plans.

Based on the highest readings of these substances in the soils analysis, acute exposure levels at offsite receptors were calculated by conducting dispersion modeling of the pesticide contaminated fugitive dust. The maximum calculated concentrations were compared to acceptable exposure levels, as established by the California Office of Environmental Health Hazard Assessment (OEHHA), and are reported in Table 4.3-3. The table shows that the maximum acute exposure levels of TACs from fugitive dust during construction activities are well below the acceptable threshold levels. The potential exposure to TACs during construction is therefore considered a less than significant impact.

TABLE 4.3-3
MAXIMUM ACUTE EXPOSURE LEVELS FROM CONSTRUCTION ACTIVITIES

Substance	Concentration in Soil (mg/kg)[a]	Maximum Acute Exposure (μg/m³)[b]	Acceptable Acute Exposure (μg/m³)
DDT/DDD/DDE	0.145[c]	3.8×10^{-6}	10.0[d]
Arsenic	4.6	1.2×10^{-4}	0.19[e]
Nickel	5.7	1.5×10^{-4}	6.0[e]

[a] Concentrations include the highest levels of 16 samples taken between September 9 and October 2, 2002.
[b] Exposure level is based on PM_{10} concentration of 26 μg/m³.
[c] Concentration is the sum of all three pesticides for the highest sample.
[d] Acceptable level is 1% of the OSHA threshold Limit Value of 1,000 μg/m³.
[e] Established by California Office of Environmental Health Hazard Assessment.

mg/kg = milligram per kilogram of soil
μg/m³ = microgram per cubic meter

The impacts from exposure to carcinogens in the soil and from diesel exhaust during construction were determined by applying the carcinogenic unit risk values to the maximum offsite long-term average concentrations. The carcinogens released to the air from construction activities include toxic metals contained in the soil, such as arsenic, nickel, and lead and diesel PM emissions from construction equipment.

The maximum annual average concentration of PM_{10} from fugitive dust during the worst year of construction is estimated from modeling to be 1.04 μg/m³. This estimated PM_{10} level is applied to the soil sample results for individual species to estimate maximum concentrations of carcinogens at the offsite receptors. These maximum concentrations for a worst-case construction year are adjusted to factor in an expected lifetime incremental carcinogenic risk at the maximum receptor. The incremental risks from TAC emissions are reported in Table 4.3-4.

The maximum annual average concentration from diesel PM emissions during a worst year of construction was determined from modeling to be 0.46 μg/m3. The lifetime exposure concentration is adjusted by factoring in periods when construction does not occur. The total incremental carcinogenic health risk from exposure to both diesel PM and from contaminated soil is estimated to be 2.1 in a million, as reported in Table 4.3-4. The maximum incremental risk is lower than the significance threshold of 10 in a million; therefore the impacts are less than significant.

TABLE 4.3-4
MAXIMUM INCREMENTAL CARCINOGENIC RISK FROM EXPOSURE TO TACs DURING CONSTRUCTION

Substance	Concentration in Soil (mg/kg)	Maximum Lifetime Exposure (μg/m^3)	Unit Risk Value (risk/μg/m^3)	Incremental Lifetime Cancer Risk in a Million
Arsenic	4.6	4.6 X 10^{-6}	3.3 X 10^{-3}	0.0015
Nickel	5.7	5.7 X 10^{-6}	2.6 X 10^{-4}	0.00002
Lead	12.0	12.0 X 10^{-6}	1.2 X 10^{-5}	0.000001
Diesel PM	-	0.007	3 X 10^{-4}	2.1

mg/kg = milligram per kilogram of soil
μg/m^3 = microgram per cubic meter

Near-term Projects

Emissions of TACs from construction of the near-term projects would affect receptors at the property boundary east of the construction activities. However, none of the near-term projects would cause or substantially contribute to significant (adverse) health impacts (carcinogenic and non-carcinogenic) from the emissions of TACs beyond those analyzed above for the CLRDP as a whole.

OPERATIONAL IMPACTS – EMISSIONS OF VOCS, NO_X, PM_{10}, AND SO_2

Entire Development Program

Development under the CLRDP would result in an increase in emissions primarily due to motor vehicle trips. Onsite stationary sources (such as natural gas fuel combustion for space heating) and area sources (such as landscaping and use of consumer products) would result in lesser quantities of pollutant emissions.

Emissions from development under the CLRDP have been estimated using URBEMIS2001 and the traffic data provided in Section 4.15, Transportation/Traffic. The estimates are based on 3,128 additional daily vehicle trips (an increase over the existing 1,000 trips at the project site) as estimated in Section 4.15. Emissions increases from CLRDP development in the year 2020 are then compared with the MBUAPCD-recommended significance criteria for VOCs, NO_X, PM_{10}, CO, and SO_2, as shown in Table 4.3-5.

As indicated by the results presented in Table 4.3-5, emissions of reactive organic gases (ROG) (an accurate estimate for emissions of VOCs), NO_X, PM_{10}, and SO_2 generated by CLRDP development through the year 2020 would remain below their respective significance thresholds and would not result in a significant air quality impact.

TABLE 4.3-5
ESTIMATED OPERATIONAL EMISSIONS[a] (IN POUNDS PER DAY), 2002 AND 2020

Pollutant	MBUAPCD Threshold	Existing Estimated Project Site Emissions (2002)	2020 Estimated Project Emissions[b]	Increase (2002-2020)
ROG[b]	137 (direct + indirect)	16	71	55
NO_x	137 (direct + indirect)	24	97	73
PM_{10}	82 (onsite)	9	36	27
SO_2	150 (direct)	0.1	0.4	0.3
CO	550 (direct)[d]	186	749	562[e]

[a] It is assumed that none of the support housing facilities would contain wood-burning stoves or fireplaces that would result in additional stationary source emissions.

[b] Emission factors were generated by the California Air Resources Board's URBEMIS 2001 model for the North Central Coast Air Basin, and assume a default vehicle mix. Input assumptions include an ambient temperature of 50 degrees Fahrenheit for winter and year 2010 and 2020 EMFAC2001 composite emissions factors. All daily estimates are for wintertime conditions, which were higher than estimates calculated for summertime conditions for all five criteria pollutants.

[c] Emissions of reactive organic gases (ROG) emissions serve as an accurate estimate for emissions of volatile organic compounds (VOC).

[d] Further modeling can be used to determine whether the CO concentrations produced by the project violate the State Ambient Air Quality Standard of 9 parts per million (8 hour average) or 20 parts per million (1 hour average).

[e] Projects for which mobile source CO emissions exceed 550 pounds per day do not necessarily have a significant air quality impact, but are required to estimate localized CO concentrations. Refer to analysis of localized CO concentrations below.

SOURCE: Environmental Science Associates, 2003.

Near-term Projects

None of the near-term projects would result in the emission of VOCs, NO_X, PM_{10}, and SO_X beyond those levels analyzed above for the CLRDP in Table 4.3-5 (see further discussion below). Furthermore, CO concentrations with addition of traffic generated by the five near-term projects would remain below State and federal ambient standards, as indicated by the CLRDP-level results presented in Table 4.3-6. Therefore, emissions associated with the operation of all five near-term projects would not result in a significant impact on air quality.

TABLE 4.3-6
ESTIMATED CARBON MONOXIDE CONCENTRATIONS AT SELECTED INTERSECTIONS IN PROJECT VICINITY (IN PARTS PER MILLION)[a]

Intersection	Existing + Near-term Projects[b]	Existing + CLRDP Development[b]	Year 2020 + CLRDP Development
#11 Mission St. and Bay St.			
1-hour	6.26	6.38	7.42
8-hour	3.69	3.78	4.51
#16 State Highway 1/Chestnut St. and Mission St.			
1-hour	8.57	8.79	10.79
8-hour	5.11	5.26	6.67
#19 Western Dr. and Empire Grade Rd./High St.			
1-hour	4.36	4.36	4.68
8-hour	2.16	2.17	2.39
#22 Bay St. and Escalona Dr.			
1-hour	4.55	4.56	5.09
8-hour	2.30	2.30	2.68
#24 Empire Grade and Heller Dr.			
1-hour	4.40	4.42	4.88
8-hour	2.19	2.20	2.53
#11 Mission St. and Bay St.			
1-hour	6.26	6.38	7.42
8-hour	3.69	3.78	4.51

[a] All values are parts per million (ppm) of carbon monoxide. The State one-hour carbon monoxide standard is 20 parts per million (ppm) and the corresponding federal standard is 35 ppm. The State and federal eight-hour carbon monoxide standard is 9.0 ppm.

[b] Eight-hour concentrations were derived from one-hour concentrations by applying a 0.7 persistence factor to the local carbon monoxide increment.

[c] The scenarios for “Existing + Near-term Projects” and “Existing + CLRDP Development,” by definition, will not actually occur. They show the project’s influence on future CO concentrations in comparison to cumulative growth and development not related to the project; they are hypothetical. The “Existing + Near-term Projects” scenario presents CO concentrations if the near-term projects were to be developed and no additional traffic related to other projects in the area was to occur. Similarly, the “Existing + CLRDP Development” scenario presents CO concentrations if full CLRDP development were to occur and no additional traffic related to other projects in the area were to occur.

SOURCE: Environmental Science Associates, 2003.

OPERATIONAL IMPACTS – EMISSIONS OF CARBON MONOXIDE

Entire Development Program

While the estimated increase in CO emissions from CLRDP development through 2020 exceeds the 550 pound per day threshold, the MBUAPCD *CEQA Air Quality Guidelines* explain that modeling can be used to refute (or validate) this determination. If modeling demonstrates that the project would not cause a violation of State or federal AAQS at sensitive receptors (9 parts per million [ppm] for the 8-hour average or 20 ppm for the one-hour average), the project would not have a significant impact on air quality.

Six intersections were selected from the 24 analyzed in the traffic section (Section 4.15) for the potential to exceed CO standards based on the criteria in the MPUAPCD *CEQA Air Quality Guidelines*. These six intersections would experience the highest traffic volumes or be most affected by CLRDP development. The MBUAPCD CO screening model was used to evaluate worst-case concentrations at these six intersections and the screening results are shown below in Table 4.3-6.

As indicated by the results presented in Table 4.3-6, CO concentrations with addition of traffic generated by CLRDP development would remain below State and federal ambient standards and would not result in a significant air quality impact.

Near-term Projects

Table 4.3-6 presents estimated CO concentrations that would result at study intersections from vehicle emissions associated with existing traffic plus the traffic from the five near-term projects. CO concentrations with addition of traffic generated by the near-term projects would remain below State and Federal ambient standards and would not result in a significant air quality impact.

OPERATIONAL IMPACTS – EMISSIONS OF TACS

Entire Development Program

TACs would be released from laboratories, diesel trucks and buses servicing CLRDP facilities, and from emergency diesel generators at several of the proposed buildings. TAC emissions would occur from fume hoods at several research laboratories related to the project, including SORACC, the USGS Western Coastal and Marine Geology Facility, and the Center for Ocean Health Phase II facility. Emissions were assumed to occur from rooftop exhausts at each of 10 different buildings related to the CLRDP. It is uncertain what types of chemicals would be used at these buildings, but they would probably be similar to those that were assumed for the previous *Long Marine Laboratory Master Plan Health Risk Assessment*.[10] The chemicals were chosen because of their high toxicity values. Equivalent emissions were assumed to occur from each of the 10 buildings and are reported in Table 4.3-7. Maximum offsite concentrations of toxic air contaminants from the laboratory emissions and from the diesel equipment were calculated through dispersion modeling. Details of the assumptions in the modeling are given in Appendix C.

[10] ENSR, 1993.

Emissions from the generators would occur during routine testing and in cases when emergency power is needed. The generators were assumed to be 388 horsepower with PM_{10} emission rates of 0.08 gram per horsepower-hour. It was assumed that there would be generators located near each of the clusters of buildings anticipated under the CLRDP, including one near the marine research laboratories on the middle terrace, one near the USGS laboratories on the middle terrace, and one near the marine research buildings on the lower terrace. It was assumed that each generator would be tested 10 hours per year. This is consistent with other emergency generator testing that has occurred for buildings located in this part of the campus.

Delivery truck and bus emissions were estimated using the emission model URBEMIS 2001 for the baseline year 2010. It was assumed that truck and bus traffic would travel from the northeast portion of the campus on Shaffer Road along the middle terrace to the southwest portion along McAllister Way.

The maximum annual average diesel PM concentration from buses and trucks related to the project was estimated to be 0.017 $\mu g/m^3$. The maximum concentration would occur on the property line immediately east of the project site, which is on the western edge of the De Anza Santa Cruz residential community. The maximum annual average concentration of diesel PM from emergency generator testing at the same receptor was estimated to be 0.0011 $\mu g/m^3$. The maximum annual average diesel PM concentration from both activities was estimated to be 0.018 $\mu g/m^3$. This results in an estimated incremental increase of contracting cancer at the maximum impact receptor of 5.4 in a million where the major contribution is from the mobile sources. The maximum incremental risk from all of the proposed research laboratories is estimated to be 1.0×10^{-7}, or 0.1 in a million.

The total incremental carcinogenic risk from stationary and mobile sources related to the project include the impacts of diesel PM emissions from buses and delivery trucks and from emergency generators, as well as from TAC emissions from the research laboratories. As is shown in Table 4.3-7, the maximum incremental cancer risk (5.4 in a million from diesel sources [mobile and stationary] plus 0.1 in a million from stationary sources [laboratory fume hoods], totaling 5.5 in a million) is dominated by the diesel PM emissions from the diesel sources, as emissions from these sources contribute about 93% of the incremental risk. Since the maximum increment is less than the significance threshold of 10 in a million, the impact is less than significant.

Noncarcinogenic health effects were determined by estimating hazard indices from exposure to toxic noncarcinogens at the maximum offsite receptor. The hazard index for a TAC was calculated by dividing the predicted maximum concentration of a specific substance by the Reference Exposure Level (REL), as published by OEHHA. The hazard indices for all toxics were then summed. If the total Hazard Index at a receptor is greater than 1.0, there would be adverse health effects, and the impact would be significant.

The maximum chronic hazard index from diesel exhaust is estimated to be 3.6×10^{-3}. For the laboratory chemicals, the Hazard Index is estimated to be less than 1×10^{-4}, and the total Hazard Index (laboratory chemicals and diesel exhaust) is estimated to be 3.7×10^{-3}. This maximum level is well below the significance threshold of 1.0.

TABLE 4.3-7
INCREMENTAL CANCER RISK FROM TAC EMISSIONS UNDER THE CLRDP

Substance	Emission (g/sec.)	Maximum Concentration (µg/m^3)	Maximum Incremental Risk
Laboratory Emissions			
Benzene	5.6×10^{-6}	4.9×10^{-4}	1.4×10^{-8}
Carbon Tetrachloride	2.0×10^{-5}	1.8×10^{-3}	7.6×10^{-8}
Formaldehyde	1.4×10^{-7}	1.2×10^{-5}	7.2×10^{-9}
Methylene Chloride	5.1×10^{-5}	4.5×10^{-3}	4.5×10^{-9}
		Laboratory Subtotal	1.0×10^{-7}
Diesel Engines			
Diesel PM	—	0.018	5.4×10^{-6}
		Diesel Engines Subtotal	5.4×10^{-6}
		Total	**5.5×10^{-6}**

g/sec. = grams per second emission rate
µg/m^3 = microgram per cubic meter

SOURCE: Modeling performed by Environmental Science Associates, 2003; Meteorological data attained from UCSC, 2003

Near-term Projects

Long-term (annual) emissions and subsequent exposure to TACs from the near-term projects would be less than the emissions and exposure associated with the full development under the CLRDP. Therefore, none of the near-term projects would result in a maximum incremental cancer risk from emissions of TACs and diesel PM that is beyond the level analyzed above for the CLRDP in Table 4.3-7, and the impact would be less than significant.

OPERATIONAL IMPACTS – OBJECTIONABLE ODORS

Entire Development Program

Implementation of the CLRDP is not expected to result in the emission of pollutants associated with objectionable odors.

Near-term Projects

None of the near-term project is expected to result in the emission of pollutants associated with objectionable odors.

Based on the MBUAPCD CEQA significance thresholds for criteria air pollutants and the "Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values for TACS" evaluated above, implementation of the CLRDP and the near-term projects with mitigation would not have a significant adverse impact on air quality.

CUMULATIVE IMPACTS – EMISSIONS OF CARBON MONOXIDE

Entire Development Program

Increased traffic congestion on roadways and intersections generated by cumulative growth through 2020 in addition to full development under the CLRDP has the potential to generate high localized levels of CO. Development under the CLRDP through 2020 would have a cumulatively considerable air quality impact if it would result in a violation of CO concentration thresholds at individual intersections in conjunction with implementation of cumulative growth and development in the area. The MBUAPCD CO screening model was used to evaluate worst-case concentrations at the intersections most affected by development under the CLRDP and cumulative development.

Table 4.3-6 above shows the estimated CO concentrations caused by the CLRDP and cumulative development in the column headed “Year 2020 + CLRDP Development.” As indicated by the results in Table 4.3-6, CO concentrations with addition of traffic generated by the CLRDP and cumulative development would remain below State and federal ambient standards and therefore would not result in a cumulatively considerable significant air quality impact.

Near-term Projects

None of the near-term projects would result in a violation of CO concentration thresholds at individual intersections beyond those levels analyzed above for the CLRDP in Table 4.3-6.

CUMULATIVE IMPACTS

CUMULATIVE IMPACTS – EMISSIONS OF CARBON MONOXIDE

Entire Development Program

Increased traffic congestion on roadways and intersections generated by cumulative growth through 2020 in addition to full development under the CLRDP has the potential to generate high localized levels of CO. Development under the CLRDP through 2020 would have a cumulatively considerable air quality impact if it would result in a violation of CO concentration thresholds at individual intersections in conjunction with implementation of cumulative growth and development in the area. The MBUAPCD CO screening model was used to evaluate worst-case concentrations at the intersections most affected by development under the CLRDP and cumulative development.

Table 4.3-6 above shows the estimated CO concentrations caused by the CLRDP and cumulative development in the column headed “Year 2020 + CLRDP Development.” As indicated by the results in Table 4.3-6, CO concentrations with addition of traffic generated by the CLRDP and cumulative development would remain below State and federal ambient standards and therefore would not result in a cumulatively significant air quality impact.

Near-term Projects

None of the near-term projects would result in CO concentrations at individual intersections greater than those analyzed above in Table 4.3-6 for the CLRDP as a whole, and therefore would not result in a cumulatively significant air quality impact.

CUMULATIVE IMPACTS – EMISSIONS OF TACS

Entire Development Program

The analysis of cumulative TAC emissions considers the cumulative concentrations of TACs emitted from the Marine Science Campus and the only other stationary source of TACs within one-half mile of the campus. Under the cumulative scenario, it was assumed that, in addition to the CLRDP, the research laboratory on the corner of Delaware Avenue and Natural Bridges Drive formerly owned by Texas Instruments would be reactivated. The cumulative impact of this facility's TAC emissions was determined by modeling emissions of operations similar to those of the Texas Instruments facility, in combination with the CLRDP emissions. Details of the assumptions in the modeling are given in Appendix C. TAC emissions from the previous Texas Instruments building were obtained from MBUAPCD. The TAC emissions of concern are benzene, acetaldehyde, and arsenic compounds. The incremental risks from these emissions at the maximum cumulative receptor are reported in Table 4.3-8. They show that the maximum incremental carcinogenic risk from the cumulative source at the old Texas Instruments site is estimated to be 1.2 in a million. The total cumulative risk (CLRDP, 5.5 in a million, plus other cumulative sources) is estimated to be 6.7 in a million. The maximum occurs between the two facilities (i.e., east of the project site and west of the former Texas Instruments building). In this case, the maximum risk is dominated by diesel PM emissions from trucks and buses related to the CLRDP. The maximum cumulative risk is less than the 10 in a million significance threshold, and the impact is less than significant.

TABLE 4.3-8
MAXIMUM INCREMENTAL RISK FROM A CUMULATIVE SOURCE AT THE TEXAS INSTRUMENTS SITE

Substance	Emission (g/sec)	Maximum Annual Concentration (µg/m^3)	Maximum Incremental Risk
benzene	6.5×10^{-5}	7.0×10^{-5}	2.1×10^{-8}
acetaldehyde	3.5×10^{-5}	3,9 X 10^{-5}	1.0×10^{-10}
arsenic	3.3×10^{-4}	3.5×10^{-4}	1.2×10^{-6}
		Total	**1.2×10^{-6}**

g/sec. = grams per second emission rate
µg/m^3 = microgram per cubic meter

Near-term Projects

None of the near-term projects would result in the emission of TACs beyond those levels analyzed above for the CLRDP in Table 4.3-8.

CUMULATIVE IMPACTS – CONSISTENCY WITH THE AIR QUALITY MANAGEMENT PLAN

Entire Development Program

After review of project trip generation estimates and project residential growth, AMBAG found the proposed project to be consistent with the *2000 Air Quality Management Plan for the Monterey Bay*.[11] Because AMBAG has determined the proposed project to be consistent with the *2000 Air Quality Management Plan for the Monterey Bay Region*, the CLRDP is considered to have a less-than-significant cumulative impact on regional air quality. This determination applies to potential cumulative impacts on regional air quality from emissions of VOCs, NO_X, and $SO_{2.}$

Near-term Projects

None of the near-term projects would result in any cumulative impacts on air quality, beyond those analyzed above for the CLRDP as a whole.

Based on the information cited above and in the CLRDP and expected emission levels from other projects and growth in the area, cumulative impacts on air quality from the implementation of the CLRDP and the near-term projects, in conjunction with other regional development, would be less than significant.

[11] AMBAG, 2003

4.4 BIOLOGICAL RESOURCES

This section evaluates the impacts of the implementation of the proposed CLRDP and the five near-term projects on the existing flora and fauna located on and near the proposed project site. Information in this section is derived primarily from the following reports and studies: "Final Results of Biological Resource Survey for the Proposed University of California Santa Cruz Marine Science Campus," prepared by EcoSystems West Consulting Group, August 2002; "Investigation of the Geographic Extent of Wetlands and Other Environmentally Sensitive Habitat Areas on Terrace Point and Younger Lagoon Reserve, University of California, Santa Cruz," prepared by The Huffman-Broadway Group (HBG), Inc., July 2002; "Investigation of the Geographic Extent of Wetlands and 'Other Waters of the U.S.' on Terrace Point and Younger Lagoon Reserve" prepared by The Huffman-Broadway Group, Inc., October 2002, and "California Red-Legged Frog Biological Assessment for the Proposed University of California Santa Cruz Marine Science Campus," prepared by EcoSystems West Consulting Group, July 2002. These documents are incorporated by reference. Secondary sources include prior EIRs prepared for the project site, including *Draft Environmental Impact Report, Long Marine Lab Master Plan*, prepared by the University of California (1993), *Draft Environmental Impact Report, Santa Cruz Coastal Marine Research Center at Terrace Point*, prepared by Strelow Consulting (1997), *Environmental Assessment, National Marine Fisheries Service Santa Cruz Laboratory, Santa Cruz, California*, prepared by Harding Lawson Associates (1998) and *Final Environmental Impact Report Santa Cruz Coastal Marine Research Center at Terrace Point*, prepared by MHA Environmental Consulting (August 1998).

Based on CEQA criteria, a project would generally be considered to have a significant adverse impact on the environment if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game (CDFG) or U.S. Fish and Wildlife Service (USFWS).

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFG 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 marshes, vernal pools, coastal areas, etc.) through direct removal, filling, hydrological interruptions, or other means.

- Interfere substantially with 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 applicable local policies protecting biological resources.

- Conflict with the provisions of an adopted habitat conservation plan (HCP), Natural Communities Conservation Plan (NCCP), or other approved local, regional, or state HCP.

SETTING

This Draft EIR presents an analysis of environmental conditions at the time environmental analysis was commenced, from both a local and regional perspective. This setting section first discusses applicable laws, general plans and regional plans, and then provides the baseline biological conditions by which the lead agency determines whether an impact is significant. In the section that follows, special emphasis is placed on environmental resources that are rare or unique to the Santa Cruz coastal region and would be affected by the project.

REGULATORY CONTEXT

Special-Status Species[1]

Federal Endangered Species Act

Under the Federal Endangered Species Act (FESA), the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a species as threatened or endangered (16 United States Code [USC] 1533[c]). Pursuant to the requirements of FESA, a federal agency reviewing a proposed project within its jurisdiction must determine whether any federally listed threatened or endangered species or federally proposed for listing may be present in the project area and determine whether the proposed project will have a potentially significant impact on such species. In addition, the federal agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under FESA or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536[3], [4]). Substantial adverse project impacts on these species or their habitats would be considered potentially significant in this Draft EIR.

The FESA of 1973 was amended in 1982 under Section 10 of the Act to permit the "taking" (killing, harassing, or disturbing the habitat) of federally listed species when such taking was incidental to an otherwise lawful activity (16 USC 1539). Section 10 allows USFWS to issue take permits for federally listed species. It was the intent of Congress to resolve the issues of taking of listed species or critical habitat by creating the Habitat Conservation Plan (HCP) process. An HCP is a plan that accompanies a permit application to "take" a certain number of threatened and endangered species or acres of their habitat over a certain period of time, and that demonstrates that the permit applicant will compensate for the taking so as to achieve no net reduction in the species' chances for survival. There are two separate HCP processes underway in the vicinity, one for inclusion Area D on the main campus of UCSC and one for the City of Santa Cruz. The plan areas for both HCPs exclude the project site and no HCP has been developed for or applies to the project site.

The USFWS also publishes a list of candidate species for listing and "species of concern." Species on this list receive special attention from federal agencies during environmental review, although they are not protected otherwise under the FESA. The candidate species are taxa for which the USFWS has sufficient biological information to support a proposal to list as

1 Several species known to occur or that may occur on or in the vicinity of the project site are accorded "special-status" because of their recognized rarity or vulnerability to various causes of habitat loss or population decline. Some of these receive specific protection defined in federal or state endangered species legislation, but others have been designated as special-status on the basis of expertise of state resource agencies or organizations.

endangered or threatened. "Species of concern" are taxa whose conservation status may be of concern for the USFWS, but the designation does not confer official status. Project impacts on such species could, on a case-by-case basis, be considered potentially significant in this Draft EIR.

California Endangered Species Act

Under the California Endangered Species Act (CESA), CDFG has the responsibility for maintaining a list of threatened species and endangered and fully protected species (California Fish and Game Code Section 2070). The CDFG also maintains a list of "candidate species," which are species that the CDFG has formally noticed as being under review for addition to either the list of endangered species or the list of threatened species. The CDFG also maintains lists of "species of special concern," which are roughly analogous to the federal species of concern described above. Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such species. In addition, CDFG encourages informal consultation on any proposed project that may impact a candidate species. Substantial adverse project impacts to species on the CESA endangered and threatened list would be considered significant in this EIR.

Actions otherwise prohibited under CESA can be legalized under the state's Natural Community Conservation Planning (NCCP) Act (Fish and Game Code Section 2800-2840), which is somewhat broader in its orientation and objectives than CESA or FESA. These laws are designed to identify and protect individual species that have already significantly declined in number. The primary objective of the NCCP program is to conserve natural communities at the ecosystem scale while accommodating compatible land use. The program provides limited authorization to adversely affect habitat supporting special-status species. No NCCP program has been adopted or applies to the project site.

For the potential taking of individual animals (as opposed to habitat) listed under CESA there is a permit process somewhat similar to Section 10 of FESA.[2] If the species is listed by California alone, and a proposed project would result in a take, an "incidental take" permit pursuant to Section 2081 of the Fish and Game Code would be necessary. CDFG will issue an incidental take permit only if:

- the authorized take is incidental to an otherwise lawful activity;
- the impacts of the authorized take are minimized and fully mitigated; and
- the measures required to minimize and fully mitigate the impacts of the authorized take
    - are roughly proportional in extent to the impact of the taking on the species;
    - maintain the project applicant's objectives to the greatest extent possible;
    - are capable of successful implementation; and,
    - adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with, and the effectiveness of, the measures.

[2] If a landowner obtains a Federal take permit for a species that is also state listed, CESA does not require an additional state permit, but CESA Sec. 2080.1 (c) does require CDFG to review the terms and conditions of the permit to ensure that they meet CESA's requirements.

CEQA Section 15380 and Standards of Significance

CEQA Guidelines Section 15380(a) provides additional regulatory guidance. Under the first of the significance criteria discussed in the introduction to this chapter, substantial adverse project impacts to species on the CESA or FESA endangered or threatened lists would be considered potentially significant in this EIR. Impacts to species of special concern would be considered significant under certain circumstances. For example, removal of breeding habitat for a bird such as the yellow warbler, which is not formally listed but for which reduced breeding habitat has been identified as a reason for population decline, could be considered potentially significant.

The California Native Plant Protection Act (Fish and Game Code Sections 1900–1913) and the Natural Communities Conservation Planning Act provide guidance on preservation of plant resources and those Acts underlie the language and intent of Section 15380(d). Vascular plants listed as rare or endangered by the California Native Plant Society (CNPS) (Skinner and Pavlik, 1995), but which have no designated status or protection under federal or state endangered species legislation, are defined as follows:

- List 1A: Plants presumed extinct.
- List 1B: Plants rare, threatened, or endangered in California and elsewhere.
- List 2: Plants rare, threatened, or endangered in California, but more numerous elsewhere.
- List 3: Plants about which more information is needed – a review list.
- List 4: Plants of limited distribution – a watch list.

In general, plants appearing on CNPS List 1A, 1B, or 2 are considered to meet the criteria of Section 15380 of the CEQA Guidelines, and substantial adverse effects to these species are considered potentially significant in this EIR. Additionally, plants listed on CNPS List 1A, 1B, or List 2 also meet the definition of Section 1901, Chapter 10 (Native Plant Protection Act) and Sections 2062 and 2067 (CESA) of the California Fish and Game Code.

Other Statutes, Codes, and Policies Affording Limited Species Protection

The federal Migratory Bird Treaty Act (MBTA 16 USC, Section 703, Supp. I, 1989) prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This Act encompasses whole birds, parts of birds, and bird nests and eggs. In most CEQA analyses, where actual killing of birds is not an impact, the MBTA is generally interpreted as protecting active nests of all species of birds which are included in the "List of Migratory Birds" (50 CFR 10.13).

Independent of the MBTA, birds of prey are protected in California under the California Fish and Game Code (Section 3503.5, 1992). Section 3503.5 states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Substantial adverse project impacts of this type could be considered potentially significant in this Draft EIR (i.e., under CEQA Guidelines) if a species is known or expected to have a high potential to nest on the site or rely on it for primary foraging.

The federal Bald and Golden Eagle Protection Act (16 USC 668) prohibits persons within the United States (or places subject to U.S. jurisdiction) from "possessing, selling, purchasing, offering to sell, transporting, exporting or importing any bald eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof." These forms of harassment are not relevant to most CEQA documents, and would be superceded by significance standards derived directly from the Fish and Game codes cited above.

Sensitive Habitats

Several specific native vegetative communities within California (as distinct from the organisms they support) have been identified as rare and/or sensitive by the CDFG.[3] These natural communities are of special significance because the present rate of loss indicates that acreage reductions or habitat degradation could threaten the viability of dependent plant and wildlife species and possibly hinder the long-term sustainability of the community or species dependent upon the community. Loss of some significant natural communities can diminish valued ecosystem functions, such as the roles of marshes in water filtration, or of riparian woodlands in riverbank stabilization.[4]

The majority of sensitive habitat on the site consists of various types of wetlands. Almost all types of wetlands are highly biologically active, and almost all have suffered significant declines in California. Wetlands are protected by different laws and regulations, as described below.

Federal and State Provisions Applying to Wetlands

In a jurisdictional sense, there are two definitions of a wetland, one definition adopted by federal and the other by state agencies, thus delineating different jurisdictional areas. Federal and state wetland definitions are presented below.

U.S. Army Corps of Engineers Wetland Definition. Wetlands are a subset of "waters of the United States" and receive protection under Section 404 of the Clean Water Act (CWA). The term "waters of the United States"[5] is defined in the Code of Federal Regulations (33 CFR 328.3[a]; 40 CFR 230.3[s]). Wetlands are defined by the federal government [CFR, Section 328.3(b)] as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

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3 Tibor, D.P. (e.d.), "California Native Plant Society Inventory of Rare and Endangered Vascular Plants of California," 6th ed., California Native Plant Society, 386 p., 2001.

4 California Department of Fish and Game, "List of California terrestrial natural communities recognized by the Natural Diversity Data Base," hhtp://www.dfg. gov/whdab/natcomlist.pdf (May 2002).

5 Based on the Supreme Court ruling in *Solid Waste Agency for Northern Cook County v. U. S. Army Corps of Engineers* (SWANCC) concerning the Clean Water Act jurisdiction over isolated waters (January 9, 2001), non-navigable, isolated, intrastate waters based solely on the use of such waters by migratory birds are no longer defined as waters of the United States. Jurisdiction of non-navigable, isolated, intrastate waters may be possible if their use, degradation, or destruction could affect other waters of the Unites States, or interstate or foreign commerce. Jurisdiction over such other waters should be analyzed on a case-by-case basis. Impoundments of waters, tributaries of waters, and wetlands adjacent to waters should be analyzed on a case-by-case basis.

California Coastal Commission Wetland Definition. The California Coastal Act provides a definition of wetlands (Public Resources Code Section 30121):

> "Wetland means lands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens."

This is the definition on which the Coastal Commission relies to identify wetlands. The Commission's Wetlands Guideline explains that "in cases where wetlands may not be readily identifiable, the Commission will also rely on the presence of hydrophytes and/or the presence of hydric soils .... [These] make excellent physical parameters upon which to judge the existence of wetland habitat areas for purposes of the Coastal Act, but they are not the sole criteria. In some cases, proper identification of wetlands will require the skills of a qualified professional." (Guidelines p. 78).[6] Thus, under Coastal Commission practice, the hydrological conditions necessary to establish a wetland, if not otherwise apparent, may be determined by the presence of either hydrophytic vegetation or hydric soils.

California Department of Fish and Game Wetland Definition. The Department relies on a definition and implementation guidelines closely similar to those of the Coastal Commission. Under policy adopted by the Fish and Game Commission to guide the CDFG, "where less than three indicators are present, policy application shall be supported by the demonstrable use of wetland areas by wetland associated fish or wildlife resources, related biological activity, and wetland habitat values" (August 4, 1994). The CDFG serves as the Coastal Commission's principal consultant on all matters related to fish and wildlife, and the Commission may not establish or impose any wildlife management controls that duplicate or exceed regulatory controls established by the CDFG or the Fish and Game Commission. PRC Section 30411; Wetlands Guideline, p. 31. The CDFG also has direct regulatory authority affecting wetlands under Fish and Game Code Section 1601, which address development which may alter any stream, river, lake, or streambed.

Regulation of Activities in Wetlands. The U.S. Army Corps of Engineers (Corps) has primary federal responsibility for administering regulations that concern waters and wetlands within the property. In this regard, the Corps acts under two statutory authorities; Section 10 of the Rivers and Harbors Act, which governs specified activities in "navigable waters," and the Clean Water Act (Section 404), which governs specified activities in "waters of the United States," including wetlands.

The state's authority in regulating activities in wetlands and waters at the project site resides primarily with the Coastal Commission and the State Water Resources Control Board (SWRCB). The SWRCB, acting through the Central Coast Regional Water Quality Control Board (RWQCB), must certify that a Corps permit action meets state water quality objectives (Section 401, Clean Water Act).

6 The Commission has also adopted a regulation entitled "Criteria for Permit and Appeal Jurisdiction Boundary Determinations." (For city and county local coastal programs, wetland areas remain permanently subject to the Commission's original permit jurisdiction. PRC section 30519.) This regulation elaborates the wetland definition, providing that wetland is defined as land where the water table is at, near, or above the land surface long enough to support a predominance of hydric soils or hydrophytes. 15 CCR section 13577 (b).

Coastal Act considerations that apply to wetland sites are discussed below and in Draft EIR Section 4.9. The regulatory authority and policies of the Coastal Commission derive from the provisions of Sections 30230, 30231, 30233, 30240 and 30607.1 of the Coastal Act. The Coastal Act adopted the Cowardin definition of wetlands when it defined wetlands in Section 30121 as "lands within the coastal zone which may be covered periodically or permanently with shallow water."

The Coastal Commission applies the policies of the Coastal Act to the wetland resources of this site primarily through review and certification of the CLRDP. Following certification, coastal permit authority for the entire site passes to the University. PRC Sections 30605, 30518 (b). Thereafter, the Coastal Commission may review a coastal permit approved by the University only to assure compliance with the provisions of the CLRDP. PRC Sections 30606, 30607. The Coastal Commission does continue to exercise original review of certain federal or federally permitted activities for consistency with Coastal Act policies. Applicants for a Section 404 permit to fill or alter a wetland must prepare a certification of consistency with the California Coastal Management Program, and the Coastal Commission must concur in the certification before the Section 404 permit can be issued.[7] In all of its actions affecting wetlands, the Coastal Commission acts upon consultation and advice from the CDFG.

Other water bodies and water-associated habitats on the project site that the Coastal Commission would review, based on criteria in 14 CCR 13577 and the Coastal Commission's wetland guidelines, are:

- Riparian habitats. Associations of plant species that grow next to freshwater streams, lakes, and other systems, plus a 100-foot-wide upland buffer measured from the landward edge of the riparian habitat.

- Streams. Mapped on USGS 7.5-minute quadrangle series or identified in a local coastal program, plus a 100-foot-wide buffer measured from the top of the bank.

The policies of the Coastal Act strictly limit development within wetlands, allowing only incidental public service uses (e.g., pipelines), restoration and resource-dependent activities, aquaculture, certain coastal-dependent industrial facilities, and, in wetlands which do not qualify as Environmentally Sensitive Habitat Areas (ESHAs), extraction of minerals (e.g., sand) (PRC Section 30233).

Provisions and Policies Applying to Sensitive Habitats in both Wetlands and Uplands

California Coastal Act Provisions and ESHAs. The Coastal Act defines "environmentally sensitive areas" (equivalent with ESHA) as "any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments." PRC Section 30107.5. The Coastal Commission generally treats wetlands, streams, riparian habitats, and open coastal waters as ESHAs, although exceptions may exist where the definition of ESHA is not satisfied. An ESHA may also be found in upland areas.

[7] This "federal consistency" authority is granted to the Coastal Commission under Section 1456 of the federal Coastal Zone Management Act (16 USC § 1451 *et seq.*)

The principal Coastal Act policy pertaining to ESHAs is PRC Section 30240, which provides: "Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas." For ESHAs which are also wetlands, the provisions of PRC Section 30233, the principal wetlands policy (discussed above), also apply and are controlling if there is any conflict with PRC Section 30240.

As discussed in connection with wetlands, above, the ESHA policies are applied by the Coastal Commission in this case primarily through its review and certification of the CLRDP. After certification, the permit authority will pass to the University and be governed by the content of the CLRDP. Thereafter, the Commission will apply Coastal Act policies directly only in connection with review of federal activities and federal permit activities which affect coastal resources.[8]

California Department of Fish and Game Provisions Applying to Sensitive Habitats. In addition to the lists of special-status plants and animals, the CDFG maintains a classification of the state's natural communities (both terrestrial and aquatic). The natural community classification is used by a wide variety of government agencies, private conservation organizations, and private biological consultants to help identify and prioritize their preservation, acquisition, or designation activities.

Each community is ranked according to its rarity and threat of extinction on both global and statewide scales, regardless of its state or federal listing or management status.[9] By virtue of the rarity or sensitivity of such natural communities (as determined by the state authority responsible for resource protection), substantial impact on such a community could be considered significant under CEQA.

As a policy statement, CESA (Fish and Game Code Section 2053) declares that state agencies should not approve projects which would result in the destruction or adverse modification of habitat essential to the continued existence of state-listed species, if there are reasonable and prudent alternatives available. Substantial impact on such essential habitat would, therefore, be considered significant under CEQA.

University of California Natural Reserve System (NRS). Younger Lagoon Reserve (YLR) is one of 34 ecological reserves administered by the Natural Reserve System (NRS) of the University of California to preserve natural systems for teaching and research. Five natural reserve sites administered by the UCSC Natural Reserves office are spread out along 60 miles of the Central Coast, from Año Nuevo Reserve in the north to Landels-Hill Big Creek Reserve in the south. Established in 1986, the approximately 25-acre Younger Lagoon Reserve (YLR) is a relatively undisturbed ecosystem fragment that has been historically surrounded by agriculture, but which supports a diverse flora and fauna. It is administered through an adaptive management plan that lists the following objectives:[10]

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8 The federal consistency review authority provided to the Commission by Section 1456 of the federal Coastal Zone Management Act (16 USC §1451, *et seq.*) would cover, for example, applications for permits under the federal Endangered Species Act or Clean Water Act, as well as federal agency activities which affect coastal zone resources.

9 Global and State Sensitivity Rankings are part of a system devised by the CDFG to provide information on the rarity of a species or community. For example, G1 is defined as less than 6 viable element occurrences *or* less than 1,000 individuals *or* less than 2,000 acres.

10 Fusari, M. H., "Younger Lagoon Management Plan," University of California, Santa Cruz, 2001.

- Lagoon preservation
- Habitat preservation
- Minimum development of facilities in or immediately adjacent to the reserve boundary
- Minimum disturbance by adjacent uses
- Preservation of scenic values
- Facility security (i.e., protection against trespass)
- Control of public access

The Younger Lagoon Reserve management plan is intended to protect habitats which would qualify as ESHAs.

REGIONAL BIOLOGICAL CONTEXT

The Santa Cruz coastal region has a Mediterranean climate and is a mosaic of upland oak, mixed evergreen, and redwood forests, native and non-native grasslands, upland scrubs, wetland communities, and riparian scrubs and forests. Proximity of the coastal mountains has partially isolated the area and resulted in a high degree of endemism (i.e., species restricted to this area alone) in addition to a relatively high species diversity. Urban and agricultural development in the region has reduced open space, limiting large expanses of most of the natural communities. Smaller species such as reptiles, amphibians, and invertebrates are often restricted to certain communities. Regional open space, however, with its diversity of communities, is an important consideration for animals whose home ranges encompass several habitats.

In the coastal zone, four ecotypes define much of the biological context. As described by the Coastal Commission,[11] these are coastal streams, marine terraces, coastal bluffs, and the rocky intertidal areas and beaches that border the ocean.

Coastal Streams

Coastal streams and rivers drain mountains formed from uplifted sea floor sediments, and this highly erodable substrate combines with timing of winter rains to carve steep, narrow canyons. Sediment transport provides sand for the "pocket" beaches along the Santa Cruz shoreline and organic matter deposited along the banks, particularly in lower reaches. The result is a productive combination of well-oxygenated water for fish and dense, diverse vegetation with multiple layers and habitat types. Where the streams approach the coast and lose speed they often form lagoons, with fresh and salt water marshes intermingling, barrier sandbar, and "back dune" flats. Lagoon conditions provide habitat for salmonid smolts acclimatizing to ocean conditions prior to entering the ocean (when the sandbar is open), and for resident tidewater goby (*Eucyclogobius newberryi*), which is able to complete its entire life cycle in fresh to brackish water.

Marine Terraces

Marine terraces form by wave action that erodes away a relatively flat bench. Formation of these terraces is associated with high energy erosion of a sheer sea cliff and deposition of near-shore marine sediments on the newly eroded bench. As sea level falls or tectonic forces uplift the land surface, the wave cut platform is raised above sea level and exposed. This uplift also exposes the near-shore sediments that were deposited on the bench during formation of the bench. As the marine terrace is formed, streams begin to find their way to the sea across the exposed wave-cut

[11] California Coastal Commission. 1987. *California Coastal Resource Guide*. University of California Press, Berkeley. 384 pp.

terrace. As each new terrace is exposed, the stream flows over the previous wave-cut cliff. Streams in their route to the sea continue to flow across each uplifted terrace and continually down-cut to maintain grade, thereby dissecting and eroding the older terraces. Terrace soils are thin, and the relative youth of nearshore terraces generally means the characteristic cover is herbaceous, although localized communities of trees have developed, such as pygmy cypress in the far north (Mendocino County) and non-native Monterey pines which occur both north and south of the project area.

Coastal Bluffs

The seaward edges of the terraces are the coastal bluffs. The complexity and biological uniqueness of the bluffs are due to the sea caves and cracks, stacks and arches where fractures occur in the bluffs and less resistant cliff components are eroded. The sites are both windswept and dry, but support a community of plants and animals adapted to these conditions and dependent upon them. In particular, they are habitat for specialized nesting birds such as cliff swallows and black swift (*Cypseloides niger*).

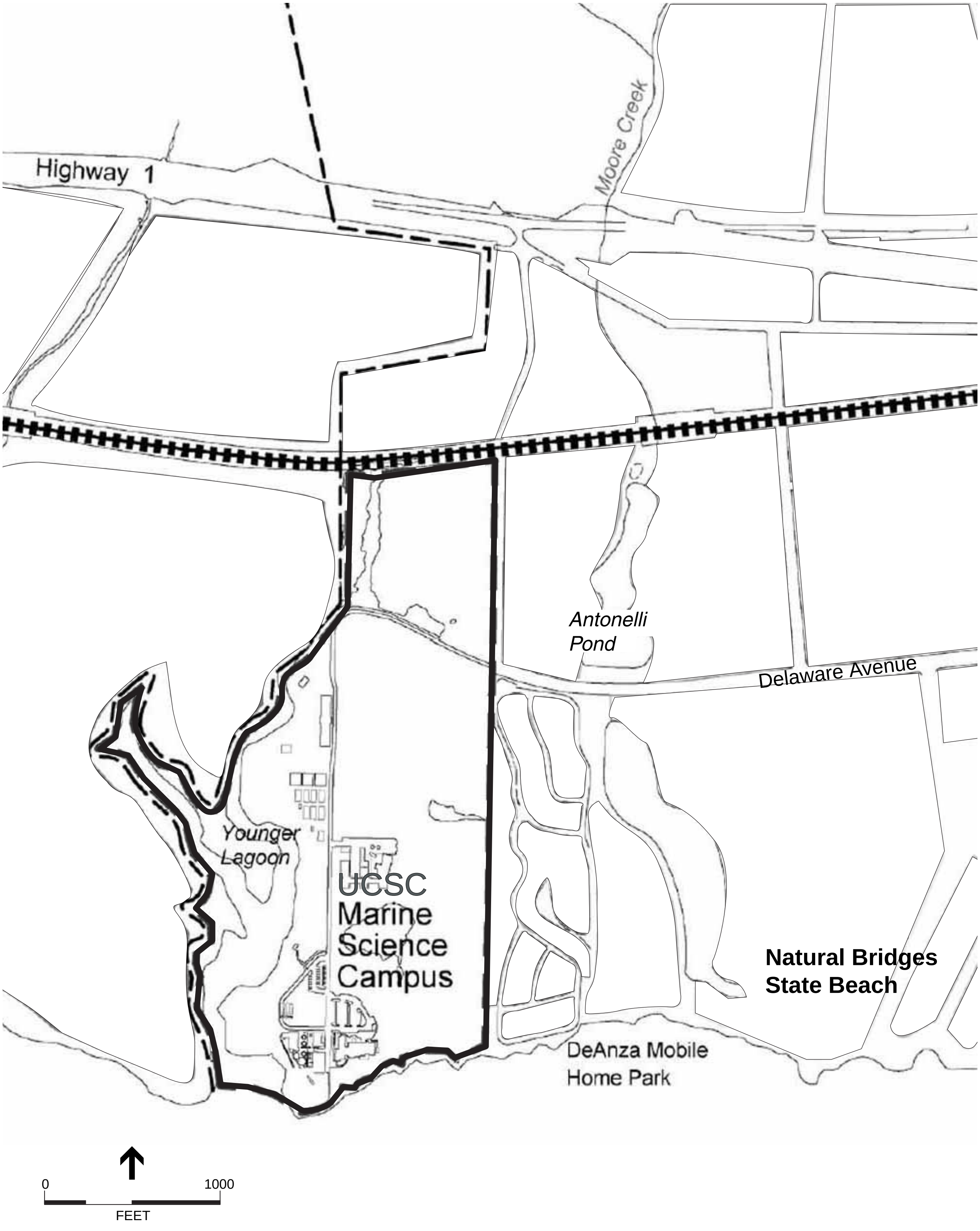
Beach and Intertidal

Intertidal communities include both beaches and rocky areas; intertidal rocks are the most densely populated biologically, with distinct niches forming in zones of different tidal influence. Work at the Fitzgerald Marine Reserve near Half Moon Bay documented 164 species of invertebrates in rocky intertidal areas.[12] In Monterey Bay intertidal areas, John Pearse reported more than 400 species of invertebrate animals and nearly 250 species of algae extant in the 1970s.[13]

Proximate Natural Habitats

The project site is within 0.4 mile of the strictly freshwater habitats at Antonelli Pond and the riparian and oak woodland communities of Moore Creek (see Figure 4.4-1). Antonelli Pond is approximately 500 feet east of the project site boundary. It is used by a wide variety of waterbirds (pied-billed grebe [*Podilymbus podiceps*] and green-back heron [*Butorides striatus*], are reported to nest there) and over 15 species of mammals. It is deep and thus perennial and supports robust willow thickets.[14] Antonelli Pond provides suitable breeding habitat for the California red-legged frog (*Rana aurora draytonii*), however this suitability has been degraded by the presence of bullfrog and predatory fish (Flohr and Jennings 2001).[14a] Moore Creek is an intermittent stream that flows from the UCSC Main Campus second-growth redwood stands and ultimately into a coastal lagoon at Natural Bridges State Park. It enters Antonelli Pond about 0.6 mi from the project site. In its lower reaches it is bordered by riparian vegetation and oak woodland. It is an important corridor of natural habitat that links the UCSC Main Campus and the coast.

12 Brady/LSA, "Fitzgerald Marine Reserve Master Plan," prepared for San Mateo County Division of Parks and Recreation, August, 1999.
13 Intertidal Biodiversity Project @ http://www.biology.ucsc.edu/classes/bio161l/project2.html
14 Strelow Consulting, "Draft Environmental Impact Report, Santa Cruz Coastal Marine Research Center at Terrace Point," 1997.
14a Flohr and Jennings, California Red-Legged Frog Survey for the Shaffer Road Projects, Santa Cruz, California, 2000. Zander Associates, Letter to Mr. Garwood of Pacific Union Apartments dated November 13, 2000.



SOURCE: Draft CLRDP

Figure 4.4-1
Resource Setting

Current Regional Conditions

Much of the coastal region in Santa Cruz County has been modified for agriculture. The production of high-value vegetables on the coastal terraces began in the early part of the 20th century, converting pasture land to row crops.

Despite land use changes and habitat fragmentation, the regional biotic context near the project site is robust due to local conservation efforts, the preservation of open space (including deep, densely vegetated canyons that indent the coastline and inhibit casual use), and the juxtaposition of Monterey Bay and a rocky shoreline that is difficult to access in many places. Within two miles of project site, the California Natural Diversity Data Base[15] reports 22 records of plants and animals that have special status. Of particular importance in sustaining local biodiversity are the off-site resources of Antonelli Pond and Natural Bridges, the former adjacent to the project to the east of Shaffer Road, the latter separated from the site by the De Anza Santa Cruz residential community. Together, Antonelli Pond and Natural Bridges State Beach offer intertidal terrace, lagoon and brackish and freshwater marsh. At Natural Bridges, a riparian ravine supports an important and well-protected population of wintering monarch butterflies. The Santa Cruz Bird Club[16] reports 30-40 bird species observable at any season in this area.

EXISTING CONDITIONS AT THE PROJECT SITE

In the discussion that follows, the terms “terrace,” “terrace area” and “upland terrace” refer to the portion of the project site planned for development under the CLRDP (i.e., the project site exclusive of the YLR). The terms “upper terrace;” “middle terrace” and “lower terrace” are used to distinguish between north, central and south portions of the site, respectively, where development is planned.

Vegetation

Based on field observations as well as the Holland (1986) and Sawyer and Keeler-Wolf (1995) classification systems, seven distinct natural plant communities are present in the terrace area (see Figure 4.4-2). These include non-native grassland, moist meadow, willow-herb/false willow, coyote brush scrub-grassland, coastal bluff scrub, seasonal pond, and freshwater marsh.[17] Of these communities, CDFG considers seasonal pond and freshwater marsh as sensitive plant communities due to their rarity or limited distribution.[18] Three additional artificial communities are present, including ruderal,[19] developed/ruderal, and landscape plant berm. Non-native grassland and coyote brush scrub-grassland cover most of the terrace area.

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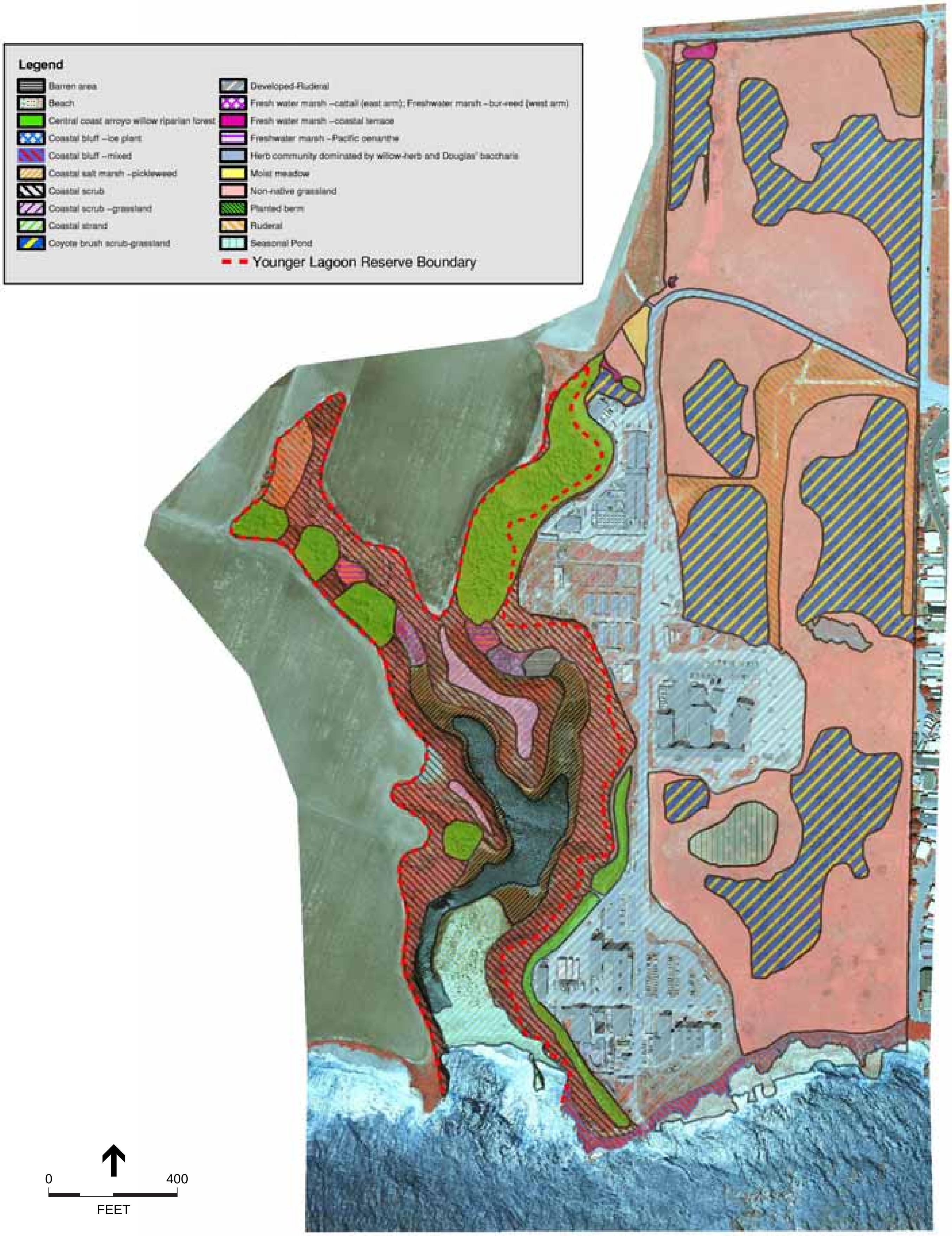
15 California Department of Fish and Game (CDFG), “California Natural Diversity Data Base” for 7.5 minute topographic quadrangle Santa Cruz. Information dated June 2002.
16 Internet address santacruzbirdclub.org
17 Ecosystems West Consulting Group, “Final Results of Biological Resource survey for the proposed University of California Santa Cruz Marine Science Campus,” prepared for University of California Santa Cruz, August 2002.
18 California Department of Fish and Game (CDFG), “California Natural Diversity Data Base” for 7.5 minute topographic quadrangle Santa Cruz. Information dated June 2002.
19 Ruderal is defined as heavily disturbed areas in wastelands near human habitation that support primarily annual non-native plant species.



SOURCE: EcoSystems West Consulting Group and Huffman-Broadway Group

Figure 4.4-2
Plant Communities on the Project Site

Eight distinct natural plant communities are present on the YLR (see Figure 4.4-2). These include two upland communities (i.e., coastal scrub and coastal scrub-grassland), and six wetland communities in the lowlands, including coastal strand, coastal salt marsh, central coast arroyo willow riparian forest, and three types of freshwater marsh. [20] The CDFG considers six of these plant communities as sensitive plant communities due to their rarity or limited distribution.[21] These sensitive plant communities include coastal strand, coastal salt marsh, freshwater marsh (i.e., freshwater marsh-cattail, freshwater marsh-bur-reed, and freshwater marsh- Pacific oenanthe), and central coast arroyo willow riparian forest. Heavily disturbed barren and ruderal communities are also present in the lowlands and the upland steep slope, respectively.

An overview of each community type on the terrace area and YLR, as described by Ecosystems West (2002), follows.

Dune Communities

Beach. This habitat type corresponds to the active coastal dunes recognized by Holland (1986). Beach communities form along the Pacific Ocean, where high winds have deposited sand. This community is unvegetated due to harsh environmental conditions, including salt spray deposition, high wind speeds, and full sun exposure. These environmental conditions gradually decrease moving away from the beach. This community is not a sensitive habitat, and no special status plants are present in this habitat type (see "Special Status Plants" below).

Coastal strand. This habitat type is recognized by Munz and Keck (1973). It corresponds to the northern foredune habitat type of Holland (1986), grading to active coastal dunes (beach) closest to the ocean, and to the sand verbena-beach bursage series of Sawyer and Keeler-Wolf (1995). The coastal strand habitat type occupies the portion of the Younger Lagoon lowland nearest the beach, where relatively recent sand deposition has taken place and become somewhat stabilized. East of the open water of the lagoon and behind (north of) the beach area, there is an area where the sandy substrate is more stable than the unvegetated beach area. This area has a moderate vegetation cover with much bare sand. It is dominated by more-or-less evenly spaced individuals of beach-bur (*Ambrosia chamissonis*), a large, prostrate, much-branched perennial herb. A number of smaller native herbs, many of them characteristic of coastal strand habitats, also occur in this area. The most abundant and widespread of these is beach evening-primrose (*Camissonia cheiranthifolia* ssp. *cheiranthifolia*); other species include beach morning glory (*Calystegia soldanella*), willow dock (*Rumex salicifolius* var. *crassus*), pink sand verbena (*Abronia umbellata* ssp. *umbellata*), yellow sand verbena (*Abronia latifolia*), California poppy (*Eschscholzia californica*), and fragrant everlasting (*Gnaphalium canescens* ssp. *beneolens*). The non-native herb cut-leaved plantain (*Plantago coronopus*) and the non-native grass ripgut brome (*Bromus diandrus*) are also relatively abundant and widespread. Bordering the open water of the lagoon there is a narrow strip that is densely vegetated, primarily with the native rhizomatous perennial grass saltgrass (*Distichlis spicata*). Another native rhizomatous perennial grass, creeping wild rye (*Leymus triticoides*), is intermixed.

CDFG (2002) considers coastal strand a very threatened community (S2.1), with 2,000-10,000 acres remaining. No special status plants are present in this community at the project site (see "Special Status Plants" below).

20 Ecosystems West Consulting Group, op. cit.
21 California Department of Fish and Game (CDFG), "California Natural Diversity Data Base" for 7.5 minute topographic quadrangle Santa Cruz. Information dated June 2002.

Grassland Communities

Non-native grassland. Non-native grassland is a habitat type recognized by Holland (1986) and corresponds to a phase of the California annual grassland series of Sawyer and Keeler-Wolf (1995). This plant community occurs throughout the terrace area in a mosaic with the coyote brush-grassland community type. In the project site, this community type is ruderal in character and is composed almost entirely of annual, non-native species that favor previously heavily disturbed areas. The dominant grasses are all non-native and mostly annual; they include ripgut brome, soft chess (*Bromus hordeaceus*), six-weeks fescue (*Vulpia bromoides*), slender wild oat (*Avena barbata*), hare barley (*Hordeum murinum* ssp. *leporinum*), and Italian rye grass (*Lolium multiflorum*, sometimes biennial). The associated herb species include such non-natives as wild radish (*Raphanus sativus*), cut-leaved geranium (*Geranium dissectum*), bristly ox-tongue (*Picris echioides*), and Bermuda-buttercup (*Oxalis pes-caprae*). Bermuda-buttercup, a species that reproduces (in California) only by vegetative bulblets and not by seed, is generally not a prominent component of non-native grassland communities; its abundant presence on the terrace area is an indicator of past cultivation and tilling of the soil. Occasional individuals of the native shrub coyote brush (*Baccharis pilularis*) are widely scattered in non-native grassland. Dense, widely scattered patches, 10 to 40 feet across, of the large, semi-woody native herb Douglas' baccharis (also known as false willow) (*Baccharis douglasii*) are scattered over much of the grassland on the terrace area, and constitute a distinctive floristic and ecological element in this community.

This community is not a sensitive habitat, and no special status plants are present in this community at the project site (see "Special Status Plants" below).

Moist meadow. This habitat type is located in a small area west of the main road near the western boundary of the terrace area, adjacent to the northeast corner of the YLR. This small area of grassland intermixes with the adjacent non-native grassland, but is floristically distinct. This community is dominated by velvet grass (*Holcus lanatus*), a non-native perennial grass that is typically found in wetlands and nonwetlands. The native perennial herb Pacific silverweed (*Potentilla anserina* ssp. *pacifica*), also an indicator of moist or seasonally moist conditions, is the most abundant associate species over most of the area. Other important associates include the native herb willow-herb (*Epilobium ciliatum* ssp. *ciliatum*) and non-native species cut-leaved geranium, wild radish, prickly sow-thistle (*Sonchus asper*), and bristly ox-tongue.

This community is not a sensitive habitat, and no special status plants are present in this community at the project site (see "Special Status Plants" below).

Scrub Communities

Willow-herb/false willow. This classification is based on field observations of a small area in the east-central portion of the terrace area that could not be readily accommodated by any generalized community classification scheme. This community type is largely dominated by willow-herb, with false willow also abundant. Non-native species, including cut-leaved geranium and bristly ox-tongue, are also relatively abundant associates.

This community is not a sensitive habitat, and no special status plants are present in this community at the project site (see "Special Status Plants" below).

Coyote brush scrub-grassland. For this document, coyote brush scrub-grassland is treated as a transitional community between the non-native grassland community type, as described above, and northern (Franciscan) coastal scrub as described in Holland (1986). Coyote brush scrub-grassland is located throughout the terrace area. This community type is composed of clumps of coyote brush of varying sizes interspersed with open areas. Much of the coyote brush in this community type is of exceptional size, with many individual shrubs up to 10 feet tall. No other shrub species is associated with this community type. Bermuda-buttercup is generally abundant under the shrubs. The open areas between the clusters of shrubs support a mixture of grasses and herbs that is very similar in species composition to non-native grassland. As in that community type, clumps of Douglas' baccharis occur locally in coyote brush scrub-grassland community type.

This community is not a sensitive habitat, and no special status plants are present in this community at the project site (see "Special Status Plants" below).

Coastal scrub-grassland. This habitat type is not sharply distinct from the coastal scrub habitat type (described below) at the YLR and could be treated as a phase of coastal scrub. It is here recognized as a separate habitat type in order to emphasize its somewhat distinctive physiognomy and species composition, with a more diverse assortment of native herbs than is typical of the coastal scrub elsewhere on the site. It corresponds to a phase of Holland's (1986) northern coyote brush scrub subtype of the northern (Franciscan) coastal scrub habitat type, with elements of Holland's coastal terrace prairie and coastal bluff scrub habitat types. On the site, it is restricted to the ridge that separates the two arms of the lagoon and to a smaller ridge separating the lagoon from a small tributary drainage entering the lagoon from the west. This habitat type is characterized by patches of shrubs, primarily coyote brush, interspersed with relatively large areas dominated by grasses, with an assortment of associated herb species. The small native shrub wood rose (*Rosa gymnocarpa*) is scattered among the coyote brush; this species seems to constitute a distinctive element in this habitat type on this site, since it was not seen elsewhere on the site. Dominant grasses in the grassy areas include the native perennial bunchgrass purple needlegrass (*Nassella* [= *Stipa*] *pulchra*), along with non-native annuals such as six-weeks fescue, ripgut brome, soft chess, and slender wild oat. Associated native herbs include coast buckwheat (*Eriogonum latifolium*), sea lettuce (*Dudleya caespitosa*), soap plant (*Chlorogalum pomeridianum*), California aster (*Lessingia filaginifolia* var. *californica*), and yarrow (*Achillea millefolium*). Coast buckwheat and sea lettuce, especially, are characteristic species of coastal bluff scrub habitats. Abundant non-native herbs in this habitat type include English plantain (*Plantago lanceolata*), bur-clover (*Medicago polymorpha*), Italian thistle (*Carduus pycnocephalus*), and smooth cat's-ear (*Hypocharis glabra*).

This community is not a sensitive habitat, and no special status plants are present in this community at the project site (see "Special Status Plants" below).

Coastal scrub. This habitat type corresponds to the northern coyote brush scrub subtype of the northern (Franciscan) coastal scrub habitat type of Holland (1986) and to the coyote brush series of Sawyer and Keeler-Wolf (1995), although it is quite distinct in floristic composition from the coyote brush scrub-grassland habitat on the upland terrace. In the YLR, the coastal scrub habitat type occupies most of the upland slopes. It is quite diverse on the site in both species composition and physiognomy, and has apparently been affected, at least locally, by past disturbances related to agricultural uses of the terraces (the majority of the site produced brussel sprouts until 1987). Coastal scrub is a habitat type dominated by shrubs, but on the YLR, shrub cover ranges from dense to sparse, and there are numerous open areas of varying size. Coyote brush is the most abundant shrub overall in the coastal scrub on the site and is usually a dominant. Important shrub associates include poison oak (*Toxicodendron diversilobum*), lizard tail (*Eriophyllum staechadifolium*), and sticky monkeyflower (*Mimulus aurantiacus*). Sticky monkeyflower is absent from many areas, but is abundant locally. Some areas of coastal scrub are overwhelmingly dominated by poison-oak. The most extensive of these are on east-facing slopes, although similar but smaller areas also occur on west-facing slopes. In some areas where the shrub cover is sparse, open areas between the shrubs have a good cover consisting largely of native herbs, including soap plant, California hedge-nettle (*Stachys bullata*), Pacific sanicle (*Sanicula crassicaulis*), and yarrow. Other openings are dominated by non-native species, including poison hemlock (*Conium maculatum*), Italian thistle, rattail fescue (*Vulpia myuros* var. *myuros*), soft chess, and wild radish. Many of the larger openings, especially, are dominated by dense stands of poison hemlock, with Italian thistle often associated. Some of these openings may represent localized areas of past disturbance. The invasion of poison hemlock, a species of concern for management, is widespread but uneven in this coastal scrub. While this species is most prevalent in areas where the shrub cover is less than 20 percent, it has successfully invaded some areas where the shrub cover exceeds 50 percent.

This community is not a sensitive habitat, and no special status plants are present in this community at the project site (see “Special Status Plants” below).

Coastal bluff scrub. This community type occurs only in a narrow zone, typically 10 to 40 feet wide, along the top of the coastal bluff at the south edge of the terrace area. Two phases are recognized: mixed and ice plant. These phases may be correlated with past disturbance events, with the mixed phase having been moderately heavily disturbed and the ice plant phase very heavily disturbed. The mixed phase occurs along the top of the coastal bluff directly south of the existing Long Marine Laboratory (LML) complex. It may be regarded as a somewhat degraded phase of the northern coastal bluff scrub type of Holland (1986), although it contains relatively few shrubs, except scattered prostrate or small, wind-pruned individuals of coyote brush. A mixture of native and non-native grasses and herbs are the dominant species. The most abundant native species is the rhizomatous perennial grass creeping wild rye. Associated native species include the shrub lizard tail, along with coast buckwheat, seaside daisy (*Erigeron glaucus*), yarrow, and, less commonly, sea lettuce. Abundant non-native species include wild radish, Bermuda-buttercup, Cretan lavatera (*Lavatera cretica*), and ripgut brome. Lizard tail, coast buckwheat, seaside daisy, yarrow, and sea lettuce are all abundantly planted in the immediately adjacent LML native plant garden; all are also native on the coastal bluffs above the YLR, immediately west of the terrace area. It is impossible to determine at present whether these species are strictly indigenous to the terrace or have become established from seed dispersed from the native plant garden. The ice plant phase occurs along the top of the coastal bluff to the east of the preceding community type, extending to the eastern boundary of the site. This phase may be the result of more intensive and complete past disturbance to the coastal bluff community than the mixed phase. It is a highly degraded, essentially ruderal community type overwhelmingly dominated by the creeping, mat-forming, non-native succulent ice plant (*Carpobrotus edulis*). Ripgut brome is abundant around the margins of the ice plant patches, and localized dense colonies of the tall, non-native herb poison hemlock are interspersed with the ice plant.

This community is not a sensitive habitat, and no special status plants are present in this community at the project site (see “Special Status Plants” below).

Pond and Marsh Communities

Seasonal pond. This community type corresponds to a phase of bulrush series of Sawyer and Keeler-Wolf (1995). It is located within the grasslands south of the National Marine Fisheries Service (NMFS) building in the southwestern portion of the terrace area and consists of a large, shallow pond that contains water during the winter and early spring. The vegetation around the margins of this shallow seasonal pond is not sharply distinct from that of the adjacent grassland, although the delicate, prostrate annual herb water starwort (*Callitriche marginata*), an indicator of seasonal inundation, is abundant. The central portion of the pond is largely dominated by dense patches of prairie bulrush (*Scirpus maritimus*), interspersed with smaller, dense patches of pale spike-rush (*Eleocharis macrostachya*). The succulent subshrub pickleweed (*Salicornia virginica*), a species that generally occurs in coastal salt marshes, is scattered on the bed of the pond. Localized open areas on the pond bed have a low, moderate vegetation cover largely consisting of one or more of three non-native herb species: brass buttons (*Cotula coronopifolia*), swamp grass (*Crypsis schoenoides*), and biennial sagewort (*Artemisia biennis*). The species composition of this community type is suggestive of somewhat saline soil conditions.

CDFG (2002) considers seasonal pond a threatened community (S3.2), with 10,000-50,000 acres remaining. No special status plants are present in this community at the project site (see “Special Status Plants” below).

Freshwater marsh. Four types of freshwater marsh are located on the project site, including freshwater marsh-coastal terrace, freshwater marsh-cattail, freshwater marsh-bur-reed, and freshwater marsh- Pacific oenanthe. The first, freshwater marsh-coastal terrace, corresponds to the coastal and valley freshwater marsh community type of Holland (1986). Three small freshwater marshes are present on the terrace. The first is located on the terrace west of the main road near the western boundary of the terrace area, adjacent to the northeast corner of the YLR. The margins of the marsh are vegetated primarily by prairie bulrush, with willow-herb associated. A drainageway flows from the main part of the marsh into the east arm of Younger Lagoon. This drainageway is vegetated primarily by willow-herb, prairie bulrush, and tall cyperus (*Cyperus eragrostis*). The second freshwater marsh is also located near the western boundary of the site, just north of the sharp curve of the entrance road. It occupies a small but distinct topographic depression and may have originated as an agricultural drainage pond. This marsh is dominated by a dense patch of California tule (*Scirpus californicus*) in the center. The edges of the marsh are dominated by water smartweed (*Polygonum punctatum*) and willow-herb, species that are indicators of wet or seasonally wet conditions. One small, multi-stemmed arroyo willow (*Salix lasiolepis*) occurs at the edge of this marsh. The third and largest freshwater marsh is located just south of the railroad tracks in the northwestern corner of the project site. Although the property boundary is not marked on the ground, a portion of this marsh may be on Union Pacific Railroad property. The vegetation in this marsh is more diverse and more complex than in the first marsh. A large arroyo willow dominates the center of this marsh. A dense colony of broad-leaved cattail (*Typha latifolia*) occupies one part of the marsh, and a colony of floating marsh-pennywort (*Hydrocotyle ranunculoides*) occurs in another part of the marsh. Elsewhere, the marsh is largely dominated by water smartweed and willow-herb, with a small amount of prairie bulrush. Dense patches of saltgrass (*Distichlis spicata*) occur locally around the margins of this marsh.

The other three types of freshwater marsh are located within the YLR. Freshwater marsh–cattail occurs in the east arm of the lowland. It may be referred to the cattail series of Sawyer and Keeler-Wolf (1995). It is characterized by a dense cover of three tall emergent monocots. Southern cattail (*Typha domingensis*) dominates, with California tule (*Scirpus californicus*) and a small amount of broad-leaved cattail as associates. Freshwater marsh–bur-reed occurs in the west arm of the lowland and consists of a dense stand of the tall emergent monocot Greene's bur-reed (*Sparganium erectum* ssp. *stoloniferum*), with a small amount of broad-leaved cattail associated. Although this marsh type may be referred to as the bur-reed series of Sawyer and Keeler-Wolf (1995), that type refers primarily to habitats dominated by a bur-reed species that is normally submersed rather than emergent, as is Greene's bur-reed. Freshwater marsh–Pacific oenanthe is not easily accommodated by any generalized classification scheme. One area of this marsh type is located in each arm of the lowland, in each case located further up the arm than the emergent monocot (cattail or bur-reed) marsh type. This marsh type is dominated by a dense cover of the rhizomatous perennial herb Pacific oenanthe (*Oenanthe sarmentosa*), with scattered individuals of broad-leaved cattail associated.

CDFG (2002) considers freshwater marsh a very threatened community (S2.1), with 2,000-10,000 acres remaining. No special status plants are present in this community at the project site (see "Special Status Plants" below).

Coastal salt marsh (pickleweed). This habitat type borders the open water of the lagoon around most of its perimeter, and extends across the entire bottom of the lowland for some distance above the open water in both arms. It may be regarded as a phase of the northern coastal salt marsh habitat type of Holland (1986) and of the pickleweed series of Sawyer and Keeler-Wolf (1995). In the project site, this habitat type essentially consists of a monoculture of pickleweed, forming a continuous cover 1 to 2 feet high, with almost no associated species. A narrow zone largely dominated by Pacific silverweed borders this habitat type on the inland side, along the base of the slope.

CDFG (2002) considers coastal salt marsh a threatened community (S3.2), with 10,000-50,000 acres remaining. No special status plants are present in this community at the project site (see "Special Status Plants" below).

Riparian Communities

Central coast arroyo willow riparian forest. Holland (1986) recognizes this habitat type, although Holland indicates that this habitat type only occurs from Monterey County south. It corresponds to the arroyo willow series of Sawyer and Keeler-Wolf (1995). Central coast arroyo willow riparian forest occupies the entire upper portion of the eastern arm of Younger Lagoon (including YLR and outside its boundaries), extending from the lowland to the top of the slope. In the western arm, this habitat type occurs as three discrete patches in the lowland, each extending to the top of the slope on the west side. Within the project site, this habitat type consists of dense, often impenetrable thickets of arroyo willow, an arborescent shrub or small tree, with no other arborescent species present. There are few understory species, although the woody vine Pacific blackberry (*Rubus ursinus*) and the tall herb American stinging nettle (*Urtica dioica* ssp. *gracilis*) are occasional. In the northernmost patch of this habitat in the western arm, the highly invasive non-native vine cape-ivy (*Senecio mikanioides* [= *Delairea odorata*]) is also present in the understory and twining among the willow branches.

CDFG (2002) considers central coast arroyo willow riparian forest a threatened community (S3.2), with 10,000-50,000 acres remaining. No special status plants are present in this community at the project site (see "Special Status Plants" below).

Urban and Ruderal Communities

Ruderal. The areas mapped as "ruderal" are areas that have been affected by relatively recent or repeated heavy disturbance. These areas are vegetated primarily with annual, non-native species that favor disturbed areas. One sizable ruderal area on the terrace area is a linear north-south underground utility corridor in the approximate center of the site from which all vegetation was removed in the relatively recent past. This corridor of ruderal community also has an extension to the west, and widens to a broader, recently disturbed area south of the entrance road in the east-central portion of the site. A ruderal community then extends southward for some distance along the eastern boundary of the site. Another large ruderal area occupies the northeastern corner of the terrace area. A small ruderal area at the head of the west arm of Younger Lagoon, probably disturbed in the past, was overwhelmingly dominated by poison hemlock at the time of the survey.

This community is not a sensitive habitat, and no special status plants are present in this community at the project site (see "Special Status Plants" below).

Developed/ruderal. This community type designation is used for areas occupied by buildings, roads, parking lots, and other developed facilities, as well as adjacent landscaped or heavily disturbed areas. Vegetation in these areas (other than landscaping plants) consists mostly of non-native species. A number of large ruderal areas immediately adjacent to developed areas are also mapped within this community type. These ruderal areas are sparsely vegetated with ruderal species.

This community is not a sensitive habitat, and no special status plants are present in this community at the project site (see "Special Status Plants" below).

Landscape planted berm. Two artificially constructed earthen berms, separated by a narrow gap, border the southern portion of the terrace area on the west, along the top of the slope above (just east of) the YLR boundary. These berms have been planted with a variety of native shrub, grass, and herb species. These berms could have been treated as belonging to the ruderal or developed/ruderal community types, but because they are planted areas whose history is known, they are here treated as a distinct community type.

This community is not a sensitive habitat, and no special status plants are present in this community at the project site (see "Special Status Plants" below).

Barren area. The area mapped as "barren area" is located in the central portion of the eastern arm of the lowland, separating the coastal salt marsh (pickleweed) habitat from the freshwater marsh–cattail habitat type on YLR. This area was largely occupied by a mat of dead vegetation, perhaps deposited during a flood event, at the time of the survey in May 2001, but had relatively little live vegetation. Scattered plants of broad-leaved cattail occur in this area, along with several colonies of small plants (at the time of the survey) of spearscale (*Atriplex triangularis*) and water smartweed.

This community is not a sensitive habitat, and no special status plants are present in this community at the project site (see "Special Status Plants" below).

Special-Status Plant Species

The discussion of special-status plant species is structured as follows. Plants with a theoretical potential to occur on or in the vicinity of the site were listed in Table 4.4-1. Table 4.4-1 is essentially a catalogue or checklist to ensure that no species was omitted from consideration at the broadest level of analysis. The next step was to determine which species would be determined "Not Present," based on surveys and a consideration of specific on-site habitat characteristics or other factors.

A three-year presence/absence survey for special-status plants was conducted in 2000, 2001, and 2002 on the terrace and at the YLR.[22,23] The survey method followed the CNPS guidelines. The surveys targeted a total of 32 special-status plant species with potential to occur on or in the vicinity of the project site (Table 4.4-1). Target special-status plant species included five federal- and/or state-listed species, and five species designated as CNPS List 1B or List 2. The remaining are federal or state species of concern, and CNPS List 3 or List 4 species. Table 4.4-2 provides a summary of these species and their habitat associations.

No special-status plants were observed during presence/absence surveys on the terrace area or on the YLR.[24] Surveys were conducted at the appropriate season for identification of all of the special status species listed in Table 4.4-1. Additionally, no special-status species were identified during reconnaissance surveys.[25,26] It is unlikely that any special-status plant species occur on the terrace area due to the long-term past disturbance, including cultivation, and the invasion of non-native species.[27]

Wildlife

Wildlife Habitats

Wildlife habitats are not as clearly delineated as vegetation communities, which are characterized by certain plant species adapted to specific environmental conditions. Wildlife habitats are areas where organisms live and are composed of various vegetative communities that create areas for different life cycle needs, such as foraging areas, nesting areas, and shelter from predators. The quality of wildlife habitat is determined by the presence of healthy, stable vegetative communities that provide abundance and variety of foraging areas, nesting areas, and shelter. For organizational purposes in this document, the description of habitats is structured around the Wildlife Habitat Relationships (WHR) system.[28] Since WHR types tend to aggregate plant communities, Table 4.4-3 provides a cross-reference for the plant communities displayed in Figure 4.4-2, with approximately equivalent classifications aligned horizontally. A separate

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22 The Terrace area and YLR were surveyed in detail. However, only the periphery of the coastal strand nearest the ocean was surveyed, in order to avoid disturbance to nesting birds. No special status plant species are known, or have the potential, to occur on the coastal strand.

23 Ecosystems West Consulting Group, op. cit.

24 Ecosystems West Consulting Group, op. cit.

25 Habitat Restoration Group, *Biotic Assessment Terrace Point Specific Plan*, Prepared for Strelow Consulting, March 1994, *In:* Strelow Consulting, *Draft Environmental Impact Report Santa Cruz Coastal Marine Research Center at Terrace Point*, Prepared for City of Santa Cruz, April 1997.

26 John Gilchrist & Associates and Environmental Hydrology, "Revised Draft Santa Cruz Coastal Marine Research Center at Terrace Point: Landscape, Habitat and Open Space Management Plan," prepared for ATC Realty Sixteen, Inc., May 1998.

27 Ecosystems West Consulting Group, op. cit.

28 Mayer, K.E. and W.F. Laudenslayer (eds.), "A Guide to Wildlife Habitats of California", 1988.

TABLE 4.4-1
STATUS, DISTRIBUTION AND HABITAT OF SPECIAL-STATUS PLANTS WITH A THEORETICAL POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED UCSC MARINE SCIENCE CAMPUS SITE

Species Common Name[a]	USFWS Listing[b]	State Status[c]	CNPS Status[d]	Habitat Type[e]
Amsinckia lunaris bent-flowered fiddleneck	None	None	List 1B	Cismontane woodland, valley, and foothill grassland
Arabis blepharophylla coast rock cress	None	None	List 4	Rocky places in broad-leaved upland forest, coastal bluff scrub, coastal prairie, coastal scrub
Arenaria paludicola marsh sandwort	Endangered	Endangered	List 1B	Freshwater marshes
Calandrinia breweri Brewer's calandrinia	None	None	List 4	Chaparral, coastal scrub in sandy or loamy soil, often on burns or disturbed sites
Campanula californica swamp harebell	Species of Concern	None	List 1B	Moist places; bogs and fens, closed-cone coniferous forest, coastal prairie, meadows, freshwater marshes and swamps, north coast coniferous forest
Carex comosa bristly sedge	None	None	List 2	Marshes and swamps, lake margins
Carex saliniformis deceiving sedge	None	None	List 1B	Coastal prairie, coastal scrub, meadows, coastal salt marshes
Chorizanthe robusta var. *robusta* robust spineflower	Endangered	None	List 1B	Coastal dunes, coastal scrub, openings in cismontane woodland, in sandy or gravelly soil
Collinsia multicolor San Francisco collinsia	None	None	List 4	Closed-cone coniferous forest, coastal scrub, broad-leaved upland forest
Elymus californicus California bottlebrush grass	None	None	List 4	Cismontane woodland, north coast coniferous forest, broad-leaved upland forest, riparian woodland

TABLE 4.4-1 (Continued)
STATUS, DISTRIBUTION AND HABITAT OF SPECIAL-STATUS PLANTS WITH A THEORETICAL POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED UCSC MARINE SCIENCE CAMPUS SITE

Species Common Name[a]	USFWS Listing[b]	State Status[c]	CNPS Status[d]	Habitat Type[e]
Fritillaria agrestis stinkbells	None	None	List 4	Low-lying areas in heavy clay soil, chaparral, cismontane woodland, valley and foothill grassland
Grindelia hirsutula var. *maritima* San Francisco gumplant	Species of Concern	None	List 1B	Coastal bluff scrub, coastal scrub, valley and foothill grassland, in sandy or serpentine soil
Holocarpha macradenia Santa Cruz tarplant	Threatened	Endangered	List 1B	Coastal prairie, valley and foothill grassland, often in clay soils
Horkelia cuneata ssp. *sericea* Kellogg's horkelia	Species of Concern	None	List 1B	Openings in closed-cone coniferous forest, maritime chaparral, coastal scrub, coastal prairie, in sandy or gravelly soil
Horkelia marinensis Point Reyes horkelia	Species of Concern	None	List 1B	Coastal dunes, coastal prairie, coastal scrub in sandy soil
Linanthus grandiflorus large-flower linanthus	None	None	List 4	Coastal scrub, coastal bluff scrub, closed-cone coniferous forest, cismontane woodland, coastal dunes, coastal prairie, valley and foothill grassland, usually in sandy soil
Lomatium parvifolium small-leaved lomatium	None	None	List 4	Closed-cone coniferous forest, chaparral, coastal scrub
Micropus amphibolus Mt. Diablo cottonweed	None	None	List 3	Broad-leaved upland forest, cismontane woodland, valley and foothill grassland, coastal scrub
Microseris paludosa marsh microseris	None	None	List 1B	Moist places in closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland
Monardella undulata curly-leaved monardella	None	None	List 4	Maritime chaparral, coastal dunes, coastal prairie, coastal scrub, ponderosa pine sandhills, in sandy soil

TABLE 4.4-1 (Continued)
STATUS, DISTRIBUTION AND HABITAT OF SPECIAL-STATUS PLANTS WITH A THEORETICAL POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED UCSC MARINE SCIENCE CAMPUS SITE

Species Common Name[a]	USFWS Listing[b]	State Status[c]	CNPS Status[d]	Habitat Type[e]
Pedicularis dudleyi Dudley's lousewort	Species of Concern	Rare	List 1B	Maritime chaparral, north coast coniferous forest, valley and foothill grassland
Pentachaeta bllidiflora white-rayed pentachaeta	Endangered	Endangered	List 1B	Valley and foothill grassland, coastal scrub, coastal prairie
Perideridia gairdneri ssp. *gairdneri* Gairdner's yampah	Species of Concern	None	List 4	Mesic sites in coastal prairie, broad-leaved upland forest, chaparral, valley and foothill grassland,
Piperia michaelii Michael's rein orchid	None	None	List 4	Coastal bluff scrub, closed-cone coniferous forest, chaparral, cismontane woodland, broad-leaved upland forest, coastal scrub, lower montane coniferous forest
Plagiobothrys chorisianus var. *hickmanii* Hickman's popcorn-flower	None	None	List 4	Moist places in closed-cone coniferous forest, chaparral, coastal scrub, marshes and swamps, vernal pools
Plagiobothrys diffusus San Francisco popcornflower	Species of Concern	Endangered	List 1B	Coastal prairie; valley and foothill grassland
Sanicula hoffmannii Hoffmann's sanicle	None	None	List 4	Broad-leaved upland forest, chaparral, coastal scrub, often serpentinite or clay soil
Sidalcea malachroides maple-leaved checkerbloom	None	None	List 1B	Broad-leaved upland forest, coastal prairie, coastal scrub, north coast coniferous forest, often in disturbed places
Silene verecunda ssp. *verecunda* San Francisco campion	Species of Concern	None	List 1B	Coastal bluff scrub, chaparral, coastal prairie, coastal scrub, valley and foothill grassland, generally in sandy or rocky soil
Stebbinsoseris decipiens Santa Cruz microseris	Species of Concern	None	List 1B	Open areas in broad-leaved upland forest, closed-cone coniferous forest, chaparral, coastal prairie, coastal scrub

TABLE 4.4-1 (Continued)
STATUS, DISTRIBUTION AND HABITAT OF SPECIAL-STATUS PLANTS WITH A THEORETICAL POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED UCSC MARINE SCIENCE CAMPUS SITE

Species Common Name[a]	USFWS Listing[b]	State Status[c]	CNPS Status[d]	Habitat Type[e]
Trifolium buckwestiorum Santa Cruz clover	None	None	List 1B	Coastal prairie, broad-leaved upland forest, cismontane woodland
Zigadenus micranthus var. *fontanus* marsh zigadenus	None	None	List 4	Vernally moist places in chaparral, cismontane woodland, lower montane coniferous forest, meadows, marshes and swamps, often serpentinite soil

[a] Nomenclature follows Hickman (1993); Skinner and Pavlik (1994); and California Native Plant Society (2001).
[b] U.S. Fish and Wildlife Service (1999a, b).
[c] Section 1904, California Fish and Game Code (California Department of Fish and Game, 2001).
[d] CNPS List. List 1B: Rare, Threatened, or Endangered in California and elsewhere. List 2: Rare, Threatened, or Endangered in California, more common elsewhere. List 3: Plants about which more information is needed. List 4: Plants of limited distribution: a watch list.
[e] Thomas (1960), Munz and Keck (1973), Hickman (1993), Skinner and Pavlik (1994), and unpublished information.

SOURCE: Ecosystems West 2002, CDFG 2001, CNPS 2001

**TABLE 4.4-2
PLANT COMMUNITY TYPES AND
ASSOCIATED SPECIAL-STATUS SPECIES ON THE PROJECT SITE**

Community Type	Dominant and Associate Plant Species	Reported Special-Status Plant Species Observed (O), Presumed Present, or Not Observed
Terrace Area		
Non-native grassland	Ripgut brome, soft chess, six-weeks fescue, slender wild oat, hare barley, Italian ryegrass	Not Observed
Moist meadow	Velvet grass, Pacific silverweed	Not Observed
Willow-herb/false willow	Willow herb, false willow	Not Observed
Coyote brush scrub-grassland	Coyote brush, Bermuda-buttercup, non-native grasses	Not Observed
Coastal bluff scrub	Creeping wildrye, lizard tail, coast buckwheat, wild radish, iceplant	Not Observed
Seasonal pond	Prairie bulrush, water starwort, spike-rush, brass buttons	Not Observed
Freshwater marsh	Willow-herb, prairie bulrush, tall cyperus	Not Observed
Ruderal	Annual and biennal non-native species that favor heavily disturbed areas	Not Observed
Developed/Ruderal	Developed facilities / Annual and biennal non-native species that favor heavily disturbed areas	Not Observed
Landscape Plant Berm	Planted native shrub, grass and herb species	Not Observed
Younger Lagoon Reserve		
Beach	None	Not Observed
Coastal strand	Beach evening-primrose, beach morning glory, pink sand verbena, non-native annual species	Not Observed
Coastal scrub	Coyote brush, poison oak, lizard tail, sticky monkeyflower	Not Observed
Coastal scrub-grassland	Coyote brush, purple needlegrass, non-native annual species	Not Observed
Coastal salt marsh	Pickleweed, Pacific silverweed	Not Observed
Cattail freshwater marsh	Southern cattail, California tule, broad-leaved cattail	Not Observed
Bur-reed freshwater marsh	Greene’s bur-reed	Not Observed
Pacific oenanthe freshwater marsh	Pacific oenanthe, broad-leaved cattail	Not Observed
Central coast arroyo willow riparian forest	Arroyo willow	Not Observed
Barren	(No plants present)	Not Observed
Ruderal	Poison hemlock	Not Observed

TABLE 4.4-3
PLANT COMMUNITY TYPES AND
CORRESPONDING WILDLIFE HABITATS AT THE PROJECT SITE

Plant Community Type	WHR Classification[29]
Beach/coastal strand	Marine, Beaches, and Bluffs[30]
Non-native grassland/moist meadow	Annual Grassland
Coyote brush scrub/coastal scrub/willow-herb/false willow/coastal bluff scrub	Coastal Scrub
Seasonal pond/freshwater marsh-coastal terrace/cattail freshwater marsh/bur-reed freshwater marsh/ pacific oenanthe freshwater marsh	Fresh Emergent Wetland
Coastal salt marsh	Saline Emergent Wetland
Central coast arroyo willow riparian forest	Valley Foothill Riparian
Ruderal/developed-ruderal/landscape plant berm/barren	Urban

classification has been added that is distinct from vegetation types and not well described in the WHR: Marine, Beaches, and Bluffs. The purpose of this section is to provide an overview of how these habitats function; species that best represent the type are listed herein and may not have been seen during the surveys performed for this Draft EIR, except where noted. References are made to special-status species, but they are treated in detail in another section.

Marine, beaches, and bluffs. Gray whales (*Eschrichtius robustus*) and sea otters are most common along rocky shores and are closely associated with the kelp bed marine ecosystem offshore. Coastal bluffs are the seaward edges of marine terraces uplifted from the seabed.[31] Caves, stacks, and arches that are composed of sedimentary rocks primarily mudstone are prone to erosion, form both inhospitable natural environments and a habitat for specialized nesting birds such as cliff swallows and black swift. EcoSystems West observed nesting pigeon guillemots (*Cepphus columba*), pelagic cormorants (*Phalacrocorax pelagicus*), western gull (*Larus occidentalis*), black phoebe (*Sayornis nigricans*), cliff swallows (*Petrochelidon pyrrhonota*), and barn swallows (*Hirundo rustica*) in the rock crevices and on the bluff tops near the beach. The coastal strand (beach) habitat type occupies the portion of the YLR lowland nearest the ocean, where relatively recent sand deposition has taken place. The beach area immediately bordering the ocean, where sand has most recently been deposited, is nearly unvegetated. East of the open water of the lagoon and behind (north of) the beach area, there is an area where the sandy substrate is more stable. EcoSystems West also observed two beach nesting species near the lagoon: Wilson’s plover (*Charadrius wilsonia*) and killdeer (*Charadrius vociferus*).

Three special-status species were observed or are potentially present in these habitats, including tidewater goby, black swift, and snowy plover (see discussion below in “Special-Status Wildlife Species”). Coastal strand is a sensitive plant habitat associated with these WHR habitat types.

29 Mayer, K.E. and W.F. Laudenslayer (eds.). op. cit.
30 This habitat classification has been added because it is not well described in the WHR.
31 California Coastal Commission, “The California Coastal Resource Guide,” 1987.

Annual grassland. Grassland habitat attracts seed eaters as well as insect eaters. California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), and meadowlarks (*Sturnella neglecta*) are seed eaters that use grasslands for nesting. Insect eaters such as scrub jays (*Aphelocoma caerulescens*), barn swallows (*Hirundo rustica*), and northern mockingbirds (*Mimus polyglottus*) use the habitat for foraging only. Southern alligator lizard (*Gerrhonotus multicarinatus*) is a grassland-dwelling reptile found on the project site.[32] Small mammals such as California vole (*Microtus californicus*), deer mouse (*Peromyscus maniculatus*), broad-footed mole (*Scapanus latimanus*), and black-tailed jackrabbit (*Lepus californicus*) forage and nest within the grassland and also provide an abundant food source for raptors (falcons, hawks, and owls). EcoSystems West (2002) observed the following raptor species using the upper terrace grasslands for foraging: white-tailed kite (*Elanus caeruleus*), a pair of American kestrels (*Falco sparverius*), barn owl (*Tyto alba*), and a pair of northern harrier hawks. Other foraging species observed include rufous-sided towhee *(Pipilo erythropthalmus),* black-headed phoebe *(Sayornis nigricans),* California towhee *(Pipilo crissalis),* American robin (*Turdus migratorius*), California quail, white crowned sparrow (*Zonotrichia leucophrys*), Anna's hummingbird (*Calypte anna*), barn swallow (*Hirundo rustica*), tree swallow (*Tachycineta bicolor*), Stellers jay (*Cyanocitta stelleri*), American crow *(Corvus corax),* and purple finch *(Carpodacus purpureus)*.

The presence of domestic cats degrades the nesting potential for ground-nesting birds such as northern harrier hawks, and no nesting birds were observed on the upland terrace by EcoSystems West in 2001 and 2002.

Six special-status species have been observed or are potentially present in this habitat: merlin, loggerhead shrike, peregrine falcon, northern harrier, white-tailed kite and western burrowing owl (see discussion below in "Special-Status Wildlife Species"). No sensitive habitats are associated with annual grasslands.

Coastal scrub. Coastal scrub is less vegetatively productive than adjacent grassland or riparian habitats, but seems to support equivalent numbers of wildlife species. [33] Species commonly occurring in the coastal scrub include orange crowned warbler (*Vermivora celata*), bushtit (*Psaltriparus minimus*), and California horned lizard (*Phrynosoma coronatum*).

No special-status species were observed in this WHR type in the project area. Dusky-footed woodrat (*Neotoma fuscipes annectens*) are potentially present, No sensitive habitats are associated with coastal scrub.

Fresh emergent wetland. Fresh emergent wetlands within the project site offer water, food, and cover for a variety of species. Mammals are attracted to the water, including California voles, Virginia opossum (*Didelphis virginiana*), vagrant shrew (*Sorex vagrans*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and gray fox (*Urocyon cinereoargenteus*). Bats, e.g., *Myotis*, forage for insects over pools and wet meadows. Reptiles and amphibians that use this habitat for feeding and breeding include western terrestrial garter snake (*Thamnophis elegans*) and Pacific tree frog (*Hylla regilla*). All of the above species have been reported from the YLR.[34] The marshes and seasonal pond on the terrace, their coastal location, and proximity to other wetlands at YLR and Antonelli Pond, attract large numbers of migratory birds in the spring and fall. This was also true during the period when the terrace was actively farmed.

32 Fusari, M. H., "Younger Lagoon Management Plan," University of California, Santa Cruz, 2001.
33 Mayer, K.E. and W.F. Laudenslayer (eds.), op. cit
34 Fusari, M. H., "Younger Lagoon Management Plan," University of California, Santa Cruz, 2001.

The inland avifauna at Younger Lagoon is particularly rich. Over 200 species of birds have been seen in or near Younger Lagoon since the onset of record keeping in the 1970s. [35] These include oceanic species, transients, and rare visitors from across the United States, and over 100 species of land birds that use terrestrial habitats of the lagoon. Diversity is highest during spring migration.[36] During the winter, regular visitors to the on-site seasonal pond include teal (*Anas crecca* and *A. cyanoptera*), northern pintail (*Anas acuta*), herons, and egrets.[37]

One special-status species was observed in this habitat, the California red-legged frog (see discussion below in “Special-Status Wildlife Species”). Fresh emergent wetland is considered a sensitive habitat.

Saline emergent wetland. As noted above, in the project site, this habitat type essentially consists of a monoculture of pickleweed, forming a continuous cover 1 to 2 feet high, with almost no associated species. Saline emergent wetlands provide food, cover, and nesting habitat for a variety of birds, mammals, reptiles, and amphibians. Bird species include herons, egrets, hawks (e.g., the northern harrier) shorebirds, swallows, and the marsh wren (*Cistothorus palustris*). Characteristic mammals include species of shrews (e.g., vagrant shrew [*Sorex vagrans*]), bats, and mice.

One special-status species was observed in this habitat, the saltmarsh common yellowthroat (see discussion below in “Special-status Wildlife Species”). A sensitive habitat associated with saline emergent wetland is coastal salt marsh.

Valley Foothill Riparian. Riparian (streamside) areas provide nesting habitat and insect diversity attractive to a variety of migratory birds. Diverse foraging substrates such as foliage, bark, and ground substrates increase feeding availability. Riparian areas, due to their biological wealth and severe degradation, are vital habitat for the conservation of neotropical migrants and resident birds of the western U.S.[38] Birds that forage for insects in the leaves of plants include Bewick’s wren (*Thryomanes bewickii*), bushtit (*Psaltriparus minimus*), and black-headed grosbeak (*Pheuticus melanocephalus*). Bark-insect foraging species such as downy woodpecker (*Picoides pubescens*) and white-breasted nuthatch (*Sitta carolinensis*) forage for insects in the bark. There are a few species that are adapted to foraging for insects in flight, such as western wood pewee (*Contopus sordidulus*) and tree swallows (*Tachicyneta bicolor*). Although insects are the primary food source for most species in the riparian habitat, ground dwelling species such as California quail (*Callipepla californica*) and brown towhee (*Pipilo fuscus*) are also present in the riparian habitat, feeding primarily on seeds.

Many special-status bird species could be associated with this habitat, but none have been observed in studies performed for this and prior Draft EIRs. However, the habitat type itself is considered sensitive.

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[35] Ibid.
[36] Ibid.
[37] Strelow Consulting, “Draft Environmental Impact Report, Santa Cruz Coastal Marine Research Center at Terrace Point,” 1997.
[38] Riparian Habitat Joint Venture (RHJV), “The Riparian Bird Conservation Plan: a Strategy for Reversing the Decline of Riparian Associated Birds in California,” California Partners in Flight, August, 2000.

Urban. Urban habitats are those defined by structures (impervious surfaces) and non-native vegetation in the form of landscaping. Species diversity is characteristically low for wildlife, dominated by human-adapted species such as the house sparrow (*Passer domesticus*) and starling (*Sturnus vulgaris*).

Special-Status Wildlife Species

The discussion of special-status wildlife species is structured as follows. A CNDDB search of the project vicinity USGS quadrangles was conducted and a list of species from USFWS was obtained. Then, those animals with a theoretical potential to occur on or in the vicinity of the site were listed in Table 4.4-4. Table 4.4-4 is essentially a catalogue or checklist to ensure that no species was omitted from consideration at the broadest level of analysis. The next step was to determine, which species would be determined "Not Present", based on surveys and a consideration of specific on-site habitat characteristics or other factors. Special-status species *actually observed* are subsequently discussed in detail below. Lastly, species are considered for which observational data are incomplete but which have a potential for both occurrence and exposure to impacts. The latter two groups are those considered in the impact section which follows.

Special-Status Species Determined Not to be Present

The majority of the species listed in Table 4.4-4 do not occur at the project site. Some of the animals were determined to be absent because their habitats are not present, and other determinations were based on surveys conducted on the terrace area or on the YLR.[39]

Special-Status Species Observed on the Site

This section identifies and describes special-status wildlife species found onsite, based on current or past surveys, which could be exposed to direct or indirect project impacts.

The tricolored blackbird, loggerhead shrike, peregrine falcon, black swift, and merlin have been observed on the upland terrace as visitors or transients during migrations;[40,41] however, these species were not recorded during the 2001 and 2002 avian surveys conducted by EcoSystems West. These species are considered transient, and with the exception of black swift (discussed under "Special Status Species Potentially Present,") would not be exposed to project impacts and are not discussed in detail.

Special-status species observed on the site include tidewater goby, California red-legged frog, northern harrier, white-tailed kite, burrowing owl, and salt marsh common yellowthroat. These species are described below.

39 Ecosystems West Consulting Group, op. cit.
40 University of California Santa Cruz Office of Campus Facilities, "Draft Environmental Impact Report, Long Marine Lab Master Plan," 1993.
41 Tyler, W. Breck, "Annotated checklist for the birds of the Younger Lagoon area. Institute of Marine Sciences, UC Santa Cruz Natural Resource Library," 1988.

TABLE 4.4-4
STATUS, DISTRIBUTION AND HABITAT OF SPECIAL-STATUS ANIMALS WITH A THEORETICAL POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED UCSC MARINE SCIENCE CAMPUS SITE

Common Name (*Scientific Name*)	**Status: Federal/State**	**Habitat Requirements**
Amphibians		
Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*)	E/E	Temporary ponds and vegetated drainages.
California tiger salamander (*Ambystoma californiense*)	SC/SC	Small mammal burrows and ponds.
California red-legged frog (*Rana aurora draytonii*)	T/SC	Requires water that lasts until the end of June for reproduction. Occupies ponds, reservoirs, or creeks with slow-moving pools during the winter and spring (Reis 1999a). During the late summer or fall, adults are known to utilize a variety of upland habitat types with leaf litter or mammal burrows. Adults are known to travel up to three miles overland between aquatic sites.
Reptiles		
Western pond turtle (*Clemmys marmorata*)	SC/SC	Found in ponds, marshes, rivers, streams, and irrigation ditches containing aquatic vegetation. Usually seen sunning on logs, banks, or rocks near banks. Moves up to three or four miles within a creek system, especially during “walk-abouts” before a female lays eggs. Nests in burrows that can be up to several hundred feet away from river or pond banks and may be found in woodlands, grasslands, and open forest.
California coast horned lizard (*Phrynosoma coronatum frontale*)	--/SC	Associated with open patches of sandy soils in washes, chaparral, scrub, and grasslands. Forages on beetles, ant colonies, and other insects.
Legless lizard (*Anniella pulchra*)	--/SC	Associated with moist, sandy, loose soils for burrowing. Forages for invertebrates under leaf litter of plants. Found in coastal sand dunes, washes, woodlands, chaparral, and riparian areas.
Fish		
Steelhead (*Oncorhynchus mykiss*)	TESU/--	Spends the first few years of its life in fresh water before migrating to the ocean. Adults will later return to the freshwater location where they were spawned to breed.
Tidewater goby (*Eucyclogobius newberryi)*	E/SC	Coastal lagoons (and creeks up to river mile one) with protected still-water areas.
Coho salmon (*Oncorhynchus kisutch)*	--/E	Spends the first year of its life in fresh water before migrating to the ocean. Adults will later return to the freshwater location where they were spawned to breed.

TABLE 4.4-4 (Continued)
STATUS, DISTRIBUTION AND HABITAT OF SPECIAL-STATUS ANIMALS WITH A THEORETICAL POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED UCSC MARINE SCIENCE CAMPUS SITE

Common Name (*Scientific Name*)	**Status: Federal/State**	**Habitat Requirements**
Invertebrates		
Opler's longhorn moth (*Adella oplerella*)	SC/--	Feeds on *Platystemon californicus* associated with grassland.
Sandy beach tiger beetle (*Icindela hirticollis grarida*)	--/SC	Larva live subsurface in sandy soils with some moisture content.
Ohlone tiger beetle (*Cicindela ohlone*)	E/--	Occupies coastal grasslands such as coastal terrace prairie and mima mounds.
Monarch butterfly (*Danaus plexipus*)	--/**	Groves of eucalyptus and native trees along the coast.
California Linderiella (*Linderiella occidentalis*)	--/SC Formerly proposed as Endangered, but not listed	Uses ephemeral still-water environments.
Globose dune beetle (*Coelus globosus*)	--/SC	Occupies sandy soils of coastal dunes and beaches.
Unsilvered fritillary (*Speyeria adiasta adiaste*)	FC1/--	Feeds on *Viola pedunculata*, associated with grasslands.
San Francisco lacewing (*Nothochrysa californica*)	FSC/--	Woodlands and coastal scrub habitat.
California brackish water snail (*Tryonia imitator*)	SC/--	Occupies coastal brackish-water lagoons.

TABLE 4.4-4 (Continued)
STATUS, DISTRIBUTION AND HABITAT OF SPECIAL-STATUS ANIMALS WITH A THEORETICAL POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED UCSC MARINE SCIENCE CAMPUS SITE

Common Name (*Scientific Name*)	**Status: Federal/State**	**Habitat Requirements**
Birds		
Yellow warbler (*Dendroica petechia brewsteri*)	--/SC	Breeds in a variety of habitats, but primarily in deciduous riparian woodlands and shrub habitats with open riparian canopy along streams and lakes, especially where substantial areas of riparian habitat remain along major creeks and rivers. Forages in areas with dense undergrowth among a variety of riparian tree types.
Willow flycatcher (*Empidonax traillii*)	--/E	Flies out from favored perches to feed on flying insects. Prefers to perch from low to medium heights in willow trees and riparian shrubs. Willow riparian habitats are favored during migration as well as the breeding season.
Yellow-breasted chat (*Icteria virens*)	--/SC	Associated with dense riparian habitats with a well-developed understory. Forages at various heights by gleaning insects from leaves and bark, and feeding on small fruits. Typically forms nests in dense riparian vegetation 1 to 8 feet above the ground.
Saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*)	--/SC	Nests in over-grown fields with scrubs, margins of woodlands, freshwater and saltwater marshes. Forages on insects, largely spiders on vegetation, and occasionally will take insects on the ground or seeds.
Bank swallow (*Riparia riparia*)	--/T	Nests in colonies in earth burrows along vertical banks or cliffs near water.
Black swift (*Cypseloides niger*)	--/SC	Nest colonies occur in coastal bluff caves in scattered locations in both Santa Cruz and San Mateo Counties.
California horned lark (*Eremphila alpestris actia*)	--/SC	Nests and forages in low growing grassland habitats such as native prairie or non-native grasses that have been grazed.
Double crested commorant rookery (*Phalacrocorax autitus*)	--/SC	Frequents freshwater lakes, rivers, and large ponds, as well as the inshore coastal lagoons and estuaries. Nests in colonies, on rock cliffs or in tall trees or poles surrounded by water where mammalian predators cannot reach its eggs. It may also nest on the ground on isolated islands if trees are absent. Feeds primarily on fish.
Brown pelican (*Pelecanus occidentalis*)	E/E	Nests in colonies on rock cliffs or islands where mammalian predators cannot reach its eggs. Feeds primarily on schooling fish.
Great blue heron rookery (*Arden herodia*)	--/SC	Frequents freshwater lakes, rivers, and large ponds, as well as inshore coastal waters of lagoons and estuaries. Often nests in colonies, on rock cliffs, or in tall trees.

TABLE 4.4-4 (Continued)
STATUS, DISTRIBUTION AND HABITAT OF SPECIAL-STATUS ANIMALS WITH A THEORETICAL POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED UCSC MARINE SCIENCE CAMPUS SITE

Common Name (*Scientific Name*)	**Status: Federal/State**	**Habitat Requirements**
Birds (cont.)		
Western snowy plover (*Charadrius alexandrinus nivosus*)	T/SC	Pacific coast populations nest on protected beaches or in coastal sand dunes.
California gull (*Larus californicus*)	--/SC	Nests in colonies on rock cliffs or islands where predators cannot reach its eggs.
Loggerhead shrike (*Lanius ludovicianus*)	--/SC	Associated with grassland or shrub habitat with plentiful lizards and insects for foraging. Hangs/stores prey items on thorns or barbed wire.
Tricolored blackbird (*Agelaius tricolor*)	--/SC	Nests in colonies in dense riparian vegetation, along rivers, lagoons, lakes, and ponds. Forages for insects over grasslands or aquatic habitats.
Vaux's swift (*Chaetura vauxi*)	--/SC	Nests in cavities of snags.
Burrowing owl (*Speotyto cunicularia*)	SC/SC	Uses open grassland habitats with low-growing vegetation interspersed with raised perches (bushes or fence posts). Uses abandoned burrows, especially of ground squirrels, for roost and nest sites. Forages on small mammals, lizards, and insects.
Northern harrier hawk (*Circus cyaneus*)	--/SC	Grasslands, prairie, savanna, sloughs, wet meadows, and marshes. Nests on the ground or in thick vegetation near the ground. Forages mainly on voles but will also take birds, carrion, snakes, frogs, and insects.
Sharp-shinned hawk (*Accipiter striatus*)	--/SC	Nests in a variety of habitats, including deciduous riparian forest, but is commonly associated with dense stands of smaller conifers. Often hunts near openings in forest or woodland, using woodland for cover.
Cooper's hawk (*Accipiter cooperi*)	--/SC	Nesting habitats include dense stands of riparian deciduous live oak or second-growth conifers, with relatively high crown closure and open understory, usually near stream courses.
White-tailed kite (*Elanus caeruleus*)	--/FP	Nests in conifers near open habitats such as grasslands or margins of sloughs/wetlands. Forages on small mammals (largely meadow voles) and lizards.
Long-eared owl (*Asio otus*)	--/SC	Utilizes abandoned stick nest of other large birds or squirrel nests. Utilizes a variety of wooded habitats, including orchards, but usually near both water and open habitats for foraging. Opportunistic feeder but forages mostly on rodents.

TABLE 4.4-4 (Continued)
STATUS, DISTRIBUTION AND HABITAT OF SPECIAL-STATUS ANIMALS WITH A THEORETICAL POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED UCSC MARINE SCIENCE CAMPUS SITE

Common Name (*Scientific Name*)	**Status: Federal/State**	**Habitat Requirements**
Birds (cont.)		
Short-eared owl (*Aiso flammeus*)	--/SC	Nests in low-growing vegetation in prairie, savanna, marsh, and meadow habitats.
Merlin (*Falco columbarius*)	--/SC	Uses a variety of habitats. Frequents shorelines in winter and catches shorebirds. Searches while flying at low level; attacks with a short dive, or dash from above. Captures prey on ground or in air, after direct pursuit.
Peregrine falcon (*Falco peregrinus*)	E/ Formerly E; delisted 8/25/99	Nests in cavities of cliff faces. Forages on other birds.
Mammals		
Pallid bat (*Antrozous pallidus*)	--/SC	Maternity roosts and day roost habitat occurs in bridge crevices and ledges, oak tree cavities (both mature or medium aged coast live-oak woodland, and coast live-oak savanna) and in cavities and bark of Monterey Pines.
Townsend's western big-eared bat (*Plecotus townsendii*)	--/SC	Potential maternity roosts and day-roost habitat occurs in bridge and buildings, in hollow redwoods, or in large tree cavities (oaks).
Fringed myotis (*Myotis thysanodes*)	--/**	Potential maternity roost habitat occurs in bridge crevices and ledges, tree cavities, and under exfoliating bark.
Long-legged myotis (*Myotis volans*)	--/SC**	Potential maternity roost and day roost habitat occurs in bridge crevices and ledges, and in the exfoliating bark on dead limbs and snags.
Western red bat (*Lasiurus blossevillii*)	--/**	Roosts in deciduous foliage of riparian habitat.
Southern sea otter (*Enhydra lutris nereis*)	T/FP	California sea otter will pup on land; usually in intertidal areas with rock outcrops protected from predators. The otter will take refuge and hunt in coastal lagoons.
Steller's sea lion (*Eumetoplas jubatus*)	T/--	Pups on land (on small offshore rocks or on mainland beaches).
San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*)	--/SC	Associated with riparian, oak woodland and redwood forest habitats. Builds stick nests on ground, under or in buildings or in hollow trees.

TABLE 4.4-4 (Continued)
STATUS, DISTRIBUTION AND HABITAT OF SPECIAL-STATUS ANIMALS WITH A THEORETICAL POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED UCSC MARINE SCIENCE CAMPUS SITE

Status Definitions:

Federal

E = Endangered: Any species that is in danger of extinction throughout all or a significant portion of its range.
T = Threatened: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
SC = Taxa which are under review, and for which sufficient biological information exists to support a proposal to list as an endangered or threatened species.
TESU = Threatened at the level of an Evolutionarily Significant Unit

State of California

E = Endangered: A native species or subspecies of animal which is in serious danger of becoming extinct throughout all or a significant portion of its range, due to loss of habitat, change in habitat, over exploitation, predation, competition, and/or disease.
T = Threatened: A native species or subspecies that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.
SC = CDFG Species of Special Concern
FP = Fully protected under Fish and Code Section 3511.
** = Taxa given special consideration because they are biologically rare, very restricted in distribution, declining throughout their range, or at a critical stage in their life cycle when residing in California, or taxa that are closely associated with a habitat that is declining in California (e.g., wetlands, riparian, old growth forest).

Notes: This table lists the endangered, threatened and sensitive wildlife species that use or could potentially use the project area. The principle source of information for status designation is California Department of Fish and Game (2001), "Special Animals." These wildlife species meet the criteria for consideration as threatened or endangered wildlife species, or are of particular concern to natural resource management agencies and potentially occur within the project site. Under Section 15380 of CEQA, a species not included in any listing identified by the state "shall nevertheless be considered rare or endangered if the species can be shown to meet the criteria" for listing. The USFWS encourages the consideration of proposed and candidate species in environmental planning such as environmental impact analysis under the National Environmental Policy Act of 1969.

SOURCE: Ecosystems West 2002, CDFG 2001

Tidewater goby (*Eucyclogobius newberryi*)

Listing Status: *California:* Species of Special Concern
Federal: Endangered[42]

The tidewater goby is a benthic fish that inhabits shallow lagoons and the lower reaches of coastal streams. It differs from other species of gobies in California in that it is able to complete its entire life cycle in fresh to brackish water. This goby appears to be mainly an annual species, although individuals in the northern part of the range may live up to three years.[43]

The tidewater goby is endemic to California and is distributed in brackish-water habitats along the coast from Agua Hedionda Lagoon, San Diego County, in the south to the mouth of the Smith River (Tillas Slough), Del Norte County, in the north. [44] Although the species was originally believed to be restricted to low-salinity waters (Fed. Reg., 1994), tidewater gobies are capable of living in saline waters reaching over 50 parts per thousand (ppt).[45] Large populations have been observed in lagoons ranging from fresh water (e.g., Soquel Creek and Pescadero Creek) to ocean salinities (Corcoran Lagoon and Moran Lagoon).[46] Tidewater gobies were captured during the September 2000 surveys in Younger Lagoon. Younger Lagoon is connected to two upland drainages. Both drainages are intermittent creeks/agricultural ditches. These drainages contain sandy soil and do not provide long-enough-lasting water to support native fishes. Younger Lagoon does not provide habitat for other special-status fish species.

California red-legged frog (*Rana aurora draytonii*)

Listing Status: *California:* Species of Special Concern
Federal: Threatened

California red-legged frog (CRLF) is chiefly a pond frog that can be found in quiet, permanent waters of ponds, pools, streams, springs, marshes, and lakes. Moist woodlands, forest clearings, and grasslands also provide suitable habitat for this species in the nonbreeding season (Stebbins, 1985). Adult frogs seek waters with dense vegetation along the shore, such as cattails, that provide good cover,[47] but may be found in unvegetated waters as well.

CRLF breed from January to May. Eggs are attached to vegetation in shallow water and are deposited in irregular clusters. Tadpoles grow to three inches before metamorphosing. CRLF are active year-long along the coast but will aestivate inland, frequently in ground squirrel burrows, from late summer to early winter. They may travel as far as a mile between areas of suitable habitat.[48]Adults consume insects such as beetles, caterpillars and isopods, while tadpoles forage on algae and detritus.

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42 Tidewater goby populations north of Orange County have been proposed for delisting by the USFWS because more recent data collected on the species suggest that the original listing rule overestimated the species' risk of extinction (Fed. Reg., 2001).
43 Moyle, P, R. Yoshiyhama, J. Williams, and EE. Wikramanayake, *Fish Species of Special Concern in California*, 2nd Edition. Published by California Department of Fish and Game, 1995.
44 Ibid.
45 Ibid.
46 Smith, J. J. Fisheries Biologist. San Jose State University. Personal Communication, 2000, 2001.
47 Miller, K.J., Willy, A. Larsen, and S. Morey, *Determination of Threatened Status for the California Red-legged Frog: Final Rule.* Federal Register, 61 (101): 25813-25833, 1996.
48 Federal Register, 2000. *Designated Critical Habitat: Critical Habitat for 19 Evolutionarily Significant Units of Salmon and Steelhead in Washington, Oregon, Idaho, and California – Final Rule.* Vol. 65, No. 32, February 16.

The uses of the aquatic habitats by CRLF at the site are discussed in detail in the California red-legged frog Biological Assessment prepared by EcoSystems West (2002). EcoSystems West observed one small adult CRLF at night on May 13, and during the day on May 14 of 2002, at a pool along the drainage ditch adjacent to the railroad tracks at the northern (upper) end of the terrace area. Bryan Mori observed three juvenile CRLF at this same location in 1997.[49] The CNDDB records four additional observation of CRLF within one mile of the project site. Given the opportunistic nature of CRLF selection of breeding sites, any of these observations could be at or near a breeding site (see also Ecosystem West 2002).

Both the lower and upper reaches of open water in Younger Lagoon are too saline to provide potential CRLF habitat. Both of the upper arms of Younger Lagoon contain small drainages with good riparian cover (mainly willows and small patches of cattails). These shallow, freshwater areas provide temporary hydration points, but are considered to be too ephemeral to support CRLF reproduction or rearing of non-reproductive juveniles. The upland areas adjacent to the wetlands and drainages of the YLR contain accumulated leaf litter and dense, low vegetation (blackberries and poison oak) that provide potential but unlikely upland cover. There is a potential for CRLF to move seasonally along the northern portion of the Younger Lagoon drainages (not the saline, open-water habitat of the lagoon itself).

Northern harrier (*Circus cyaneus*)

<u>Listing Status</u>: *California:* Species of Special Concern, Fish and Game Code 3503[50]–3503.5[51]
Federal: None

This species nests and forages along wet meadows, sloughs, savannas or prairies, and marshes, feeding on small mammals. The territory for this species is often a minimum of 10 to 20 acres foraging area.

A pair of mature northern harrier hawks was observed foraging over the upland terrace portion of the site. One bird from the pair was present during the entire length of the field observations conducted during April and May 2001. The female broods, feeds young, and chooses a male by territory.[52] During the mating season, nesting pairs will compete for territory with other nesting pairs, whereas, at other times, northern harriers may roost on the ground communally. Based on expectations of spring territoriality, it is reasonable to assume that the observed female and male northern harriers were a nesting pair, as they were not territorial with each other. No other harriers were observed foraging over the site. They used the undeveloped areas of the upland terrace intensively, and only occasionally flew over the upland area of the YLR. Their flight over Younger Lagoon usually resulted only in a quick circle back to the upland terrace. The adjacent agricultural fields were tilled and contained no foraging resources (rodents, grasshoppers, snakes, and frogs). At dusk, the male northern harrier was observed leaving the project site, flying towards the house in the agricultural field north of YLR, indicating that this bird does not night roost or nest at the project site. The harriers' intensive foraging of upland terrace and the lack of foraging areas on either side indicate that the upland terrace is an important foraging area for this

49 Mori, Bryan, "Terrace Point California Red-legged Frog Site Assessment, Santa Cruz, California." Unpublished consultants report prepared for ATC Realty Sixteen, Inc., San Francisco, CA, 1997.

50 Protected under Fish and Game Code 3503, which states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto

51 Protected under Fish and Game Code 3503, which states that it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.

52 Ehrlich, P.R., D.S. Dobkin and D. Wheye, *The Birder's Handbook*, Simon and Schuster Inc. New York. 785 p, 1988.

pair. The onsite foraging resources may sustain a nest for this pair outside of the project site. The northern harriers, however, have not been documented to nest at the project site. Previous surveys of this species conducted by Bryan Mori in 1997 resulted in similar findings.[53]

White-tailed kite (*Elanus leucurus*)

Listing Status: *California:* "Rare" as defined by CNDDB; Fish and Game Code 3503-3503.5
Federal: None

This species is a California resident, but shifts regionally within the state based upon food availability. Prior to 1895, this species was common to widespread in valley and lower foothill territory, but is now rare in many sections of the state. This species forages in wetlands and open brushlands, usually near water and streams. Oak woodlands, valley oak or live oak, or trees along marsh edges are used for nesting sites. The nest made by this species is a frail platform of sticks, leaves, weed stalks, and similar materials in trees or brush. A combination of habitats is essential, including open grasslands, meadows, or marshes for foraging and isolated, dense-topped trees for perching and nesting. The species was observed foraging on the upland terrace by EcoSystems West (2002). An unconfirmed report of nesting white-tailed kite near the Predatory Bird Research Group[54] Avian Facility indicates they may nest as well as forage at the site.

Western burrowing owl (*Speotyto cunicularia*)

Listing Status: *California:* Species of Special Concern, Fish and Game Code 3503-3503.5
Federal: None

The burrowing owl is a year-long resident of the Imperial and Central Valleys, the Central Coast and the San Francisco Bay area. The owl prefers open annual or perennial grasslands and disturbed sites with existing burrows, elevated perches, large areas of bare ground or low vegetation, and few visual obstructions.[55] Ground squirrel colonies provide a potential source of burrows for this owl. Burrows are typically located near water where large numbers of prey species, primarily insects, are found. The four- to eight-inch-diameter burrows are often lined with grass, debris, and feathers. Evidence of an occupied burrow typically includes excrement ("whitewash"), regurgitated food pellets of appropriate size, feathers, and/or prey remains at the mouth of the burrow. Breeding takes place between March through August, with a peak in April and May. Burrowing owls typically produce between four and six eggs per clutch, with young emerging from nests within two weeks and flying by about four weeks.

Grassland foraging habitat for burrowing owl, and limited nesting habitat in ground squirrel burrows, occurs on the upper terrace. Winter sightings of perching owls have been made on the artificial berm in past years. However, this species was not observed during the more recent surveys conducted by EcoSystems West and has not been known to nest in Santa Cruz County for many years.[56]

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53 Mori, Bryan, op. cit.
54 Linthicum, J. UCSC Predatory Bird Research Group. Personal Communication, 2003.
55 Zeiner, D.C., W.F. Laudenslayer, Jr., and K.E. Mayer (eds).California Department of Fish and Game (CDFG), *Birds, Volume II*, 1990.
56 Barclay, J. Raptor Biologist. Albion Environmental, Santa Cruz, CA. Personal Communication, 2003.

Saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*)

Listing Status: *California:* Species of Special Concern
Federal: Species of Concern

The saltmarsh common yellowthroat is a subspecies of the common yellowthroat, *Geothlypis trichas*. It prefers dense undergrowth in marshy areas, rivers, and swamps. The common yellowthroat may be found in both freshwater and saltwater marshes, but the saltmarsh subspecies is generally only found in saltwater habitats. Three male saltmarsh common yellowthroats were observed singing for territories during the 2002 surveys. Tyler[57] observed a small population of common yellowthroats nesting in tall reeds and cattails above the lagoon and between willow groves. This species was also observed exhibiting nesting behavior in the upper reach of the riparian corridor during 2001 avian surveys.

Special-Status Species Potentially Present

"Potentially present," as used in this section, is a designation for species which were not eliminated (considered absent) and for which habitat is present but data are incomplete. This may mean that records are old or uncertain as to locality or behavior of the species when observed. In addition, one species, the San Francisco dusky-footed woodrat, is not recorded at the site but is considered potentially present due to suitable habitat. These species are presumed present for purposes of the impact discussion.

These species—snowy plover, black swift, and San Francisco dusky-footed woodrat—are described in more detail below.

Snowy plover (*Charadrius alexandrinus nivosus*)

Listing Status: *California:* Species of Special Concern
Federal: Threatened

The snowy plover was listed as Threatened in 1993, primarily because of poor reproductive success resulting from human disturbance and predation, combined with permanent or long-term loss of nesting habitat to urban development. It is a bird adapted to ground-nesting on sandy beaches, where the survival value of seeing predators coming can exceed the value of adequate cover to hide behind. Plovers are slightly over six inches long, and pale colored. Upperparts are the color of dry sand on California beaches; the underparts are white. There are dark marks on the forecrown, auriculars (ear coverts), and at the shoulder. Plovers have a short black bill.

The parts of the beaches selected for nesting are generally open; however, areas surrounding plover nests can have up to 25 percent total cover. The majority of snowy plovers are site-faithful, returning to the same breeding site in subsequent breeding seasons. Three-quarters of the birds breeding in Monterey and Santa Cruz Counties in 2000 had been there the year before.[58] Wintering habitat is also important, especially since birds breeding in interior areas of the Great Basin may spend the winters with coastal populations, and loss of wintering habitat has certainly contributed to the decline of the species.

[57] Tyler, W. Breck, op. cit.
[58] Page, G.W.; Warriner, J.C.; George, D.; Neuman, K.; Eyster, C.; Hankel, L.; Stenzel, L.E. and D. Dixon. *Nesting of the Snowy Plover in Monterey Bay and on the Beaches of Northern Santa Cruz County, California, in 2000.* Point Reyes Bird Observatory, Stinson Beach, CA. January, 2001.

Wintering plovers are found on many of the beaches used for nesting but also on beaches not used for nesting, and this is probably the case in the project area. Snowy plover have been observed on the beaches and exhibited breeding behavior in 1983,[59] but the narrowness of the beach and the lack of subsequent observations suggest mainly non-breeding and occasional use.

Black swift (*Cypseloides niger*)

Listing Status: *California:* Species of Special Concern (nesting)
Federal: None

The black swift is a long-distance, neotropical, migratory bird that breeds in western North America in close association with seaside cliffs.[60] Known breeding populations are disjunct and are associated with highly specialized habitat characteristics: swifts require a moist cliff environment for nesting with high relief, inaccessibility, darkness, and absence of obstructions in the vicinity of the nest.[61] Black swift are present in the area, and anecdotal evidence in 1988 indicated a possible nest west of Natural Bridges State Beach and possibly at the YLR.

San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*)

Listing Status: *California:* Species of Special Concern
Federal: Species of Concern

This species prefers hardwood forests and brushlands and often forages above ground. Food includes berries, fungi, leaves, flowers, and nuts.[62] Potential habitat exists for the San Francisco dusky-footed woodrat in the impenetrable thickets of poison oak and scrub in the YLR and in central coast arroyo willow riparian forest.

Table 4.4-5 provides a summary of the special-status wildlife species, displayed by habitat types, either known or potentially present at the project site.

Sensitive Habitats

Wetlands

The definitions of, and regulations protecting, sensitive habitats (including ESHAs as defined under the Coastal Act, U.S. Army Corps of Engineers wetlands, and CNDDB sensitive natural communities) are discussed in a previous section. This section identifies those onsite habitats determined to be sensitive, under any or a combination of the sensitive habitat standards, and explains the relationship between the vegetation communities described above and the sensitive habitats.

The Habitat Restoration Group (1993) and John Gilchrist & Associates (1997) conducted previous wetland delineations in accordance with the 1987 *Army Corps of Engineers Wetlands Manual*. The wetland areas delineated in the 1997 report were considerably smaller than those reported in the 1993 report due in part to changed site conditions. The U.S. Army Corps of

59 Tyler, W. Breck, op. cit.
60 Foerster, K. S., "The distribution and breeding biology of the Black Swift (*Cypseloides niger*) in southern California." M.S. Thesis. Cal. State Univ., Long Beach, CA, 1987.
61 Terres, J.K. op. cit.
62 Jameson, E.W. and H.J. Peeters. *California Mammals*. University of California Press, Berkeley. 1988.

TABLE 4.4-5
WILDLIFE HABITAT TYPES AND
ASSOCIATED SPECIAL-STATUS SPECIES ON THE PROJECT SITE

Wildlife Habitat Type	Special-Status Wildlife Species Observed or Presumed Present
Annual grassland	Northern harrier (Observed) White-tailed kite (Observed) Western burrowing owl (Observed)
Coastal scrub	San Francisco dusky-footed woodrat (Presumed Present)
Fresh emergent wetland	California red-legged frog (Observed)
Saline emergent wetland	Saltmarsh common yellowthroat (Observed)
Riparian	San Francisco dusky-footed woodrat (Presumed Present)
Marine, beaches, and bluffs	Tidewater goby (Observed) Snowy plover (Presumed Present) Black swift (Presumed Present)

Engineers (Corps) verified the 1997 wetland delineation. In late 2000, the Coastal Commission expressed concern about the accuracy of certain wetlands in the 1997 wetland delineation. Additionally, the Terrace Point Action Network expressed further concerns about the accuracy of the 1997 wetland delineation. An informal wetland delineation indicating wetlands over most of the site was prepared by a consortium of environmental groups, including the Sierra Club and Terrace Point Action Network, among others.

The Huffman-Broadway Group (HBG) completed a detailed wetland delineation of the project site in 2002 in order to address the concerns expressed by the California Coastal Commission (CCC) and environmental groups.[63] HBG held several consultations and on-site meetings with CCC's senior biologist and received written input from the CCC and from various interested parties. The wetland investigation methods employed by HBG were based on the *Statewide Interpretive Guidelines on Wetlands and Other Wet Environmentally Sensitive Habitat Areas* (Wetland Guidelines), adopted by the Coastal Commission on Feb. 2, 1981, in which hydrology, soils, and vegetation were evaluated and interpreted using best professional judgement and other relevant state/federal wetland criteria (e.g., NRCS hydric soils criteria, Corps' 1987 Wetland

[63] Huffman-Broadway Group, Inc., *Investigation of the Geographic Extent of Wetlands and Other Environmental Sensitive Habitat Areas on Terrace Point and Younger Lagoon Reserve*, University of California, Santa Cruz. Prepared for the University of California, Santa Cruz. April 2002. Larkspur, California 46 pp. plus attachments and October 2002. Larkspur, California 35 pp. plus attachments.

Delineation Manual). The Coastal Commission is in the process of reviewing and verifying the 2002 HBG wetland delineation. The HBG has also prepared a wetland delineation in accordance with the 1987 *Army Corps of Engineers Wetlands Manual*. The Corps has not verified the October 2002 HBG wetland delineation. No wetland delineation was prepared to determine the jurisdiction of the CDFG; therefore, the extent of CDFG's jurisdiction was estimated for this document. The wetland areas on the site that are defined by CCC, Corps and CDFG regulations or guidelines are described below.

Table 4.4-6 summarizes the jurisdictional status of each wetland. A description of each wetland is presented below. See Figure 4.4-3 for locations of these wetlands.

TABLE 4.4-6
JURISDICTIONAL WETLANDS ON THE TERRACE AREA AND YOUNGER LAGOON RESERVE

Jurisdictional Feature	**Corps Jurisdiction (acres)**	**CCC Jurisdiction (acres)**	**CDFG Jurisdiction (approx. acres)**
Terrace Area			
Wetland W1 (drainage)	0.08	0.11	~0.11
Other drainages	0.02	(included in stream/riparian acreage for Younger Lagoon Reserve below)	(included in stream/riparian acreage for Younger Lagoon Reserve below)
Wetland W2/W3	3.46	4.49	--
Wetland W4	0.27	0.42	--
Wetland W5	1.65	1.99	--
Wetland W6	0.09	0.09	--
Wetland W7 (northeastern depression)	-- --	0.00098 (43 sf)	-- --
Wetland W8	--	0.01	--
Stream/Riparian Habitat	--	(included in stream/ riparian acreage for Younger Lagoon Reserve below)	(included in stream/ riparian acreage for Younger Lagoon Reserve below)
Total	**5.57**	**7.11**	**~0.11**
Younger Lagoon Reserve			
Wetlands	4.01	5.57	--
Open Water	2.97	(included in wetland acreage)	~2.97
Other drainages	0.04	(included in stream/ riparian acreage)	(included in stream/riparian acreage)
Stream/Riparian Habitat	--	5.37	~5.37
Total	**7.02**	**10.94**	**~8.34**

-- = No potential jurisdiction

Wetland W1 (Agricultural Drainage Ditch). This drainage feature flows due south in an artificial ditch along the western boundary of the terrace area, then turns southwest opposite the sharp curve in the entrance road and flows into the eastern arm of Younger Lagoon. The ditch was used to prevent inundation and allow cultivation in the northern portion of the property. Arroyo willow is scattered along the margins of the ditch, along with willow herb, and weedy non-native species, such as curly dock (*Rumex crispus).* This feature is subject to California Coastal Act wetland protection policies and CDFG jurisdiction under Section 1600 – 1607 of the Fish and Game Code.

The agricultural drainage ditch may qualify for exemption from the Clean Water Act Section 404 jurisdiction as a non-tidal drainage ditch excavated on dry land. However, HBG determined that this feature replaced a previously existing natural drainage and serves as an important hydrologic connection between Younger Lagoon and its upstream watershed. Thus, the agriculture ditch is also subject to Corps jurisdiction under Section 404 of the Clean Water Act.

Wetland W2. This seasonal drainage swale is located in the upper terrace area and extends to the northern boundary of the property. It drains to Younger Lagoon via a low point at the confluence of W2, W3 and the agricultural drainage ditch (W1). Much of the southernmost portion of the wetland, immediately north of the access road, is not sharply distinct in species composition from the adjacent, slightly more elevated grassland. The vegetation consists of non-native grassland. Italian ryegrass with scattered curly dock and false willow are the dominant species. This wetland is subject to California Coastal Act wetland protection policies and the jurisdiction of the Corps under Section 404 of the Clean Water Act.

Wetland W3. This wetland is a large area north of the entrance road that is topographically at a slightly lower elevation than its surroundings. It drains to Younger Lagoon via a low point at the confluence of wetlands W2, W3 and the agricultural drainage ditch. The vegetation consists of non-native grassland. It is similar in floristic composition to wetland W2, being overwhelmingly dominated by Italian rye grass, with scattered curly dock, but false willow is absent. This wetland is subject to California Coastal Act protection policies and the jurisdiction of the Corps under Section 404 of the Clean Water Act.

Wetland W4. This wetland consists of a swale and drainageway that drains to a culvert near the eastern boundary of the terrace area. The lower (eastern) end of the site is largely vegetated with non-native species, including wild radish, curly dock, and Italian ryegrass; the native species willow-herb is also scattered in this area. The vegetation of the central portion is not sharply distinct from that of the adjacent grassland. The western portion of the site, which is recognized as the willow-herb/false willow plant community, is largely dominated by willow-herb, with false willow also abundant. The non-native species cut-leaved geranium and bristly ox-tongue are also relatively abundant associates. This wetland is subject to California Coastal Act wetland protection policies and the jurisdiction of the Corps under Section 404 of the Clean Water Act.

Wetland W5. This wetland occupies a modest topographic depression in the southern portion of the terrace, immediately south of the NMFS building. The vegetation around the margins of this shallow seasonal pond is not sharply distinct from that of the adjacent grassland. The central portions of the pond are largely dominated by prairie bulrush, interspersed with patches of pale spike-rush (*Eleocharis macrostachya*), cattail, salt grass (*Distichlis spicata*) and pickleweed. The non-native herb biennial sagewort (*Artemisia biennis*) is locally abundant on the bed of this pond. It could be argued that W5 is considered an isolated, intrastate wetland and therefore not under Corps jurisdiction because of the SWANCC decision (see definition of waters of the U.S. in

Regulatory Context Section above). However, HBG determined that W5 should be considered a wetland because there is a clear hydrologic connection between W5 and Younger Lagoon via an artificial drainage ditch along the Long Marine Laboratory entry road, an underground culvert near the NMFS building and a narrow channel to the eastern portion of Younger Lagoon. Therefore, this wetland is subject to California Coastal Act wetland protection policies and the jurisdiction of the Corps under Section 404 of the Clean Water Act.

Wetland W6. This wetland is a seasonal wetland complex and occupies the lower-lying portions of the moist meadow habitat west of the entrance road in the extreme northeast corner near the YLR area. The non-native species, velvet grass, dominates the wetland. It also contains a mixture of rabbitsfoot grass (*Polypogon monospeliensis*), cutleaf plantain (*Plantago coronopus*), wild radish, prickly sow-thistle, and bristly ox-tongue. This wetland is subject to California Coastal Act wetland protection policies and the jurisdiction of the Corps under Section 404 of the Clean Water Act.

Wetlands W7 (Northeastern Depression). This northeastern artificial depression, located approximately 150 feet west of the eastern property line, is subject to ponding due to locally-generated runoff. The vegetation consists of non-native grassland. HBG (October 2002) believes this depression to be an anthropogenic feature created by demolition activities in the abandoned farm complex. The northeastern depression is hydrologically isolated from other wetlands on site. HBG determined that this wetland is not subject to Section 404 of the Clean Water Act because of its hydrologic isolation. This wetland is subject to California Coastal Act wetland protection policies since the hydrology and soil criteria are met.

Wetland W8 (Delaware Avenue Roadway Depression). This site just south of Delaware Avenue is a low-lying seasonal wetland immediately adjacent to the entry road of the project site. The vegetation consists of non-native grassland. The area is subject to a high degree of anthropogenic disturbance as evidenced by the existing tire ruts. This depressional area supports wetland hydrologic conditions during the rainy season, particularly within the tire ruts, but is hydrologically isolated from other wetlands on site due to the presence of Delaware Avenue. HBG determined that this wetland is not subject to Section 404 of the Clean Water Act because of its hydrologic isolation. This wetland is subject to California Coastal Act wetland protection policies since the hydrology and soil criteria are met.

Stream/Riparian Habitat. Stream/riparian habitat feeds the northwestern and northeastern fingers of the lagoon. The vegetation consists of central coast arroyo willow riparian forest. The boundaries of this stream/riparian habitat extend from YLR to the edge of willow vegetation on the terrace. HBG (July 2002) determined that because willow growth is typically colonial, the edge of stream/riparian habitat extends into upland areas, which do not exhibit wetland hydrology and hydric soil conditions. Stream/riparian habitat is subject to California Coastal Act wetland protection policies and possibly to CDFG jurisdiction under Section 1600 – 1607 of the Fish and Game Code.

Open water and other drainages. Open water and other drainages occupy the central portion of the YLR primarily, and a small portion on the terrace. As described by Huffman (July 2002), water levels in these area fluctuate based on freshwater inputs from the contributing watershed. The central portion of these areas contain streams with intermittent or perennial flows. Open water and other drainages are subject to California Coastal Act wetland protection policies, Corps jurisdiction under Section 404 of the Clean Water Act and possibly to CDFG under Section 1600 – 1607 of the Fish and Game Code.

California Coastal Commission Wetlands and ESHAs under California Coastal Act

Wetlands. The terrace area contains a total of 7.11 acres of wetlands which are subject to the California Coastal Act wetland protection policies. These include both natural and artificial wetlands. The natural wetlands include seasonal wetlands (W2 and W3, 4.49 acres), a drainage swale (W4, 0.42 acre), a seasonal pond (W5, 1.99 acres), and low-lying seasonal wetlands (W6, 0.09 acre). The artificial wetlands included an agricultural drainage ditch (W1, 0.11 acre), Delaware Avenue roadway depression (W8, 0.01 acre), and the northeastern man-made depression (W7, 0.00098 acre). The YLR contains 5.57 acres of wetlands and 5.37 acres of stream/riparian habitat, which are subject to the California Coastal Act wetland protection policies.

Wetlands and ESHAs under the Coastal Act. The Coastal Act defines "wetlands" under Section 30107.5. This definition states that wetlands are "lands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens." The Coastal Act defines "Environmentally sensitive area" as any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments. The Commission "generally considers wetlands, estuaries, streams, riparian habitats and portions of open coastal waters to be ESHAs because of the especially valuable role of these habitat areas in maintaining the natural ecological functioning of many coastal habitat areas and because these areas are easily degraded by human developments."[64] Most areas mapped as wetlands in both the terrace area (i.e., wetlands W2, W3, W4, W5, W6, and W8) and in YLR (including stream/riparian habitat) are therefore considered to meet the definition of an ESHA under the California Coastal Act (see Figure 4.4-3). In addition, the agricultural drainage ditch (W1), although an artificial drainage feature, is considered an ESHA because it functions as a source of freshwater to Younger Lagoon and is a documented habitat for sub-adult CRLF.

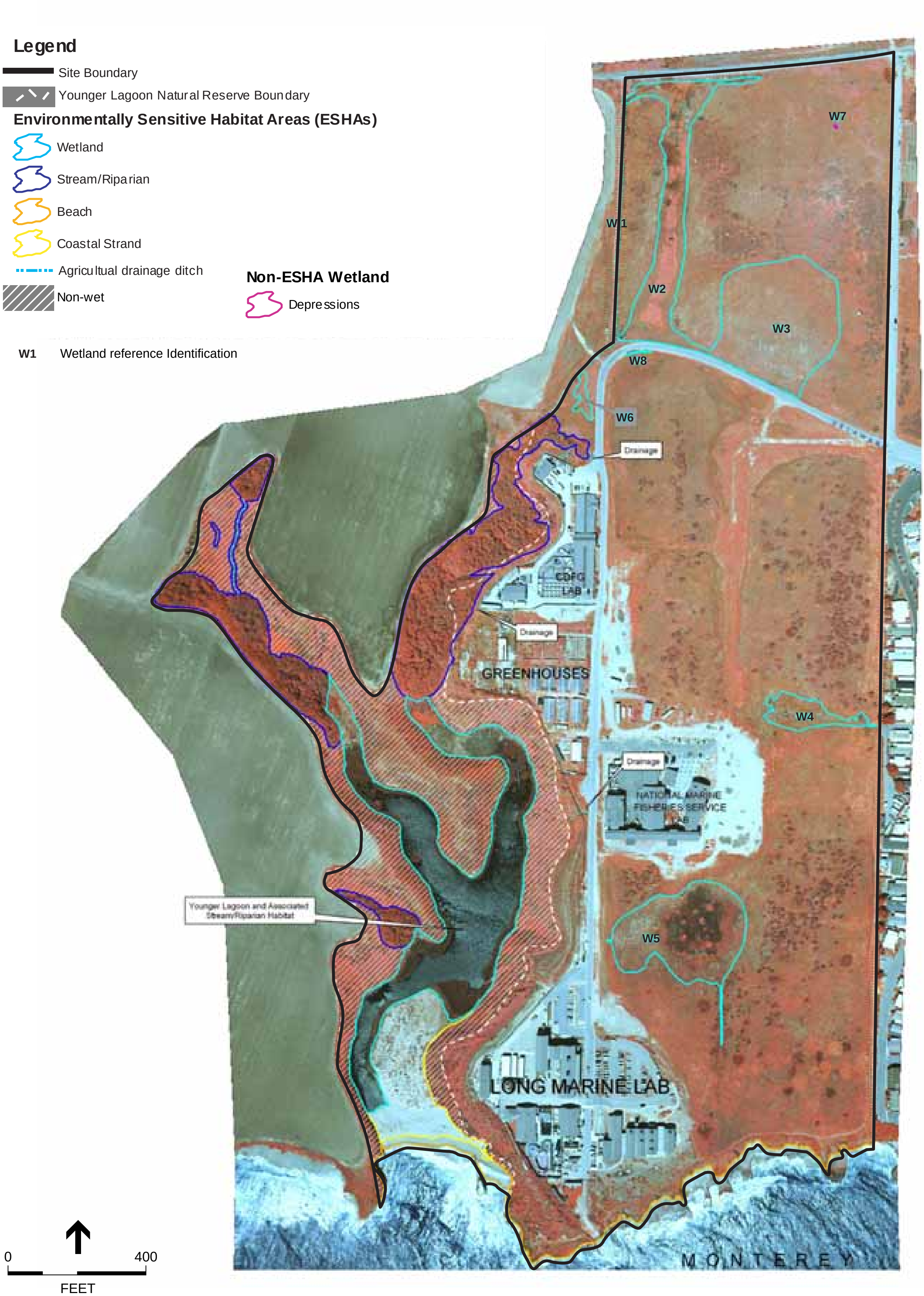
Wetland habitat types at the YLR include coastal saltmarsh (pickleweed), all three types of freshwater marsh (cattail, bur-reed, and Pacific oenanthe), and central coast arroyo willow riparian forest. All of these habitat types are considered ESHAs since they serve as important bird habitat, especially for migratory bird species.

Non-wet ESHAs. The entire YLR, including both the wetland described above and its upland habitats within its boundary, has been designated as an ESHA since at least the early 1990s (see Huffman-Broadway [July 2002] for discussion). Additionally, beach and coastal strand habitats are considered an ESHA based on the California Coastal Act protection policies assigned to beach habitats, and because CDFG (2002) considers coastal strand a very threatened community (S2.1), with 2,000-10,000 acres remaining. A final ESHA map is provided (see Figure 4.4-3); the boundary was drawn to reflect the definition provided in Coastal Act Section 30107.5.

U.S. Army Corps of Engineers Waters of the U.S.

A total of 5.47 acres of wetlands on the terrace area are subject to the jurisdiction of the Corps under Section 404 of the Clean Water Act. These wetlands include W2 and W3 (3.46 acres), W4 (0.27 acre), W5 (1.65 acres) and W6 (0.09 acre). The terrace area also contains 0.10 acres of

64 *Statewide Interpretive Guidelines on Wetlands and other Wet Environmentally Sensitive Habitat Areas,* adopted by the Coastal Commission on Feb. 2, 1981.



SOURCE: EcoSystems West Consulting Group and Huffman-Broadway Group

Figure 4.4-3
Wetlands and Other Environmentally Sensitive Habitat Areas on the Project Site

other “waters of the U.S.” including the agricultural ditch (0.08 acre) and other drainages (0.02 acre) that are subject to the jurisdiction of the Corps under Section 404 of the Clean Water Act. The YLR contains 4.01 acres of wetlands and 3.01 acres of other “waters of the U.S.,” including 2.97 acres of open water habitat and 0.04 acre of other jurisdictional drainages. Wetlands W7 and W8 are not considered wetlands under Section 404 of the Clean Water Act since the depressions are non-navigable, isolated, intrastate resources that lack a link to interstate commerce and lack a surface water connection to other “waters of the U.S.”[65] In addition, historical aerial photographs suggest that W7 was created on dry land incidental to construction activities.[66]

California Department of Fish and Game Streams and Sensitive Habitat

Streams. On the terrace area, the agriculture ditch and other drainages may be subject to the jurisdiction of the CDFG under Sections 1600–1607 of the California Fish and Game Code. The stream/riparian habitat is also subject to the jurisdiction of the CDFG under Sections 1600–1607 of the California Fish and Game Code.

Sensitive Habitat. On the terrace area, the seasonal pond at W6 and freshwater marsh–coastal terrace are identified as “worthy of consideration” as sensitive plant habitats by CDFG due to their rarity or limited distribution.[67] On the YLR, coastal strand, beach, coastal saltmarsh, cattail freshwater marsh, bur-reed freshwater marsh, Pacific oenanthe freshwater marsh, and central coast arroyo willow riparian forest are identified as “worthy of consideration” as sensitive plant habitats by CDFG due to their rarity or limited distribution.[68] Refer to Figure 4.4-2 for locations of these sensitive habitats.

Non-Sensitive Habitats

Natural habitats (especially ones that support native plant species) are generally considered to have greater ecological value than artificial habitats. However, not all such habitats have been deemed appropriate for special designation or protection. These habitats include areas that do not support potential jurisdictional wetlands, are not considered locally rare, are not uncommonly found, do not support special-status species, or that do not meet the Coastal Act definition of an ESHA or the CDFG definitions of a sensitive habitat.

As defined in the Coastal Act (30107.5), an ESHA must support species or habitats that are rare (e.g., a listed species resides there) or have a special role in the ecosystem (e.g., saltwater and freshwater intermixing zone). In addition, an ESHA must be vulnerable to human degradation or induced disturbance. Some habitats are frequently considered EHSAs under the Coastal Act (e.g., wetlands, streams, estuaries). However, if an area does not support special-status species

[65] Based on the Supreme Court ruling in *Solid Waste Agency for Northern Cook County v. U. S. Army Corps of Engineers* (SWANCC) concerning the Clean Water Act jurisdiction over isolated waters (January 9, 2001), non-navigable, isolated, intrastate waters based solely on the use of such waters by migratory birds are no longer defined as waters of the United States. Jurisdiction of non-navigable, isolated, intrastate waters may be possible if their use, degradation, or destruction could affect other waters of the Unites States, or interstate or foreign commerce.

[66] Huffman-Broadway Group, Inc., *Investigation of the Geographic Extent of Wetlands and “Other Waters of the U.S.” on Terrace Point and Younger Lagoon Reserve*,University of California, Santa Cruz. Prepared for the University of California, Santa Cruz. October 2002. Larkspur, California 35 pp. plus attachments.

[67] California Department of Fish and Game (CDFG), “California Natural Diversity Data Base” for 7.5 minute topographic quadrangle Santa Cruz. Information dated June 2002.

[68] California Department of Fish and Game (CDFG), “California Natural Diversity Data Base” for 7.5 minute topographic quadrangle Santa Cruz. Information dated June 2002.

and is already disturbed as a result of human activity, it can be excluded from the ESHA designation because, by definition, it fails the “sensitive” standard. All upland plant communities on the terrace also fail to qualify as ESHAs because they do not pass the two standards. The most fundamental basis for reaching this conclusion is that the entire terrace site was farmed, and its upland habitats are essentially disturbance-derived. While this condition does not automatically exclude ESHA status, it makes the area less sensitive to disturbance and less likely to support sensitive species.

Non-ESHA Wetlands

The northeastern man-made depression (Wetland W7) is not sensitive habitat or an ESHA under the criteria discussed above.[69] Neither this nor the Delaware Avenue roadway depression at W8 are considered Corps jurisdictional wetlands under Section 404 of the Clean Water Act since the depressions are non-navigable, isolated, intrastate resources that lack a link to interstate commerce and lack a surface water connection to other “waters of the U.S.” [70] In addition, historical aerial photographs suggest that W7 was created on dry land incidental to construction activities.[71]

False Willow (Douglas Baccharis) Patches

Except for populations of false willow that occur in or adjacent to previously identified wetland areas, HBG (July 2002, October 2002) determined that patches of false willow are not considered wetlands under California Coastal Act protection policies. Primarily, false willow does not act as a hydrophyte, since the sites occupied by this species do not undergo periodic flooding/ponding or periodic anaerobic soil conditions.[72] Moreover, most patches of false willow occur in association with upland plants, including coyote brush and Italian ryegrass.

Similarly, except for populations of false willow that occur in or adjacent to previously identified wetland areas, patches of false willow are not considered waters of the U.S. under Section 404 of the Clean Water Act. Moreover, these areas do not meet the conditions of the Fish and Game Commission policy statement: where less than three indicators are present, use of wetlands areas by wetland-associated fish or wildlife resources, related biological activity, and wetland habitat must be demonstrated. EcoSystems West surveys did not find organisms (e.g., breeding, wetland-dependent birds) that indicated these areas function as wetlands in a larger biological sense. By itself, false willow does not constitute a valuable species or community, nor does it support special-status or other wetland-dependent wildlife.

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[69] Huffman-Broadway Group, Inc., *Investigation of the Geographic Extent of Wetlands and Other Environmental Sensitive Habitat Areas on Terrace Point and Younger Lagoon Reserve*, University of California, Santa Cruz. Prepared for the University of California, Santa Cruz. April 2002. Larkspur, California 46 pp. plus attachments.

[70] Based on the Supreme Court ruling in *Solid Waste Agency for Northern Cook County v. U. S. Army Corps of Engineers* (SWANCC) concerning the Clean Water Act jurisdiction over isolated waters (January 9, 2001), non-navigable, isolated, intrastate waters based solely on the use of such waters by migratory birds are no longer defined as waters of the United States. Jurisdiction of non-navigable, isolated, intrastate waters may be possible if their use, degradation, or destruction could affect other waters of the Unites States, or interstate or foreign commerce.

[71] Huffman-Broadway Group, Inc., *Investigation of the Geographic Extent of Wetlands and “Other Waters of the U.S.” on Terrace Point and Younger Lagoon Reserve*,University of California, Santa Cruz. Prepared for the University of California, Santa Cruz. October 2002. Larkspur, California 35 pp. plus attachments.

[72] Huffman-Broadway Group, Inc., *Investigation of the Geographic Extent of Wetlands and Other Environmental Sensitive Habitat Areas on Terrace Point and Younger Lagoon Reserve*, University of California, Santa Cruz. Prepared for the University of California, Santa Cruz. April 2002. Larkspur, California 46 pp. plus attachments.

Grassland Suitable for Foraging by Special-Status Birds

The grasslands are used for foraging by the special status raptors discussed above, including northern harrier, the most persistent and often observed raptor on the project site. A foraging pair of northern harriers is not considered a basis for ESHA determination of upland areas. The species is not particularly disturbed by humans (it is common around built-up portions of the San Francisco Bayfront, for example) as long as there is adequate foraging within its typical home range. The scientific literature suggests that northern harriers respond more to the total amount of grassland available in the surrounding landscape rather than to the sizes of individual grassland fragments.[73] The project site does not “support” the harrier.[74]

Other Plant Communities

Nonsensitive natural habitats include all, or portions of the following vegetation communities, non-native grassland, moist meadow, willow-herb/false willow, coyote brush scrub-grassland, coastal bluff scrub, coastal scrub, and coastal scrub-grassland. Nonsensitive artificial habitats include barren ruderal, developed/ruderal, and landscape plant berm.

Wildlife Movement

The northern and western margins of the terrace portion of the site may be used by wildlife, such as red-legged frogs and smaller mammals, that move between the Moore Creek Drainage, Antonelli Pond and YLR. Most wildlife movement probably occurs along existing transportation corridors such as Delaware Road Extension and the railroad right-of-way (adjacent to the northern property boundary and offering some amount of cover due to the track berm) and to a lesser degree across the undeveloped fields of the upper terrace. Wildlife movement may concentrate along Wetland W2, which extends in a north-south direction and connects to YLR through Wetland W6 and has screening vegetation. The principle that isolated patches of habitat, however pristine, cannot assure the preservation of plant or animals species is well established in ecological literature and scientific consensus, and movement between these patches is clearly important in principle. However, this Draft EIR does not consider the area used by wildlife for movement to be an ESHA. In terms of the ESHA definition, the presumption that some portion of the upper terrace supports special-status species simply by virtue of its location is speculative and does not appear to meet the intent of the Coastal Act definition of ESHA as “any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem.”

73 Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, M. P. Nenneman, and B. R. Euliss. “Effects of management practices on grassland birds: Northern Harrier,” Northern Prairie Wildlife Research Center, Jamestown, ND. http://www.npwrc.usgs.gov/resource/literatr/grasbird/harrier/harrier.htm (Version 17FEB2000), 2001.

74 According to John Dixon, Biologist for the CCC, there has only been one project in California for which an ESHA was identified for an area based in part on the presence of foraging raptors. This ESHA determination was justifiable because the birds occurred in combination with other vegetation and wildlife resources and the areas were much larger.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP building program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new development of 529,856 square feet (sf) at the Marine Science Campus by about 2020. The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education; 70,000 sf for Outdoor Research Areas; 19,000 sf for Support Facilities; 98,100 sf for Support Housing; 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for Seawater System Expansion.

The CLRDP also identifies other site improvements including modifying and extending public-access trails and roadways, constructing parking, providing utility services, installing stormwater management systems, expanding the seawater system, developing new public access overlook areas, installing lighting, installing landscaping and signage, and implementing resource management measures to protect and enhance remaining habitat on the site. While most of the above development activities would occur within the three development zones, some improvements and/or activities would also occur outside of these areas, including: limited parking, utility improvements, stormwater management systems, the intake and discharge portion of an expanded seawater system, public access overlooks, lighting for safety and wayfinding, signage, and resource management activities.

The exact locations for buildings within each development area have not been mandated by the CLRDP. However, a prototype site plan is provided in the CLRDP (see Figure 3-7), which provides an example of how and where development described in the CLRDP building program could occur. The terrace area contains approximately 73 acres of habitat types, including approximately 20 acres of existing development (i.e., developed-ruderal). Within the three development areas, habitat types are distributed as follows:

1. Within the upper terrace development area, habitat types include ruderal (~ 0.3 acre),[75] non-native grasslands (~ 2 acres), coyote brush scrub-grassland (~ 2 acres) and two small wetlands (totaling 63 sf).

2. Within the middle terrace development area, the habitat types include the same three upland habitats listed above (~ 2 acres, ~ 4 acres, ~ 4 acres, respectively) as well as developed-ruderal (~ 11 acres); and

3. Within the lower terrace development area, the only habitats present are developed-ruderal (~ 7 acres) and non-native grassland (~ 0.6 acre).

Implementation of the CLRDP within the development areas would result in the removal of approximately 15 acres of habitat on the terrace area (excluding approximately 18 acres of developed-ruderal). This represents a loss of approximately 28% of the existing habitats on the terrace.

[75] The symbol "~" indicates an approximation.

The above described CLRDP development would increase noise on site during construction and operation, would increase the presence of people on site, would disturb soils during construction, would increase night lighting, could result in the introduction of invasive plant materials, and would change drainage conditions. To avoid and/or minimize indirect impacts on habitat resources outside the three development areas, the CLRDP includes Resource Protection Buffers around ESHAs. These buffers are 100 feet in most areas, unless a different width is shown on CLRDP Figure 5.2 (see Figure 3-6).[76] The CLRDP also includes policies that would: minimize noise intrusion into sensitive habitat areas; control and/or restrict access into sensitive habitat areas; provide for development restrictions (e.g., regulate location of windows, lighting, access, etc.) to protect habitat values; enhance wetlands and uplands; and control the quantity and quality of stormwater runoff into sensitive habitat areas. (See section below on Measures Proposed as Part of the Project for further details about these and other policies.)

The stormwater management policies of the CLRDP, designed to minimize impacts to on-site sensitive habitat areas, will be implemented via the CLRDP Stormwater Concept Plan. The five key components of this plan include: (1) maintenance of pre-development drainage peak flows to minimize downstream erosion and sedimentation; (2) treatment of stormwater through the use of source controls, treatment best management practices, and engineered stormwater treatment systems to achieve water quality objectives; (3) maintenance and monitoring of stormwater to ensure effective control of water quantity and quality; (4) maintenance of groundwater recharge at pre-CLRDP levels to the maximum extent practicable; and (5) correction of existing erosion and sedimentation problems in the YLR.

The CLRDP also includes resource management policies and a Resource Management Plan that provide detailed guidance for protecting, maintaining, and, as feasible, enhancing the natural resources of the non-developed areas of the terrace portion of the site. These policies and the plan call for the restoration and enhancement of wetlands, protection and enhancement of other natural areas, protection and enhancement of wildlife movement by establishing a wildlife corridor along the northern boundary of the site, management of special-status species, and maintenance and monitoring of management activities. (See section below on Measures Proposed as Part of the Project for further details about these policies.) The wildlife corridor noted above will be 20 feet wide with an adjacent 80-foot landscaped buffer to the south (for a total of 100 feet). The approximately 50 feet of railroad right of way between the property line and the tracks would increase the functional width of the corridor. The corridor will connect to wetlands W1, W2 and W6, which will in turn connect with the Younger Lagoon Reserve to create a continuous corridor for wildlife movement across the site.

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program by about 2010. Amongst the building footprints depicted in the CLRDP prototype site plan are specific sites for these five near-term projects (see Figure 3-7). These projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area in coyote brush scrub-grassland and ruderal vegetation. Additionally, this near-term project would be sited in an area occupied by non-ESHA wetlands. This project would have a

[76] Buffers are narrower where existing roads or other site features interfere; where the use of berms, fencing, and building design have historically supported a smaller buffer; and where differing elevations provide vertical separation.

ground surface area of 107,500 sf and would result in the removal of approximately 2.4 acres of existing habitat. This project would be located adjacent to the proposed wildlife corridor and associated resource protection buffer and also adjacent to the wetland resource protection buffer for wetland W2.

- 42 Apartment/Townhouse Units with a combined building space of approximately 43,050 sf would be constructed on the middle terrace development zone in ruderal and non-native grassland vegetation. This project would comprise a footprint of 1.3 acres and would result in the removal of approximately 1.3 acres of existing habitat. The southern most portion of this project would be located in proximity to wetland W4 and the remainder of the project would be located adjacent to open space on the site.

- The United States Geological Survey (USGS) Western Coastal and Marine Geology facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area in coyote brush scrub-grassland and ruderal vegetation. This project would comprise a footprint of 1.5 acres of ground surface and would result in the removal of approximately 1.5 acre of existing habitat. This project would be located in proximity to wetland W4.

- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area in an area occupied by developed/ruderal vegetation. This project would comprise 0.7 acres of ground surface and would result in the removal of approximately 0.1 acre of existing habitat. This project would be located adjacent to the eastern boundary of the YLR.

- The 18,000 sf-Center for Ocean Health Phase II facility (COH) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area in a previously developed area. Additionally, this proposed project would include the construction of two new public-access overlooks and improvement of an existing overlook. This project would comprise a footprint of 0.41 acres of ground surface and would result in the removal of 0.41 acre of existing habitat. The building portion of the project would be located in proximity to the eastern boundary of the YLR in an area already occupied by development. Two of the overlooks would be located adjacent to the eastern boundary of the YLR and the third would be located south of wetland W5.

MEASURES PROPOSED AS PART OF THE PROJECT

Numerous biological resource protection policies are proposed for the terrace area and the YLR. As part of the project, the resource management goals are identified in the Resource Management Plan (RMP). The purpose of the RMP is to provide guidance to protect, maintain, and enhance the natural resources of the terrace and YLR. The RMP, which is incorporated by reference in this Draft EIR and appended to the CLRDP, prescribes actions, time periods, and performance standards. Table 4.4-7 summarizes policies from the CLRDP that would contribute to protecting biological resources and cross references policy implementation measures to specific performance standards in the RMP, where applicable. In one case (the Resource Protection Buffer) the standard is drawn from another section (5.2.2) of the CLRDP. Refer to Section 4.9, Land Use and Planning, for a description of other measures that apply to biological resources.

TABLE 4.4-7
SUMMARY OF APPLICABLE CLRDP POLICIES AND IMPLEMENTATION MEASURES RELEVANT TO BIOLOGICAL RESOURCES PROPOSED AS PART OF THE PROJECT

POLICY 3.2 PROTECTION AND RESTORATION OF HABITAT AREAS		
Implementation Measure 3.2.1	**Restoration of Wetlands on the Marine Science Campus** As part of the University's comprehensive effort to manage natural resources on the Marine Science Campus, the University will consolidate, expand, and enhance wetlands on the northern part of the site to enhance functional values. The restoration program will include integrating the hydrology of Wetlands W1 and W2 and expanding this consolidated area to provide biological values that are not, and cannot be provided by the small non-ESHA wetland depression (W7) in the northeast corner of the site, which are isolated from other wetlands on the upper terrace. The program will also enhance plant biology in Wetlands W1, W2, and W6 to create a consolidated north-south corridor for wildlife movement to YLR. The University will prepare a restoration plan and submit it to the California Department of Fish and Game for review and comment.	**Performance Standard:** Wetland function as expected per design; Establish 50% cover of appropriate riparian native plants and 40% cover of native plant revegetation; Eliminate highly invasive weeds; Reduce weedy annual grassland seedset; No human disturbance to wetlands; Install fencing or signs as appropriate at restoration sites; Minimize anthropogenic disturbance to existing surface drainage patterns in open space areas; Continue monitoring restoration efforts.
Implementation Measure 3.2.2	**Management of Seasonal Wetlands** The University will protect and enhance the seasonal wetlands by improving surface water flow, controlling weeds, promoting the abundance and diversity of native plant species through small-scale plantings, creating buffers, implementing the stormwater concept plan, controlling access by humans and non-native animals, and implementing other enhancement measures in accordance with the management measures contained in the CLRDP.	**Performance Standard:** Construct new campus street that diverts traffic from Delaware Ave. Extension to the south out of wetland buffer area; Wetland function as expected per design; Establish 50% cover of appropriate riparian native plants; Eliminate highly invasive weeds in buffer areas; Reduce weedy annual grassland seedset; No human disturbance to wetlands; Establish berm at wetland W5; No human disturbance to revegetation plantings; Minimize anthropogenic disturbance to existing surface drainage patterns in open space areas; Continue monitoring restoration efforts.

**TABLE 4.4-7 (Continued)
SUMMARY OF APPLICABLE CLRDP POLICIES AND
IMPLEMENTATION MEASURES RELEVANT TO BIOLOGICAL RESOURCES
PROPOSED AS PART OF THE PROJECT**

POLICY 3.2 (cont.) PROTECTION AND RESTORATION OF HABITAT AREAS		
Implementation Measure 3.2.3	**Protection and Enhancement of Wildlife Movement** The University will facilitate and enhance wildlife movement across the site by establishing a corridor 20 feet in width and with a Resource Protection Buffer of 80 feet for unimpaired movement of wildlife along the northern boundary of the site, connecting with the north-south alignment of the wetland complex envisioned in Implementation Measure 3.2.1. Conditions for wildlife movement in these areas will be enhanced by eliminating highly invasive weeds, planting native species to provide better protective cover and visual screening for wildlife than existing vegetation, controlling access by humans and non-native animals, and other enhancement measures in accordance with the management measures contained in the CLRDP. The University will also coordinate with the owner of the property immediately east of the Upper Terrace (across Shaffer Road) to promote the extension of the proposed wildlife corridor to Antonelli Pond.	**Performance Standard:** Eliminate highly invasive weeds in proposed wildlife corridor; Establish 50% cover of appropriate native plants; No disturbance to revegetation plantings; No unauthorized activities in buffer areas; Minimal changes to surface topography from management activities; No changes to surface topography due to unauthorized activities; Maintain safe passage across Shaffer Road.
Implementation Measure 3.2.4	**Management of Special-Status Species [on the Terrace Area]** The University will protect special status animal species through protection and enhancement of wetland habitats (for CRLF) and grassland/scrub-grassland habitats outside of development zones (for special status bird species), through protection from non-native predators, and implement other enhancement measures in accordance with the management measures contained in the CLRDP.	**Performance Standard:** No evidence of non-native wildlife and feral animals on site; No domestic dogs or cats on site.

**TABLE 4.4-7 (Continued)
SUMMARY OF APPLICABLE CLRDP POLICIES AND
IMPLEMENTATION MEASURES RELEVANT TO BIOLOGICAL RESOURCES
PROPOSED AS PART OF THE PROJECT**

POLICY 3.2 (cont.) PROTECTION AND RESTORATION OF HABITAT AREAS		
Implementation Measure 3.2.5	**Management of Accessways on the Marine Science Campus** The University will protect habitat areas on the Marine Science Campus by developing trails and interpretive signs, managing trail use, and implementing other enhancement measures in accordance with the management measures contained in the CLRDP.	**Performance Standard:** Install designated trails and overlooks; No damage to vegetation or wildlife; No erosion; No unauthorized human trails due to trespassing.
Implementation Measure 3.2.6	**Management of Natural Areas** Except in areas designated “Research and Education Mixed,” the University will protect and enhance the non-native grassland, ruderal, coyote brush scrub-grassland, and coastal bluff areas through eliminating highly invasive weeds, controlling lower priority weeds, promoting the abundance and diversity of native plant species through small-scale plantings, preventing unauthorized trail development, and implementing other enhancement measures in accordance with the management measures contained in the CLRDP.	**Performance Standard:** Eliminate highly invasive weeds; Reduce weedy annual grassland seedset; Establish 40% cover of native species; Establish native plants in zone extending 60 feet beyond planted areas; No disturbance to revegetation plantings.
Implementation Measure 3.2.7	**Management of Water Quality** The University will protect water quality and prevent erosion by implementing the Stormwater Concept Plan contained in the CLRDP.	**Performance Standard:** No erosion problems in terrace habitats.
Implementation Measure 3.2.8	**Maintenance and Monitoring of Terrace Habitats** The University will develop long-term maintenance and monitoring programs for the terrace habitats and implement other enhancement measures in accordance with the management measures contained in the CLRDP.	**Performance Standard:** Monitor all terrace habitats for highly invasive species; Assess the adequacy of vegetation screening in buffers and wildlife corridor; Monitor terrace habitat plantings; Photodocument each habitat area; Conduct surveys of wetland habitats and surface water patterns; Prepare monitoring schedule; Maintain monitoring log; Replace plants.

TABLE 4.4-7 (Continued)
SUMMARY OF APPLICABLE CLRDP POLICIES AND IMPLEMENTATION MEASURES RELEVANT TO BIOLOGICAL RESOURCES PROPOSED AS PART OF THE PROJECT

POLICY 3.3 **USE AND ALTERATION OF MARINE RESOURCES**		
Implementation Measure 3.3.1	**Fill of Non-ESHA Wetland Depression** Fill of the small isolated non-ESHA wetland depression (W 7) near the northeast corner of the site will be carried out only as part of the wetland restoration program described in Implementation Measure 3.2.1. The University will replace fill wetland at a ratio of 2:1.	**Performance Standard:** (refer to Implementation Measures 3.2.1 and 3.2.2).
POLICY 3.4 **PROTECTION OF ENVIRONMENTALLY SENSITIVE HABITAT AREAS**		
Implementation Measure 3.4.1	**Additional Measures to Protect Habitat Areas** Buffering of sensitive habitat areas will also be achieved through development restrictions consistent with the policies and programs of this CRLDP which regulate the location of windows, lighting, access, signage, and noise-generating equipment that would disrupt protected habitat values.	**Performance Standard:** As per CLRDP Section 5.2.2, Resource Protection Buffer shall be 100 feet unless existing roads or other site features interfere, where the use of berms, fencing and building design have historically supported a smaller buffer, and where differing elevations provide vertical separation
Implementation Measure 3.4.2	**Noise Intrusion into Terrace ESHA** Buildings and parking lots constructed adjacent to YLR will be designed so that noise sources are at least 100 feet from ESHA located in the terrace portion of the Marine Science Campus.	
Implementation Measure 3.4.3	**Noise Intrusion into YLR** YLR will not be exposed to noise generated by human activity on the terrace portion of the Marine Science Campus in excess of 60 dBA CNEL, as measured at the boundary of the YLR.	

TABLE 4.4-7 (Continued)
SUMMARY OF APPLICABLE CLRDP POLICIES AND IMPLEMENTATION MEASURES RELEVANT TO BIOLOGICAL RESOURCES PROPOSED AS PART OF THE PROJECT

POLICY 3.5 SPECIAL PROTECTION FOR YOUNGER LAGOON RESERVE		
Implementation Measure 3.5.1	**Protection and Enhancement of YLR Habitats** The University will protect and enhance native plant and animal habitats for Younger Lagoon Reserve by controlling and removing weeds, promoting the abundance and diversity of native plant species through small-scale plantings and revegetation of areas where exotics have been removed, implementing the Stormwater Concept Plan, maintaining the existing security fencing and providing additional fencing as needed to control trespass from the terrace portion of the site into YLR, and limiting access by humans and domestic pets.	**Performance Standard:** Maintain fencing along YLR/terrace boundary; Eliminate highly invasive weeds (including poison hemlock) in YLR buffer/planted berm; Establish 50 percent cover of native plants; No human disturbance to revegetation plantings; No erosion of slope.
Implementation Measure 3.5.2	**Protection of Special-Status Species in YLR** The University will protect and enhance habitats for special-status animal species that use YLR.	**Performance Standard:** No evidence of non-native wildlife and feral animals on site; No domestic dogs or cats on site.
Implementation Measure 3.5.3	**Protection of Stream and Riparian Resources** The University will protect the biological productivity and quality of stream and riparian areas by minimizing the effects of wastewater discharges and entrainment, controlling runoff, preventing depletion of groundwater supplies, maintaining natural vegetation buffers areas and minimizing alteration of natural streams.	**Performance Standard:** (refer to Implementation Measures 3.2.1 and 3.2.2).
Implementation Measure 3.5.4	**Development of Monitoring and Maintenance Program** The University will develop long-term maintenance and monitoring programs for the YLR to assist in long-term preservation of species and habitats.	

**TABLE 4.4-7 (Continued)
SUMMARY OF APPLICABLE CLRDP POLICIES AND
IMPLEMENTATION MEASURES RELEVANT TO BIOLOGICAL RESOURCES
PROPOSED AS PART OF THE PROJECT**

	POLICY 3.6 **CONTROLLED PUBLIC ACCESS TO YLR**	
Implementation Measure 3.6.1	**Provision of Controlled Access to Terrace Habitats** The University will provide visual access to Younger Lagoon Reserve for the general public (overlooks) and limited physical access by authorized management, emergency, research, or student personnel, consistent with the Public Access and Recreation Plan contained in the CLRDP and with illustrative plans for overlooks contained in Appendix C of the CLRDP.	**Performance Standard:** No evidence of unauthorized trails or trespass.
	POLICY 3.7 **COASTAL BLUFF PROTECTION**	
Implementation Measure 3.7.1	**Bluff Setbacks** A setback of 100 feet will be maintained for buildings and facilities along the coastal bluff in recognition of potential geologic coastal cliff erosion and to minimize the risk to human life. Development in the cliff setback will be limited to existing streets, existing and proposed pedestrian and bicycle pathways, and infrastructure improvements such as seawater system facilities that are consistent with the CLRDP.	
Implementation Measure 3.7.2	**Protection and Enhancement Measures** The University will protect and enhance the coastal bluff environment of the Marine Science Campus in accordance with the management measures contained in the CLRDP.	**Performance Standard:** Eliminate highly invasive weeds (including iceplant) on coastal bluff; Establish 40 percent cover of native plants in planted areas; No disturbance to coastal bluff vegetation.

In addition to the implementation measures summarized above from the clrdp and the rmp, two scenic and visual resource policies would contribute to protecting biological resources. These measures include Implementation Measure 4.4.1 (Building Lighting), which states that "direct light from a lighting fixture located in the interior or exterior of buildings immediately adjacent to YLR or terrace wetlands will not be visible in the YLR or the adjacent terrace wetlands," and Implementation Measure 4.4.3 (Parking Lot and Maintenance Yard Lighting), which states that "direct light from a lighting fixture located in a parking lot immediately adjacent to YLR or terrace wetlands will not be visible in the YLR or the adjacent terrace wetlands."

PROJECT IMPACTS AND MITIGATION MEASURES

This impact assessment is based upon a review of the project site and the potential effects of the CLRDP activities on biological resources, including special status plant and animal species, sensitive plant communities, wetlands, wildlife movement corridors and applicable plans and policies. For each potential impact, the analysis compared the resource impact to the standards of significance and determined the level of significance under CEQA.

SPECIAL-STATUS PLANT SPECIES

Entire Development Program

No state or federal special-status plant species or other special-status plant species occur on the project site, and no such species are presumed to be present due to the lack of suitable habitat. Therefore, the implementation of the proposed CLRDP would not have the potential to result in significant adverse impacts on any special-status plant species under CEQA.

Near-term Projects

For the same reasons noted above, the five near-term projects would not have the potential to result in impacts to special status plant species.

SPECIAL-STATUS WILDLIFE SPECIES

Entire Development Program

Migratory birds, especially shorebirds and waterfowl, make transient use of the site, but are not supported exclusively by onsite habitats. Moreover, the most important site habitat features to which these species are attracted, those in the YLR and terrace wetlands, would be protected as part of the project. Effects upon most of these species are thus considered less than significant, under the significance criteria listed at the beginning of this chapter.

Snowy Plover. Snowy plover have been observed on the beaches and exhibited breeding behavior in 1983,[77] but beach width and the possibility that waves wash over the beach and into the lagoon during the nesting season suggest it is not used for nesting. In any event, the beach area would not be affected by the actions proposed in the CLRDP. Therefore, this Draft EIR concludes that effects on snowy plovers are less than significant, under the significance criteria listed at the beginning of this chapter.

[77] Tyler, W. Breck, "Annotated checklist for the birds of the Younger Lagoon area. Institute of Marine Sciences, UC Santa Cruz Natural Resource Library," 1988.

Merlin. Merlin were discussed in prior EIRs[78,79] as these species had been observed on the terrace where development was proposed. Impacts were identified as less than significant because their presence on the site was only occasional, and foraging would not be extensively disrupted. For the same reasons, this Draft EIR also concludes that project effects on merlin are less than significant, under the significance criteria listed at the beginning of this chapter.

Loggerhead shrike. Loggerhead shrike were discussed in prior EIRs[80,81] prepared for the project site, as these species had been observed on the terrace where development was proposed. Impacts were identified as less than significant because their presence on the site was only occasional, and foraging would not be extensively disrupted. For the same reasons, this Draft EIR concludes that project effects on loggerhead shrike are less than significant, under the significance criteria listed at the beginning of this chapter.

Tricolored blackbird. Tricolored blackbird were discussed in prior EIRs[82,83] as these species had been observed on the terrace where development was proposed. Impacts were identified as less than significant because their presence on the site was only occasional, and foraging would not be extensively disrupted. For the same reasons, this Draft EIR concludes that project effects on tricolored blackbird are less than significant, under the significance criteria listed at the beginning of this chapter.

Peregrine falcon. Peregrine falcon was the focus of considerable public concern in the earlier documents. The peregrine's restoration in the wild has been a subject of international and local importance, and there are known active peregrine eyries (nest sites) along south Waddell Creek in Big Basin State Park and along Bear Creek north of Boulder Creek.[84] In response to comments on the 1997 Santa Cruz Coastal Marine Research Center at Terrace Point EIR, it was concluded that the peregrine falcon, an international migrant with a vast home range, would not be significantly affected by the loss of 40 acres of ruderal grassland. The presence of peregrines successfully introduced into urban areas can be interpreted to mean that the species can persist in urbanized environments, provided that prey base and cliff nesting habitats are available in an environment uncontaminated by DDT. None of these necessary conditions would be affected by the project. Moreover, the peregrine was federally delisted in 1999, reflecting improved populations nationwide. This Draft EIR concludes that effects on peregrine falcon are less than significant, under the significance criteria listed at the beginning of this chapter.

Tidewater goby. The tidewater goby survives best in brackish coastal lagoons with sandy mud bottoms, abundant submerged and emergent vegetation, and with backwater areas not susceptible to frequent scouring from high winter flows. Major factors known to affect tidewater goby populations are loss and degradation of suitable coastal saltmarsh habitat, but that degradation occurs mostly from diversions (as opposed to inputs) of freshwater, which reduces flows and reduce brackish marsh health, as well as upstream pollutants. Invasion of non-native species of fish and frogs which prey on the gobies is also a problem for the species.

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78 University of California Santa Cruz Office of Campus Facilities, "Draft Environmental Impact Report, Long Marine Lab Master Plan," 1993.
79 Strelow Consulting, "Draft Environmental Impact Report, Santa Cruz Coastal Marine Research Center at Terrace Point," 1997.
80 University of California Draftop.cit.
81 Strelow ConsultingDraft, op.cit.
82 University of California Draft, op. cit.
83 Strelow ConsultingDraft, op. cit.
84 Linthicum, J. "UCSC Predatory Bird Research Group." Personal Communication.

Implementation of the CLRDP is not anticipated to result in any of these kinds of significant changes to the lagoon ecosystem, due to measures described in the Stormwater Concept Plan for the project (CLRDP, Appendix D) and in the Hydrology chapter of this Draft EIR. The goby does not seem to be particularly sensitive to minor water quality effects that might occur from runoff: for example, the tidewater goby is reported to be tolerant of anoxic conditions that eliminate most other fishes.[85] In their 1999 proposal to de-list the northern populations of the goby, the USFWS described them as "a resilient species which can tolerate a wide range of water quality conditions."[86]

Effects upon the tidewater goby are thus considered less than significant, under the significance criteria listed at the beginning of this chapter.

California Red-Legged Frog. The status and distribution of CRLF and its habitat are discussed in the Setting section above based on the *USCS Marine Science Campus California Red-Legged Frog Biological Assessment*, prepared by Ecosystems West (2002), which is incorporated by reference.

Impact 4.4-1: Implementation of the CLRDP would not affect CLRF breeding habitat and would avoid impacts on dispersing CRLF by setting development back from off-site areas where the species has previously been observed. The impact on the species would be considered less than significant.

As described in the Setting section, several focused surveys of the project site for CRLF have been conducted between 1993 and 2002. The species has not been observed onsite, although on two occasions (in 1997 and 2002), juveniles and sub-adults were observed immediately adjacent to the site in a ditch along the railroad tracks to the north of the Marine Science Campus.

CRLF are known to occupy and reproduce in marshy habitats, springs, ponds and backwater pools of rivers and streams. For successful reproduction to occur, surface water must be present at a minimum from March to late June (Ecosystems West 2002). Breeding adults tend to be associated with ponded or slow moving water at least 2 feet deep and good aquatic cover (e.g., emergent vegetation and riparian cover) (Mori 1997; Flohr 2000). This habitat may be permanent or ephemeral freshwater sources or tidally influenced coastal marshes with low salinity levels (less than 9 ppm). Adults usually stay within a few feet of surface water areas during spring and summer months but will move up to 3 miles to other aquatic areas during rainy weather (Bulger 1999). CRLF movements appear to follow a straight line of travel across upland habitats outside of riparian or wetland areas (Ecosystems West 2002).

As discussed in the Setting section, although wetlands on or adjacent to the upper terrace area may serve as temporary hydration points for dispersing individuals, given the short duration of ponding in the terrace wetlands, and the salinity levels in the Younger Lagoon, the project site wetlands do not provide breeding habitat for the species. Following focused surveys for the species on the site for the proposed project, the University consulted with USFWS staff who concurred that the project site does not provide appropriate breeding habitat for CRLF.

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[85] Moyle, P, R. Yoshiyhama, J. Williams, and EE. Wikramanayake, *Fish Species of Special Concern in California*. 2nd Edition. Published by California Department of Fish and Game, 1995.

[86] U.S. Fish and Wildlife Service news release June 24, 1999.

During the non-reproductive period, adult frogs spend time in riparian habitat resting and feeding in the vegetation and tend to remain near the water (Ecosystems West 2002). The non-aquatic upland areas on the terrace portion of the site do not provide such habitat, and its low vegetation cover offers little protection from predators. The upland areas are therefore considered to have a low potential for use by CRLF, and it is unlikely that any adult or sub-adult frogs would be encountered in this area. Juvenile CRLF may disperse and utilize both breeding and non-breeding habitat throughout the year. However, there are no known breeding sites close to the project site from where juveniles may disperse. Although Antonelli Pond is approximately 500 feet east of the Marine Science Campus and historically CRLF has been sighted at this pond, because of the abundance of predators in and around the pond (including bullfrogs, other vertebrate predators as well as non-native fishes), that pond has been determined not to be a breeding site (Flohr 2000). The nearest known breeding sites are at Wilder State Park about 1.5 miles to the west and at the UCSC Main Campus about 2.5 miles to the north. The project site is not close to any of these known breeding sites, nor is it located on a dispersal corridor between two suitable aquatic habitats. Although the wetland areas on the upper terrace do have the potential to provide temporary hydration and foraging areas for CRLF during winter movements, the number of dispersing individuals in this area is likely to be low because of the distance from breeding sites and because the aquatic habitat on the site is ephemeral. During consultation with Amelia Orten-Palmer, Section Supervisor for the Ventura Office of the USFWS, and Diane Gunderson, USFWS staff biologist, the Service concurred that because of its distance from known breeding sites, the project site does not provide suitable aestivation habitat for the species. Therefore, it is unlikely that the project would affect aestivating or dispersing individuals.

Furthermore, the CLRDP has been developed to avoid impacts to the species. The CLRDP land use diagram (Figure 3-6) includes a 100-foot buffer between the ditch where CRLF has been observed in the past and the upper terrace development area, and all areas of the upper terrace area that are potential habitat for this species have been protected by designating the land as resource protection or resource protection buffer on the land use diagram. In summary, the proposed project would not affect CRLF breeding habitat as none is present on site, and would avoid impacts on dispersing CRLF by setting development back from off-site areas where the species has previously been observed and by preserving areas that provide potential habitat for the species. The impact on the species is considered to be less than significant. To further reduce the potential to adversely affect the species, the following mitigation measure will be implemented:

Project-Specific Mitigation Measure 4.4-1: For all projects proposed in the upper terrace under the CLRDP, the University will implement the following:

- **A preconstruction survey for CRLF will be conducted of all areas proposed for grading and construction by a qualified biologist, approved by the USFWS. If CRLF are observed, grading activities shall be postponed and USFWS shall be consulted to determine appropriate actions to avoid impact. Consultation with the USFWS will result in either a determination of the need to obtain a permit or in the identification of measures to avoid take of the individual(s).**

- **The biological monitor shall also conduct meetings with the contractor(s) and other key construction personnel to describe the importance of the species, the need to restrict work to designated areas, and to discuss procedures for avoiding harm or harassment of wildlife encountered during construction.**

Northern Harrier. The species is not listed under the FESA or the CESA, but is considered to have special status by the CDFG and its nest sites are further protected under the California Fish and Game Code (Section 3503.5). Thus extensive habitat loss and destruction of nests would be significant. A pair of northern harriers (a CDFG species of special concern) regularly uses the terrace area. Beyond the loss of foraging habitat, indirect disturbance to grassland habitats could result from night lighting, noise, and other human activity. Impacts from these sources (for the northern harrier and the other raptors discussed below) will be effectively reduced to less-than-significant though CLRDP Implementation Measures 3.4.1, which provides a buffer for sensitive habitat areas, 3.2.6, which prohibits unauthorized trail development, and 4.4.1 and 4.4.3, which limit direct lighting from buildings and parking lots.

Survey data suggest that the northern harriers do not presently nest on the site; however, they may establish nests during the implementation of the ground-disturbance phases of the CLRDP. Therefore, the project does have the potential to cause adverse impacts to harriers that may be nesting during construction or restoration activities.

The aggregate loss of about 15 acres of raptor foraging habitat (including ruderal, non-native grassland, and coyote brush scrub-grassland), or about 28 percent of the current extent available at the site, would be offset by CLRDP Implementation Measure 3.2.6, which will protect and enhance these habitat types on the property. Native grass and shrublands are considered more diverse than the weedy plant communities they have replaced; for example, the small open areas between perennial grass hummocks may allow more efficient foraging by aerial predators while simultaneously protecting nest sites with vegetation that retains its height structure longer into the summer. With implementation of this policy, there is a higher likelihood that the northern harrier, which requires sites "well-concealed by tall, dense vegetation, including living and residual grasses and forbs, or low shrubs,"[87] could establish nesting sites. The project thus provides a compensatory feature to prevent this impact from becoming significant.

White-tailed Kite. The species is not listed under the FESA or the CESA, but is considered to have special status by the CDFG and its nest sites are further protected under the California Fish and Game Code (Section 3503.5). Thus extensive habitat loss and destruction of nests would be significant. There have been multiple observations of the white-tailed kite at the site. A report of nesting activity by white-tailed kite at the Predatory Bird Research Group[88] indicates they may nest as well as forage; therefore, the project does have the potential to cause adverse impacts to kites that may be nesting during construction or restoration activities.

Western Burrowing Owl. The species is not listed under the FESA or the CESA, but is considered to have special status by the CDFG and its nest sites are further protected under the California Fish and Game Code (Section 3503.5). Although the species was not observed in surveys conducted for the project and has not been known to nest in Santa Cruz County for many years, observations of wintering owls in past years suggest the possibility of nesting; therefore, the project does have the potential to cause adverse impacts to owls that may be nesting during construction or restoration activities.

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[87] Herkert, J. R., S. A. Simpson, R. L. Westemeier, T. L. Esker, and J. W. Walk, *Response of Northern Harriers and Short-eared Owls to grassland management in Illinois*. Journal of Wildlife Management 63:517-523, 1999.
[88] Linthicum, J. UCSC Predatory Bird Research Group. Personal Communication, 2003.

<u>Impact 4.4-2</u>: Development on, and restoration of, annual grassland and coastal scrub on the middle and upper terrace development zones could cause a lost of nesting raptors that may be present, primarily through the direct effects of ground disturbance and the indirect effects of increased human activity and noise. Because raptor nesting records are limited for the site, and due to abundant alternate and protected habitat in the region, the probability of this impact is low and the degree of impact is considered less than significant.

> **<u>Project Specific Mitigation Measure 4.4-2</u>: UCSC shall ensure that construction activities avoid disturbing nests of raptors (and other special-status birds). If ground-disturbing activities are scheduled to occur during the breeding season (February 1 through August 31), the following measures are required to avoid potential adverse effects on nesting special-status raptors and other birds:**
>
> - **A qualified wildlife biologist will conduct preconstruction surveys of all potential nesting habitat. For burrowing owls, such surveys will follow the most recent CDFG *Burrowing Owl Survey Protocol and Mitigation Guidelines.***[89]
> - **If active raptor nests are found during preconstruction surveys, a no-disturbance buffer acceptable in size to CDFG will be created around active raptor nests and nests of any other special-status birds during the breeding season, and maintained until it is determined that all young have fledged. Raptor or other bird nests initiated during construction are presumed to be unaffected, and no buffer is necessary. However, the "take" of any individuals will be prohibited.**
> - **If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied during the construction/restoration period, no further mitigation is required. Trees and shrubs that have been determined to be unoccupied by special-status birds or that are located outside the no-disturbance buffer for active nests may be removed.**

If construction or restoration activities (i.e., ground clearing and grading, including removal of trees or shrubs) are scheduled to occur during the nonbreeding season (September 1 through January 31), no mitigation is required.

The proposed mitigation measures would reduce impacts on special-status raptors.

Black Swift. Black swift would be sufficiently distant and shielded from disturbances caused by most development that impacts would generally be less than significant. However, the CLRDP proposes to expand the current seawater system on the lower terrace portion of the site to accommodate an additional 6,000-gallon-per-minute capacity. Construction and/or operation of the expanded seawater system has the potential to disrupt nesting black swift, if present. Given the relative scarcity of suitable nesting habitat and the sensitivity and rarity of the species, disruption of nesting could be a significant impact according to the significance criteria listed at the beginning of this chapter.

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[89] California Department of Fish and Game, *Staff Report on Burrowing Owl Mitigation*, The Resources Agency, October 17, 1995.

Impact 4.4-3: Construction of expanded seawater system facilities could cause a direct loss of nesting black swift not now known to nest, but with the potential to do so in any given year, an adverse but less than significant impact.

> **Project Specific Mitigation Measure 4.4-3: UCSC will ensure that construction/operation activities avoid disturbing nests of black swift. If construction activities are scheduled to occur during the breeding season (June 1 through September 30), the following measures will be implemented to avoid potential adverse effects:**
>
> - **UCSC will conduct pre-construction surveys to determine presence of active black swift nests within the project area. Published literature[90] suggests that the optimal survey time is the final two hours of daylight, when chick provisioning rates may increase and adults are returning to the colony to roost. Targeting surveys for the last hours of daylight should also maximize the probability of counting breeding as opposed to nonresident foraging individuals.**
>
> - **If active nests are found during preconstruction surveys, UCSC will delay construction until after fledging occurs. If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied, no further mitigation is required.**

Saltmarsh Common Yellowthroat. Three male saltmarsh common yellowthroats were observed singing for territories during the 2002 surveys, without identification of actual nest sites. Tyler[91] observed a small population of common yellowthroats nesting in tall reeds and cattails above the lagoon and between willow groves. The species is both a state and federal species of concern and nests sites are protected by the Migratory Bird Treaty Act and by the Fish and Game codes.

The nest sites, both presumed to be in the YLR and protected by tall reeds and cattails, would not be disturbed by the project and are well shielded from indirect effects. Therefore, impacts on this species are considered less than significant.

San Francisco dusky-footed woodrat. The nest sites and home ranges of this species, not known but presumed to be present in the YLR, are in dense scrub and brushlands. These habitats (shown in Figure 4.4-2) would not be disturbed by the project and are well shielded from indirect effects. Therefore, potential impacts on this species are considered less than significant.

Near-term Projects

The Shared Campus Warehouse and Laydown Facility would occupy an approximate combined total of about 2 acres on the upper terrace, most of it consisting of coyote brush scrub-grassland and ruderal vegetation. This habitat type is used by northern harrier for foraging and potentially for nesting. Disturbance, loss of foraging habitat and potential destruction of nests is discussed under Impact 4.4-2 above. Project-Specific Mitigation Measure 4.4-2 would reduce the impact to a less-than-significant level. Additionally, as noted above, the upper terrace area may be used by CLRF to disperse and therefore construction activities associated with the shared warehouse

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90 Foerster, K. S., "The distribution and breeding biology of the Black Swift (*Cypseloides niger*) in southern California." M.S. Thesis. Cal. State Univ., Long Beach, CA, 1987.
91 Tyler, W. Breck, "Annotated checklist for the birds of the Younger Lagoon area. Institute of Marine Sciences, UC Santa Cruz Natural Resource Library," IMS Publication #10, 1988.

project could potentially result in the take of CLRF that may incidentally be present on site (Impact 4.4-1). The project will implement Project-Specific Mitigation Measure 4.4-1, which would reduce the impact to a less than significant level.

The USGS Phase I project, SORACC, and the 42 Housing Units would have a combined footprint of approximately 1.5 acres on the middle terrace, most of it developed-ruderal, coyote brush scrub-grassland and ruderal vegetation. Impacts and mitigations would be similar to those for the Shared Campus Warehouse and Laydown Facility, and these projects would also implement Project-Specific Mitigation Measure 4.4-2, which would reduce the impact to nesting raptors to a less than significant level.

The Ocean Health Phase II project would have a footprint of approximately 0.2 acre on the lower terrace in an existing developed area. Developed/ruderal is the dominant plant community on the lower terrace. Development of this facility would require removal of minimal ruderal vegetation which is not used for nesting or foraging by any of the species discussed above. Therefore, this project would not result in impacts on special-status wildlife species.

SENSITIVE HABITATS AND WETLANDS

Entire Development Program

Several types of sensitive habitats are present on the site, including wetlands (seasonal pond and freshwater marsh–coastal terrace), coastal strand, coastal salt marsh, cattail freshwater marsh, bur-reed freshwater marsh, Pacific oenanthe freshwater marsh, and central coast arroyo willow riparian forest. It is not expected, however, that project actions would cause significant adverse effects on sensitive habitats, for the reasons outlined below.

As part of the project, sensitive habitats are designated within resource protection zones and are outside of the three development areas, with the exception of wetland W7.

Seasonal pond and freshwater marsh–coastal terrace occur on the terrace area near the development areas. These are the wetlands, designated W2, W3, W4, W5 and W6. These wetlands are under the jurisdiction of at least one of the regulatory agencies, and would be avoided as part of the CLRDP (Policy 3.2) and protected with buffers of 100 feet unless a different width is designated in CLRDP Section 5.2.2. Buffers are narrower where existing roads or other site features interfere, where the use of berms, fencing, and building design have historically supported a smaller buffer, and where differing elevations provide vertical separation. As noted above, these wetlands (including W1) are also ESHAs under the Coastal Commission definition. Beyond the immediate boundaries of the wetlands/ESHAs, the buffers are considered adequate to ensure that the development proposed does not degrade the habitat area (as required by Coastal Act Section 30240). The 100-foot buffer is referenced in the Coastal Commission's statewide interpretive guidelines; when combined with the wetland enhancement proposed as part of the project (Policy 3.2), CLRDP Implementation Measure 3.4.1, which provides a buffer for sensitive habitat areas, and 4.4.1, which limits direct lighting from buildings, impacts are considered less than significant to ESHAs and wetlands on the terrace portion of the site. Implementation of Policy 3.2 would also enhance and protect sensitive plant communities on the terrace area.

Wetland W7 would be filled by the project as part of the restoration activities conducted under the Resource Management Plan (CLRDP Appendix B). A full discussion of the land use consistency of this action is provided in Chapter 4.9. Wetland function on the site as a whole would be enhanced by the implementation of CLRDP Implementation Measure 3.2.1. Moreover, implementation of the Stormwater Concept Plan (CLRDP Appendix D) helps ensure that water draining to protected wetlands will not be reduced.

All other sensitive habitats and ESHAs occur at the YLR. A 50-foot resource protection buffer extends beyond the mapped boundary between the YLR and the terrace, except where precluded by existing development. This buffer designation is important, as it would allow for continued use of the existing security fence (fences are allowed within buffers, per the Coastal Commission's statewide interpretive guidelines). Robust, dense shrubs such as coyote brush would be planted along the fence. Additionally, implementation of the Stormwater Concept Plan (see CLRDP, Appendix D) would minimize construction- and operation-related erosion impacts on sensitive habitats. The CLRDP provisions referenced above (Policy 3.2 and Implementation Measures 3.4.1, 4.4.1 and 4.4.2) apply to YLR. A separate Implementation Measure (3.4.3) strictly limits noise intrusion.

Therefore, this analysis concludes that, considering measures and policies proposed as part of the project, there would be no significant impacts to sensitive habitats from the implementation of the CLRDP.

Near-term Projects

A 100-foot buffer would separate the Shared Campus Warehouse and Laydown Facility project site from nearby wetlands and ESHAs (W2 and W3), as well as an 80-foot landscaped buffer for the 20-foot wide wildlife movement corridor (CLRDP Section 5.2.2). All site runoff in this area would be directed to structural BMPs and then discharged after treatment to the YLR, and therefore there is no potential for water quality impacts from project site runoff on nearby wetland areas and ESHAs. Refer to the Hydrology and Water Quality (Section 4.8) for a further analysis of water quality. Wetland W7, which is not an ESHA, would be filled by the project as part of the restoration activities conducted under the Resource Management Plan (CLRDP Appendix B).

The 42 Housing Units project and the USGS Phase I project would be constructed on the middle terrace near wetland W4. Both projects would be separated from that wetland area by a 100-foot buffer and would implement the CLRDP provisions referenced above. Therefore no significant impacts would occur.

With respect to SORACC, although this project would be separated from terrace wetlands and ESHAs by intervening existing development, it would be adjacent to the YLR. Impacts to the YLR would be avoided by the CLRDP provisions referenced above (CLRDP Policy 3.2).

With respect to the COH Phase II project, while there are no designated wetlands near this site, this project would be located adjacent to YLR. However, impacts to YLR would be avoided by the CLRDP provisions referenced above.

WILDLIFE MOVEMENT

Entire Development Program

Protection of areas that are potentially used for movement by special status and other wildlife species is considered part of the project (per Implementation Measure 3.2.3). The presence of rich riparian avifaunas in both Moore Creek (as indicated in surveys conducted along the Central Coast in 1999 as part of the Central Coast Riparian Bird Conservation Project)[92] and at YLR suggest that the impediment is not significant for birds. However, the adjacent De Anza residential community, industrial uses along Delaware Avenue, and existing development on the terrace have created an already fragmented landscape for nonavian species. To the extent that portions of the upper terrace may be used by some species to disperse, the CLRDP allows for a 20-foot wide corridor along the south side of the railroad tracks. The purpose of the proposed wildlife corridor is to maintain both aquatic habitats and vegetation cover for animals dispersing between the Moore Creek Drainage, Antonelli Pond and YLR. For those animals known to be resident in the project area, zones of suitable habitat 20 feet wide are sufficient for such passage, provided the animal is protected from disturbances that would prohibit its passage. In effect the area in the upper terrace is much wider for wildlife movement, including an 20-foot corridor, 80-foot buffer and the approximately 50-foot railroad right-of-way south of the tracks, further benefiting wildlife movement.

Implementation Measure 3. 2.3 describes the location, protection and enhancement of the corridor. In addition it stipulates coordination with adjacent property owners to provide the extension of the wildlife corridor to Antonelli Pond. It consequently provides benefits that would offset the impacts of the CLRDP on wildlife movement. Therefore, this analysis concludes that, considering measures and policies adopted as part of the project, there would be no significant impacts to wildlife movement from the project.

Near-term Projects

The COH, SORACC, USGS Phase I and 42 Housing Units projects would not affect wildlife movement because these would be located adjacent to existing development on middle and lower terrace where movement of terrestrial wildlife is limited even under current conditions. Besides the middle and lower terrace areas are separated from other lands on the east by the existing mobile home park.

Although the Shared Campus Warehouse and Laydown Facility project would be located on the upper terrace where some terrestrial wildlife movement may currently take place, as discussed above the CLRDP provides a corridor to the north of this project which would be adequate for wildlife passage. Furthermore, due to the nature of this project, there would be limited lighting or nighttime activity at this location and therefore nocturnal movement would not be adversely affected.

[92] This project was initiated by the Point Reyes Bird Observatory and the Coastal Watershed Council.

PLANS AND POLICIES PROTECTING BIOLOGICAL RESOURCES

Entire Development Program

As noted above, there is an existing plan for the conservation of a portion of the project site — the Younger Lagoon Reserve Management Plan. Although there are two separate HCPs in preparation for the main campus of UCSC and the City of Santa Cruz, those do not apply to the project area.

The YLR Management Plan[93] mandates habitat preservation, minimal development and disturbance adjacent to the reserve boundary, and control of public access, all of which must be carefully evaluated with respect to the CLRDP.

In the YLR, native species and communities, as well as any special-status species, will be fully protected in the interests of providing natural systems for teaching and research. Increased development and increased use adjacent to the YLR could bring about habitat degradation unless care is given at all phases and preventative actions are taken. Protection of the YLR is accorded specifically under Policy 3.5 but in many other policies in the CLRDP as well (e.g., Figure 5.3 and Policies 3.2, 3.4, 3.6, 4.3, 4.4, 5.1, 6.1,7.1, 7.2, 7.3, and 8.2).

The overriding YLR management objective is "to provide the best possible environment for coastal-dependent and coastal-related research and education activities." The document further states: "The proximity of Younger Lagoon to research facilities was an important consideration for controlling people's access to this sensitive wetland region." The presence of facilities included in the CLRDP development program may offset impacts of development by both increasing research opportunities and by controlling trespass into the lagoon by virtue of a larger University presence. In sum, the CLRDP was developed in consultation with the YLR manager and is consistent with the goals of the YLR Management Plan.

Near-term Projects

All five near-term projects have been specifically designed to avoid any conflicts with the Management Plan for the YLR; they would also be subject to the provisions of Policy 3.5.

Based on the CEQA criteria evaluated herein, the project as mitigated would not have a significant adverse impact on biological resources.

CUMULATIVE IMPACTS

ENTIRE DEVELOPMENT PROGRAM

The cumulative context for the CLRDP is existing development in the westside study area (see Figure 4.0-1), together with the development of the Marine Science Campus and development of remaining undeveloped parcels located within the Santa Cruz westside study area by about 2020.

The standards of significance that apply to the cumulative impact analysis are the same as those that apply to the project-level analysis. The standards address the potential for cumulative development to affect special-status plant or wildlife species, sensitive habitats or wetlands, wildlife movement, or plans or policies for the protection of biological resources.

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[93] Fusari, M. H., "Younger Lagoon Management Plan," University of California, Santa Cruz, 2001.

Special Status Plant Species. Although some special status plant species may occur in the Santa Cruz westside study area and could be affected by other development, the proposed project would not contribute to the cumulative impact because no special status plants or their habitat occur on the project site.

Special Status Wildlife Species. With respect to special status wildlife species and their habitat, Table 4.4-4 lists all those species that have a potential to occur in the vicinity of the project. Cumulative impacts would be limited to those species that would also be affected by the proposed project. As discussed under Project Impacts and Mitigation Measures, the project would not affect all but a few of the species listed in the table because the species nor their habitat do not occur on the project site. The project would result in less than significant impacts on four special species including the CRLF, northern harrier, western burrowing owls and the black swift.

Relative to the CRLF, there would not be a loss of breeding or aestivation habitat as a result of the project, and with the implementation of mitigation measures, take of individual frogs would be avoided. Development of other remaining vacant parcels in the Santa Cruz westside study area would also likely have similar less than significant impacts on the species because there are no breeding sites closer than 1.5 miles and the westside study area does not lie between two suitable aquatic habitat areas. Although the Moore Creek corridor is considered CLRF hydration, aestivation and dispersal habitat as the species has been observed there, vacant parcels adjacent to Moore Creek south of Highway 1 have already been developed (and in the case of recent projects with appropriate setbacks from the creek) and those parcels that are undeveloped are adjacent to Antonelli Pond. As noted earlier in this section, Antonelli Pond has been determined not to be a breeding site because of the presence of predators. Therefore cumulative development in the westside study area, including the proposed project, would result in a less than significant cumulative impact on the species.

With respect to the raptors and the black swift, the project would not remove any known nesting habitat of the species because despite numerous surveys at the site, no nesting birds have been observed. However, because these bird species have been observed foraging in the area and could potentially establish nests at the site in a given nesting season, in order to avoid impacts to nesting birds from project construction noise, mitigation measures are proposed. Cumulative impacts on nesting special status birds generally are not expected because all projects would be required to conduct preconstruction surveys for nesting birds and in the event that a nest site is observed, would be required to avoid impacts through mitigation measures such as establishment of adequate buffers. Furthermore, it is unlikely that the same nest site could be affected by noise from two separate construction projects.

Sensitive Habitats and Wetlands. The project involves filling one small wetland (43 square feet) on the upper terrace, but this wetland is not considered to be ESHA. Filling of and indirect impacts to all other wetlands on the campus site from changes in hydrology and runoff would be avoided by the inclusion of buffers and other controls. Any biological impact from filling the small non-ESHA wetland would be offset by the wetland restoration plan that would be implemented at the site. Impacts on wetlands from other development in the region cannot be reasonably estimated or characterized. However, because of the fact that there are at least three regulatory programs in place (ACOE, CCC and RWQCB) for the protection of wetlands, and there are only a few vacant parcels that are currently undeveloped, the cumulative impact would likely be less than significant. The project's contribution to the impact in any event would not be cumulatively considerable.

Wildlife Movement. Development that has occurred in the westside study area has already resulted in the fragmentation of habitat, although there are some fairly large natural areas in the project vicinity including the Moore Creek Preserve, Natural Bridges State Beach, Antonelli Pond, YLR, and Wilder Ranch further to the west. Wildlife movement likely occurs between these natural areas with wildlife generally moving along drainages such as the Moore Creek corridor and along linear facilities such as the railroad tracks and agricultural ditches further west, although some dispersal across undeveloped parcels of land also likely occurs. Although cumulative development would not affect wildlife movements along drainages and linear facilities such as the railroad corridor would continue to facilitate some wildlife movement, development of the remaining vacant parcels between Shaffer Road and Antonelli Pond (vacant parcel and the community gardens as shown on Figure 4.0-1 as sites 6 and 7 and listed in Table 4.0-1 as the Swenson property) could hinder such movement between the Moore Creek corridor/Antonelli Pond area to the east and YLR and Wilder Ranch to the west. Therefore, there could be a cumulative impact in the project vicinity on wildlife movement as a result of the development of the land between Shaffer Road and Antonelli Pond. Note that the severance of the movement corridor would result from the development of those vacant parcels and the proposed CLRDP would not cause the severance. Furthermore, the proposed project includes a 100-foot-wide wildlife corridor and buffer in the upper terrace that would extend from Shaffer Road west and then southwest to YLR. Also the University will coordinate with adjacent property owners to provide the extension of the wildlife corridor to Antonelli Pond, and will work with the City to maintain a wildlife corridor under Shaffer Road in the event that the City decides to open Shaffer Road across the railroad tracks to through traffic. Therefore the proposed CLRDP would not contribute to this impact. In the event that the development of the Swenson property provides for an adequate wildlife corridor, the cumulative impact on this potential movement corridor would be reduced to a less than significant level.

Conflict with Local Plans and Policies. The City's General Plan/LCP Environmental Quality/Biotic Resources Policies include protecting the natural ecosystem of the Monterey Bay Marine Sanctuary and the shoreline (Policy 4.1); preserving the habitat of and minimize disturbance to seabird rookeries and roosting areas along the coastline (4.1.2); encouraging implementation of the management plan for Younger Lagoon (4.2.1); establishing setback requirements of at least 100 feet from riparian areas and wetlands (4.2.1); protecting rare, endangered, and sensitive species and the habitats supporting them (Policy 4.5); and restoring native vegetation (Policy 4.6). In addition, there are several existing or proposed management plans for certain natural areas in the westside study area. These include the YLR Management Plan which covers a portion of the project site and has already been discussed earlier in this section, and the plans listed below.

- *Moore Creek Corridor Access and Management Plan,* developed by the City in 1987. The primary goal of the plan is to retain and protect the existing vegetation along the Moore Creek Corridor to the extent feasible. The plan proposes to improve access to the Moore Creek Corridor.

- *Moore Creek Preserve Interim Management Plan,* developed by the City in 2001. The preserve supports a diversity of habitats as well as federal and/or state listed plant and animal species. The proposed uses and infrastructure improvements include hiking trails, fenced cattle grazing, protection and preservation of native habitats, and erosion control measures.

- *Antonelli Pond Interim Management Plan* (prepared in 1980) and *Antonelli Pond Conceptual Management Plan* (prepared in 1995), which apply to the Antonelli Pond property owned by the Santa Cruz County Land Trust. These documents will be updated and are expected to include, but not be limited to, developing a protection plan for California red-legged frog and other sensitive species.

Although some of these plans are not finalized and therefore their effectiveness relative to resource protection and enhancement cannot be determined, implementation of these management plans and General Plan policies would be expected to benefit sensitive species and habitats within the project vicinity. Furthermore, it should be noted that while these plans are intended to improve habitats within the plan areas, they do not restrict population and allow for passive use by people.

The proposed CLRDP and other development in the Santa Cruz westside study area would not conflict with the General Plan policies for the protection of biological resources or with any of the other management plans listed above that are applicable to the area. As discussed in Section 4.9, Land Use and Planning, the CLRDP would not conflict with the City's General Plan/LCP. It would be reasonable to assume that any new projects that are approved by the City in this study area would be approved only if they are found to be in compliance with the General Plan/LCP policies. It would also be reasonable to assume that the City will, through its environmental review process, ensure that proposed development does not adversely affect the natural areas that are present in the westside study area and managed under the various management plans. Therefore, cumulative development should not result in conflicts with policies contained in the City's General Plan/LCP for protecting biological resources or otherwise conflict with the management plans that have been developed for natural areas in this part of the city.

One of the consequences of cumulative development in the project vicinity, including the proposed CLRDP, would be an increase the number of persons that would live and/or work in the westside study area. Increased residential population would also be accompanied by an increase in the number of domestic pets such as dogs and cats. Because of the proximity of the YLR, Moore Creek corridor and Antonelli Pond, increased population in the area could lead to increased noise from human activities, increased use of these natural areas by people who live and/or work nearby, and increased presence of domestic animals. Therefore, there could be a concern that this incremental human activity in the area could affect fauna and flora in these natural areas. As noted earlier, pursuant to the CLRDP, access into the YLR would be controlled and dogs and cats as pets would not be allowed on the Marine Science Campus, therefore such an impact on that natural area would be avoided. Human access into the Moore Creek corridor and the Antonelli Pond natural areas would not be similarly controlled, and it is expected that there would be no limitation on pets in other (non-Marine Science Campus) development that is proposed in the area. However, it is reasonable to assume that the management plans for these areas would take these factors into account because the City's General Plan/LCP allows for the remaining undeveloped parcels in the area to be developed with residential use and increased human presence in the area is anticipated. Furthermore, these management plans would provide for monitoring and appropriate adaptive management to minimize the impacts from these sources. Therefore cumulative growth in the area and the associated increase in human activity would not result a substantial conflict with these local plans and policies. This cumulative impact is considered less than significant.

NEAR-TERM PROJECTS

Only areas with low biological value are proposed for development under the five near-term projects. Sensitive species and habitats would be protected and enhanced. With implementation of resource protection policies for biological resources, none of the near-term projects would result in a net loss of habitat for wildlife and plants beyond that analyzed above for the CLRDP as a whole. (See Measures Proposed as Part of the Project above for further details.) For reasons presented above for the CLRDP as a whole, none of the near-term projects would result in or contribute considerably to significant cumulative impacts on biological resources.

Based on the foregoing analysis, the CLRDP and the near-term projects, when combined with other regional development would not have a significant cumulative impact on biological resources.

4.5 CULTURAL RESOURCES

This section evaluates the potential impacts of the proposed project on prehistoric and historic cultural resources. The analysis in this section is based on a study prepared for this project in July 2002 by Pacific Legacy, and on three previous archaeological surveys conducted for the project site and for properties adjacent to the project site, including *Archaeological Reconnaissance Westside Lands* prepared by Archaeological Consulting and Research Services, Inc. (ACRS), July 15, 1985; *Archaeological Reconnaissance Ocean Genetics* prepared by ACRS, March 22, 1987; and *An Archaeological Survey for the Long Marine Lab Master Plan EIR, Santa Cruz* prepared by BioSystems Analysis, Inc., December 18, 1992. Additional information contained in this section is derived from the *Draft Environmental Impact Report Long Marine Laboratory Master Plan* prepared by UCSC Office of Campus Facilities, July 1993; and *Draft Environmental Impact Report Terrace Point Specific Plan* prepared by Strelow Consulting, March 1994.

Based on CEQA Guidelines, a project would generally be considered to have a significant adverse impact on the environment if it would:

- Cause a substantial adverse change[1] in the significance of a historical resource as defined in CEQA Section 15064.5.
- Cause a substantial adverse change in the significance of a prehistoric archaeological resource pursuant to CEQA Section 15064.5.
- Disturb any human remains, including those interred outside of formal cemeteries.
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

Section 15064.5 of the CEQA Guidelines defines a historical resource as a resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in, the California Register of Historical Resources. A resource is considered to be eligible for inclusion in the California Register if it “is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage; is associated with the lives of persons important in our past; embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses artistic values; or has yielded, or may be likely to yield, information important in prehistory or history.” In addition, a resource listed in a local register of historical resources, or any resource that a lead agency determines, by substantial evidence “in light of the whole record,” may be considered to be historically significant.

Pursuant to Section 15064.5 of the CEQA Guidelines, archaeological resources that have not otherwise been determined to be historical resources may be considered significant if they are unique. Public Resources Code Section 21083.2 defines a unique archaeological resource as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without

[1] A “substantial adverse change,” according to CEQA Guidelines Section 15064.5, is defined as the “physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource is impaired.” Material impairment is defined as the alteration, “in an adverse manner, those characteristics of a historical resource that convey its historical significance and its eligibility for inclusion in the California Register of Historical Resources.”

merely adding to the current body of knowledge, there is a high probability that it meets one of the following criteria: contains information needed to answer important scientific questions and there is a demonstrable public interest in that information; has a special and particular quality, such as being the oldest of its type or the best available example of its type; or is directly associated with a scientifically recognized, important prehistoric or historic event or person.

Section 15064.5 also assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are stated under Public Resources Code Section 5097.

SETTING

REGIONAL CONTEXT

Archaeological evidence suggests that human occupation of the Santa Cruz area probably began at least 10,000 years ago. The Central California region, extending from San Francisco south to Big Sur, including the project site, lies within the ethnographic territory of the Ohlone Indians. The Ohlone are believed to have occupied the region from about 500 A.D., and speakers of the Hokan language previously occupied at least part of the region. The project site lies within the currently recognized ethnographic territory of the Costanoan (often called Ohlone) linguistic group.

The Costanoan followed a hunter-gatherer subsistence pattern with partial dependence on the natural acorn crop, and utilized only the native flora and fauna, with the exception of one domesticate, the dog. The abundance and high quality of natural resources allowed them to settle in semi-sedentary villages. Hunting and fishing as well as gathering of terrestrial plant materials, especially grass and brush seeds, acorn, tubers, forbs and corms, marine vegetation, and shellfish and insects, provided the Costanoans with an abundance of resources for food, ornamentation, tools, and economic exchange.

The Costanoan were organized in triblets, autonomous social units composed of 100 to 250 members. A triblet refers to one or more permanent villages with smaller villages in relatively close proximity. Parties would leave major villages at different times of the year to obtain various resources from within the tribal territory. Occupation sites can be expected most often at the confluence of streams, other areas of similar topography along streams, or within the vicinity of springs. These original sources of water may no longer be present or adequate. Also, resource gathering and processing areas, and associated temporary campsites, are frequently found on the coast and in other locations containing resources used by the group. Factors that influence the location of these sites include the presence of suitable exposures of rock for bedrock mortars or other milling activities, ecotones, the presence of specific resources (oak groves, marshes, quarries, game trails, trade routes, etc.), proximity to water, and the availability of shelter. Temporary camps or other activity areas can also be found along ridges or other travel corridors.

The Portola expedition in 1769 was the first overland Spanish exploration in the Santa Cruz area. The Mission Santa Cruz was founded in 1791, marking the first permanent European colony in the Santa Cruz area. The Mexican administration of Alta California secularized the mission system (1833–1834) and awarded numerous land grants to Mexican and other pioneers throughout the region. Among these land grants is the Rancho Refugio, which includes the project site.

PROJECT SITE

Historic Resources

Approximately 150 meters east of the mouth of Younger Lagoon, at the base of the marine terrace cliff, is the site of the wreck of the coastal steamer *La Feliz*. The *La Feliz* was built in Seattle, Washington in 1904 and was lost on October 1, 1924 while bound from Monterey for San Francisco carrying a cargo of 3,100 cases of sardines. The 162-ton, 72-foot ship foundered on the reef of Chimney Rock and was then swept onto the shallow coastal shelf immediately below the cliffs by a very high tide and waves. No evidence of the wreck is visible, although the site is marked by what is reportedly the vessel's mast that was wedged into the cliff face during efforts to salvage the ship's cargo. The location of the wreck can be easily discerned by examining historic photographs and comparing topographic details with the modern setting. The University has erected a small interpretive sign overlooking the wreck site. No determination has been made regarding the potential eligibility of the wreck or wreck site for the National Register of Historic Places (NRHP) or the California Register of Historic Resources (CRHR), and thus it is unknown whether this is a significant resource.

Site preparation and infrastructure improvements required for construction of the Long Marine Laboratory (LML), including the seawater system, began in late 1976. The first two buildings were completed in 1978, and the formal opening of LML occurred in December 1978. As such, the facilities are less than 50 years of age, which is the minimum age criterion for the NRHP and the CRHR. A property less than 50 years old may be eligible for listing in the NRHP if it can be regarded as "exceptional," as defined by NRHP procedures, or may be eligible for listing in the CRHR "if it can be demonstrated that sufficient time has passed to understand its historical importance" (Chapter 11, Title 14, Section 4842[d][2]). The existing facilities are typical of a modern campus, and do not exhibit any exceptional characteristics. Based on these age, merit, and historical criteria, the existing facilities of the LML are not eligible to be considered historic resources.

Archaeological Resources (including Human Remains)

To determine the presence or absence of cultural resources on the project site, previous archaeological surveys conducted on and in the vicinity of the site were reviewed and evaluated. In addition, an archaeological records search of the project site and field reconnaissance of the 25-acre Younger Lagoon Reserve (YLR) was conducted for the proposed project. This survey, completed on September 10, 2000, found no prehistoric or historic archaeological resources in the project area. The archaeological field reconnaissance conducted in conjunction with the proposed Westside Lands Plan in 1985 found no indications of cultural resources on the 60-acre site,[2] although a potential prehistoric resource was identified on the middle terrace, on the 16-acre LML property. Another archaeological survey, conducted in 1987 in conjunction with the proposed expansion of the mariculture facilities located on the upper terrace portion of the 16-acre LML property, further evaluated the potential prehistoric resource identified in the 1985 survey.[3] Augering of the area provided no evidence of an archaeological deposit. In December 1992, a field investigation of the upper terrace portion of the LML site and the 18-acre, western

[2] ACRS, "Archaeological Reconnaissance Westside Lands," July 15, 1985.

[3] ACRS, "Archaeological Reconnaissance Ocean Genetics," March 22, 1987

portion of the Terrace Point site was conducted in conjunction with the *LML Master Plan EIR*.[4] This investigation found no indication of prehistoric resources.

The Northwest Information Center of the California Historical Resources Information System (File 00-067) completed a records and archival search for the proposed project on August 11, 2000. The search confirmed that there have been no other recent cultural resources investigations at the site, and that there were no recorded archaeological or historic sites or structures on the subject property. The closest documented archaeological site (CA-SCR-274), a small habitation/shell processing site at Natural Bridges State Beach, is approximately 2,000 meters (over a mile) east of the project site. Several other previously recorded prehistoric sites are located in the vicinity of the study area: on Wilder Creek (CA-SCR-11), and within the Wilder Ranch complex and immediate vicinity (CA-SCR-38/123, CA-SCR-39, CA-SCR-40, and CA-SCR-126). All of these recorded sites are on marine terraces.

The City of Santa Cruz General Plan includes a Sensitive Archaeological and Paleontological Areas Map that identifies areas that are considered by the city to be sensitive for cultural resources on the basis of the location of known sites and knowledge of the settlement and use patterns of Native American, Spanish, and Anglo people who occupied the area prehistorically or historically. The eastern approximately one-third of the project site is included within a sensitive archaeological area on the General Plan Map CR-2, on the basis of assessed potential for the occurrence of archaeological resources. However, no resources have been identified or documented in this area of the campus.

Paleontological Resources

Present-day Santa Cruz County has been partially or completely covered by the sea many times during past geologic ages. Thousands of feet of marine sediments deposited on the ocean floor eventually hardened into rock and were uplifted to form the Santa Cruz Mountains. This sand, gravel, and mud includes animal remains such as shells, teeth, and bones, and plant remains such as leaves and wood. Over time, ancient plant and animal remains became fossils (molds, casts, impressions, and other traces of past life).

The two geologic units that underlie the project site are a marine terrace deposit approximately 105,000 years old that is underlain by the Santa Cruz Mudstone bedrock, which is approximately 6 to 10 million years old. The majority of the seacliff face is composed of Santa Cruz Mudstone. The mudstone bedrock contains few fossils, but does contain some clam molds near its base in the Scotts Valley area as well as fish bones and scales. Megafossils are exceedingly rare, the only specimen being a single shark tooth taken from just below Mission Hill in Santa Cruz. In general, mudstone may be the least fossiliferous formation in all of Santa Cruz County.

Additionally, fossils are rarely found in the overlying marine terrace deposits; those that are found consist primarily of whale vertebrae and shells that are identical to those of living species. The majority of these fossils are of various species of clam. Fossilized remains of land animals are very scarce in Santa Cruz County.

According to the City of Santa Cruz General Plan Sensitive Archaeological and Paleontological Areas Map, a sensitive paleontological resource area borders the southern edge of the campus site, along the coastline, and extends from Younger Lagoon to approximately Monterey Street

[4] BioSystems Analysis, Inc., “An Archaeological Survey for the Long Marine Lab Master Plan EIR, Santa Cruz,” December 18, 1992.

near Cowell Beach. There are no known fossil deposits in the surface stratum on the bluff –top on the campus.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP building program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new development of approximately 529,856 square feet (sf) at the Marine Science Campus by about 2020. The CLRDP building program would include new development for the following uses: Marine Research and Education; Outdoor Research Areas; Support Facilities; Support Housing; Equipment Storage and Maintenance; and Seawater System Expansion. The CLRDP building program would also include removal of Temporary Office Trailers, Greenhouses, and Caretaker Housing. The project site would be subject to grading and excavation for building pads, as well as other land-disturbing activities required for implementation of other proposed site improvements. These improvements include modifying and extending public access trails and roadways, constructing parking areas, undergrounding utility lines, installing stormwater management systems, expanding the seawater system, developing new public access overlook areas, and providing lighting, landscaping, and signage. While most of the above development activities would occur within the three development areas, some improvements and/or activities would also occur outside of these areas. These improvements and/or activities would include limited parking, utility improvements, stormwater management systems, the intake and discharge portion of an expanded seawater system, public access overlooks, lighting for safety and wayfinding, signage, and resource management activities.

Development under the CLRDP would not affect any previously identified historic or archaeological resources. The CLRDP includes a policy for how to handle previously unidentified resources that could potentially be uncovered during construction. See *Measures Proposed as Part of the Project*, below, for further details about this policy.

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program (by 2010). Amongst the building locations depicted in the CLRDP prototype site plan are specific sites for these five near-term projects (see Figure 3-7). These projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area.

- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area.

- The United States Geological Survey (USGS) Western Coastal and Marine Geology Facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area.

- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area. Construction of the project would require removal of the greenhouses presently on the site. These greenhouses are of modern construction and would not qualify as historical resources under CEQA.

- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area. Additionally, this proposed project would include the construction of two new public access overlooks and improvement of an existing overlook.

Construction of each of these projects would also involve excavation and other ground disturbing activities, such as those described above for the CLRDP building program. As for the CLRDP program overall, there are no known resources at any of these project sites, and the projects therefore do not have potential to affect previously identified archaeological or historical resources. The CLRDP policy identified below would address the potential for impacts to previously unidentified resources that could potentially be uncovered during construction.

MEASURES PROPOSED AS PART OF THE PROJECT

The CLRDP states that "the University will require reasonable mitigation measures where development would adversely impact archaeological or paleontological resources" (Policy 3.9, Conservation of Cultural Resources). To achieve this goal, the following implementation measure is proposed:

- Should archaeological resources be uncovered during any construction on the Marine Science Campus, all activity that could damage or destroy these resources will be temporarily suspended until the site has been examined by a qualified archaeologist and mitigation measures[5] have been developed that address the impacts of the project on archaeological resources. Such mitigation measures shall be reviewed by the State Office of Historic Preservation and approved by the Executive Director of the California Coastal Commission (Implementation Measure 3.9.1, Construction Monitoring).

PROJECT IMPACTS AND MITIGATION MEASURES

HISTORIC RESOURCES

Entire Development Program

There are no known historic resources within the project area, as defined by CEQA Guidelines Section 15064.5. As mentioned earlier, the shipwreck of the *La Feliz* and its mast are located within close proximity (approximately 30 feet) of the southern boundary of the Marine Science Campus. This feature has not been evaluated to determine whether or not it is a historic resource as defined by CEQA. However, it is not anticipated that project actions proposed on the lower terrace, specifically installation of new or modified seawater intake and discharge system pipes,

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[5] Typical mitigation measures, as identified in CEQA Guidelines Section 15126.4, are intended to preserve in place identified archaeological sites. Preservation in place may be accomplished by, but is not limited to: planning construction to avoid archaeological sites; incorporation of sites within parks, greenspace, or other open space; covering the archaeological sites with a layer of chemically stable soil prior to paving over for parking areas or other similar facilities; and, deeding the site into a permanent conservation easement.

construction of new buildings, and modification of public access trails, would cause significant adverse impacts to this feature for the reasons outlined below. Installation of new or modified seawater intake and discharge system pipes would occur at locations at least 225 feet west of the shipwreck site, and no new development would be allowed on the lower terrace within a 100-foot setback from the cliff's edge. Additionally, although a section of the public access trail proposed for enhancement would bring visitors within approximately 40 feet of the mast, the mast would remain inaccessible from this trail due to its location at the bottom of a steep slope.

The State Office of Historic Preservation, Department of Parks and Recreation concurs that the site of the shipwreck, the *La Feliz*, and her mast would neither directly nor indirectly be affected by activities proposed as part of the project.[6] Implementation of the proposed CLRDP would therefore not cause a substantial adverse change in the significance of a historical resource as defined by CEQA.

Near-term Projects

As no known historic resources are present on the project sites, none of the five near-term projects would result in a substantial adverse change in the significance of a historical resource as defined by CEQA. The greenhouses that would be removed for the SORACC are recently constructed structures and do not qualify as historic resources.

ARCHAEOLOGICAL RESOURCES (Including Human Remains)

Entire Development Program

According to the City's General Plan, the eastern one third of the project site is within a sensitive archaeological resources area. However, based on a records search prepared for the project site by the Northwest Information Center of the California Historical Resources Information System (File 00-067) on August 11, 2000, there are no recorded archaeological resources within the project site. The closest documented archaeological site (CA-SCR-274) is approximately 2,000 meters east of the project site at Natural Bridges State Beach. Furthermore, three previous site surveys and auger testing conducted by Archaeological Consulting and Research Services, Inc. (ACRS) (July 15, 1985, and March 22, 1987) and by BioSystems Analysis, Inc. (December 18, 1992) for the project site and for properties adjacent to the project site indicate that there is no surface or subsurface evidence of archaeological resources on the project site. Implementation of the proposed development program therefore would not result in significant adverse impacts on any identified archaeological resource under CEQA.

Although some of the native soils and subsoils on the project site have been disturbed by excavation and earth moving during previous development, such as for the NMFS facility and the Seymour Center, areas of undisturbed native soils and rock are present on site. Construction of the proposed project could result in disruption or adverse effects to unknown archaeological resources or human remains due to land alteration activities such as clearing vegetation, grading, driving heavy vehicles, soil compacting, excavation, and landscaping. CLRDP Implementation Measure 3.9.1, Construction Monitoring, would ensure that construction activities associated with implementation of the development program would not result in significant adverse impacts on any unknown archaeological resources, as defined by CEQA, because disturbances would be halted in the event of a discovery and appropriate mitigation would be developed and carried out.

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[6] Dr. Knox Mellon, State Historic Preservation Officer, written correspondence, July 31, 2002.

Archaeological surveys and previous construction projects on the project site and vicinity have not resulted in the discovery of any human remains. Nevertheless, during the construction phase of any development project under the CLRDP, it is possible that previously undiscovered human remains could be unearthed. The development program has the potential to result in a significant adverse impact on previously undiscovered human remains, as described below.

Impact 4.5-1: Construction activities associated with development in the upper terrace, middle terrace, and lower terrace development areas could disturb previously undiscovered human burial sites of Native American groups, a potentially significant impact.

Earth moving during construction could uncover and disturb or destroy previously undiscovered Native American human remains.

> **Project-Specific Mitigation Measure 4.5-1: If human remains are discovered during the construction of a development project under the CLRDP, the University and/or its employees shall notify the Santa Cruz County Coroner's Office immediately. Upon determination by the County Coroner that the remains are Native American, the Coroner shall contact the California Native American Heritage Commission, pursuant to subdivision (c) of Section 7050.5 of the Health and Safety Code, and the County Coordinator of Indian Affairs and appropriate Native American consultation shall be conducted, as outlined by PRC 5097.98. Implementation Measure 3.9.1, Construction Monitoring, as identified in the CLRDP, shall also apply. UCSC will be responsible for implementing this mitigation measure.**

The proposed mitigation measure would reduce potentially significant impacts on previously undiscovered human remains to a less than significant level. Therefore, implementation of the proposed CLRDP development program would not cause a substantial adverse change in the significance of a prehistoric archaeological resource pursuant to CEQA

Near-term Projects

As each of the near-term projects would involve excavation and ground disturbing activities, all five near-term projects could potentially result in Impact 4.5-1, identified above. Therefore, all five projects will be required to implement Project-Specific Mitigation Measure 4.5-1. This would reduce the project-level impact to a less than significant level.

PALEONTOLOGICAL RESOURCES

Entire Development Program

Land-disturbing activities associated with construction of any development project could uncover fossils, although the likelihood of this occurrence is very low. Land-disturbing activities such as grading and excavation would generally affect the overlying marine terrace deposits, which are up to 15 feet deep. As stated in the Setting section, above, fossils are rarely found in these deposits, and those that do occur are generally identical to living species. Implementation of the proposed CLRDP would therefore not directly or indirectly destroy a previously undiscovered unique paleontological resource or site.

Near-term Projects

For the reasons noted above for the entire development program, none of the near-term projects would result in significant impacts on paleontological resources.

Based on the CEQA criteria evaluated above, implementation of the CLRDP and the near-term projects, with mitigation, would not have a significant adverse impact on historic, archaeological, including human remains, or paleontological resources.

CUMULATIVE IMPACTS

ENTIRE DEVELOPMENT PROGRAM

The cumulative context in which the impacts of CLRDP can be assessed would be the development of both the Marine Science Campus and of the remaining undeveloped parcels located within the Santa Cruz westside study area (as delineated on Figure 4.0-1) by about 2020. This analysis assumes development of the Santa Cruz westside study area according to existing City of Santa Cruz General Plan land use designations. (See Figures 4.9-1 and 4.9-2 in Section 4.9, Land Use and Planning, which illustrate general plan land use designations and existing land uses in the area.) Although the General Plan is currently being updated, it is assumed that the undeveloped parcels in the Santa Cruz westside study area will be developed at similar intensities and densities as those described under the current General Plan.

The standards of significance that apply to the cumulative impact analysis are similar to those that apply to the project-level analysis. These standards address the potential for cumulative development to (1) cause a substantial adverse change in the significance of historical resources or prehistoric archaeological resources, (2) disturb any human remains, or (3) directly or indirectly destroy unique paleontological resources or sites or unique geologic features.

Any disturbance of native soils carries the potential to result in impacts to archaeological resources and human remains. Disturbance of fossil-bearing sediments carries the potential to disturb or destroy paleontological resources. These impacts may be significant if a significant resource is disturbed or destroyed. CLRDP policies and mitigation measures will minimize the impact of development under the CLRDP because the campus will carry out a continuing program of project review, appropriate work stoppage for discoveries, and preservation or mitigation. Further, archaeological surveys and studies have been conducted on the Marine Science Campus and no significant resources have been identified in any areas proposed for development. While it is possible that buried resources could come to light in future, the potential for impacts is slight. In this context, with mitigation the CLRDP would have little or no residual cultural resources impact.

Similarly, the City of Santa Cruz is actively identifying and preserving cultural resources through policies and programs contained in the City of Santa Cruz General Plan/LCP. The General Plan/LCP Cultural Resources Element and EIR identify zones that are considered to be archaeologically and paleontologically sensitive on the basis of proximity to known resources, resource zones, and additionally for archaeological and historic resources, knowledge of settlement and use patterns of Native American, Spanish, and Anglo people. In the Santa Cruz westside study area, the City of Santa Cruz General Plan/LCP identifies sensitive archaeological resource areas on the west and east sides of the Moore Creek corridor. Sensitive paleontological resources are identified along the coastline, from Younger Lagoon eastward along the coastline to approximately Monterey Street near Cowell Beach. No historic architectural resources or resource zones are identified in the Santa Cruz westside study area.

The Cultural Resource Element of the City's General Plan/LCP identifies policies regarding development in areas where sensitive resources may exist. Developers of projects on remaining vacant parcels in the Santa Cruz westside study area that could affect sensitive archaeological and/or paleontological resources would be required to identify and evaluate the extent of resources on their properties, in accordance with General Plan/LCP Policy 1.2.2. If resources were found, mitigation (as stipulated in Policies 1.2.3 through 1.2.5) would be required. Developers of parcels that are not within the areas identified as sensitive would still be required to provide for the evaluation and proper handling of any cultural resources discovered in the course of development. Project level reviews by the City of Santa Cruz will ensure that resources that potentially would be affected by development are identified and appropriately treated. Implementation of these policies would ensure the protection of archaeological and paleontological sites as they are identified in the future. Therefore, as a result of protections in place, development in the study area, including the proposed project would not result in a cumulatively significant impact on cultural resources. It is true that there may be occasions when a development project within the study area could require the removal of or otherwise adversely affect a cultural resource that is identified as a significant resource, and that in such instances there could be a residually significant impact on the resource even after mitigation. However, it would be speculative to assume that there would be a large number of such instances in the study area and that the residual effects would combine to result in a cumulatively significant impact. CEQA advises against speculative analysis, and with respect to previously unknown subsurface resources such as archaeological resources, suggests that if there are no data to suggest presence, the absence of the resource from the site/study area should be assumed.

NEAR-TERM PROJECTS

For the reasons described above for the CLRDP as a whole, none of the near-term projects in conjunction with other regional development would result in a significant cumulative impact on cultural resources.

Based on the information presented above, the implementation of the proposed CLRDP and its near-term projects, in conjunction with other development in the vicinity of the Marine Science Campus, would not result in cumulatively significant adverse impacts on historic, archaeological, or paleontological resources.

4.6 GEOLOGY AND SOILS

This section evaluates whether the proposed CDLRP or the five near-term projects would expose people or structures to major geologic hazards or would damage geological resources. Regional and site-specific geologic and seismic information was derived from published reports and maps and from the geotechnical studies conducted for existing development. The primary documents used for completing this section include: "Geologic and Coastal Erosion Study, Long Marine Laboratory Addition," prepared by Foxx, Nielsen, and Associates," December 15, 1992; Technical peer review of the 1992 Foxx, Nielsen and Associates study, prepared by ESA and Hoexter Consulting, August 14, 2002[1]; "Soils Investigation – Final Report, Long Marine Laboratory Additions," prepared by Rutherford and Chekene, December 1982; "Geotechnical Investigation for Oiled Wildlife Rescue and Rehabilitation Station," prepared by Gregory P. Luth, March 1994; Coastal Erosion Issues at the Long Marine Lab Campus, prepared by Gary Griggs, January 2002; and the *Geologic Map of Santa Cruz County, California*, prepared by the U.S. Geological Survey (USGS), 1989. Additional reference documents include: "Geotechnical Investigation for Long Marine Lab Center," prepared by Haro, Kasunich, and Associates, June 1997; and "UCSC Long Marine Laboratory, Center for Ocean Health," prepared by Rutherford and Chekene, dated July 1, 1999.

Based on the following CEQA criteria, a project would generally be considered to have a significant adverse impact on the environment if it would expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

- Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. Refer to California Geological Survey Special Publication 42;
- Strong seismic ground shaking;
- Seismic related ground failure, including liquefaction;
- Landslides;
- Result in substantial soil erosion or the loss of topsoil;
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994 or most current edition), creating substantial risks to life or property;
- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

[1] ESA conducted a peer review of the 1992 Foxx, Nielsen and Associates (FNA) study to determine whether the information and data presented in the report was consistent with current conditions and applicable to the site 11 years later. In August 2002, an ESA California Registered geologist and a California certified engineering geologist from the independent engineering geology firm of Hoexter Consulting reviewed the FNA study, conducted an site reconnaissance and prepared a technical memorandum. In general, site conditions as assessed in 1992 are similar to those observed during the peer review and conclusions of the peer review are consistent with those of the original FNA study. This chapter contains additional discussion of the conclusion from the peer review.

SETTING

REGULATORY CONTEXT

Alquist-Priolo Earthquake Fault Zoning Act

Impact analysis of geological issues necessitates review of the Alquist-Priolo Earthquake Fault Zoning Act to determine whether the Marine Science Campus is included within a designated earthquake fault zone. This review is required to address the standards of significance, as listed above, pertaining to surface fault rupture. The Alquist-Priolo Earthquake Fault Zoning Act (formerly the Alquist-Priolo Special Studies Zone Act), signed into law December 1972, requires the delineation of earthquake fault zones along active faults in California. Special Publication 42, published by the California Geological Survey, (formerly the California Division of Mines and Geology), includes text of the Alquist-Priolo Earthquake Fault Zoning Act and describes its provisions.[2] The purpose of the Alquist-Priolo Earthquake Fault Zoning Act is to regulate development on or near fault traces to reduce the hazard of fault rupture and to prohibit the location of most structures for human occupancy across these traces. Cities and counties must regulate certain development projects within the zones, which includes withholding permits until geologic investigations demonstrate that development sites are not threatened by future surface displacement.

Seismic Hazards Mapping Act

The standard of significance listed above addresses earthquake-induced ground shaking and ground failure (landslides) and therefore, analysis of potential geologic impacts require determining whether the project site is located within a region zoned by the Seismic Hazards Mapping Act. The Seismic Hazards Mapping Act (Public Resources Code 7.8), adopted September 1990, was developed to protect the public from the effects of earthquake-induced landslides and liquefaction. This law requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit is granted for a site within a seismic hazard zone, a lead agency must require site-specific geotechnical investigation and recommend appropriate mitigation measures incorporated into the project design. The purpose of the Seismic Hazards Mapping Act is to reduce the threat to public safety and minimize loss of life and property throughout California by reducing earthquake hazards and making new development safe during earthquakes. The California Geological Survey (CGS) has identified and considers high priority urban areas in California with rapid growth, new construction, susceptible geology, and a high risk of ground shaking. The CGS will evaluate and zone high priority areas first. The Seismic Hazard Mapping program began mapping high priority areas in southern California and completed several portions of the San Francisco Bay Area. The Marine Science Campus is located within an area considered high priority. Although the CGS has not yet completed seismic hazard evaluation and mapping for this area, it is likely to occur during the development period of the proposed CDLRP. If located in an area determined to be susceptible to liquefaction and earthquake-induced landslides, development occurring after the area is zoned would be required to comply with the provisions of Seismic Hazards Mapping Act.

2 As of January 2002, the California Division of Mines and Geology, is the California Geological Survey.

California Building Code

The California Building Code (CBC) is another name for the body of regulations known as the California Code of Regulations (CCR), Title 24, Part 2, which is a portion of the California Building Standards Code. Title 24 is assigned to the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under state law, all building standards must be centralized in Title 24 or they are not enforceable.[3]

Published by the International Conference of Building Officials, the Uniform Building Code (UBC) is a widely adopted model building code in the United States. The California Building Code incorporates by reference the Uniform Building Code, referred to in the CEQA standard of significance above, with necessary California amendments. Approximately one-third of the text within the California Building Code has been tailored to address California earthquake conditions.[4]

University of California Seismic Safety Policy

The policy requires the identification and correction of potential earthquake hazards in existing structures. The policy requires that UC contract with consulting structural engineers to examine existing buildings and other facilities to determine the adequacy of the structures to resist seismic forces. For buildings rated as Poor or Very Poor by the engineer, the policy requires that UC immediately take appropriate action, which may include partial or total evacuation, temporary emergency measures, reduction in use, and/or reconstruction. Seismic rehabilitation projects are required to provide, as a minimum, a level of safety equivalent to that which would be established by compliance with the current seismic provisions of the CBC or local seismic requirements, whichever are more stringent. For new structures, the design and construction must, as a minimum, comply with the CBC or local seismic requirements. In addition, the policy requires design provisions for new structures not included in the CBC, including adequate anchorage of nonstructural building elements and a process for seismic design standard review.

REGIONAL CONTEXT

Geologists refer to the western portion of California, between the Pacific Ocean and the Great Valley and stretching from the Oregon border to the San Ynez River near Santa Barbara, as the Coast Ranges geomorphic province. This northwest-trending, 900-mile-long province contains mountain ranges and associated intervening valleys that are relatively comparable in age and share somewhat similar history, geologic composition, and structure, although the geologic composition or rock types vary widely.

One such range, known as the Santa Cruz Mountains, forms the mountainous spine of the San Francisco Peninsula and extends 80 miles southeast from Daly City in the north to the Pajaro River, near Watsonville, where it merges with the southern Gabilan Range. The western margin of the Santa Cruz range between San Francisco and the city of Santa Cruz is distinguished by the dramatic coastline formed where the bedrock uplands of the range meet the Pacific Ocean. Landscapes along this portion of the coast can be abrupt, with steep coastal terrain and rocky shores, or can be more gradual, formed on flat, uplifted marine terraces that slope gently downward from mountainous uplands to sandy beaches. Much of the coastline in the Santa Cruz area is situated on an uplifted marine terrace, known as the “Lowest Emergent Terrace,” which is

3 Bolt, B., “Earthquakes,” W. H. Freeman and Company, New York, New York, 1988.
4 International Conference of Building Officials (ICBO), Uniform Building Code, Whittier, California, 1994, 1997.

the youngest in a series of marine terraces that form uplands east of Highway 1, along the coastal flank of Ben Lomond Mountain. Over time, as the sea level fluctuates and the coast uplifts, stream courses that cross these marine terraces incise small canyons that eventually reach the ocean and form the lagoons and beaches that exist today.

GEOLOGIC CONDITIONS AT THE PROJECT SITE

Topography

The Marine Science Campus lies on a portion of the Lowest Emergent Terrace, which is relatively flat and truncated by a near-vertical sea cliff. The site itself slopes gently (1 to 2 percent) to the south, varying in elevation from 51 feet above sea level at the northern edge to 37 feet above sea level at the southern edge, where the coastal bluff drops sharply to the intertidal beaches below. The sea cliff is approximately 30 feet high and has an abrupt cliff edge.[5] At the base of the sea cliff, a well-developed shore platform extends offshore. Two soil berms, approximately 10 to 12 feet high and 40 to 50 feet wide, were constructed along the top of the bank at the east side of Younger Lagoon. Material to construct the berms was excavated from the western portion of the Marine Science Campus during previous site development, accounting for grade changes on this part of the site.

Geologic Materials

Similar to many locations along the Lowest Emergent Terrace, surficial materials were deposited during the Quaternary epoch (period ranging from 2 million years ago to the present) about 100,000 year ago and are described as coastal terrace deposits consisting of semiconsolidated, clayey to clean sand and gravel, derived from an ancient coastal depositional environment. These types of materials are found to depths of 5 to 9 feet across the subject property.[6] They include both marine and nonmarine sediments and contain well-sorted sand, with occasional continuous layers of gravel.

Below the younger coastal terrace deposits lies a hard mudstone bedrock, locally referred to as Santa Cruz Mudstone, that is exposed in sea cliffs along the coast from West Cliff to the Santa Cruz – Santa Mateo County line. The Miocene- to Pliocene-age (approximately 15 million years old) Santa Cruz Mudstone is light tan, well-cemented (indurated), moderately jointed, and fractured. Previous studies indicate the regional bedding of this unit dips 2 to 5 degrees seaward (south).[7] The bedding thickness varies. Although the compressive strength of the Santa Cruz Mudstone is considered comparable to that of concrete, the mudstone is weak and brittle and contains abundant, closely spaced fractures that produce small angular slabs when disturbed by slope failure or excavation. This formation is approximately 8,860 feet thick and composed primarily of silica-rich (siliceous) mudstones and sandy siltstone. Most of this rock, similar to the older Monterey Formation, is diatomaceous because it contains numerous diatoms or their siliceous remains.

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5 Foxx, Nelson and Associates, "Geologic and Coastal Erosion Study, Long Marine Laboratory Addition, University of California, Santa Cruz," December 15, 1992.
6 Rutherford and Chekene Consulting Engineers, "Geotechnical Investigation, UCSC Long Marine Laboratory Center for Ocean Health, Santa Cruz, California," July 1, 1999.
7 Foxx, Nielsen and Associates, "Geologic and Coastal Erosion Study, Long Marine Laboratory Addition, University of California, Santa Cruz," December 15, 1992.

Soils

Locally Derived Soils

Soils found on the subject property are generally characterized by a deep profile that extends between 40 and over 60 inches on slopes ranging from 0 to 9 percent.[8] These soils form primarily along old coastal terraces and valleys in weathered alluvium derived from numerous rock sources. Two dominant soil series cover the subject property and are referred to as the Watsonville Series and Elkhorn Series.[9] The Watsonville Series is generally found in the lower and upper terraces and extends to the cliff area in the south. The Elkhorn Series covers the central portion of the subject property (middle terrace). Soils of these types are mainly cultivated for field and row crops, irrigated and annual pasture, and specialty crops such as strawberries and Brussels sprouts.[10] Typical native vegetation mainly consists of annual grasses, forbs, and a few coastal chaparral plants. A more detailed description of the two soil series is provided below.

Soil erosion can be characterized by the soil erodability factor (K) and the erosion hazard. Soil erodability factors describe the relative ease at which a soil can be eroded by wind, water, or other disturbances. The K value for a specific soil can range from 0.10 to 0.64.[11] High values of K mean that a soil erodes relatively easily, and low values of K mean that a soil is relatively resistant to erosion. Erosion hazard of a soil is given with a description of either "slight," "moderate," or "high." A soil with a high erosion hazard has a high K value, and a soil with a slight erosion hazard has a low K value.

Watsonville Series. The NRCS divides the Watsonville series into two classes: *loam* and *loam, thick surface* and then subdivides based on slope. In general, the surface layer is characterized by a dark-gray sandy loam that extends from 0 to 12 inches. Below this layer is a light-gray sandy loam from 12 to 18 inches (albic horizon[12]). A notable increase in clay is experienced below 18 inches. The layer below 18 inches is commonly referred to as an argillic[13] horizon that extends from 18 to roughly 39 inches. This horizon consists of a brown clay loam. Light-brown weathered bedrock is found below this layer and extends down to solid bedrock. The depth of the layers varies across the site and generally correlates with the topographical gradient. Generally, these soils are typically well-drained, with slow to rapid runoff and moderately slow permeability. The Watsonville loam on 0-2% and 2-15% slopes is a poorly drained soil that can be located on coastal terraces. During periods of heavy rainfall, these soils may form a perched water table above the argillic horizon (above 18 inches).

The erosion hazard of the Watsonville loam (0-2%) as described by the NRCS is "slight," indicating it has a relatively low K value. The erosion hazard of the Watsonville loam (2-15%) is "slight to moderate," with a higher K value than the Watsonville loam (0-2%). Because of increased slope gradient, the erosion hazard of the Watsonville loam, thick surface on 15-30% slopes is "high," with a K value near the upper range (i.e., 0.64).

8 U.S. Department of Agriculture, Natural Resources Conservation Service, "Soil Survey for Santa Cruz County, California," August 1980.
9 The soil series is a subdivision of a family and consists of soils that are similar in all major profile characteristics.
10 U.S. Department of Agriculture, Natural Resources Conservation Service, "Soil Survey for Santa Cruz County, California," August 1980.
11 U.S. Department of Agriculture, Natural Resources Conservation Service, "Soil Survey for Santa Cruz County, California," August 1980.
12 A mineral soil horizon from which clay and free iron oxides have been removed to the extent that the color or the horizon is determined primarily by the color of the sand.
13 A mineral soil horizon that is characterized by the alluvial accumulation of silicate clays.

Elkhorn Series. The Elkhorn series is considered a *sandy loam*, divided into four subgroups divided by slope gradient. The surface layer typically consists of a grayish-brown sandy loam, which exhibits an angular blocky structure. This layer extends to depths ranging from 17 to 23 inches. An argillic horizon is typically found below this layer at varying depths and extends down to approximately 46 inches. This layer is characterized by a dark-brown to yellowish-brown clay loam with a massive structure. A buried sandy clay loam occurs below this horizon in some locations. Weathered bedrock extends to competent bedrock at a depth of approximately 60 inches. The upper portion of the soil profile (above 40 inches) typically contains less than 15 percent gravel or shale rock fragments by volume. These soils contain high organic matter at the surface, which ranges from 2 to 6 percent in the upper 20 inches. In cultivated areas, much of the surface layer has been removed by sheet and rill erosion. Generally, the soil profile is considered well drained, with slow to rapid runoff and moderately slow permeability.

The erosion hazard of the Elkhorn sandy loam n 0-2% is rated by the NRCS as “slight” (low K value) while the erosion hazard of the Elkhorn sandy loam (2-9%) is rated “slight to moderate” (slightly higher K value than the Elkhorn sandy loam (0-2%)). The erosion hazard of the Elkhorn sandy loam (9-15%) is “moderate” and the erosion hazard of the Elkhorn sandy loam (15-30%) is rated “high” with a K value in the upper range.

Geologic Hazards

Soil Erosion

Erosion is the detachment and movement of soil materials through natural processes or human activities. Depending on the local landscape and climatic conditions, erosion may be very slow to very rapid. The detachment of soil particles can be initiated through the suspension of material in either a hydraulic (water) or eolian (wind) setting. The Mediterranean-type climate in Santa Cruz, exemplified by moist winters and dry summers, results in high wintertime soil erosion rates, while in the summer the area is more prone to wind erosion. The project site is essentially level with gradual slopes of less than 2 percent, which greatly reduce the velocity of any surface runoff and therefore, the potential for soil erosion. Detailed descriptions (by basin) of erosion susceptible areas are provided in the Hydrology and Water Quality section of this EIR.

Coastal Erosion

Erosion of the coastal bluffs is an issue of concern in the developed portions of Santa Cruz County. Bluff erosion results from an episodic failure of a seacliff face undercut from at the surf zone, severe wave attack (especially during high tide), intense and/or prolonged rainfall, or seismic shaking. Erosion of a sea cliff face is not temporal or spatially constant. Alongshore differences in the strength of materials (i.e., alluvium versus more competent bedrock), the presence of or absence of a protective beach and concentration of wave energy contribute to the episodic and local variable nature of sea cliff retreat.[14] Repeated high-tide wave attack was the major cause of the extensive coastal storm damage along the California coast during the 1982–1983 El Niño event; however, the damage was not as severe during the 1997–1998 El Niño Event.[15] Average annual rates of bluff erosion and retreat range from roughly 4 to 8 feet per year

[14] Foxx, Nelson and Associates, “Geologic and Coastal Erosion Study, Long Marine Laboratory Addition, University of California, Santa Cruz,” December 15, 1992.

[15] Griggs, G, “Coastal Erosion Issues at the Long Marine Lab Campus Site,” Letter to UCSC Environmental Assessment Group, January 2002.

in unconsolidated sand dunes of the Fort Ord and Marina areas to a negligible amount in the granitic rocks of the Monterey peninsula.[16]

The Santa Cruz Mudstone is a siliceous sedimentary rock with fractures and joints sets that is relatively resistant to wave attack. The principal mechanism of seacliff retreat along this stretch of the Santa Cruz County coastline is wave action (hydraulic and mechanical forces), which applies force directly on the joint and fractures in the mudstone.[17] The erosion along the joints and fractures exposed in the surf zone undercuts the bedrock cliffs reducing support of overlying rock resulting in instantaneous rock fall. Following bedrock failure, the overlying terrace deposits gradually collapse until they reach a stable angle of repose.

The determination of seacliff erosion rates involves careful measurements from sequential historic stereo aerial photographs, historic maps or surveys, or a combination of the two. Essentially, these are the only data available that allow for a quantitative determination of cliff erosion rates over time. Average long-term cliff erosion rates of the Santa Cruz Mudstone, including the subject site, have been measured or calculated in several previous studies.[18,19] All of the measurements or calculations determined to date for the Santa Cruz Mudstone fall within a relatively narrow range. Studies have determined that average annual retreat rates in the Santa Cruz Mudstone, from north of Davenport to near Natural Bridges, range from 0 to 21 centimeters per year (0 to about 8 inches/year).

Foxx, Nielson and Associates (FNA) prepared the Geologic and Coastal Erosion Study for the project site in 1992.[20] Based primarily on comparison of historical aerial photographs from a 50-year period, FNA concluded that the average historical rate of sea cliff retreat at the site has been on the order of 0 to 0.2 feet per year. This rate corresponds well with rates observed or calculated for nearby sites, particularly sites with similar geologic conditions. FNA further concluded that future erosion rates will be essentially the same, except for possible seismic shaking resulting in a single-occurrence retreat of no more than 10 feet. In the opinion of FNA, for failure related to an earthquake to occur, "it would probably take many years before the seacliff top began to recede again."

At an average rate of 0.2 feet per year, the seacliff retreat would be 10 feet over 50 years and 20 feet within 100 years. Based on the average cliff retreat rate, FNA recommended a 50-year setback of 30 feet from the top edge of the terrace deposit and a 100-year setback of 50 feet for all proposed structures. The additional distances of 20 feet for the 50-year period and 30 feet for the 100-year period provide a factor of safety over the average retreat rate, particularly in light of possible failures due to earthquakes.

The ship mast leaning against the seacliff immediately in front of the Seymour Marine Discovery Center indicates the low rate of cliff retreat at the site. On October 2, 1924, the schooner *La Feliz* went aground on the rocks of the shore platform fronting the project site. The mast was taken off the ship and leaned against the cliff, and a block and tackle was attached to salvage the ship's

[16] Griggs, G, "Coastal Erosion Issues at the Long Marine Lab Campus Site," Letter to UCSC Environmental Assessment Group, January 2002.
[17] Foxx, Nelson and Associates, "Geologic and Coastal Erosion Study, Long Marine Laboratory Addition, University of California, Santa Cruz," December 15, 1992.
[18] Griggs, G.B. and Johnson. R.E., 1979. Erosional Processe and Cliff Retreat Along the Northern Santa Cruz County Coastline, California Geology, 32:67-76.
[19] Griggs, G.B. and Savoy, L.E., 1985, Living With the California Coast, Duje University Press, Durham, N.C., 393p.
[20] Foxx, Nelson and Associates, "Geologic and Coastal Erosion Study, Long Marine Laboratory Addition, University of California, Santa Cruz," December 15, 1992.

cargo. The wreck, the mast, and the adjacent bluffs have been well documented, providing evidence that the cliffs at the site have not changed significantly in 78 years.

ESA conducted a peer review of the 1992 FNA study and presented their conclusions in a letter dated August 14, 2002. An ESA registered geologist and a certified engineering geologist, retained by ESA, concluded from their peer review study that the FNA report adequately addresses the issue of erosion rate and proposed setback of facilities from the bluff face. ESA's peer review did not identify significant changes to the geologic conditions of the site, which would change the FNA findings and therefore, ESA recommended the setback criteria proposed by FNA.

REGIONAL AND SITE-SPECIFIC SEISMICITY

The Coast Ranges of California contain both active and potentially active faults and are considered a region of high seismic activity. The 1997 Uniform Building Code (UBC) places the entire Bay Area, which includes Santa Cruz County, within Seismic Risk Zone 4. Areas within Zone 4 are expected to experience maximum magnitudes and damage in the event of an earthquake. The USGS Working Group on California Earthquake Probabilities has indicated that there is a 70 percent likelihood of one or more earthquakes of Richter magnitude 6.7 or higher occurring in the San Francisco Bay Area between 2000 and 2030.[21]

Regional Faults

Geologic sources reviewed for this EIR did not indicate the presence of known and confirmed active, potentially active, or ancient faults features beneath the proposed CLRDP site or adjacent sites.[22] There are four major faults near the project site that have the potential to produce major earthquakes. The San Andreas Fault Zone to the east and the San Gregorio Fault Zone to the west represent the two principal active faults within the region (see Figure 4.6-1). These faults are known as right-lateral strike-slip faults (i.e., those with principal movement parallel to the trend of the fault). Right-lateral strike-slip movement of the San Andreas fault, for example, means that the lands to the west of the fault are slowly moving north, while the relative motion of the lands to the east of the fault is to the south. Unlike the active faults in the region that have exhibited movement in historic time (within the last 200 years), the potentially active Zayante-Vergales and Ben Lomond faults have not exhibited clear evidence of movement within the last 200 years.[23]

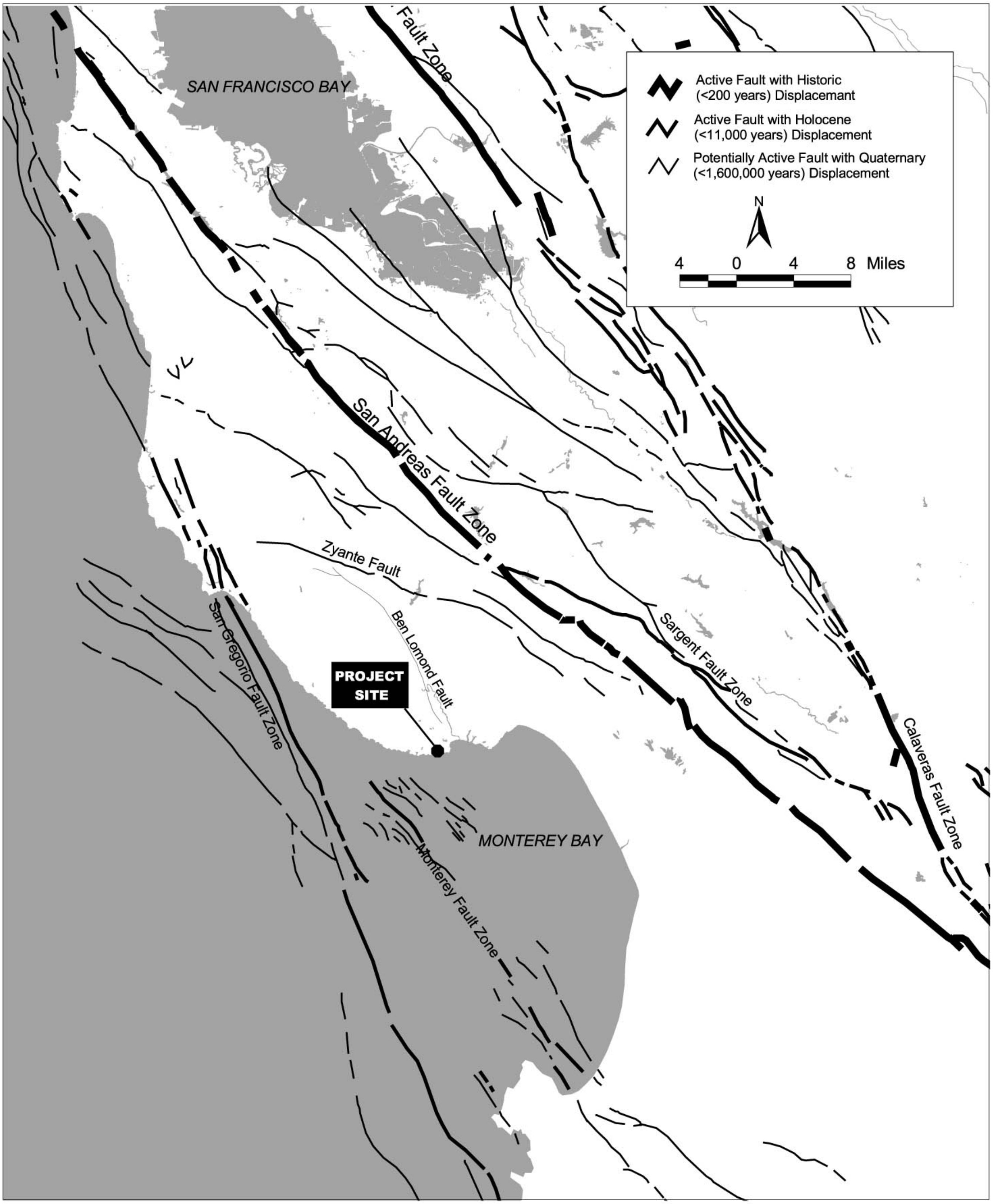
The San Andreas Fault Zone extends nearly the entire length of California and marks the boundary between the North American plate to the east and the Pacific plate to the west. Locally, the San Andreas fault was responsible for the 1906 San Francisco earthquake (magnitude 7.8) and the recent 1989 Loma Prieta earthquake (magnitude 6.9). During recorded history, numerous California earthquakes with magnitudes greater than 6.5 have occurred on this fault, from Los Angeles to Point Arena.[24]

[21] U.S. Geological Survey (USGS) Working Group on California Earthquake Probabilities (WG99), "Earthquake Probabilities in the San Francisco Bay Region: 2000-2030 – A Summary of Findings," Open-File Report (OFR) 99-517, 1999.

[22] Jennings, C. W., "Fault Activity Map of California and Adjacent Areas," California Division of Mines and Geologic, Geologic Data Map No. 6, 1:750,000, 1994.

[23] Ibid.

[24] Magnitudes herein are expressed as moment magnitudes. Moment magnitude is related to the physical size of a fault rupture and movement across a fault, while Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave. Moment magnitude provides a physically meaningful measure of the size of a faulting event. The concept of "characteristic" earthquake means that we can anticipate, with reasonable certainty, the actual damaging earthquake that can occur on a fault.



SOURCE: California Department of Conservation, Division of Mines and Geology (After Jennings, 1994)

Figure 4.6-1
Regional Active and Potentially Active Faults in the Santa Cruz Area

The 1989 Loma Prieta Earthquake occurred on the southern Santa Cruz Mountains segment of the San Andreas fault with the epicenter approximately 11 miles east of the Marine Science Campus and at a depth of approximately 11 miles below the ground surface.[25] There was not significant damage to any buildings at the Marine Science Campus. The large marine mammal tank did suffer some minor cracking of the plaster that was subsequently repaired. Ground motion instrumentation recorded peak accelerations at both the UCSC campus and at Capitola. Peak vertical accelerations ranged from 0.40 to 0.60 g, while peak horizontal accelerations ranged from 0.47 to 0.54 g. Given the stress released by the Loma Prieta earthquake on the southern Santa Cruz Mountains segment of the San Andreas fault system, there is a lower probability that the accelerations recorded in the vicinity of the site (UCSC) will be exceeded in the next 50 years.[26]

The San Gregorio Fault Zone consists of several branches and extends about 270 miles from the vicinity of Bolinas Bay south to Monterey Bay, roughly parallel to the coast of California where it becomes the Hosgri fault. Except for two segments that pass through land, the San Gregorio Fault Zone remains offshore from San Francisco to the Monterey Peninsula; it is about seven miles off the shore of Santa Cruz. The onshore active fault segments are the Seal Cove fault, which comes onshore at Pillar Point near Half Moon Bay, and two parallel segments that come onshore at Pescadero Point to Año Nuevo. Previous studies referred to these parallel strands as the Frijoles strand and the Coastways strand.[27]

While other major faults in the region have produced earthquakes with magnitudes greater than 6.0, the San Gregorio fault has not provided observable evidence of displacement. The 1989 Loma Prieta earthquake did not appear to trigger secondary movement on the San Gregorio Fault Zone. The right-lateral "slip" or movement on the San Gregorio fault is estimated to be between 1 to 10 millimeters per year (mm/yr). Data on earthquakes recorded in historic times indicate three small earthquakes, with magnitudes ranging from 5.5 to 5.9, occurred offshore of Davenport between the years 1869 and 1931. Two larger earthquakes (magnitude 6.0 to 6.4) occurred off the shore of Carmel during the same time period.[28]

The northern extent of the Monterey Bay–Tularcitos fault is approximately four miles south of the subject property, and trends southeast through the Monterey Bay. The Tularcitos fault continues onshore to the south of Monterey. The Monterey Bay portion of this fault alignment has exhibited activity within the Holocene time (about 11,000 years ago).

At its closest location, the Zayante-Vergales fault is approximately 12 miles north of the Marine Science Campus, and trends southeast from Big Basin State Park towards Scott's Valley, and continuing southward to the hills north of Aptos. This fault may have been an important geologic structural feature in this region during late Tertiary time (about 53 million years ago), but by the early Miocene (about 26 million years ago), seismic activity had decreased. This fault is not well-exposed, and its trace has been mapped primarily by offset rock outcrops. Portions of this fault may be active, and some scientists believe its southern section may be indirectly connected to the San Andreas Fault Zone.

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[25] Foxx, Neilson and Associates, "Geologic and Coastal Erosion Study, Long Marine Laboratory Addition, University of California, Santa Cruz," December 15, 1992.

[26] Sydnor, R.H., Griggs, G.B., Weber, G.E., McCarthy, R.J., and Plant, N. 1990. Coast Bluff Landslides in Santa Cruz County Resulting from the Loma Prieta Earthquake of 17 October, 1989, California Division of Mines and Geology Spec. Pub. 104: 67-82.

[27] Sedlock, R.L., "Tests of Alternate Hypotheses of Dextral Slip Rate on the San Gregorio Fault Zone." Department of Geology, San Jose State University, 1997.

[28] Toppozada, T., Branum, D., Petersen, M., Hallstrom, Cramer, C., and Reichle, M., 2000, Epicenters of and Areas Damaged by M≥5 California Earthquakes, 1800-1999, CDMG Map Sheet 49.

The Ben Lomond fault, located about three miles north of the subject property, is not considered active and may be too old to be considered a potentially active feature. The fault trends southeast from Boulder Creek to the area around Felton and is observed in small offsets of Miocene-age rocks. Granitic rocks of Ben Lomond Mountain and the Monterey Formation are divided at the contact of the Ben Lomond fault.

Earthquake Intensity

Strong ground movement from a major earthquake could affect the project site within the next 30 years. Groundshaking may affect areas hundreds of miles distant from an earthquake's epicenter. Earthquakes on the active faults in the region are expected to produce a range of groundshaking intensities at the property. The estimated (moment) magnitudes identified in Table 4.6-1 represent *characteristic* earthquakes on particular faults.[29]

While the magnitude is a measure of the energy released in an earthquake, intensity is a measure of the groundshaking effects at a particular location. Ground movement intensity during an earthquake can vary depending on the overall magnitude, the distance to the fault, the focus of earthquake energy, and the type of geologic material. Groundshaking can be described in terms of peak acceleration, peak velocity, and displacement of the ground.[30] Areas that are underlain by bedrock tend to experience less groundshaking than those underlain by unconsolidated sediments such as artificial fill or natural alluvium. The composition of underlying soils in areas located relatively distant from faults can intensify groundshaking. Portions of the region that experienced the worst structural damage during the Loma Prieta earthquake were not those closest to the fault, but rather those with soils that magnified the effects of groundshaking, for example in the San Francisco and Oakland waterfront areas, some 75 miles from the epicenter.

Seismic Hazards

Surface Fault Rupture

Surface expression of fault rupture is typically observed and is expected on or within close proximity to the causative fault.[31] The Alquist-Priolo Earthquake Fault Zoning Act delineates fault rupture zones approximately 1,000 feet wide, or 500 feet on either side of an active fault trace. The San Andreas Fault Zone lies approximately 13 miles east of the project site. The San Gregorio Fault Zone is located offshore, approximately 7 miles to the west. The 1992 geologic study by Foxx, Neilson and Associates found no evidence of active fault traces such as air photo lineations, scarps, or juxtaposed geological units.[32] In addition, review of current fault maps did not indicate the presence of active, potentially active, or ancient fault traces transecting the

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[29] The concept of "characteristic" earthquake means that the actual damaging earthquake that can occur on a fault can be anticipated with reasonable certainty.

[30] Peak acceleration, peak velocity, and peak displacement values were measured by strong-motion detectors during the Loma Prieta earthquake in several ground and structure strong-motion stations in the Bay Area. For comparison purposes, the maximum peak acceleration value recorded was in the vicinity of the epicenter, near Santa Cruz, at 0.64 g. The highest value measured on the San Francisco Peninsula was 0.33 g, recorded in artificial fill soils at the San Francisco International Airport. Peak ground acceleration is the maximum horizontal ground movement expressed as acceleration due to gravity, or approximately 980 centimeters per second.

[31] Fault rupture is displacement at the earth's surface resulting from fault movement associated with an earthquake (Steinbrugge, et al., 1987).

[32] Foxx, Neilson and Associates, "Geologic and Coastal Erosion Study, Long Marine Laboratory Addition, University of California, Santa Cruz," December 15, 1992.

TABLE 4.6-1
ACTIVE FAULTS IN THE PROJECT SITE VICINITY

Fault Name	Distance and Direction from UCSC – LML	Recency of Movement	Fault Classification[a]	Historical Seismicity[b]	Maximum Moment Magnitude Earthquake (Mw)[c]
San Andreas (Santa Cruz Segment)	13 miles east	Historic (1989 ruptures)	Active	M7.1, 1989 Many <M6.0	6.9
San Andreas (Peninsula Segment)	20 miles north	Historic (1838, 1906; 1989 ruptures)	Active	M7.0, 1838 Many <M6	7.1
San Andreas (North Golden Gate Segment)	60 miles north	Historic (1906 rupture)	Active	M8.25, 1906	7.9
San Gregorio	8 miles west	Holocene	Active segments	Epicenters Plotted M5.5–5.9 1869–1931	7.5
Monterey Bay	4 miles south	Holocene	Active	Activity suggested[d]	Not Available[d]
Zayante	12 miles north	Quaternary	Potentially active segments	Activity suggested[d]	6.8

[a] An active fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 11,000 years). A potentially active fault is defined as a fault that has shown evidence of surface displacement during the Quaternary (last 1.6 million years), unless direct geologic evidence demonstrates inactivity for all of the Holocene or longer. This definition does not, of course, mean that faults lacking evidence of surface displacement are necessarily inactive. “Sufficiently active” is also used to describe a fault if there is some evidence that Holocene displacement occurred on one or more of its segments or branches.

[b] Richter magnitude (M) and year for recent and/or large events. Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave.

[c] Moment magnitude is related to the physical size of a fault rupture and movement across a fault. Moment magnitude provides a physically meaningful measure of the size of a faulting event. The maximum moment magnitude earthquake (Mw), derived from the joint CDMG/USGS Probabilistic Seismic Hazard Assessment for the State of California, 1996 (CDMG OFR 96-08 and USGS OFR 96-706).

[d] Seismicity on the Monterey Bay and Zayante faults has been suggested in Brown and Lee (1971) and Griggs (1973) (see references below). No epicenters have been stated to have specifically occurred on either the Monterey Bay or Zayante faults in these publications.

SOURCES: Brown, R. D., and Lee, W. H. K., 1971, Active Faults and Preliminary Earthquake Epicenters (1969-1970) in the Southern Part of the San Francisco Bay Region, Miscellaneous Field Studies Map MF-307.

Griggs, G. B., 1973, Earthquake Activity Between Monterey and Half Moon Bay, California: California Geology, May 1973 issue, 7 p.

Hart, E. W., *Fault-Rupture Hazard Zones in California: Alquist-Priolo Special Studies Zones Act of 1972 with Index to Special Studies Zones Maps,* California Division of Mines and Geology, Special Publication 42, 1990, revised and updated 1997.

Jennings, C.W. Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions. CDMG Geologic Data Map No. 6, 1994.

Peterson, M.D., Bryant, W.A., Cramer, C.H., “Probabilistic Seismic Hazard Assessment for the State of California,” CDMG Open-File Report, issued jointly with USGS, CDMG 96-08 and USGS 96-706, 1996.

subject property or the presence of a delineated Alquist-Priolo Earthquake Fault Zone.[33] Because it is a generally accepted geologic principle that surface fault rupture occurs most commonly near pre-existing active fault traces, the possibility of ground rupture at the project site is considered negligible.

Earthquake Ground Shaking

Seismically, this region is active and earthquakes of considerable magnitude are expected to affect the Marine Science Campus sometime in the future. Although there are no active faults extending through the Property capable of surface rupture, considerable ground shaking would be expected from an earthquake along the San Gregorio or the San Andreas Fault Zones. The most significant impact of seismic ground shaking, other than the potential damage to buildings, would likely be caused by localized failures along steep seacliffs with steep slopes underlain by Santa Cruz Mudstone or alluvium.

Based on seismic probability analysis, called Probabilistic Seismic Hazard Assessment (PSHA), the CGS have determined that peak ground accelerations in the Marine Science Campus area of Santa Cruz region could range from 0.40 g to 0.50 g.[34] A probabilistic seismic hazard map shows the earthquake hazards that geologists and seismologists agree could occur in California.

It is probabilistic because it considers the uncertainties in the size and location of earthquakes and the resulting ground motions that can affect a particular site.[35]

The susceptibility of a structure to damage from ground shaking is also related to the underlying foundation material. A foundation of rock or very firm material can intensify short-period motions, which affect low-rise buildings more than tall, flexible ones. A deep layer of saturated alluvium can cushion low-rise buildings, but it can accentuate the motion in tall buildings. Other potentially dangerous conditions include architectural features that are not firmly anchored, such as parapets and cornices; roadways, including column and pile bents; and aboveground storage tanks and their mounting devices. During strong or sustained ground shaking, such features could be damaged or destroyed.

Liquefaction and Settlement

Liquefaction is a process whereby unconsolidated, granular, and saturated materials lose strength and fail when subjected to ground motion. The evaluation of liquefaction potential must consider soil type, soil density, groundwater table, and the duration and intensity of shaking. The greatest potential for liquefaction occurs in those areas where the water table is less than 20 feet below ground surface and the materials are predominately clean, relatively uniform, low-density sands.

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[33] Hart, E. W., *Fault-Rupture Hazard Zones in California: Alquist-Priolo Special Studies Zones Act of 1972 with Index to Special Studies Zones Maps,* California Division of Mines and Geology, Special Publication 42, 1990, revised and updated 1997

[34] Peterson, M. D., Bryant, W. A., Cramer, C. H., "Probabilistic Seismic Hazard Assessment for the State of California," CDMG Open-File Report, issued jointly with USGS, CDMG 96-08 and USGS 96-706, 1996.

[35] The PSHA maps express earthquake ground motion in terms of probability of exceeding a certain ground motion. For example, the 10% probability of exceedance in 50 years maps depict an annual probability of 1 in 475 of being exceeded each year. This level of ground shaking has been used for designing buildings in high seismic areas. The maps for 10% probability of exceedance in 50 years show ground motions that we do not think will be exceeded in the next 50 years. In fact, there is a 90% chance that these ground motions will not be exceeded. This probability level allows engineers to design buildings for larger ground motions than what we think will occur during a 50-year interval, which will make buildings safer than if they were only designed for the ground motions that we expect to occur in the next 50 years.

Clayey-type soils are generally not subject to liquefaction. The soils and unconsolidated marine terrace deposits underlying the Marine Science Campus site did not experience liquefaction during the 1989 earthquake nor did any of the other marine terraces throughout the Monterey Bay area. The areas that experience liquefaction in the vicinity during the 1989 and 1906 earthquakes were young, thick, alluvial sediments such as those found along the flood plains of the San Lorenzo, Salinas and Pajaro Rivers.

The 1992 FNA study concluded that liquefaction is not a potential hazard at the Marine Science Campus. However, the peer review of the FNA study in August 2002 generally concurred but also concluded that there is potential for liquefaction. This conclusion is based on the confirmed presence of sand in the unconsolidated terrace deposits and a seasonal high groundwater level. Thus, at various times sandy soils underlying the site are saturated and therefore potentially liquefiable. Although the unconsolidated deposits are most likely of sufficient density and are too thin to result in a liquefaction hazard, the peer review recommended a detailed liquefaction analysis at the design phase of the proposed buildings.

This conclusion is further substantiated by the geotechnical findings prepared by Steven Raas and Associates in 1994 during the construction of the Oiled Mammal Care Facility. In that report, Steven Raas and Associates concluded that the soils they encountered in the southwest portion of the Marine Science Campus (Main Long Marine Laboratory) have a high potential for liquefaction and resulting ground failure such as differential settlement. [36] Subsurface data collected for the geotechnical study of the Center for Ocean Health, conducted by Rutherford and Chekene in 1999 concluded that the unconsolidated terrace deposits have a moderate liquefaction susceptibility and recommended that soil densification be conducted to reduce the liquefaction potential. [37]

Settlement is the consolidation of the underlying soil when a load, such as that of a building or new fill material, is placed upon it. “Differential settlement” is the settlement of soil at different rates and by varying amounts depending on the load weight. Unconsolidated fill materials have the potential to respond more adversely to additional load weights as compared to adjacent native soils. Although settlement is possible under any building, geotechnical design of underlying soil material can reduce the amount of settlement that most buildings can tolerate. The potential for post-construction differential settlement is low at the project site.

Earthquake-Induced Inundation

Earthquakes can cause tsunamis (“tidal waves”), seiches (oscillating waves in enclosed water bodies), and landslide splash waves in enclosed water bodies such as lakes, reservoirs, and large channels. The project site is not within an area of potential inundation by tidal waves due to its elevation and location on the marine terrace.[38]

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[36] Steven Raas and Associates, “Geotechnical Investigation for Oiled Wildlife Rescue and Rehabilitation Station,” Santa Cruz, CA, March 1994.

[37] Rutherford and Chekene Consulting Engineers, “Geotechnical Investigation, UCSC Long Marine Laboratory Center for Ocean Health, Santa Cruz, California,” July 1, 1999.

[38] Ibid.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new development of 529,856 square feet (sf) at the Marine Science Campus by about 2020. The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education; 70,000 sf for Outdoor Research Areas; 19,000 sf for Support Facilities; 98,100 sf for Support Housing; 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for Seawater System Expansion. The CLRDP also identifies other site improvements including modifying and extending public-access trails and roadways, constructing parking, providing utility services, installing storm water management elements including detention basins and conveyance, expanding the seawater system, developing new public access overlook areas. The CLRDP has not mandated exact locations for buildings within the development areas. However, the CDLRP provides a prototype site plan (see Figure 3-7), which provides an example of how and where development described in the CLRDP building program could occur.

Development associated with the implementation of the CLRDP would require the construction of a number of buildings, additional roadways, parking lots, and associated infrastructure. Design and construction of these program elements would require analysis of geologic and seismic conditions at the time of the actual structural design of individual projects.

Construction of the structures proposed under the CLRDP would require initial grubbing and grading and could require import fill to construct building pads. Development and construction of the detention and conveyance elements of the storm water management system would involve site grading and excavation and installation of facilities in the unconsolidated terrace deposits and surface soils. Building foundation design would be standard and would depend on the seismic design, building square footage and height. Given the geologic material underlying the site, foundations could include concrete spread footing, concrete perimeter wall, slab, or pier and grade beam. Pile driven foundation would likely not be necessary or practical due to the shallow depth (5 to 9 feet below ground surface) of the terrace deposits and presence of the Santa Cruz Mudstone. The depth to underlying Santa Cruz Mudstone bedrock would limit basements and other subsurface structures. The soil and groundwater interface beneath the Marine Science Campus may require dewatering of deep excavations during the construction phases. Roadway construction would require grading and import of roadway base depending on quality of onsite materials for this use.

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program by about 2010. Amongst the building footprints depicted in the CLRDP prototype site plan are specific sites for these five near-term projects (see Figure 3-7). These projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area. Foundation or building type has not been determined although considering the location and the soil thickness in this area, these buildings could be constructed of wood and steel on a conventional spread footing foundation. Actual foundation and building design would be determined following the required site-specific geotechnical study. The laydown yard would be paved with either concrete or asphalt over engineered base material.

- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area. Considering its proposed uses as a residence facility, the building would likely consist of wood-framed structures supported by slab on grade foundations. Actual foundation and building design would be determined following the required site-specific geotechnical study.

- The United States Geological Survey (USGS) Western Coastal and Marine Geology facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area. Soils in this area are approximately 10 feet deep, underlain by competent bedrock. Construction of subsurface foundations in this area would require soil excavation. The building may be constructed of concrete with a steel frame supported by conventional spread footings or drilled piers, depending on conditions at the site. Actual foundation and building design would be determined following the required site-specific geotechnical study.

- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area. Unconsolidated terrace deposits and competent bedrock would underlie this 10,000 square foot building. Foundation types are not known at this phase, however, considering the location and existing building types, a steel and wood structure supported by a slab on grade foundation or drilled piers would be probable. Actual foundation and building design would be determined following the required site-specific geotechnical study.

- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area. Additionally, this proposed project would include the construction of two new public-access overlooks and improvement of an existing overlook. Preliminary plans propose a 36-foot tall building, although foundation design and construction methods are not yet determined. Considering its location in proximity to the YLR, and the fact that the site is underlain by competent geologic materials, this building would likely be constructed of wood and steel with either slab on grade foundation or drilled piers. Actual foundation and building design would be determined following the required site-specific geotechnical study.

MEASURES PROPOSED AS PART OF THE PROJECT

A Stormwater Concept Plan has been incorporated into the CLRDP (Appendix D) to address localized erosion and sedimentation issues associated with project construction and operation and post-development. This plan is discussed in detail in Section 4.8, Hydrology and Water Quality.

To mitigate geologic hazards associated with the subject property, the CLRDP includes a coastal bluff protection policy that restricts any development within 100 feet of the cliff area. The Coastal Bluffs protection policy states that the University will not permit new development that creates or contributes to erosion or geologic instability or substantially alters natural landforms along the bluffs. The University will also expand coastal bluff top vegetation. The CDLRP proposes the following Implementation Measure in support of the policy:

A setback of 100 feet will be maintained for buildings and facilities along the coastal bluff in recognition of potential coastal cliff erosion. Development in the cliff setback will be limited to existing streets, existing and proposed pedestrian and bicycle pathways, and infrastructure improvements such as seawater system facilities that are consistent with the CLRDP (Implementation Measure 3.7.1, Bluff Setbacks).

PROJECT IMPACTS AND MITIGATION MEASURES

This impact analysis follows the general order of the standards of significance listed at the beginning of this chapter. Impacts related to seismicity (fault rupture, ground shaking, liquefaction, and slope failure are discussed first, followed by geologic other potential impacts related to general geology that include soil erosion, expansive soils, unstable geologic units, and the ability of the soils to support septic tanks.

SURFACE FAULT RUPTURE

Entire Development Program

Development under the proposed CLRDP on the Marine Science Campus would occur within a seismically active region of California and would be subjected to earthquakes throughout the life of the project. However, surface fault rupture is not a potential seismic hazard because an active fault capable of causing surface rupture does not cross the proposed CDLRP development area and the development area is not located within an earthquake fault zone designated under the Alquist-Priolo Earthquake Fault Zoning Act.

Near-term Projects

As no known active faults capable of causing surface rupture occur on the project site or the near vicinity, none of the five near-term projects described above would be susceptible to impacts associated with surface fault rupture.

EARTHQUAKE-INDUCED GROUND SHAKING

Entire Development Program

The standard of significance at the beginning of this chapter states that a project impact would be considered significant if the project exposed people or property to hazards associated with seismically-induced ground shaking. In the event of a major earthquake in the region, seismic ground shaking could potentially expose people and property to injury and structural damage. The City of Santa Cruz will likely experience at least one major earthquake (greater than moment magnitude 7) within the next 30 years.[39] The intensity of such an event would depend on the causative fault and the distance to the epicenter, the moment magnitude, and the duration of shaking. Examples of ground shaking effects at the Marine Science Campus include moderate structural damage to some older structures, toppling of equipment and furniture, and minor structural damage to newer buildings or equipment.

39 U.S. Geological Survey (USGS) Working Group on California Earthquake Probabilities (WG99), "Earthquake Probabilities in the San Francisco Bay Region: 2000-2030 – A Summary of Findings," Open-File Report (OFR) 99-517, 1999.

Buildings, roadways, and other facilities constructed or altered under the proposed project must comply with recommendations developed during engineering investigations to reduce the damaging effects of ground shaking and ground failure. The intensity of ground shaking is reasonably predictable based on past events and site location, but the damage caused in an earthquake is not entirely avoidable. Current engineering standards for construction in California and improved building codes reduce the risk of injury and building collapse. Buildings constructed under the CLRDP would be designed and constructed in accordance with provisions of the California Building Code (CBC) (Title 24 of the California Code of Regulations) and recommendations of the geotechnical and structural engineers. The CBC provides building standards that reduce the potential for collapse of a building although some structural damage is possible during an earthquake in a building designed under the CBC. Compliance with the CBC and incorporating recommendations of the geotechnical engineer into the project design would not wholly eliminate damage or injury during an earthquake but in reducing the incident of collapse of a structure, would reduce the impact of ground motion to an acceptable level. Although the CLRDP development at the Marine Science Campus would attract additional staff and visitors and may expose additional people to hazards related to major earthquakes, compliance with current building codes reduce the level of hazard associated with ground shaking. Therefore, this Draft EIR concludes that effects on earthquake ground shaking are less than significant.

Near-term Projects

In the event of an earthquake, the entire project site would undergo ground shaking that would impact the near-term projects. However, the various new structures proposed under the near-term projects would respond differently to ground shaking because of their different footprints and heights. Regardless of their intended use, each structure proposed as part of the near-term projects would comply with the seismic design criteria of the CBC and applicable, more stringent design criteria, if required by the University or the federal government. The CBC seismic design criteria is intended to protect life and property by ensuring that a building will withstand strong shaking without collapse. Seismic design considerations for each building would vary due to whether the building is intended as a habitable structure (i.e., apartments/townhouses) or a support facility (i.e., shared warehouse).

The seismic design of each near-term project building would be determined at the design phase of each project based on geotechnical data collected during the required site–specific geotechnical study. The geotechnical study and subsequent structural design would consider underlying geology, estimated ground motion, and the predicted response of the proposed building to that ground motion. Design of the foundation and structural elements of the new building would incorporate the ground motion response of each site due to an earthquake. Compliance with the CBC or other more stringent design criteria would ensure that ground shaking impacts associated with near-term projects are less than significant.

SEISMICALLY-INDUCED GROUND FAILURE AND LIQUEFACTION

Entire Development Program

The significance criteria at the beginning of this chapter states that a project impact would be considered significant if the project exposed people or property to hazards associated with seismically-induced ground failure and liquefaction. As previously discussed in the geologic setting section of this chapter, the 1992 FNA geologic study of the Marine Science Campus concluded that the underlying materials were not subject to liquefaction due to the competency of the materials. The peer review of that study completed by ESA in 2002 expressed reservations regarding that conclusion because the underlying unconsolidated terrace deposits contained sand and the water table beneath the site can become shallow during the winter and periods of precipitation. Steven Raas and Associates identified soils in the southern portion of the site with what they described as a high susceptibility to liquefaction and discussed the potential for differential settlements to occur as a result of liquefaction. Based on the previous studies mentioned above, liquefiable soils may occur in areas underlying the project site.

Liquefaction of the unconsolidated terrace deposits overlying the Marine Science Campus would occur during a major earthquake that would be capable of generating considerable ground motions (high ground accelerations and velocity). The effects of the liquefied soils would be localized and limited to areas underlain by susceptible soils, namely soils consisting of near-surface saturated, non-cohesive sediments. Ground failure caused by liquefaction could differentially settle building foundations, cause downward warping in roadways and parking lots, and disrupt underground utilities. The California Geological Survey (CGS) has not zoned the Santa Cruz area, including the Marine Science Campus, under the Seismic Hazard Zoning Act, although it is located in an area considered by the CGS as high-priority for evaluation and mapping. Once seismic hazard zoning is complete in this area of Santa Cruz, the Marine Science Campus may be delineated as a Seismic Hazard Zone for liquefaction. If that does occur, future development would be subjected to the evaluation and mitigation provisions required by the Seismic Hazard Zoning Act.

Typically, conditions that indicate potentially liquefiable soils capable of causing ground failure during an earthquake are recognizable during site-specific geotechnical investigations. Geotechnical engineers commonly recommend and development projects incorporate mitigation for liquefaction-susceptible areas throughout California when site conditions warrant. Mitigation for liquefaction are standard practice in California, especially the San Francisco and Monterey Bay Area and can include removal of suspect soil and replacement with engineered fill, densification, control of subsurface water, or piers and piles. The development under the CLRDP would require a site and project specific geotechnical investigation during the design phase of each building. The geotechnical investigation would determine underlying geology and seismic response for the development site. If subsurface data indicates liquefiable soil conditions, the project geotechnical engineer would recommend standard engineering practices to mitigate the potential impact of liquefaction. Site-specific geotechnical studies for future development at the Marine Science Campus would ensure that impacts related to liquefaction are less than significant.

Near-term Projects

Considering that previous geotechnical studies identified liquefiable soils in areas beneath the subject site, there is a potential that the near-term projects are proposed in areas overlying similar soil conditions. The near-term project sites are underlain by potentially liquefiable conditions that consist of varying depths of non-cohesive terrace deposits containing sand and gravel and depending on the time of year, high groundwater conditions. As mentioned above, Steven Raas and Associates identified potentially liquefiable soils during the construction of the Oiled Mammal Care Facility near the Marine Science Campus (Main Long Marine Laboratory) and Rutherford and Chekene in 1999 concluded that the unconsolidated terrace deposits have moderate liquefaction susceptibility. Given the distribution of semi-consolidated to unconsolidated sediments throughout the site and the potential for seasonal high groundwater, there is a potential that potentially liquefiable terrace deposits could underlie each of the near-term projects.

Similar to the entire development program, the near-term project would require site and project specific geotechnical studies to determine underlying geologic conditions and seismic response. The geotechnical evaluations, necessary for design and construction of any occupied building, would identify liquefaction-susceptible soil and proposed appropriate mitigation to ensure the related impacts are less than significant.

SEISMICALLY-INDUCED SLOPE FAILURE

Entire Development Program

The standard of significance at the beginning of this chapter state that a project impact would be considered significant if the project exposed people or property to seismically-induced landslide hazards. The seacliffs along the coastal bluffs and the cliffs adjacent to Younger Lagoon are composed of Santa Cruz Mudstone overlain by unconsolidated terrace deposits. The cliffs that bound the site are steep and near vertical in some locations. Slope failure occurring under static (non-seismic) conditions are rare due to the competent bedrock and although the overlying terrace deposits along these cliffs may become unstable, the resulting failures tend to be localized and do not displace large amounts of material. Coastal bluff retreat occurs as the sea cliffs are eroded by waves strong waves attacking the exposed seacliff. The under-cutting caused by wave erosion causes the mudstone and overlying terrace deposits to rockfall into the surf zone.

Significant landslide impacts for the Marine Science Campus site are those that would occur during a major earthquake with ground shaking strong enough to dislodge large portions of slope. This may occur during large earthquakes that subject the site to high ground acceleration. Such an event could cause harm to people and damage to buildings placed too close to the edge of the bluff. The geologic study conducted by FNA in 1992 identified that long-term coastal erosion and the collapse of sea caves within the seacliffs could endanger proposed structures and facilities. FNA recommended in their study a 50-year setback of 30 feet from the top edge of the terrace deposit and a 100-year setback of 50 feet from all proposed structures. FNA proposed a 30-foot setback for 50 years rather than a 25-foot setback to account for one major earthquake during the next 100 years that could cause the bedrock seacliff to fail.

CLRDP Implementation Measure 2.12.1, Bluff Setbacks, would maintain a setback of 100-feet from bluffs for buildings and facilities along the coastal bluff in recognition of potential coastal cliff erosion and slope failure during an earthquake. The setbacks prescribed in Implementation Measure 2.12.1 would reduce the potential for seismically-induced ground failure and ensure that impacts related to seismically-induced slope failure are less than significant.

Near-term Projects

Seismically-induced slope failure hazards associated with the entire development program would be similar under the near-term projects. The proposed near-term projects are located on flat building areas, away from the coastal and YLR bluffs and outside the setbacks prescribed by Implementation Measure 2.12.1. This would ensure that impacts related to seismically induced slope failure are less than significant.

SOIL EROSION AND LOSS OF TOPSOIL

Entire Development Program

The Marine Science Campus is located on the flat surface of a marine sea terrace on a slope of about 2 percent. This setting greatly reduces the potential for soil erosion at the Marine Science Campus. Consequently, the potential erosion on the site resulting from the proposed CLRDP would not expose people or structures to adverse effects or result in topsoil loss. Minor soil erosion hazards could occur in the short-term during construction. Short-term erosion typically occurs during construction phase of a project and more readily during initial site grading and construction. For example, heavy rainfall runoff from newly graded soil building pads could cause runoff that forms erosional gullies on the slopes of the pad. This could lead to localized slope failures at the edge of the building pad or undermining of the concrete slabs. Short-term construction erosion impacts are more a nuisance than a long-term impact capable of resulting in substantial adverse effects such as property loss, injury or death. Standard construction and engineering practices would require winterizing construction sites and protecting exposed soil during heavy rainfall. The Hydrology and Water Quality section (Chapter 4.8) discusses soil erosion as a contributor to water quality impacts to surface water.

Near-term Projects

Similar to the Entire Development Program, long term erosion and soil loss is not considered a potential geologic impact at the project site although short term impacts could occur during construction of the individual near-term projects. As discussed above, short-term construction erosion impacts are considered a nuisance than a long-term adverse impact and would be overcome using standard construction and engineering practices, which require winterizing construction sites and protecting exposed soil during heavy rainfall.

UNSTABLE GEOLOGIC UNITS

Entire Development Program

Development under the proposed CLRDP would not be located on a geologic unit that is geologically unstable or one that would become unstable because of the project, as specified in the standard of significance listed at the beginning of this chapter. However, the coastal bluffs may be unstable and not capable of supporting buildings or facilities over the long-term. This instability is due to the seacliff retreat, the composition of the bedrock and terrace deposits and the presence of sea caves. The bluffs adjacent to the Younger Lagoon Reserve are not undergoing active wave erosion and with respect to mechanical weathering, are considered stable in their current configuration. However, the bluffs do undergo wave and wind erosion as discussed in Hydrology and Water Quality, Section 4.8). The 1992 FNA geologic study concluded that the average historical rate of sea cliff retreat at the site has been on the order of 0 to 0.2 feet per year. FNA further concluded that future erosion rates will be essentially the same, except for possible seismic shaking resulting in a single-occurrence retreat of no more than 10 feet, as discussed under seismic impacts above. At a rate of 0.2 feet per year, the seacliff retreat would average 10 feet over 50 years and 20 feet within 100 years. The Santa Cruz Mudstone is fractured, jointed, and therefore is susceptible to mechanical and hydraulic weathering by sustained wave attack or from high surf conditions during storms. Failure in the mudstone cliff undermines the overlying terrace deposits and leads to failure. In some locations along the seacliffs, caves have formed in the mudstone. The current seawater intake is constructed in such a cave. The 1992 FNA study recommended that no structures be placed over sea caves.

Development in the cliff setback would be limited to existing streets, existing and proposed pedestrian and bicycle pathways, and infrastructure improvements such as seawater system facilities that are consistent with the CLRDP. A setback of 50 feet from the top edge of the terrace deposit would provide sufficient protection from both ongoing and episodic (seismic) erosion for over 100 years. Likewise, a setback of 100 feet would provide protection for over 200 years. The setbacks prescribed in Implementation Measure 2.12.1 would reduce the potential for hazards related to construction on unstable geologic unit such as a eroding sea cliff or a bluff overlying a sea cave and would ensure that impacts related to unstable geologic units are less than significant.

Near-term Projects

Coastal erosion of the bluff and seacliff retreat would be similar to that described above for the entire development program. The closest new building (Center for Ocean Health) to the coastal bluff, at its closest point, would be more than 300 feet from the edge of the coastal bluff. The proposed near-term development under the CDLRP, therefore, maintains the required 100-foot setback for buildings and facilities along the coastal bluffs, as required in Implementation Measure 2.12.1. Impacts related to unstable geologic units would be less than significant for all five near-term projects.

EXPANSIVE SOILS

Entire Development Program

The NRCS Soil Survey of Santa Cruz County identify both the Watsonville Series soils and the Elkhorn Series soils as sandy loams with low expansivity. Regardless, the site-specific soil investigation conducted prior to the foundation design of a building would identify expansive soils and should they exist, recommend appropriate engineering measures to reduce potential adverse impacts. Given that the soils are sandy loams and not susceptible to shrink-swell behavior (expansivity), the issue of expansive soils, as listed in the standard of significance at the beginning of this chapter, is not considered a geologic impact of the proposed CLRDP project.

Near-term Projects

Expansive soils are not considered an impact for the near-term projects for the reasons cited above. The near-term projects would be constructed on terrace deposits not considered to be expansive due to their composition. However, the site-specific soil investigation conducted prior to the foundation design of a building would identify expansive soils if present and recommend appropriate engineering measures to reduce potential adverse impacts. Expansive soils are not considered an impact for the near-term projects proposed under the CDLRP.

SEPTIC TANKS AND WASTEWATER DISPOSAL SYSTEMS

Entire Development Program

The proposed CLRDP does not propose the installation of septic tanks and leach fields or alternate waste water systems because sanitary sewer service would be available to the project (see Section 4.16, Utilities). The CDLRP does propose a natural drainage system that would manage storm water on the Marine Science Campus to reduce non-point source pollutants and reduce post-development discharge flow rates. Given that this is a surface water drainage system relying on only minor infiltration capacity, the underlying Watsonville Series and Elkhorn Series soils would not impact this system. Therefore, the capability of the soils to adequately support wastewater disposal systems is not considered in this geologic impact analysis.

Near-term Projects

The proposed near-term projects do not require the installation or use of septic tanks and leachfields or waste water systems because sanitary sewer service would be available to the project. As discussed above under Entire Development Program, the CDLRP does propose a natural drainage system to reduce non-point source pollutants and reduce post-development flow rates but this system relies on minor infiltration capacity of the underlying Watsonville Series and Elkhorn Series. The capability of the soils to adequately support wastewater disposal systems under the near-term projects is not considered in this geologic impact analysis.

The project site is located in a seismically-active region of California, as is virtually the entire coastline of the state, and is susceptible to seismic shaking during an earthquake. In addition, it is located on an uplifted marine terrace undergoing wave attack. Based on the CEQA criteria evaluated herein, compliance with current building codes and the University's cliff setback policy would ensure that potential hazards related to geology and soils are adequately reduced and impacts would remain less than significant. The potential geologic hazards and risk associated with development on the project site would remain through buildout of the proposed CLRDP. During that time, building codes may become more stringent and requirements for evaluation and mitigation of seismic hazards may be improved.

CUMULATIVE IMPACTS

The geographic area considered includes the project site and immediate vicinity as most geologic and soil impacts tend to be site specific and do not cumulate.

ENTIRE DEVELOPMENT PROGRAM

Cumulative geologic and seismic impacts associated with the proposed CLRDP and other planned or foreseeable future projects in the site vicinity (i.e., the Westside Study Area, as defined in the introduction of Chapter 4) involve the exposure of an increased number of people and/or structures to the risks of earthquakes and their associated geologic hazards. New commercial and residential development in the Santa Cruz westside study area and development on the Marine Science Campus under the CLRDP will attract a greater number of employees, residents, and visitors to the area. In the event of a major earthquake, this development would expose more people to the potential seismic hazards than under current conditions. According to the standard of significance, an impact is significant if it exposes people or property to substantial adverse effects of geologic or seismic hazards. The cumulative impact would however be less than significant because the seismic hazard in this area is similar to that in other parts of northern California, and the majority of persons who would be exposed to the hazard at this site are likely similarly exposed to the risk at other locations where they would be residing or working prior to moving to this area. Furthermore, new construction would comply with current building codes and incorporate seismic safeguards that would minimize the risk, and therefore the impact would not be cumulatively significant.

The Coastal Act requires that new development not contribute to geologic instability of the coastal area and not result in the need for structural protection of coastal bluffs. The CLRDP requires all new development on the project site to be set back at least 100 feet from the coastal bluffs. All other land parcels that abut the coastal bluffs in the Santa Cruz westside study area are either already developed or protected from development under state parks such as Natural Bridges and Wilder Ranch. Therefore new development in the project vicinity would not affect the stability of coastal bluffs, and no cumulative impact would result.

NEAR-TERM PROJECTS

For the reasons noted above for the CLRDP, the five near-term projects in conjunction with other regional development would not result in cumulatively significant impacts related to geology or seismicity.

Based on the information presented above, the implementation of the proposed CLRDP and its near-term projects, in conjunction with other development in the vicinity of the Marine Science Campus, would not result in cumulatively significant adverse impacts related to geology and seismicity.

4.7 HAZARDS AND HAZARDOUS MATERIALS

This section evaluates the potential impacts of the proposed CLRDP and the five near-term projects on the use and disposal of hazardous materials. This section evaluates the potential impacts of the proposed project related to hazards and the use and disposal of hazardous substances. Primary sources of information used in this section include the *Soil Sampling and Analysis Report, Phase II Residual Pesticide Assessment Coastal Long Range Development Plan University of California, Santa Cruz*, Environmental Science Associates; the *Draft Environmental Impact Report Long Marine Laboratory Master Plan* UCSC Office of Campus Facilities, July 1993; and the *Santa Cruz General Plan and Local Coastal Program*, City of Santa Cruz, 1992, amended 1994. Additional information contained in this section is derived from the *University of California San Francisco Revised Laurel Heights Plan Environmental Impact Report*, Environmental Science Associates, 1995; and *EDR Radius Map with GeoCheck*®, Environmental Data Resources, November 20, 2002.

Based on the following CEQA criteria, a project would generally be considered to have significant adverse impact on the environment if it would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
- Be located on a site 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.
- Result in a safety hazard for people residing or working in the project area, for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public-use airport.
- Result in a safety hazard for people residing or working in the project area for a project within the vicinity of a private airstrip.
- 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.

SETTING

For purposes of this EIR, the term "hazardous material" is defined by its definition in law as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment.[1]

REGULATORY CONTEXT

UCSC is subject to substantial government health and safety regulations applicable to the use and disposal of all forms of hazardous materials.[2] This section provides an overview of the regulatory setting applicable to health and safety at the UCSC Marine Science Campus and introduces UCSC's established health and safety policies and procedures.

Research activities are subject to numerous laws and regulations at all levels of government. A summary of applicable laws and regulations related to the storage, use, and disposal of hazardous materials and to safety hazards at the project site and a summary of campus policies and procedures is provided below.

Applicable Regulations

Worker Safety Requirements

The California Occupational Safety and Health Administration (Cal/OSHA) and the Federal Occupational Safety and Health Administration (Fed/OSHA) are the agencies responsible for assuring worker safety in the handling and use of chemicals in the workplace. In California, Cal/OSHA assumes primary responsibility for developing and enforcing workplace safety regulations. These regulations concern the use of hazardous materials in the workplace including requirements for employee safety training; availability of safety equipment; accident and illness prevention programs; hazardous substance exposure warnings; and emergency action and fire prevention plan preparation. Cal/OSHA also enforces hazard communication program regulations, including procedures for identifying and labeling hazardous substances, and requires Material Safety Data Sheets (MSDSs) to be available for employee information and training programs.

Hazardous Materials Management Planning

State law requires detailed planning to ensure that hazardous materials are properly handled, used, stored and disposed of, and to prevent or mitigate injury to health or the environment in the event that such materials are accidentally released. The California Office of Emergency Services implements these requirements. Federal laws such as the Emergency Planning and Community-Right-To-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act or SARA) impose similar requirements.

1 State of California, Health and Safety Code, Chapter 6.95, Section 25501(o).

2 The California Health and Safety Code defines a hazardous material as any material that, because of quantity, concentration or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment. State of California, Health and Safety Code, Chapter 6.95, Section 25501(o).

The Hazardous Materials Release Response Plans and Inventory Law of 1985 (Business Plan Act) requires that any business that handles hazardous materials prepare a Business Plan, which must include the following: (a) details, including floor plans of the facility and identification of business conducted at the site; (b) an inventory of hazardous materials that are handled or stored on the site; (c) an emergency response plan; and (d) a training program in safety procedures and emergency response for new employees, with an annual refresher course in the same topics for all employees. Public agencies, including the University of California, were initially exempt from these reporting requirements. In 1988, the Business Plan Act was amended to include public agencies within the definition of a business, resulting in a requirement for state agencies, including the University of California, to submit business plans to designated local agencies. For UCSC, the designated agency to receive business plans is the Santa Cruz County Department of Environmental Health.

Hazardous Substances Transportation

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

Two state agencies have primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies: the California Highway Patrol (CHP) and the California Department of Transportation (Caltrans). The CHP enforces hazardous materials and hazardous waste labeling and packing regulations designed to prevent leakage and spills of material in transit and to provide detailed information to cleanup crews in the event of an accident. Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are all part of the responsibility of the CHP, which conducts regular inspections of licensed transporters to assure regulatory compliance. Caltrans has emergency chemical spill identification teams at as many as 72 locations throughout the state that can respond quickly in the event of a spill for remediation. In addition, the State of California regulates the transportation of hazardous waste originating or passing through the state.

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

Hazardous Waste Handling Requirements

RCRA created a major new federal hazardous waste regulatory program that is administered by the U.S. Environmental Protection Agency (EPA). Under RCRA, EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous wastes from "cradle to grave." Under RCRA individual states may implement their own hazardous waste programs. EPA approved California's program in 1992, called the Hazardous Waste Control Law (HWCL), administered by the California Environmental Protection Agency Department of Toxic Substance Control (DTSC). HWCL differs little from RCRA (although it covers a larger set of materials); both laws impose "cradle to grave" regulatory systems for handling hazardous wastes in a manner that protects human health and the environment.

Regulations implementing HWCL list 791 hazardous chemicals as well as 20 to 30 more common materials that may be hazardous; establish criteria for identifying, packaging and labeling hazardous wastes; prescribe management practices for hazardous wastes; establish permit requirements for hazardous waste treatment, storage, disposal and transportation; and identify hazardous waste that commonly would be disposed of in landfills. Under both RCRA and HWCL, hazardous waste manifests must be retained by the generator for a minimum of three years. The generator must match copies of the hazardous waste manifests with copies of manifest receipts from the treatment, disposal or recycling facility. For UCSC, the agency delegated to implement these requirements locally is the Santa Cruz County Department of Environmental Health.

Radioactive Materials

The Atomic Energy Act of 1954 and its implementing regulations establish the principal mechanism for regulating the possession and use of radioactive materials. The Energy Reorganization Act of 1974 vested regulatory functions, other than those pertaining to nuclear weapons and nuclear energy, in the Nuclear Regulatory Commission (NRC). Except for matters over which the Atomic Energy Act establishes exclusive federal jurisdiction,[3] the NRC may delegate its regulatory authority to a state agency.

The California State Radiological Health Branch (RHB) of the Department of Health Services (DHS) regulates the possession and use of radioactive materials at facilities in California, except for federal installations which remain under NRC control. At UCSC, users of radioactive materials must comply with the California Radiation Control Law and its implementing regulations. This law requires that any person desiring to possess, use, or transfer any radioactive material must have a license. UCSC holds a license from the State of California that governs the use of radioactive materials in campus laboratories, including the Marine Science Campus and Mt. Hamilton Observatory. This license specifies the exact procedures and equipment UCSC researchers must use when working with radioactive materials. In order to receive a license, UCSC must follow DHS guidelines as well as guidelines published by various scientific advisory institutions.

UCSC has a 'broad scope" license that governs the uses of radioactive materials in laboratories at UCSC. A broad scope license authorizes an institution to use radioactive materials for specified general purposes such as research and development. The institution in turn operates a program that approves and oversees each particular use of radioactive material within the institution.[4] In order to receive a broad scope license, the institution must have considerable experience with large and varied radioisotope programs, a well-developed health physics group that is capable of evaluating and dealing with radiation safety problems that might be encountered, and detailed procedures for evaluating proposed specific uses of radioactive materials and for maintaining surveillance over approved uses.

3 The NRC, for example, must retain authority over the export and import of radioactive materials, the ocean disposal of radioactive waste, and construction and operation of any facility whose primary purpose is to produce or use radioactive materials. 42 U.S.C § 2021(c).

4 California regulations do not specifically provide for broad scope licenses. The regulations distinguish between general and specific licenses. A broad scope license is a kind of specific license issued by DHS to institutions, like UCSC, that have an established radiation safety program. General licenses, on the other hand, are effective without the filing of an application or the issuance of documents. 17 C.C.R. § 30190. Use of radioactive material in certain equipment, for example, is authorized under a general license as specified in the regulations. 17 C.C.R. § 30192.1.

UCSC ensures compliance with the terms of its license through administrative procedures outlined in the University's Radiation Use Authorization.[5] All uses of radiation on UCSC's campus and also the Marine Science Campus are subject to review and approval by the Radiation Safety Committee (RSC) and the Radiation Safety Officer (RSO) prior to acquisition of radioactive materials. The Radiation Safety Officer is the head of the Radiation Safety Program, which oversees the daily use of radioactive materials. In effect, DHS has delegated to UCSC the authority to issue specific licenses to specific persons for specific uses of radioactive material on its campus. Therefore, in order to receive its broad scope license, UCSC must assure DHS that the University's authorization procedures are compatible with the regulations governing the issuance of specific licenses.[6]

UCSC's Environmental Health and Safety (EH&S) Office must maintain records of authorizations for all individual projects. These records must include the following information: location of use; names of all independent users in addition to the name of the principal investigator; resume of each independent user's training and experience with respect to use of radioactive materials; description of the nature and purpose of the proposed use; a specification of isotopes, forms, activity per procedure, and possession limits adequate to cover the proposed use; a description of major steps in the processing and handling of the isotopes including disposal; records of receipt, transfer and disposal; description of facilities and equipment to be used in processing and storing the isotopes; a copy of the authorization from RSC to user which permits the use in question and contains conditions under which the use may be conducted; the results of all internal inspections of the operating program; the exposure (and bioassay) histories of the users; leak test records; and histories of incidents and unusual occurrences. EH&S generally reviews such authorization annually.

Biosafety Standards

Similar to federal laws, state laws establish standards for working with biohazardous materials (see the federal biosafety standards section, above, for more information). At this time there are no biohazardous agents or recombinant DNA used at the Marine Science Campus. Any proposed research that would involve the use of these materials would need to be reviewed and approved by the Institutional Biosafety Committee (IBC). Due to the design of the labs at the Marine Science Campus, any research using biohazardous materials would be limited to Biosafety Level 2 materials.

Structural and Building Materials and Equipment

Underground Storage Tanks. State laws governing USTs specify requirements for permitting, monitoring, closure, and cleanup. There are no underground storage tanks subject to the UST regulations at the Marine Science Campus.

Asbestos. State laws and regulations pertain to building materials containing asbestos. While this is the case, there are no building materials that contain asbestos at the Marine Science Campus.

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5 Radiation Safety Manual supra note 9.
6 17 C.C.R. §~ 30194-30195.

UCSC Policies and Procedures

Campus Hazardous Materials Handling

It is the policy of the University of California to maintain a safe environment for its students, faculty and visitors. It is also the University's policy to conduct University operations in compliance with all applicable regulations and health and safety standards. UCSC has charged the campus Office of Environmental Health and Safety (EH&S) with compliance monitoring to ensure a safe and healthy campus environment and with coordinating the management of hazardous materials on campus. EH&S has the authority to require abatement of any condition or operation that could endanger people or facilities on campus or result in violations of pertinent federal or state laws or campus policies concerning health and safety. EH&S develops specific policies and programs in the following areas: industrial hygiene; chemical safety; physical safety; radiation safety; biohazard safety; hazardous waste management; and environmental protection.

EH&S facilitates Cal/OSHA and Fed/OSHA compliance efforts on campus. EH&S prepared a model Injury and Illness Prevention Plan and Chemical Hygiene Plan, which is used by individual units as the basis for preparing unit-specific plans; these plans set forth processes and procedures for employee training, the safe use of hazardous materials, the role of various oversight committees, and the key role of the principal investigator. Principal investigators and laboratory supervisors are responsible for ensuring that personnel are trained and that their laboratories are operated in accordance with the unit's Chemical Hygiene Plan, which must conform to the EH&S Chemical Hygiene Plan. EH&S provides a checklist for this purpose. EH&S also conducts regular inspections of labs under a new inspection program.[7] Emergency response plans are also prepared by individual units and by the campus as a whole.

To support compliance with all applicable health and safety policies and regulations, EH&S distributes written guidelines generally addressing a variety of health and safety issues (e.g., the use of hazardous materials, including radioactive materials).[8] Individual departments are assigned the responsibility for implementing specific training programs. To facilitate departmental training programs, EH&S conducts a variety of training classes throughout the year (e.g., laboratory safety, hazard communication, and bloodborne pathogens). In addition, EH&S publishes information (e.g., newsletters and fact sheets) for distribution to Injury and Illness Prevention Plan coordinators. EH&S also maintains a web page that contains a variety of health and safety information. MSDSs are made available to employees through an internet database service to which the University of California subscribes.

In accordance with the UCSC Radioactive Materials License, laboratories in which radioactive materials are used are subject to inspection by EH&S staff 1 to 4 times per year. EH&S personnel use a facility audit checklist when inspecting labs and other campus facilities where radioactive materials are used. The inspections are conducted to ensure compliance with applicable codes and policies and to be certain of conformity with applicable standards.

The UCSC Environmental Health and Safety Department (EH&S) requires that any laboratory wanting to work with biohazardous agents, recombinant DNA organisms, select agents[9] as defined by the Centers for Disease Control and Prevention (CDC), U.S. Department of Health

7 Ilse Kolbus, UCSC Environmental Health and Safety Office, personal communication, September 21, 1999.
8 For example, EH&S training is required prior to authorization for use of radioactive materials.
9 Select agents are 36 specific biohazardous materials that could "cause substantial harm to human health". They include 13 viruses, 7 bacteria, 3 rickettsiae, one fungus and 12 toxins, as listed in Appendix A to 42 CFR Part 72.

and Human Services, or material requiring Biosafety Level 2 or above, must contact the UCSC biosafety officer, fill out the UCSC Biological Agent Use Authorization Form and receive approval of the Institutional Biosafety Committee before beginning work.[10]

In accordance with the Business Plan Act, the campus has prepared a business plan that has been submitted to the Santa Cruz County Department of Environmental Health. Routine audits are performed by County inspectors.

The EH&S Chemical Spill Response Team has operated for eight years. The team responds to an average of ten spills per year. None of these has ever resulted in a reportable release, and most have occurred inside labs or have been related to minor vehicle fuel or oil releases. No significant spills have occurred at the project site.[11] Rapid response and thorough containment of small spills has been the norm at UCSC.

The potential for spills or unauthorized disposal of chemicals into laboratory drains and consequently into the sewer system is addressed in several ways on campus. Accidental spills are controlled by secondary containment requirements (including use of chemical isolation trays, when appropriate), thereby minimizing the potential for accidental discharges to drains. Education and awareness trainings conducted by EH&S and by the various departments is intended to inform building occupants about the proper use, storage, and disposal of materials.

Campus Hazardous Waste Disposal

UCSC complies with all of the requirements of RCRA and the HWCL, which govern the generation, storage, transport, and disposal of hazardous wastes. Hazardous wastes are collected by EH&S, brought to a central hazardous waste storage area (where materials are held for less than 90 days), packaged in accordance with federal and state requirements, and shipped via authorized transport services for recycling, treatment, and/or disposal at authorized sites. UCSC also implements a household hazardous materials education program, and participates in the County household hazardous waste collection and disposal program.

Campus Emergency Response/Evacuation Planning

As discussed in the Public Services section, the UCSC Fire Department typically provides first response for all fire emergencies on University property; however, due to the distance of the Marine Science Campus from the main campus fire station (approximately 4 miles), the UCSC Fire Department does not provide first response to the site. The City of Santa Cruz Fire Department, therefore, provides primary fire suppression services to the project site. The California Department of Forestry (CDF) responds to all wildland fires in unincorporated areas of Santa Cruz County, including unincorporated areas adjacent to the Marine Science Campus. In addition to responding to fires on county lands, the CDF would assist either the UCSC Fire Department or the City of Santa Cruz Fire Department if requested to do so.

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[10] UCSC Environmental Health and Safety, http://ehs.ucsc.edu/Lab_Research_Safety/ehs.asp?page=BioSafety, accessed November 5, 2002.
[11] Dan Blunk, UCSC Environmental Health and Safety Office, personal communication, December 7, 2000.

EXISTING CONDITIONS

Hazardous Materials Use, Storage, and Disposal

Table 4.7-1 describes the potential hazards associated with hazardous chemicals, radioactive materials, and biohazardous materials at the UCSC Marine Science Campus. This section describes the existing hazardous material use, storage, and disposal for the MSC and the existing controls in place to reduce the risks.

TABLE 4.7-1
POTENTIAL HAZARDS AND CONTROLS FOR HAZARDOUS MATERIALS

Type of Material	Potential Hazards and Controls
Hazardous Chemicals	Hazardous chemicals may be flammable, corrosive, reactive, or toxic, and may result in various physical or chemical risks to workers. Hazardous chemical use, storage, and disposal are conducted according to applicable Federal and state regulations and guidance by the Campus Chemical Safety Advisory Committee. Hazardous materials are used in well-ventilated laboratory spaces and stored in approved cabinets or buildings according to Building Code regulations.
Radioactive Materials	Radioactive materials contain unstable atoms that emit radiation that is capable of producing ionization in the substances through which it passes. The only consequence of small exposures to ionizing radiation is the possibility of an increase in the probability of receiving an adverse health effect (namely cancer). It is possible that there would be no increase of risk. All work with radioactive materials is reviewed by the campus Radiation Safety Officer and Radiation Safety Committee. Controls are placed on use to limit the risk to workers and the environment.
Biohazardous Materials	Biohazardous materials may include infectious agents or chemical toxins that contribute to human disease. The potential to cause disease would be based on the Risk Group (as designated by the Centers for Disease Control and National Institutes of Health) and the scope of research associated with the biohazardous agent. All work conducted with Risk Group 2 agents (organisms associated with human disease which is rarely serious and for which preventive interventions are available) or greater is reviewed by the Institutional Biosafety Committee. Increased controls or restrictions are placed on work activities as necessary to protect laboratory workers as well as the surrounding environment.

Hazardous Chemicals

Three broad areas of research are presently supported by existing LML facilities: marine vertebrate studies, marine invertebrate biology, and marine aquatic toxicology.[12] Research activities associated with LML currently use a variety of chemicals. A small portion of those hazardous chemicals used at the site evaporate and disperse into the air. The hazardous chemicals that are used and their airborne emissions are analyzed under Toxic Air Contaminants, in the

[12] UCSC, "Long Marine Laboratory Master Plan DEIR," 1993, page 14-2 and 14-3.

Air Quality section of this document. In addition to hazardous wastes generated in laboratories, marine maintenance and outfitting activities also result in hazardous waste, primarily due to the paints and metals used to protect vessels and equipment used in marine research. Existing chemical use at the UCSC Marine Science Campus resulted in the generation of approximately 2,135 pounds of hazardous wastes in 2002, based on 2002 Uniform Hazardous Waste Manifests maintained by EH&S.[13] This represents about 2.5% of all UCSC hazardous wastes shipped.[14] The amount of wastes fluctuates somewhat from year to year, but this figure should be considered as representative of the quantity of wastes currently generated. These hazardous wastes include methanol, methylene chloride, hexane, hydrochloric acid, acetone, ethyl ether, xylene, trichloroethane, and butanol.[15]

Hazardous wastes are stored temporarily in a central storage area at the Marine Science Campus site. The storage area and storage procedures are periodically inspected by EH&S and the University of California Fire Department (UCFD) fire marshall and the Santa Cruz County Department of Environmental Health. The stored materials are collected at least every 90 days by a licensed hazardous waste hauler contracted by EH&S. The materials are recycled, treated, and/or disposed of offsite at licensed facilities.

Radioactive Materials

The LML presently uses only small activities of unsealed radioisotopes. Generally, the radionuclides most often encountered at LML include ^{14}C, ^{3}H, ^{125}I, ^{32}P, (^{33}P), and ^{35}S (CHIPS) all in millicurie[16] quantities or less. The use of radioactive material at LML is regulated under UCSC's Broadscope A license issued by the California Department of Health Services. This license allows for the broad-range of both sealed and un-sealed radioisotope use at LML beyond what is presently in use.

All current, and any future radioisotope use, is reviewed by the campus Radiation Safety Officer (RSO) and the campus Radiation Safety Committee (RSC) as indicated in Radiation Safety Manual (RSM). This review includes an evaluation of the technical proficiency of the researchers, their knowledge of UCSC radiation safety program and the adequacy of the facility for conducting the research. All of the applications are reviewed for compliance with Title 17 of the California Code of Regulations and the conditions in the UCSC radioactive materials license.

Regulatory Agency Listed Sites

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The report meets the government records search requirements of the American Society for Testing Materials (ASTM) "Standard Practice for Environmental Site Assessments, E 1527-00." A summary of the database search for the project site as well as for nearby surrounding sites is given below.

13 Dan Blunk, UCSC Office of Environmental Health and Safety, personal communication, August 2003.
14 *Ibid*.
15 UCSC, "Long Marine Laboratory Master Plan DEIR," 1993, page 14-3.
16 A millicurie is one-thousandth of a Curie, a measure of the rate of radioactive decay. A millicurie is equal to 37 megabecquerels (Mbq).

Project Site

A government records search performed by EDR revealed that the project site is not listed as a contaminated or leaking site on any of the databases searched. The databases searched included, among others, the State of California Hazardous Waste and Substances List (Cortese List) and the Comprehensive Environmental Response, Compensation, and Liability System (CERCLIS). The Cortese List is a compilation of information from various sources listing potential and confirmed hazardous waste and hazardous substance sites in California and is maintained by DTSC. CERCLIS contains general information on contaminated sites, including location, status, contaminants, and actions taken. Information in the CERCLIS database can be found on sites being assessed under the Superfund Program, hazardous waste sites, and potential hazardous waste sites.

The project site was identified in the HAZNET database, a DTSC database that records annual hazardous waste shipments, as required by RCRA. All businesses that use and dispose of hazardous materials are entered into the HAZNET database, and each occurrence of a disposal and/or transfer of a hazardous waste is entered into the database as a record. The HAZNET database contains 71 records of shipments of hazardous waste disposal for the project site.

Nearby Sites

A review of the Cortese List, as provided by EDR, revealed five Cortese sites within approximately one mile of the project site. Additionally, nearby sites were identified in the RCRA Database, the Leaking Underground Storage Tank List, the Underground Storage Tank List, the Historical UST Registered Database, the California Facility Inventory Database, the HAZNET database and the CERCLIS database. Table 4.7-2, below, provides a detailed list of nearby regulatory listed sites.

Residual Pesticides and Health Risk

Residual Pesticides in Surface Soils

The application of chlorinated pesticides, such as dieldrin, chlordane, and DDT, has been a common agricultural practice in the United States. Evidence of the adverse environmental and human health effects of these substances, including their probable carcinogenicity, resulted in banning the use of these pesticides in the United States in the 1970s and 1980s. However, residual pesticides, including their degradation products (e.g., DDT degrades to DDD and DDE), continue to exist in the soil due to their persistent nature and inability to completely biodegrade.

Historical land use activities on the terrace portion of the project site (formerly referred to as Terrace Point) included agriculture (orchards and row crops).[17] A previous investigation for the presence of residual pesticides was conducted in 1995 at the site and concluded that the pesticides dieldrin, DDT, DDD, and DDE were present in the surficial soils.[18] A followup study was performed in 1997 to estimate the health risk posed by residual pesticides detected at the site.[19]

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17 Applied Science and Engineering, Inc. "Health Risk Assessment of Residual Pesticides Detected in Surface Soils at Terrace Point, Santa Cruz, California." Prepared for Wells Fargo Bank, June 23, 1997.

18 Steven Raas & Associates, Inc., "Residual Pesticide Investigation Terrace Point Site, Santa Cruz, California," August 1995.

19 Applied Science and Engineering, Inc. "Health Risk Assessment of Residual Pesticides Detected in Surface Soils at Terrace Point, Santa Cruz, California". Prepared for Wells Fargo Bank, June 23, 1997.

TABLE 4.7-2
REGULATORY LISTED NEARBY SITES[a]

Site Name	Site Location	Distance from Site	Regulatory List
RN Rudolph	2429 Mission	1 mile NE	Cortese
S.C. Artichoke & Sprout	402 Ingalls	1 mile NE	Cortese
E.V. Moceo Co., Inc.	1206 Fair Oaks	1 mile NE	Cortese
Lipton, Inc.	2200 Delaware	1/2 mile SE	Cortese, LUST[b]
Mission Linen Service	601 Swift	1 mile E	Cortese
Texas Instruments, Inc.	2300 Delaware	1/4 mile SE	RCRA[c]-LQG[d], UST List[e], CA FID[f], HAZNET
Raytek, Inc.	1201 Shaffer	1/4 mile SE	RCRA-SQG[g], HAZNET
Dallas Electronics	1201 Shaffer	1/4 mile N	RCRA-SQG, HAZNET
Lightsurf Technologies Photo Laboratory	1201 Shaffer	1/4 mile N	RCRA-SQG
AT&T Technologies	2300 Delaware	1/4 mile SE	HIST UST[h]
Wilder Ranch Burn Dump	Wilder Ranch State Park	3 miles N	CERCLIS[i]

[a] As provided by EDR.
[b] Leaking Underground Storage Tank List
[c] Resource Conservation and Recovery Act Database, maintained by EPA, includes selected information on sites that generate, store, treat, or dispose of hazardous substances as defined by RCRA.
[d] Large Quantity Generator
[e] Underground Storage Tank List
[f] The California Facility Inventory Database contains active and inactive UST locations.
[g] Resource Conservation and Recovery Act Database – Small Quantity Generator
[h] Historical Underground Storage Tank List
[i] The Comprehensive Environmental Response, Compensation, and Liability Information System

SOURCE: Environmental Data Resources, ESA

The 1997 investigation included additional surface soil sampling at the site, and the results from both the 1995 and 1997 sampling investigations were evaluated using the CalTOX health risk assessment model, discussed below.

A further assessment, conducted during September and October 2002, addressed the presence, extent, concentrations, and human health risk of residual pesticides in the shallow soils at the Marine Science Campus site.[20] This investigation was completed in accordance with the "Interim Guidance for Sampling Agricultural Soils," prepared by the California DTSC to supplement the DTSC "Preliminary Endangerment Guidance Manual." The guidance was developed for evaluating soils at proposed new school sites and/or new school construction expansion projects and serves as a conservative sampling approach to collecting data for health risk assessment modeling. Specifically, 64 surface soil samples were collected at locations dispersed evenly, with

[20] Environmental Science Associates, "Soil Sampling and Analysis Report, Phase II Residual Pesticides Assessment", February 2003.

approximately one-acre centers, across the Marine Science Campus and submitted to a California-certified analytical laboratory for analysis of constituents selected in accordance with DTSC guidance for assessing soils on agricultural sites. Organochlorine pesticides such as chlordane, DDT, DDD, and DDE were detected in the laboratory analysis and their concentrations compared to specified residential land use EPA-Preliminary Remediation Goals (EPA-PRGs) to determine which constituents may be considered to be of concern.[21] Residential land use EPA-PRGs are the lowest and considered most protective as compared to the higher industrial land use EPA-PRGs. All constituents of organochlorine pesticides detected during the 2002 assessment were well below the Residential land use EPA-PRGs.

CalTOX Assessment of Health Risk

CalTOX is a spreadsheet model that assists in health risk assessments of contaminated soils and the adjacent air, surface water, sediments, and groundwater. Assessment of human exposure to environmental contaminants such as pesticides requires the translation of environmental concentrations into quantitative estimates of the amount of a given chemical that will contact individuals within an exposed population. The CalTOX modeling software contains a library of chemicals and their properties, such as molecular weight, solubility in water, and vapor pressure.

CalTOX has been used to model residual pesticides in surface soils at the Marine Science Campus on two occasions. The 1997 CalTOX modeling effort[22] used surface soil data collected during the 1995 and 1997 soil sampling investigations to assess health risk exposure. The 2002 CalTOX modeling analysis[23] used only new surface soil data collected during a 2002 sampling investigation. In each modeling effort, only the particular chemicals that were detected by the relevant soil sampling investigation were assessed for human health risk.

For both CalTOX model runs, the assumptions employed were conservative. For example, both summed the concentrations of DDT and its breakdown products that were detected in each sample and then used the highest of these summed values as the input to CalTOX. By using the highest concentration detected, both model runs overestimate the mass of chemicals in the surface area being analyzed, and therefore overstate the resulting human exposure to those chemicals. Both models evaluated 3 exposure pathways; inhalation, dermal contact and direct ingestion. The 1997 CalTOX model run considered “exaggerated” [24] human exposures to inhaled soil particles in both indoor and outdoor air, skin contact with residual pesticides in soil, and direct ingestion of soil. The 2002 CalTOX model run evaluated human exposures from inhalation of particles in indoor air and outdoor air, skin contact with plants and soil, and direct ingestion of soil.

The conservative application of the CalTOX Multimedia Exposure Model in 1997 and again in 2002 indicated that residual pesticides measured in the soil at the Marine Science Campus pose a level of risk to human health that is well below normally accepted values.

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21 The Region IX PRGs combine current EPA toxicity values with “standard” exposure factors to estimate concentrations in environmental media (soil, air, and water) that are protective of humans, including sensitive groups, over a lifetime. PRGs are levels recommended by the EPA for individual constituents based upon potential health risks. These recommendations are not government standards, but are intended to provide guidance for cleanup of industrial sites. However, in some cases, exceedance of a PRG suggests that further evaluation of the potential risks posed by site contaminants may be appropriate.

22 Applied Science and Engineering, Inc. “Health Risk Assessment of Residual Pesticides Detected in Surface Soils at Terrace Point, Santa Cruz, California”. Prepared for Wells Fargo Bank, June 23, 1997

23 Environmental Science Associates, “Soil Sampling and Analysis Report, Phase II Residual Pesticides Assessment”, February 2003.

24 For the 1997 study, “exaggerated” meant that the level was set to ten times the default value assigned by DTSC.

Wildland Fire Hazards

For a discussion of fire protection services, see Section 4.13, Public Services. The Younger Lagoon Reserve (YLR) and the Moore Creek corridor are identified as fire hazard areas on Map S-11 of the Santa Cruz General Plan's Safety Element. However, the risk of wildland fires is low due to the coastal location of the project site, low-lying vegetation, and the presence of various building structures.

Airports and Airstrips

The LML site is not located within an airport land use plan and is not within two miles of a public airport or public-use airport. Additionally, the project site is not within the vicinity of a private airstrip.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net increase of 377,856 sf of building space and about 152,000 of outdoor development at the Marine Science Campus by about 2020. The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education; 70,000 sf for Outdoor Research Areas; 19,000 sf for Support Facilities; 98,100 sf for Support Housing; 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for Seawater System Expansion.

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program, by about 2010. Amongst the building footprints depicted in the CLRDP prototype site plan are specific sites for these five near-term projects (see Figure 3-7). These projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse, shop, labs and offices and 70,000 sf of corporation yard open space) would be sited on the upper terrace development area. The facility buildings would include several shops, preparation and painting areas, small labs, offices and warehouse. The shops would be used for maintenance and repair of boats, marine equipment and dive gear. The open corporation yard would be used as general laydown space, for such purposes as handling fishing nets and for the storage and staging of equipment. The offices would generate minor quantities of hazardous materials typically associated with that use. Marine antifouling paints and other paints, solvents, other petroleum products, antifreeze, batteries and other hazardous materials would be used in the shop areas, as well as stored in the warehouse. Hazardous materials also could be used and/or stored in the laydown yard.

- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area. Household hazardous materials would be generated at these residential units.

- The United States Geological Survey (USGS) Western Coastal and Marine Geology facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area. The facility would generate minor quantities of hazardous materials typically associated with office use. The facility also would use a range of laboratory chemicals and hazardous materials in small quantities within the confines of the laboratories in the facility. These laboratory chemicals and hazardous materials would be similar to those in use in other campus laboratories.

- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area. The administrative offices would generate minor quantities of hazardous materials typically associated with office use and the sea-otter critical care research and support uses inside the facility could use chemicals or other hazardous materials, similar to those in use in other campus laboratories. The outdoor area would have the mammal pools, with the activities being feeding and caring for the animals. Hazardous materials use outdoors would be limited mostly to materials for cleaning and maintenance.

- The Center for Ocean Health Phase II facility (18,000 sf) would be an addition to the existing Center for Ocean Health building on the lower terrace development area. Additionally, this proposed project would include the construction of two new public-access overlooks and improvement of an existing overlook. Increasing the number of laboratories would result in an overall increase in use of the chemicals already used in the Center's existing laboratories.

Construction of the near-term projects would require excavation of soil and rock material that could contain pesticides and/or other chemical constituents. Facility operation would require use and/or storage of small quantities of potentially hazardous materials in commercially available receptacles.

MEASURES PROPOSED AS PART OF THE PROJECT

The CLRDP states that "the University will protect the Marine Science Campus environment from contamination caused by the transportation, storage, and use of petroleum products and hazardous materials" (Policy 3.10, Hazardous Materials Management). To achieve this goal, the following implementation measures are proposed:

- The University, through the Office of Environmental Health and Safety, will manage the use of, and in the event of spillage the containment and cleanup of, hazardous materials and petroleum products on the UCSC Marine Science Campus in compliance with federal and state regulations related to the storage, disposal, and transportation of hazardous substances (Implementation Measure 3.10.1, Hazardous Materials Management).

- The University will install appropriate features around the perimeter of maintenance and laydown areas to ensure that accidental spills of hazardous materials do not enter the stormwater drainage system or groundwater (Implementation Measure 3.10.2, Protective Measures for Maintenance and Laydown Area).

PROJECT IMPACTS AND MITIGATION MEASURES

HAZARDOUS MATERIALS USE, TRANSPORT, AND DISPOSAL

Entire Development Program

The types of chemicals used in the proposed project laboratories and research facilities would be similar to those currently used on the Marine Science Campus. Offices and building support activities would use hazardous chemicals common in other office and support setting. These chemicals would include familiar materials, such as toners, "white out," paints, lubricants, kitchen and rest room cleaners, and other maintenance materials. These common consumer products would be used for the same purposes as in any office or similar setting.

Development of new and expanded facilities would increase laboratory space and correspondingly increase chemical use at the proposed facilities. The associated increase in chemical use would result in an increase in the generation of hazardous wastes requiring disposal.

Operation of the proposed CLRDP development projects would result in an increase in the use, storage, and disposal of petroleum products and hazardous materials. Per the Hazardous Materials Release Response Inventory Law of 1985, UCSC is required to maintain and submit, to the County of Santa Cruz, a current Hazardous Materials Business Plan that includes: details of the facilities and business conducted at the site, an inventory of hazardous materials that are handled or stored at the site, an emergency response plan, and a safety and emergency response training program for new employees with annual refresher courses. Implementation Measures 3.10.1, Hazardous Materials Management, and 3.10.2, Protective Measures for Maintenance and Laydown Area, would ensure that hazardous materials are managed in compliance with federal and state regulations related to the storage, disposal, and transportation of hazardous substances. UCSC's continuing compliance with all federal and state laws regulating petroleum products and other hazardous materials would result in any impacts being less than significant. In addition to UCSC, other, non-UC entities would also be located at the site as part of the development under the CLRDP. Two of the near-term projects involve non-UC entities – the USGS and the Monterey Bay Aquarium. Because the activities of non-UC entities are not within the direct control of UCSC, their actions with respect to hazardous materials could result in impacts.

<u>Impact 4.7-1</u>: Implementation of the CLRDP could increase use of hazardous materials by non-UC entities on campus, which could create hazards to the public or the environment under routine and/or non-routine conditions. This represents a potentially significant impact.

Under the CLRDP, the number of laboratories operated on campus by non-UC entities would increase. The CLRDP would provide land specifically to accommodate non-UCSC entities on campus. These laboratories would use hazardous chemical materials, radioactive materials, and biohazardous materials similar to those used in campus laboratories and as described above. Non-UC entities operating on campus are subject to the same laws and regulations that apply to campus laboratories. The non-UC entities would be responsible for their own permits and regulatory compliance. In addition, under a variety of contractual agreements, these entities would be required to implement programs and controls that ensure the same level of environmental protection required of campus laboratories and departments. Under the CLRDP, the non-UC entities would remain subject to laws and regulations related to safe transportation, handling, and disposal of hazardous, biohazardous, and radioactive materials and wastes. As a result, spills or releases of hazardous materials would be highly regulated and controlled, protecting the public and the environment. Project-Specific Mitigation Measure 4.7-1 would ensure that the practices of non-UC entities on campus provide the same level of environmental protection required of campus laboratories and departments. Implementation of these mitigations would reduce this potential impact to a less-than-significant level.

Project-Specific Mitigation Measure 4.7-1: For projects proposed by non-UC entities on campus that involve laboratories, non-UC entities shall be required, through contracts and agreements, to implement programs and controls that provide the same level of protection required of campus laboratories and departments.

- **Non-UC entities shall provide to campus EH&S copies of all required environmental reports to local, state, and federal environmental and safety regulators.**

- **Non-UC entities shall submit the qualifications of designated laboratory directors to UC Santa Cruz EH&S Office prior to commencing laboratory operations. Such documentation shall be in the form of educational and professional qualifications/experience.**

- **Non-UC entities shall submit a copy of applicable regulatory environmental documents prior to commencing on-site research. Applicable documents may include a Hazardous Materials Business Plan, an EPA Hazardous Waste Generator ID Number, a Wastewater Discharge Permit, and air permits regulating fume hood exhaust or emissions from other equipment. Copies of revisions or updates to regulatory documents shall be submitted to EH&S in a timely manner.**

- **Non-UC entities shall submit certification of compliance with NIH biosafety principles to the UC Santa Cruz EH&S Office prior to commencing on-site research or pilot plant manufacturing activities. Non-UC entities shall submit copies of completed medical waste management plans, biosafety management plans, inventories of infectious or genetically modified agents, applicable permits and updates.**

- **Non-UC entities shall submit proof of license with Department of Health Services Radiological Health Branch prior to commencing on-site research or pilot plant manufacturing activities involving the use of ionizing radiation or radiation producing machines, or alternatively request to be permitted under UCSC's Radioactive Material License. In either case, Non-UC entities shall submit copies of proposed radioactive material or radiation use protocols to the UCSC Radiation Safety Committee for their review and approval before any radioisotopes or radiation producing machines are brought on site.**

- **If hazardous material quantities are proposed to be increased above applicable threshold quantities as defined in California Code of Regulations, Title 19, Division 2, Chapter 4.5, non-UC entities shall implement a Risk Management Plan/California Accidental Release Prevention Plan (RMP/Cal-ARP), which discusses the handling and storage of acutely hazardous materials on site. The**

RMP/Cal-ARP shall be approved by the CUPA and filed with the UC Santa Cruz EH&S Office prior to commencing proposed operations.

- **Non-UC entities shall submit certification to the UC Santa Cruz EH&S to verify that applicable requirements for handling and disposal of hazardous wastes have been met prior to commencing on-site research or pilot plant manufacturing activities. Non-UC entities shall submit copies of management plans for handling and disposal of hazardous wastes, and written verification of contracts with licensed waste disposal firms.**

Additionally, residents, visitors in the overnight accommodations, and office workers would use and dispose of small quantities of household hazardous substances. However, the provision of housing, visitor accommodations, and office spaces would not substantially increase the use, storage, or disposal of household hazardous substances. As such, implementation of the CLRDP's development program would not cause an adverse effect on the environment with respect to the use, storage, or disposal of household hazardous substances generated from housing and office uses, and therefore the impact would be considered less than significant.

Near-term Projects

While all of the near-term projects would generate minor quantities of hazardous materials typically associated with office and, in the case of the townhouse units, residential use, the Center for Ocean Health Phase II, USGS Western Coastal and Marine Geology, and SORACC projects include laboratory uses that would involve use of standard research lab chemicals (e.g., formaldehyde) and other hazardous substances. In addition, the Shared Campus Warehouse and Laydown Facility would contain chemicals, paints and petroleum products, and other potentially hazardous substances in commercially available containers and quantities. UCSC's continuing compliance with all federal and state laws regulating the use, transportation and disposal of these hazardous materials would result in the impact being less than significant.

With respect to the Shared Warehouse and Laydown Facility, maintenance work would generally be conducted indoor in the repair shops proposed as part of the project. Certain activities such as washdown of boats would occur outdoors in the yard on a concrete apron. Water used to wash the boats down would drain to a Stormceptor, which would remove solids and other pollutants before discharge to the storm drain. The potential for this activity to release toxic paints into the storm drain is low because boats at the Marine Science Campus are not out on the bay for long periods of time and therefore are not treated with special antifouling paints that tend to be toxic.

SORACC and USGS Western Coastal and Marine Geology Laboratory projects, as facilities that would be occupied by non-UC entities, will be required to implement Project-Specific Mitigation Measure 4.7-1 to ensure that impacts from the routine handling of hazardous materials in these facilities are avoided.

HAZARDOUS MATERIAL RELEASE

Entire Development Program

Development of the entire program would incrementally increase the risk of accidental spillage of hazardous substances. Policy 30232, Hazardous Materials, of the California Coastal Act requires protection against the spillage of crude oil, gas petroleum products, or hazardous substances in relation to any development or during the transportation of such materials. It also requires that effective containment and cleanup facilities be provided and procedures implemented for accidental spills that do occur.

Several plans are in place to address these issues. The California Office of Emergency Services administers the California Emergency Response Plan, which coordinates emergency services provided by federal, state, and local governmental agencies and private persons. Response to hazardous materials releases is one part of this plan. As required under the Hazardous Materials Release Response Inventory Law of 1985, UCSC has submitted a hazardous material business plan.[25] One of the required components of the Business Plan is an emergency response plan. Additionally, UCSC has prepared several plans to facilitate the response to the accidental release of hazardous substances (see the UCSC Health and Safety Plans and Policies section for a detailed description of these written plans).

Implementation Measures 3.10.1 and 3.10.2 provided in the CLRDP would ensure protection against hazardous materials spillage and effective containment and cleanup facilities and procedures for accidental spills. In addition, UCSC's continuing compliance with all federal and state laws regulating petroleum products and hazardous materials results in any impacts associated with the accidental release of hazardous materials being considered less than significant.

Non-UC entities would be located at the site as a part of development under the CLRDP. Two non-UC entities, the USGS Western Coastal and Marine Geology laboratory and SORACC, are represented by two of the near-term projects and other non-UC entities could be sited at the MSC in the future. Because the activities of non-UC entities are not within the direct control of UCSC, their actions with respect to hazardous materials releases could result in impacts. As described previously, the non-UC entities would be subject to the laws and regulations related to hazardous, biohazardous, and radioactive materials and wastes. Project Specific Mitigation Measure 4.7-1, above, would ensure that the practices of non-UC entities on campus provide the same level of environmental protection required of campus laboratories and departments. The implementation of the project-specific mitigation measure would reduce this impact to a less than significant level.

Near-term Projects

Four of the five near-term projects, excepting only the residential units, would include laboratory or other uses that could conceivably involve chemicals and petroleum products that, if accidentally released into the environment, would potentially be of concern. However, given the current UCSC hazardous materials programs in place, incorporation of CLRDP Implementation Measures 3.10.1 and 3.10.2, Project Specific Mitigation Measure 4.7-1 and continuing adherence to state and federal regulations pertaining to hazardous materials, the resulting impacts of such releases would be considered less than significant.

[25] Dan Blunk, UCSC Office of Environmental Health and Safety, personal communication, November 2003

PROXIMITY TO SCHOOLS

Entire Development Program

None of the development projects comprising the development program would be located within ¼ mile of a public or private elementary, middle, or high school. The closest schools to the site are Natural Bridges Elementary School, located at 255 Swift Street, and Ark Alternative High School, located at 313 Swift Street. Both schools are located approximately ¾ mile to the east of the project site. As such, hazardous emissions or the handling of hazardous or acutely hazardous materials, substances, or wastes would not occur within ¼ mile of a school as a result of CLRDP implementation.

Near-term Projects

None of the five near-term projects would be located within ¼ mile of a public or private elementary, middle, or high school. As such, there would be no impacts associated with hazardous emissions or the handling of hazardous or acutely hazardous materials, substances, or wastes within ¼ mile of a school as a result of the five near-term projects.

LISTED SITES

Entire Development Program

The EDR records search did not identify the CLRDP project site as a Cortese / CERCLIS site. Because the site is not listed as a contaminated site, no significant hazard to the public or the environment would be created as a result of site development under the CLRDP.

Near-term Projects

Because the Marine Science Campus is not listed as a contaminated site, no significant hazard to the public or the environment would be created as a result of the development of the near-term projects.

PROXIMITY TO A PUBLIC AIRPORT OR PRIVATE AIRSTRIP

Entire Development Program

The CLRDP project site is not located within an airport land use plan. Furthermore, no airports exist within the City of Santa Cruz. Thus, there would be no impacts associated with safety hazards in the proximity of an airport.

Near-term Projects

For the same reasons as cited above, there would be no impacts associated with safety hazards in the proximity of an airport or private airstrip associated with the five near-term projects.

ADOPTED EMERGENCY RESPONSE PLANS

Entire Development Program

The proposed CLRDP would not interfere with the City of Santa Cruz Emergency Management Plan. Additionally, Implementation Measure 3.10.1, Hazardous Materials Management, would ensure compliance with any state or federal emergency response plan, such as the California Office of Emergency Services' Emergency Response Plan. As such, there would be no impacts associated with the interference of an adopted emergency response plan as a result of the development under the CLRDP.

Near-term Projects

The proposed near-term projects would not interfere with the City of Santa Cruz Emergency Management Plan. Additionally, Implementation Measures 3.10.1 and 3.10.2 would ensure compliance with any state or federal emergency response plan, such as the California Office of Emergency Services' Emergency Response Plan. Therefore, there would be no impacts associated with the interference of an adopted emergency response plan as a result of the five near-term projects.

WILDLAND FIRES

Entire Development Program

Although the YLR and the Moore Creek corridor are located within a designated fire hazard zone in the City's General Plan Safety Element, the risk posed to facilities by wildland fire is relatively low, due to the nature of the development constructed on the site and its coastal location. Moreover, the proposed development under the CLRDP would account for the existing fire risk and also would decrease the wildland area of the site, further reducing the risk posed to the project by wildland fire. As such, the risk of wildland fire would be considered less than significant.

Near-term Projects

For reasons noted above for the CLRDP Program, none of the five near-term projects would result in an impact due to wildland fire.

Based on the CEQA criteria evaluated herein, the CLRDP or the near-term projects would not have a significant adverse impact related to hazards and hazardous materials.

CUMULATIVE IMPACTS

ENTIRE DEVELOPMENT PROGRAM

The cumulative context for the CLRDP is the development of the Marine Sciences Campus and development of remaining undeveloped parcels located within the Santa Cruz westside study area by about 2020. According to the City General Plan, industrial areas in the Santa Cruz westside study area "contain sizeable undeveloped lands that should meet the needs of industrial development through 2005."[26] The General Plan also states that the City "aims at encouraging

[26] City of Santa Cruz, "General Plan and Local Coastal Program," 1992, amended 1994, page 106.

new and existing businesses that are non-polluting and that will also improve the City's long-term economic and environmental quality vitality…"[27] The Santa Cruz westside study area includes areas identified for Industrial Infill and Intensification and for Coastal Dependent / Related (the MSC site) development on Map L-4: Industrial Infill and Intensification Areas, and areas identified for Low Medium Density and Low Density housing on Map L-2: Housing Infill and Intensification Areas. Low Medium Density housing and Low Density housing areas are adjacent to the MSC site while the Industrial Infill and Intensification areas are farther from the MSC site.

The standards of significance that apply to the cumulative impact analysis are the same as those that apply to the project-level analysis. The standards address the potential for cumulative development to create hazards through routine or reasonably foreseeable accident conditions, interfere with adopted emergency response plans, or expose people or structures to risks involving wildland fires.

Most future development in the Santa Cruz westside study area would be residential, with minimal effect on hazards and hazardous materials. However, some additional industrial uses in the area could develop that would increase the use, transport, and disposal of hazardous materials for this part of the city. As such development is subject to the Business Plan Act, all future projects that involve the handling of hazardous materials would be required to prepare and file a hazardous materials business plan that demonstrates the safe handling and control of hazardous materials in compliance with state and federal regulations. Future development in the project vicinity would be required to provide for the safe use, storage, and disposal of hazardous materials. Therefore, although the amount of hazardous material that would be used, transported and disposed of cumulatively would increase, the impact of those increases would be less than significant.

Similarly, although the quantities of hazardous material that could be present within the vicinity of the site or even the Santa Cruz westside study area due to future cumulative industrial development would increase, the accidental release of hazardous materials from a facility would not necessarily be linked to potential accidental releases at other facilities, nor would there be a mechanism by which the effects of those releases would necessarily cumulate. The individual facility emergency response plans prepared under the Business Plan Act would be adequate to mitigate the adverse effects of each and every release to a less than significant level.

On Map L-2: Housing Infill and Intensification of the Land Use Element of the City General Plan, the Santa Cruz westside study area is designated as low-medium density, low density, and medium density infill and intensification areas. These areas have the potential to increase in population, thereby increasing the need for additional school facilities. Thus, there is the potential for a school to be located within ¼ mile of the CLRDP project site in the future. However, Section 17213 of the Education Code (School Siting Code) requires that, prior to acquiring property for a new school site, an environmental site investigation must be completed to determine the health and safety risks associated with a site. Thus, it is not expected that a school would be sited in the area if a significant risk were considered to exist. As such, cumulative impacts associated with hazardous emissions or hazardous materials handling near a school would be considered less than significant.

Several properties in the vicinity of the project site were identified during the EDR records search including five properties on the Cortese List and one property on the LUST list. Additionally, four nearby properties were identified on the RCRA database. However, because these properties

[27] *Ibid.* page 108.

must comply with all federal, state, and local regulations regarding the use, transport, and disposal of hazardous materials, proper handling is ensured.

Based on the CEQA criteria evaluated above, implementation of the CLRDP, when combined with other past and reasonably foreseeable development in the vicinity of the project would not result in significant adverse hazards and hazardous materials impacts. Future cumulative development in the vicinity would be expected to decrease, rather than to increase, the risk of occurrence or the risk to development from wildland fire.

NEAR-TERM PROJECTS

For the same reasons noted above for the CLRDP, the five near-term projects in conjunction with other regional development would not result in cumulatively significant impacts related to hazards and hazardous materials.

Based on the information presented above, the implementation of the CLRDP and its near-term projects, in conjunction with other development in the vicinity of the Marine Science Campus would not result in cumulatively significant adverse impacts with respect to hazards and hazardous materials.

4.8 HYDROLOGY AND WATER QUALITY

This section evaluates the potential impacts of the CLRDP and the five near-term projects on hydrology and water quality. Information in this section is derived from various reports and information sources. Much of this section is based on an evaluation of the *Marine Science Campus CLRDP Stormwater Concept Plan* (herein referred to as the Stormwater Concept Plan) prepared by Ketley and Associates in 2002 and revised June 24, 2002. Other sources included the *UCSC Long Marine Lab EIR* prepared by H.T Harvey and Associates in July 1993; the *Detailed Conceptual Drainage Plan for the Terrace Point Specific Plan* prepared by Philip Williams and Associates in January 1996; the groundwater level data collected by the Long Marine Laboratory (LML) between November 1994 and February 1995; and the *Terrace Point Specific Plan*, prepared by the City of Santa Cruz in March 1994.

Based on the following CEQA criteria, a project would generally be considered to have a significant adverse impact on the environment if it would:

- 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 (i.e., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
- 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 onsite or offsite;
- 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 onsite or offsite;
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- 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 structures within a 100-year flood hazard area that 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
- Be subject to inundation by seiche, tsunami, or mudflow.

SETTING

REGULATORY CONTEXT

Coastal Zone Act Reauthorization Amendments

In 1990, the U.S. Congress enacted Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA) to help address the problem of non-point source pollution in coastal waters. In it, Congress acknowledged that there is a clear link between coastal water quality and land use activities along the shore and directed that state programs under the Coastal Zone Management Act (CZMA) should play a larger role in improving coastal zone water quality. The central purpose of Section 6217 of CZARA is to strengthen the links between state coastal zone management and federal water quality programs by requiring coastal states to develop a non-point pollution control program to restore and protect coastal waters. It is intended to update and expand the coastal portion of state non-point-source management programs under Section 319 of the federal Clean Water Act (see further discussion of the Clean Water Act below). State coastal zone management agencies and state water quality agencies have dual and co-equal roles and responsibilities in developing the program. Section 6217 applies in states and territories that receive federal funds to implement their approved coastal zone programs. Because Section 6217 is mandatory, it represents a significant departure from other provisions of the CZMA, which is otherwise a voluntary program to assist states in addressing national objectives in coastal resource management. The CZARA is relevant to the proposed CLRDP because the performance and design standards of the CLRDP's Drainage Plan, in part, rely on water quality standards set forth in compliance with CZARA. The U.S. Environmental Protection Agency (EPA) developed a guidance document pursuant to CZARA section 6217(g) titled the "Guidance Specifying Management Measures for Sources of Non-point Pollution in Coastal Waters. This document is also referred to as the "g-Guidance." The "g-Guidance" identifies 56 management measures to prevent non-point source (NPS) pollution.[1] The EPA expects state programs to implement management measures in conformance with the "g-Guidance." The "California Management Measures for Polluted Runoff (CAMMPR)" was prepared by the State Water Resources Control Board and the California Coastal Commission in July 1998 to conform with the "g-Guidance."

The Non-Point Source (NPS) Program is designed to improve California's ability to assess, manage, and minimize NPS pollution. The core of this program is a set of adopted management measures referred to as the CAMMPR, and these measures are divided into six categories of NPS pollution: 1) agriculture, 2) forestry, 3) urban areas, 4) marinas and recreational boating, 5) hydro-modification activities, and 6) wetlands, riparian areas, and vegetated treatment systems. Each category identifies measures appropriate for implementation in the category, agencies with authority to implement and/or enforce those measures, and notes to clarify how implementation is conducted. The ultimate goal of CAMMPR is to protect water quality and critical habitats, as well as ensure that water meets appropriate water quality standards, as mandated by the Clean Water Act.

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1 A non-point source is a diffuse source, such as land runoff, precipitation, deposit from the atmosphere, or percolation. Major non-point sources of water pollution are agriculture, mining, oil and gas extraction, pastureland and feedlots, land disposal, and urban runoff. The State requires implementation of site-specific best management practices (BMPs) to control non-point sources. These individual or combined measures are the most practical and effective when applied to minimize the potential release of significant amounts of toxic or hazardous pollutants to surface waters. A BMP program is required to include information of potential releases and management of solid and hazardous waste.

CAMMPR management measures applicable to the CLRDP are those developed for urban areas and wetland and riparian areas. Urban area management measures are 3.1B (Site Development), 3.1C (New Development, 3.2A (Construction Site Erosion and Sediment Control), 3.2B (Construction Site Chemical Control), and 3.3A (Runoff from Existing Development). Wetland and riparian area management measures applicable to the CLRDP are 6A (Protection of Wetland and Riparian Areas, 6B (Restoration of Wetland and Riparian Areas), and 6C (Vegetated Treatment Systems).

The impact analysis in this section evaluates whether the proposed development under the CLRDP would degrade water quality or violate water quality standards. Among those standards are those set forth in compliance with CZARA.

Clean Water Act

The purpose of the Federal Clean Water Act of 1972 is to protect and maintain the quality and integrity of the nation's waters by requiring states to develop and implement state water plans and policies. The California State Board and the Regional Boards share the responsibility under the Porter-Cologne Act to formulate and adopt water policies and plans, and to adopt and implement measures to fulfill Clean Water Act requirements (see further discussion of Porter-Cologne Act below).

The Clean Water Act and subsequent amendments, under the enforcement authority of the U.S. Environmental Protection Agency (U.S. EPA), established the National Pollutant Discharge Elimination System (NPDES) program to protect water quality of receiving waters. Under the Clean Water Act, discharge of pollutants to receiving waters is prohibited unless the discharge is in compliance with a NPDES permit. Discharge of municipal and industrial wastewater as well as stormwater runoff is regulated under NPDES permit requirements. The regulations initially focused on municipal and industrial wastewater discharges in 1972, followed by stormwater discharge regulations, which became effective in November 1990 under the Phase I Stormwater Program. The NPDES permit specifies discharge prohibitions, effluent limitations and other provisions (such as monitoring programs) deemed necessary to protect water quality. In California, the U.S. EPA has delegated the implementation and enforcement of the NPDES program to the State Water Resources Control Board and the California Regional Water Quality Control Boards. Stormwater discharges are regulated somewhat differently. Under the Phase I program, stormwater runoff from construction areas of five acres or more require either an individual permit or coverage under the statewide General Construction Stormwater Permit. The Phase II Stormwater Program, which came into effect in March 2003, reduced the 5-acre limit that is required for construction NPDES permits to 1-acre. The Phase II Stormwater Program also requires urban municipalities and state institutions, such as universities, to develop Stormwater Management Plans. Those with populations greater than 50,000 or a growth rate of more than 25 percent over the next 10 years must also adopt design standards and submit Stormwater Management Plans that indicate how these design standards will be implemented. The University prepared and submitted such a plan to the RWQCB in March 2003 to address both the main campus and the Marine Science Campus.[2]

[2] Under the revised State General Permit, Regional Boards will be notifying non-traditional municipal systems, such as colleges and universities, of their obligations to file under the State General Permit. After notification non-traditional municipal systems will have 180 days to apply and submit a Stormwater Management Plan.

Other than the existing Marine Science Campus seawater discharge possibly to be regulated through provisions of the pending Permit for Discharges from Aquaculture and Aquariums (NPDES Permit No. CAG993003), the Marine Science Campus does not generate wastewater effluent for discharge to surface waters. However, the construction under the proposed CLRDP would require grading of an area greater than 1-acre and therefore UCSC would be required to obtain necessary NPDES permits for construction on the Marine Science Campus to address management of stormwater runoff and water generated during activities such as trench and excavation dewatering. NPDES permits require the preparation of stormwater pollution prevention plans. Compliance with the NPDES construction permitting requirements reduces the potential for sediment and contaminant-laden surface water runoff during construction projects. Impact analysis in this section evaluates whether proposed development under the CLRDP would degrade water quality or violate water quality standards. Among those standards are those set forth by the NPDES permitting and compliance program.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) regulates water quality within California and established the authority of the State Water Resources Control Board and the nine Regional Water Quality Control Boards. The waters of the central coast region of California are under the jurisdiction of the Regional Water Quality Control Board (RWQCB), Central Coast, Region 3.[3]

The RWQCB established regulatory standards and objectives for water quality in the Central Coast under the Water Quality Control Plan for the Monterey Bay Basin, commonly referred to as the “Basin Plan.”[4] The Basin Plan identifies existing and potential beneficial uses and provides numerical and narrative water quality objectives designed to protect those uses. The RWQCB considers the beneficial uses of receiving water in establishing NPDES permit requirements in the Central Coast Region. 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. For non-point sources, the Basin Plan outlines the approach that the Regional Board has taken to control non-point source pollution in its Urban Runoff Management scheme. Point-source discharges are subject to federal regulations that are implemented at the state level by the Regional Board. Prior to any point-source discharge that could affect the quality of the water of the state, the discharger must file a report of waste discharge with the Regional Board.

The Basin Plan addresses several beneficial uses of surface and groundwater and assigns water quality objectives depending on those beneficial uses. Establishing the beneficial uses requiring protection in the Central Coastal Basin is the foundation of the Basin Plan. Compatible water quality standards can be established once uses are recognized, as well as the level of treatment necessary to maintain the standards and ensure the continuance of the beneficial uses. Given that the Marine Science Campus is located adjacent to Younger Lagoon Reserve (YLR) and the Pacific Ocean, beneficial uses from the Basin Plan could include marine habitat, and cold fresh water habitat. The impact analysis of the section evaluates whether development under the CLRDP would degrade water quality or violate water quality standards. Water quality standards considered in the analysis include those set forth by the RWQCB Water Quality Control Plan.

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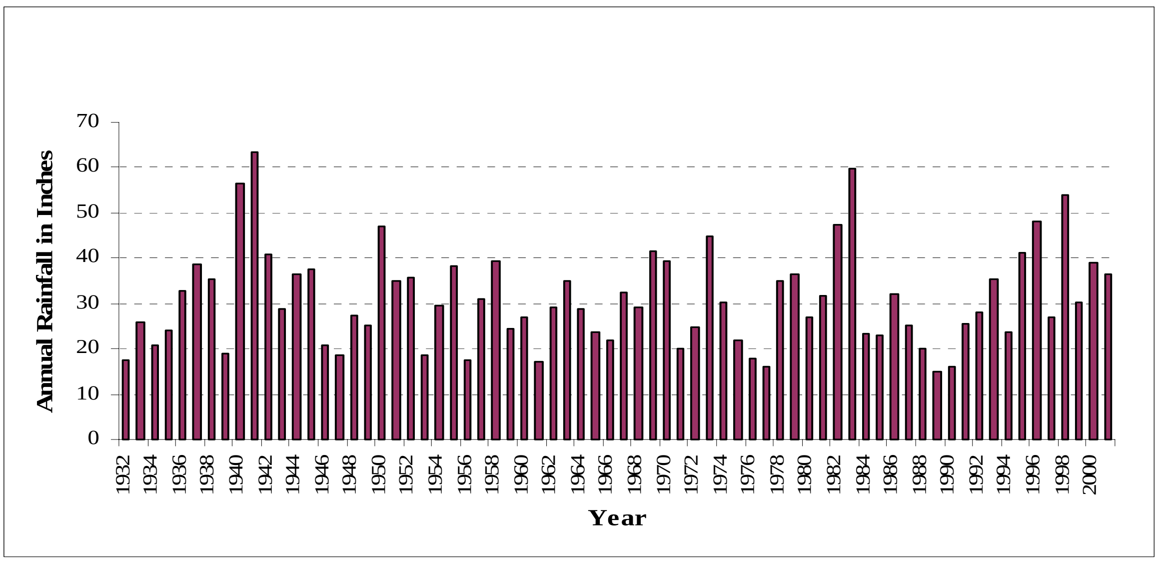
3 The RWQCB Central Coast region extends from Santa Cruz to Santa Barbara.
4 California Regional Water Quality Control Board – Central Coast Region, Water Quality Control Plan for the Central Coast Region, 1999.

REGIONAL CONTEXT

Climate

The Santa Cruz area enjoys a Mediterranean climate typical of many California coastal areas. Summers are dry and warm, although 30 to 40 percent of days are foggy, primarily in the night and early morning. Summer winds are generally from the west. Winters are cool and wet. Total precipitation averages approximately 30 inches per year primarily between November and March (see Figure 4.8-1) in the region. Storm winds in the winter are generally from the southwest. Due to its exposed setting the Marine Science Campus and vicinity has somewhat stronger wind velocities and more days with summer fog than other parts of the city of Santa Cruz. The site also is exposed to salt spray from the ocean. Strong winds, cool temperatures, and salt spray constrain development on the site by creating the need for wind-protected area, and by limiting the use of landscaping and habitat restoration plant types.



UCSC Marine Science Campus CLRDP / 200385 ■

SOURCE: California Department of Water Resources, 2002

Figure 4.8-1
City of Santa Cruz
Annual Rainfall, 1932–2001

Precipitation is the primary source for surface water and groundwater at the project site. The site typically receives between 25 and 35 inches of rainfall per year (see Figure 4.8-1). In a typical year, the campus begins to receive significant rainfall in October or November. The maximum rainfall (accounting for about 70 percent of the annual total) falls in January and February. Rainfall continues through May and very little, if any, rainfall occurs from May to October. Considering the size of the upland portion of the project site (approximately 73 acres), in a year with 40 inches of rainfall, the campus could receive a total of 243 acre feet of water from rainfall, with the highest concentration in January and February.

Regional Topography and Hydrology

The coastline in the Santa Cruz area is situated on an uplifted marine terrace, one of the many marine terraces that form the uplands east of Highway 1 along the coastal flank of Ben Lomond Mountain (see Geology and Soils, Section 4.6). Streams flow across the marine terraces from the uplands to the north and eventually empty into the Monterey Bay or the adjacent ocean. During the last million years, coastal uplift, together with an oscillating sea level caused the streams to incise deep canyons across the marine terraces. Lagoon environments and beaches, built by sediment carried in the creeks, formed at the coast where these creeks and canyons met the Pacific Ocean. Ongoing accretion of sediment transported by creeks and coastal erosion processes continue to sculpt the rugged Santa Cruz coastline. In some areas, the past 100 years of agricultural use and urban development have filled some creeks and lagoons.

The Marine Science Campus is located just north of a coastal promontory referred to as Terrace Point. This headland is bound by Wilder Creek to the west and Moore Creek to the east. Wilder Creek and Moore Creek are local examples of south-flowing creeks that have formed lagoon and beach environments. Wilder Creek forms the lagoon and beach approximately one mile west of Terrace Point and Moore Creek meets the Pacific Ocean at Natural Bridges State Beach, approximately one-half mile east of Terrace Point. Off Terrace Point, the more resistant geology composed of hard mudstone bedrock forms sheer cliffs with small pocket beaches. The surf zone contacts the base of these cliffs near and along Terrace Point with the exception of the entrance to the YLR, where a sand beach has formed across its mouth.

Water in Wilder Creek originates in the foothills northwest of the project site and is fed by Peasley Gulch and Cave Gulch. Moore Creek originates near the main UCSC campus in the uplands to the east. Flow in Moore Creek is influenced by an in-stream reservoir located approximately 2 miles inland from the coast. Antonelli Pond, located approximately 2,000 feet inland from the coast, and near the Marine Science Campus to the east, is a shallow water body that is fed by Moore Creek. Overflow from Antonelli Pond flows under Delaware Avenue, eventually entering the ocean via Natural Bridges State Beach.

Natural surface water flows originated in the uplands north of the Marine Science Campus are conveyed south to the ocean through Wilder Creek, Moore Creek, and their tributaries. Moore Creek and the drainage area surrounding Antonelli Pond capture some of the stormwater flow directly northeast of the Marine Science Campus. Stormwater north of the site that is not confined to these natural stream systems and does not infiltrate into soil in unpaved areas is captured by the municipal storm drainage system. Urban development in the industrial areas north and east of the Marine Science Campus has over time, covered permeable soil areas where stormwater once infiltrated. Impermeable surfaces reduce the infiltration capacity and result in an overall increase in storm flows and increases demand on the municipal storm drainage system. If not captured or conveyed by the municipal storm drainage systems, stormwater flows off impermeable surfaces flow overland as sheet flows, in gullies, and through old agricultural ditches. Some of these flows originating from the north enter the Marine Science Campus as surface flows. Routing of these storm flows is discussed below.

HYDROLOGIC CHARACTERISTICS OF THE PROJECT SITE

This section discusses the hydrology and drainage characteristics of the Marine Science Campus.

Surface Drainage

The Marine Science Campus is largely a closed drainage system with only limited offsite flows entering the site. As discussed above, surface water entering the site is generated by storm flows that are not captured by existing municipal stormwater systems, do not infiltrate in permeable soils, or are not captured by Antonelli Pond. Offsite surface drainage from north of the Marine Science Campus is somewhat impeded by the Union Pacific Railroad track that demarcates the property's northern border. However, surface water does pass under the railroad tracks through a culvert located near the northwestern edge of the site. This culvert, which enters a small north-south ditch that conveys water to the YLR, drains the Raytek site immediately north of the Marine Science Campus and the agricultural lands beyond. Water that enters the drainage ditch flows directly to the YLR and is a source of water for the lagoon. Other than storm flow drainage, rainfall leaves the site primarily through evaporation, evapo-transpiration, and groundwater that flows to De Anza Santa Cruz residential community, the ocean cliffs, and to the steep slopes above the YLR. A small portion of the eastern side of the site drains to the ocean through an 18-inch culvert that conveys water to the creek that flows through the De Anza Santa Cruz residential community.

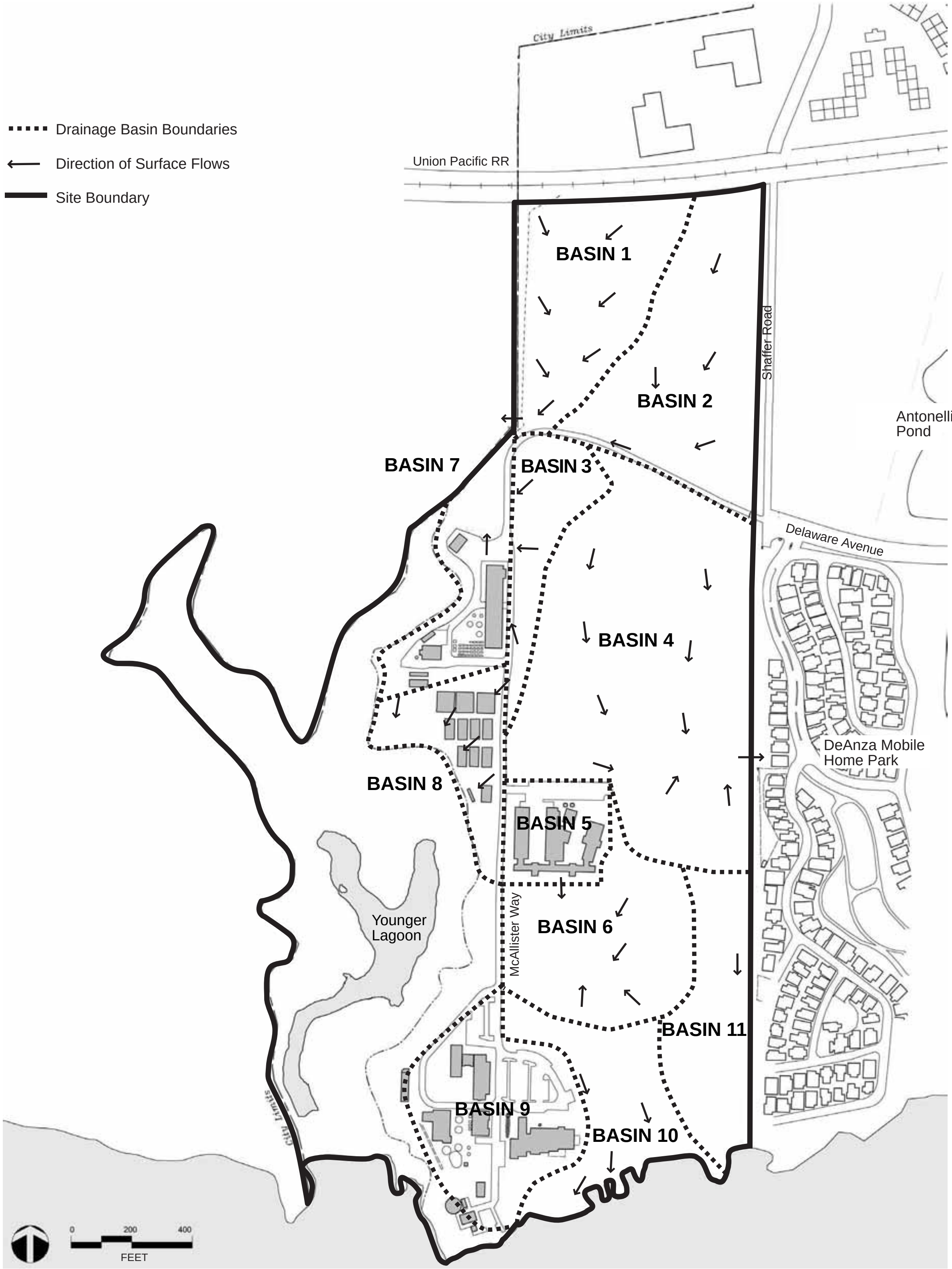
The YLR is a small, relatively closed lagoon system with agricultural runoff, rain and groundwater being the primary inflow sources. The Younger Lagoon watershed drains portions of the Marine Science Campus and the agricultural lands to the east and developed light industrial areas south of Highway 1. During most of the year, the action of ocean waves and littoral drift promote the development of a barrier beach at the lagoon outlet. The beach and a bedrock shelf below the beach inhibit salt and freshwater movement in and out of the lagoon. However, flushing during winter storms does occur periodically during winter months, creating alternating salinity, temperature, and other conditions in the lower lagoon.

Onsite Drainage Basins

The upland terrace portion of the property exhibits low relief and the overall slope ranges between 1 percent and 2 percent with topography that includes depressions and shallow slopes that inhibit rainfall runoff and promote infiltration to the shallow groundwater. Although the property appears flat, characteristics of the surface hydrology (i.e., flow patterns) vary with location. Surface water flow occurs after the rate of precipitation exceeds the infiltration capacity. In undisturbed, native ground, surface water runoff develops after the soils are saturated. On impervious surfaces, the water collects and immediately flows as stormwater runoff. The relatively flat topography of the campus allows the majority of the precipitation it receives to infiltrate or flow overland into low depressions. A smaller percentage of the runoff is conveyed from the impervious surfaces to drainages that empty into Younger Lagoon.

The maximum discharge flow for a storm event, or the peak flow, is typically measured in cubic feet per second. In 2-, 5-, and 10-year storm events, much of the rain that falls on the site infiltrates or fills surface depressions. Only in larger storm events (i.e., those greater than 10-year events), or those with high intensity rainfall, does the rate of precipitation exceed the rate of infiltration and cause significantly high peak stormwater flows. These significant stormwater flows can occur over a period of about three months annually.

The existing Marine Science Campus can be segregated into 11 distinct hydrologic "Basins" (see Figure 4.8-2). These individual basins are divided by natural variations in the topography and roads. The amount of water each basin receives and how the water is stored or conveyed to other



SOURCE: Ketley and Associates

Figure 4.8-2
Existing Drainage Basins

Basins depends on factors such as the basin location, underlying soils, and storm intensity. The amount of development on or adjacent to each basin is also a factor that determines the hydrology within each basin. The 11 basins are described in additional detail below. The individual basin descriptions include information including the size, drainage characteristics, soils types, and erosion problems. Additional information regarding the site hydrology of the sub-basins can be found in the CLRDP, Appendix D (page 4).

Basins 1 and **2** are located north of the existing Delaware Road Extension and cover approximately 16 acres with an average slope of 1 percent. These basins, both of which are undeveloped, are divided by a grade break that bisects the area from the northeast corner to the southwest corner. The Delaware Avenue Extension demarcates the southern boundary of this zone. Basin 1 covers 7.7 acres on the west side of the upper portion of the site. Basin 2 covers 8.17 acres in the eastern section of the upper portion of the site. The soils in these Basins are primarily Elkhorn sandy loam and Watsonville loam; both basins have good cover conditions provided by healthy grass growth and Coyote brush. The soil surface contains numerous small, shallow depressions and rodent burrows, which provide runoff storage and some infiltration during rain events. Stormwater runoff travels in overland flow in a southwest direction. Wetland areas (W1, W2, and W3) are prominent hydrological features in these basins. An elongated, south-trending wetland is the dominant catchment feature in Basin 1. Although not confirmed, it is possible that this feature represents a former stream course that, prior to development, may have flowed from the north into the YLR. Basin 1 drains predominantly to a farm drainage ditch along the western boundary of the site. Runoff from Basin 2 flows towards Delaware Avenue Extension. Flows then travel along a grassy swale that parallels the road, and joins with runoff from Basin 1 at a drainage ditch near the property boundary at the city limits.

Basin 3 is a small (2.9 acres), crescent-shaped, undeveloped basin with a 0.5 percent slope. Delaware Avenue Extension and McAllister Way mark the northern and western boundaries of the Basin. The eastern edge of the Basin is provided by an indistinct grade-break, formed by placement of fill soils, that separates it from Basin 4. The soil in Basin 3 is Elkhorn sandy loam. The basin has good cover conditions provided by healthy grass growth. The soil surface has scattered small, shallow depressions, which provide runoff storage and infiltration during rain events. This basin contains a wetland feature (wetland W8) that occupies the drainage parallel to McAllister Way. Stormwater runoff from Basin 3 flows southwest towards a small, overgrown drain inlet on McAllister Way (opposite the Fish and Game building). This inlet empties into a 12-inch plastic pipe that crosses under McAllister Way and discharges to a small swale. This swale is a tributary to the same drainage ditch that serves Basins 1 and 2, which in turn flows to the upper eastern arm of the YLR. Drainage discharge in Basin 3 is free of significant erosion problems.

Basin 4 is the largest undeveloped basin (17.9 acres) on the central and western portions of the middle terrace, and is underlain primarily by Elkhorn sandy loam soil. An area of Watsonville loam surrounds a small wetland feature in the southeast corner of the Basin. This basin drains by overland flow towards the wetland area (wetland W4) in the southeast corner of the Basin. Much of this basin is covered with a mix of healthy grasses and Coyote brush. An 18-inch, corrugated-metal culvert on the eastern end of this wetland is in hydraulic connection to the De Anza Santa Cruz residential community’s storm drain system. This culvert extends for a short distance beneath the mobile home park neighborhood and then empties into the creek and pond features that eventually flow to the ocean. The pipe is located below grade and has sustained damage that restricts the opening to approximately 12 inches. Drainage discharge in Basin 4 is free of significant erosion problems.

Basin 5 covers approximately 1.8 acres and incorporates the National Marine Fisheries Service (NMFS) building. The northern edge of the basin is bounded by Basin 4. Basin 5 has a 2 percent slope and drains to an engineered percolation system located to the south of the building. This basin is underlain by Elkhorn sandy loam. There has been significant disturbance in this area, and the surface is covered with patches of spoils and has areas of marginal plant growth. The drainage system for Basin 5 and the NMFS facility consists of an underground percolation system and retention chamber located south of the NMFS building. Overflows from this system discharge into the seasonal pond located in Basin 6. A grassy swale that has been narrowed to a drainage ditch by NMFS contractors and an 18-inch reinforced-concrete pipe are located west of the NMFS building, adjacent to McAllister Way. These facilities are designed to route flows from neighboring Basin 6 to the YLR. Drainage from Basin 5 does not flow into these facilities, except to the degree that drainage from Basin 5 causes overflows in Basin 6 during heavy wet periods. Construction activities at the NMFS site have filled the grassy swale along McAllister Way with erosion deposits. Construction activity has also deposited sediment into the 18-inch pipe that traverses underneath McAllister Way, and only the upper 6 inches of the pipe are free of sediment.

Basin 6 covers 7.8 acres and consists almost completely of Watsonville loam soil. The seasonal pond (wetland W5) dominates the hydrology of this basin, acting as a detention/retention area. Runoff in Basin 6 flows towards the seasonal pond, which is located approximately in the center of the Basin. Stormwater from Basin 6 is in large part retained in the seasonal pond, and when capacity of the pond is reached, stormwater flows into a grassy swale located east of McAllister Way. From this point, stormwater flows north to a narrow ditch adjacent to Basin 5 and the NMFS facility and through an 18-inch reinforced concrete pipe to Basin 8. From this point it discharges into the YLR. The 18-inch drainage pipe has become heavily silted, and only the upper 6 inches of the pipe are free of sediment. The grassy swale that previously helped to clean water flowing into Basin 8 and the YLR has been converted into a narrow drainage ditch with little ability to clean stormwater.

Basin 7 is located west of McAllister Way and occupies 2.4 acres with a gentle slope of 0.5 percent. The YLR represents the western edge of this basin, with Basin 8 marking the southern edge. This basin contains the Fish and Game building and the Avian Facility. It is almost completely covered by buildings or gravel, and soils consist of Elkhorn sandy loam. A small retention pond is located at the southeast corner of the Fish and Game building, and there is no visible outlet for this pond. Stormwater that overflows this system travels by overland flow through Basin 8, where it discharges into the YLR. Runoff from the west side of the Fish and Game building is discharged to Younger Lagoon via an unlined swale at the north end of the Basin. Runoff from McAllister Way and the east side of the Fish and Game building are routed to the small retention pond via a series of small drain inlets. The Avian Facility drains by overland flow through Basin 8, where it discharges into the YLR. Drainage discharge in Basin 7 is free of significant erosion problems.

Basin 8 covers 2.96 acres and has a 2 percent slope. This basin is a primary discharge point for stormwater from the Marine Science Campus into the YLR. Elkhorn sandy loam in this basin supports sparse vegetation around the greenhouses and other buildings. Stormwater discharges to the YLR from three discharge points. The first one, which is located at the far southwestern end of the basin, is a broad grassy swale that effectively serves to dissipate stormwater energy. The second discharge point, which is approximately 200 feet east of the first discharge, is a percolation trench with a berm that acts as a levee to prevent direct discharge into the YLR. The third discharge point is an 18-inch reinforced-concrete pipe that discharges into a gully. Each of the existing discharge points to the YLR in Basin 8 requires some level of maintenance. The westernmost discharge point appears to function without significant erosion because of well-established vegetation and a broad profile that helps to dissipate stormwater energy.

The second discharge point has been a problem for many years. Prior to the installation of the percolation trench in this area, stormwater discharged into a narrow swale that became eroded over time. While this earlier damage has been arrested by the installation of a percolation trench and berm, there are problems with these facilities. Due to large populations of rodents in the area, the stability of the protective berm has been undermined. Rodents burrow through the berm and create pathways for water that quickly become eroded with heavy stormwater flows. As a result, the berm has failed repeatedly in the past. This problem would probably continue into the future and require a better solution as new development places more demand on the outfall. The third discharge point has caused significant erosion and deposition problems in and adjacent to the YLR. The existing gully and deposits appear to have been created at least in part before development of the Marine Science Campus. Stormwater from Basin 6, which is released into the gully directly from the 18-inch discharge pipe, has increased the erosion problem.

Basin 9 is a 6.4-acre area that contains the original LML, the Ocean Health and Seymour Center facilities. This basin extends northward along McAllister Way to the southern end of Basin 8. The west side of the basin is marked by a berm along the eastern edge of the YLR. The east side of the Basin abuts Basin 10, and the south side of the basin abuts the coastal cliffs. The slope across this Basin increases from 1 percent to 2 percent as it approaches the coastal cliffs. Basin 9 is situated over Watsonville loam soils. This basin does not discharge directly to surface waters, but instead discharges to the seawater system via a Stormceptor™ unit located below the old LML buildings. A small detention pond to the south of the Seymour Discovery Center serves to attenuate peak flows from this building prior to discharge to the Stormceptor™ and seawater system. The seawater system currently has adequate capacity for the existing flows (seawater and stormwater), but has limited extra flow capacity. Drainage discharge in Basin 9 is free of significant erosion problems.

Basins 10 and **11** are located at the southern end of the site and cover 4.0 and 4.7 acres, respectively. A small section of coastal bluff makes up the southern end of these basins. In both basins, the slope increases from 1 percent to 2 percent approximately 300 feet from the coastal bluff. The Watsonville loam in these basins has some small depressions that hold water during storms. Healthy grass growth provides good cover conditions. These basins drain by overland flow to the coastal cliff. Drainage from Basins 10 and 11 has caused minor erosion and gullying at various points along the bluff.

Younger Lagoon Reserve (YLR) Basin consists of agricultural lands that drain from the west and north and the Marine Sciences Campus from the east. The source of the lagoon is primarily precipitation, agricultural runoff, and groundwater. A barrier of sand built by ocean currents separates the YLR from the ocean during most of the year. This sand barrier isolates water in the lower portion of the YLR and reduces ocean and freshwater mixing. Periodically, however, the storm waves and high surface water flows from the watershed cause the sand barrier to breach. The shallow groundwater percolates into the lagoon through seeps that form along the YLR bluffs at the interface between the Santa Cruz Mudstone and the overlying terrace deposits (see Geology and Soils, Section 4.6). Groundwater flow from the seeps in the YLR bluffs vary depending on season and depth of groundwater depth. As discussed further in the *Groundwater* section below, groundwater that supplies the seeps is likely recharged by surface water infiltration in undisturbed areas on the campus west of McAllister Way.

Water Quality

Erosion

As discussed in the Section 4.6, Geology and Soils, erosion is the detachment and movement of soil materials through natural processes or human activities. Soils found on the project site are the Watsonville Series and Elkhorn Series.[5] The Watsonville Series is generally found in the lower and upper terraces and extends to the cliff area in the south. Likewise, the Elkhorn Series covers the central portion of the project site (middle terrace). The erosion hazard of the Watsonville loam is “slight” while the erosion hazard of the Watsonville loam “slight to moderate.” On steeper slopes (15-30%), the erosion hazard of the Watsonville loam, is “high.” This is consistent with the above discussion of soil erosion hazards in the individual basins. Depending on the local landscape and climatic conditions, erosion may be very slow to very rapid. The detachment of soil particles can be initiated through the suspension of material in either a hydraulic (water) or eolian (wind) setting. The terrace portion of project site is essentially level with gradual slopes of less than 2 percent, which greatly reduce the velocity of any surface runoff and therefore, the potential for soil erosion.

Surface Water Quality

A percentage of stormwater runoff enters either the YLR or the ocean at several locations along the perimeter of the Marine Science Campus while the remainder infiltrates into the soil or flows to wetland areas in particular basins. There are approximately 11 acres of impervious surface area occupying the existing Marine Science Campus.[6] These areas are typically paved and are considered impervious to water infiltration. Semi-pervious or compacted ground includes gravel parking lots, gravel roads, construction areas, and gravel footpaths. When precipitation lands on these surfaces, it flows off immediately and typically enters either a drainage or low lying wetland area. When rainwater runs off the ground surface or through roof drains, it can collect contaminants that eventually enter a receiving water body such as the YLR. Depending on the location at the Marine Science Campus, the existing impervious surfaces of parking lots and roads can contribute sediment, oil, petroleum, and heavy metals to the stormwater runoff. These contaminants, in sufficient quantities, can alter water chemistry and possibly become toxic to certain marine animals. In most cases, the majority of roadway and parking lot contaminants adhere to sediments and it is through transportation of the sediments that they enter receiving water bodies. A smaller fraction of contaminants, such as metals and some petroleum are soluble and dissolve in the water. Contaminant loading is variable and dependent on timing of rainstorms and rainfall amounts and intensities. Typically, the longest period of contaminant accumulation is during the dry season immediately preceding the onset of the first winter rains and contaminant loading to runoff is usually highest during the first storm or series of storms in each winter season. The Environmental Protection Agency (EPA) findings indicate that 90 percent of all urban stormwater contaminants are removed by the first 0.5 inches of rain.[7]

On the existing Marine Science Campus site, the parking facility at the Seymour Center (Basin 9) is likely to have the highest potential to contribute surface-borne contaminants to receiving water bodies (namely the Pacific Ocean). However, surface water from this basin is routed through a

[5] The soil series is a subdivision of a family and consists of soils that are similar in all major profile characteristics.

[6] Impervious surfaces include roadways, building roofs, concrete surfaces. The extent of impervious surfaces were measured using a planimeter on a 1-inch = 100 foot scale aerial photograph produced in 2002.

[7] UCSC Office of Campus Facilities, Long Marine Laboratory Master Plan, Draft Environmental Impact Report, July 1993.

settlement pond for treatment to reduce sediment load before it is routed to a mechanical water filtration system. The treated stormwater is then discharged to the ocean. The next largest existing area on the campus with the potential to contribute contaminants to the surface water bodies is Basin 5 that contains the National Marine Fisheries Service Building. Most of the runoff from this site is roof water while a lesser fraction flows off the parking lots. Stormwater flows into an underground percolation system with overflows routed to the wetland area in Basin 6. Lower concentrations of contaminants such as petroleum and sediment become entrained in surface flows from the smaller parking lots and roads and eventually find their way to the YLR. The YLR also receives contaminants generated from the agricultural fields surrounding the western portion of the lagoon.

Marine Water Quality

The geology of the sea cliffs along the southern edge of the site provides adequate conditions for the operation of the existing seawater intake and discharge system for the Marine Science Campus. The existing seawater system draws up to 1,000 gallons per minute (gpm) of raw seawater from the surf zone through two, 10-inch intake lines, that draw the seawater into a 40-foot-tall caisson, extending through the roof of a natural sea cave. The caisson houses the primary pumps that convey the seawater through underground pipes to a filter system, then into two, 36-foot-tall storage tanks. Seawater is distributed from the storage tanks. An expansion of the existing seawater system was recently approved and is under construction, and includes construction of a new ocean intake, a new, larger primary storage tank, and expanded filtration. The expansion would be combined with the existing system and designed to pump a total of 2,000 gpm.

The seawater is used for keeping and growing a variety of organism including marine mammals, invertebrates, fish, marine algae, and other organisms that are subjects of scientific or educational study or commercial production. The Marine Science Campus currently chlorinates the water of some marine mammal tanks to control bacterial levels and uses small amounts of chlorine bleach to clean these tanks.[8]

After use and dechlorination, seawater is discharged from various points of use into a common outfall pipe that discharges into the ocean at the seacliff. The outfall, which also discharges site stormwater runoff from Basins 7 and 9, is on the underside of an undercut cliff face at the shoreline at about two feet below mean low water level.

Water quality of the existing seawater discharge was regulated between 1981 and 1996 through provisions of a NPDES discharge permit (NPDES Permit No. CA0048496) issued by the RWQCB.[9] In 1996, this permit was allowed to expire by the RWQCB because it was considered to be a minor discharge; however, under the NPDES regulations, the University is not allowed to exceed the discharge limits regardless of whether or not a discharge permit is in place. The additional used seawater discharges that would result with the expansion of the seawater system described above, would require that a NPDES discharge permit be in place. The UCSC Marine Science Campus has submitted a request to the RWQCB to be covered under a new General Permit for Discharges from Aquaculture and Aquariums (NPDES Permit No. CAG993003), which was adopted by the RWQCB in September of 2002. If covered under this General Permit,

8 To address this contaminant source, a gas diffusion-dechlorination system is used to dechlorinate the water prior to its discharge to the ocean.

9 The total discharge allowed under this permit was 1.2 million gallons per day (MGD) for average dry weather flows, 1.3 mgd for peak dry weather flows, and 1.6 mgd for peak wet weather flows.

UCSC would have to conduct annual monitoring to ensure that conditions of this permit would not be violated.

The relative health of biological communities generally is assessed through monitoring of coliform and fecal coliform bacterial concentrations, chlorine residual, ammonia concentrations, biochemical oxygen demand, pH, and suspended solids. The seawater discharge system may cause these constituents to enter the marine environment receiving waters off the Marine Science Campus as described above. During the preparation of this EIR, analysts reviewed seawater system monitoring data collected under the SWRCB Discharger Self Monitoring Report, from January 2001 to December 2002. According to this data, the effluent chlorine residual, effluent pH, and effluent ammonia did not exceed permit discharge limits and effluent flow, effluent temperature, and fecal coliform remained within a consistent range.

The seawater discharge is diluted when it enters the intertidal zone through the 14-inch discharge pipe. Depending on ocean conditions, the dilution factor can vary. The Long Marine Laboratory dilution factor as required by their original NPDES permit is 25:1 although under certain conditions, the campus was permitted to discharge to a dilution factor as high as 200:1. Slow moving waves, currents and wave-induced turbulence in the immediate area are thought to provide adequate dilution of the seawater discharge when it enters the marine environment but the fate and transport of the discharge is variable.

Groundwater

Similar to many locations along the Santa Cruz coast, surficial materials consist of relatively young coastal terrace deposits consisting of semi-consolidated, clayey to clean sand and gravel, deposited along an ancient coastal environment. These types of materials are found to depths of 5 to 9 feet across the project site.[10,11] They include both marine and non-marine deposits and contain well-sorted sand, with occasional continuous layers of gravel. These coastal terrace deposits overlie the Santa Cruz Mudstone and are the water-bearing sediments. These sediments are relatively more permeable than the underlying mudstone and therefore, water is held in the pore spaces and forms a water table aquifer under unconfined conditions. The mudstone is comparatively impermeable due to its fine grain size and has very limited water-bearing capacity.

At the Marine Science Campus, surface water enters (recharges) the underlying water-bearing coastal terrace deposits (referred to as the water table) primarily by infiltration through the surface soils. When the leading edge of vertically infiltrating water reaches the capillary fringe, it displaces air in the pore spaces and causes the water-table to rise.[12] The capillary fringe rises as the water table rises, and the newest recharge is located at the top of the capillary fringe. The time required for water to infiltrate and recharge a water-table is a function of the unsaturated soil thickness (soil zone between the ground surface and water table) and the vertical hydraulic conductivity.[13] Layers of low permeability material, such as silts and clays, can retard the rate of recharge, even if the layers are thin. The thickness of the saturated zones, indicated by the depth

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[10] Rutherford and Chekene Consulting Engineers, “Geotechnical Investigation, UCSC Long Marine Laboratory Center for Ocean Health, Santa Cruz, California,” July 1, 1999.

[11] Steven Raas and Associates, “Geotechnical Investigation for Oiled Wildlife Rescue and Rehabilitation Station,” Santa Cruz, CA, March 1994.

[12] The capillary fringe is the area immediately above the water, in which the pore spaces between soil grains are filled with water under pressure less than atmospheric. The capillary fringe is continuous with the water table but held above it by surface tension.

[13] Vertical hydraulic conductivity is the rate at which water can move through a permeable medium.

to groundwater, would fluctuate depending on the amount of rainfall. Following a storm event or an exceptionally wet period, the water levels gradually decrease as the groundwater migrates towards the coastal bluffs or lower drainage areas.

With continued infiltration through the coastal terrace deposits, water migrates laterally downward until it reaches the surface of the Santa Cruz Mudstone, where, upon saturation of the lower sands and gravels, the groundwater begins to migrate laterally over the surface of the mudstone. In areas where bedrock is closer to the surface or the lateral migration of the groundwater is hindered by the underlying bedrock surface, the groundwater may pool behind the obstruction or in a depression. Ponded water can remain in the saturated areas of the project site for extended period of time, depending on the capillarity of the soil, transmissivity of underlying water table sediments, and clay content of the topsoil material.

The rate of recharge to the water table is variable and depends partly on the thickness of the unsaturated zone. Where this zone is thinner, recharge can reach the water table first, resulting in a localized groundwater mound. Flow systems can develop that move groundwater laterally from temporary groundwater mounds to areas where infiltration has not reached the water table. Eventually, the groundwater in areas with thicker unsaturated zones would rise not only due to infiltration of surface water but also due to the lateral migration of water from areas of mounding. In areas with permeable subsurface materials, groundwater mounds dissipate quickly, while less permeable materials such as silts and clays dissipate over a longer period of time.[14] Refer to Section 4-6, Geology, Soils and Seismicity for further discussion of soil type and thickness.

Groundwater data collected by UCSC between November 1994 and January 1995 indicated that during a period of low to no precipitation, groundwater levels beneath the Marine Science Campus averaged about 7.5 feet below the surface. In many cases, the groundwater was just slightly above the bottom of the monitoring well during both survey periods, indicating that it was close to the underlying surface of the Santa Cruz Mudstone. During a storm event in the first week of January 1995, monitoring well observations indicated groundwater levels at the various monitoring well locations rose an average of about 6 feet. In most wells, this 6-foot increase occurred over 10 days, most likely as a result of the exceptionally wet period in January 1995, in which Santa Cruz received 17.56 inches of rain – the highest monthly rainfall for that year. The 1994–95 data are consistent with groundwater conditions observed by ESA in the winter and summer of 2002. In February 2002, groundwater levels beneath the site were indicative of the winter months, averaging about 0.6 feet below the surface in the wetland areas and about 5 feet below the surface in topographically higher areas.

Groundwater Flow Direction and Gradient

Groundwater flow is the lateral movement of groundwater that occurs at the project site between the surface soils and the top of the Santa Cruz Mudstone. Generally, groundwater flows in a southeasterly direction across the Marine Science Campus, towards the ocean and towards the De Anza Santa Cruz residential community given southeast flow, at an average groundwater gradient ranging between 0.5 and 1 percent. At times, however, it flows towards the low areas and depressions on the surface of the Santa Cruz Mudstone.[15]

[14] Fetter, C.W., Applied Hydrogeology, Prentice-Hall, Upper Saddle River: New Jersey, 1994.
[15] Ibid.

Based on the topography and the location of the surface wetland features, groundwater in Basins 1 and 2 tends to flow southwesterly towards the wetlands in the northern part of the site. The wet meadow (wetland W2) appears to feed the drainage ditch along the northwestern edge of the site, which eventually conveys flow to Younger Lagoon. In periods of high groundwater conditions, the drainage ditch in Basin 1 appears to intercept groundwater flow, conveying it towards Younger Lagoon. In periods of low groundwater conditions, the water flows in a southeasterly direction towards the central and eastern portions of the upper terrace, however, it is likely that some of the flow is directed to wetland W3.

In Basins 3 and 4, topography suggests that groundwater trends in a southerly direction. During periods of high groundwater conditions and, to a lesser extent, in periods of low groundwater conditions, the drainage swale east of the NMFS and adjacent to the De Anza Santa Cruz residential community appears to capture a portion of the groundwater flowing southeast across the site. Groundwater beneath Basins 5 and 6 flows towards wetland W5.

Groundwater tends to flow south, towards the ocean, in Basins 9, 10, and 11. The seasonal pond (wetland W5) captures some of the flow in both high and low groundwater conditions. However, based on topography and surface features, under high groundwater conditions, more groundwater is likely to flow towards the seasonal pond and out through the small drainage that conveys water to the bluff. However, in low groundwater conditions (e.g., during the summer), there may not be enough groundwater available to reach the seeps at the bluff.

Although groundwater flow monitoring was not conducted along the bluffs adjacent to the lagoon (Basins 7, 8, and 9), it is generally assumed that the water that falls on this area and infiltrates eventually flows out of seeps on the lagoon bluffs. However, considering the amount of impervious surfaces in this area, the amount of water that can infiltrate has been reduced compared to that which occurred prior to original development of the Long Marine Laboratory facilities and the Department of Fish and Game Marine Wildlife Center.

Groundwater Flow from Upgradient Sources

Although not confirmed by groundwater flow monitoring, groundwater underflow from areas north of the project site may not significantly contribute to groundwater flow that reaches the coastal bluffs via the Marine Science Campus. Based on topography and apparent drainage patterns north of the Marine Science Campus, it appears that offsite underflow does not contribute to the groundwater regime as much as surface infiltration from precipitation. The project site would most likely receive underflow along the northern boundary. However, when viewed on a more regional perspective, it appears that the majority of groundwater flowing south towards the site would likely be directed towards tributaries to Younger Lagoon and the groundwater system associated with Antonelli Pond and Moore Creek.

Groundwater Flow to the Bluffs

Water is supplied from infiltration to groundwater seeps that are located in the cliffs along the ocean and adjacent to YLR. There are two primary recharge areas on the project site where surface water can infiltrate due to porous soil conditions. The first area (Basins 9, 10, and 11) is approximately 850 feet north of the coastal bluffs and includes the seasonal wetland (wetland W5) south of the NMFS complex. Based on topography, it appears that an appropriate flow direction and gradient exists within this area to provide groundwater to the ocean and lagoon bluffs, especially in periods of high groundwater conditions. In periods of low groundwater conditions, the volume of groundwater may not be sufficient to daylight at the ocean or lagoon bluffs. The western portion of Basin 9 is primarily covered with impervious surface with low surface water infiltration potential and therefore, does not contribute groundwater to the ocean or the YLR bluffs. The second area contributing surface water infiltration and groundwater supply to the YLR bluffs includes Basins 3, 7, and 8. Surface water infiltration in these basins likely provides water to the seeps that daylight along the cliffs adjacent to the YLR. Based on topography and apparent groundwater flow direction, it appears that the central portion of the Marine Science Campus (Basins 4, 5, 6) does not contribute a significant amount of groundwater to the lagoon bluffs, because the general groundwater trend is to the south-southeast, away from the bluffs. As discussed above, Basins 1 and 2 flow into the YLR drainage directly via the existing wetland features.

Flooding

The Marine Science Campus is not located within a 100-year flood zone as determined by the Federal Emergency Management Agency (FEMA). The site is located on an uplifted marine terrace and not located in the vicinity of a major river or stream. Moore Creek, located to the east of the site is the closest waterway with a FEMA 100-year flood plain determination. However, the relatively small size of this waterway and its distance from the project site preclude potential flooding hazards at the Marine Science Campus. Flooding hazards at the Marine Science Campus include short-term localized surface flooding due to periodic conditions such as intense seasonal rainfall, and poorly maintained conveyance facilities.

Other Hazards

A seiche is a wave that occurs in an enclosed body of water due to seismic ground motion and a tsunami is a gravitational sea wave caused by an earthquake. Seiches typically occur in lakes with considerable water depth while tsunamis occur along the coast of oceans. Due to the size and depth of water in the YLR, seiches are not considered a likely occurrence at the Marine Science Campus. In the event that an ocean earthquake caused a tsunami in the Pacific Ocean, wave run up at the Marine Science Campus would depend on the size of the earthquake and distance from the property. If a major earthquake were to occur that was capable of causing a tsunami event, wave run up could be noticeable along the coast of Santa Cruz. However, considering the elevation of the Marine Science Campus on the elevated marine terrace, the effects of the wave run up would likely not be sufficient to cause flooding or damage to the facility.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP building program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new development of 529,856 square feet (sf) at the Marine Science Campus by about 2020. The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education; 70,000 sf for Outdoor Research Areas; 19,000 sf for Support Facilities; 98,100 sf for Support Housing; 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for Seawater System Expansion.

Stormwater Concept Plan

The main component for future management of hydrology and water quality on the Marine Science Campus is the Stormwater Concept Plan, included in the CLRDP as Appendix D.[16] This plan is the governing hydrology and water quality plan that considers the important role surface water runoff plays in the sustaining natural environments while realizing that urban development can alter hydrology and possibly degrade water quality due to non-point source pollutants. The Stormwater Concept Plan recognizes that stormwater runoff from the Marine Science Campus would ultimately enter important natural resource areas on and adjacent to the site, including the YLR, terrace wetlands, and the Monterey Bay National Marine Sanctuary. The Stormwater Concept Plan is designed to accommodate the phases of development so that stormwater management and water quality protection in the adjacent natural resource areas continues through to full development under the CLRDP.

The Stormwater Concept Plan is designed to accomplish five key objectives pertaining to hydrology and water quality. First, it will maintain predevelopment peak flows under post-development conditions. Second, it will provide for stormwater treatment to meet the guidance of Section 6217 (g) of the "Coastal Zone Amendment and Reauthorization Act and management measures set forth in the CAMMPR. Third, the plan incorporates maintenance and monitoring to ensure that the drainage system operates effectively to provide effective control of water quantity and quality consistent with plan objectives. Fourth, the plan recognizes the need to maintain groundwater recharge at pre-CLRDP levels to the maximum extent practicable and includes design elements to achieve this. And lastly, the plan provides mechanisms to correct existing erosion and sedimentation problems in the YLR caused by drainage from the terrace portion of the site.

The Stormwater Concept Plan identifies an approach and provides guidance for maintaining peak stormwater flows, improving existing drainage deficiencies, and improving water quality resulting from CLRDP development. Detention of stormwater is designed with the objectives of maintaining pre-development stormwater discharge flows, promoting infiltration of surface water for groundwater recharge, and improving water quality. Under the plan, existing stormwater discharge points would be improved with energy dissipation systems and outlet structures to reduce erosion and accommodate discharge flows during a 100-year storm event. Systems referred to as source and treatment Best Management Practices (BMPs) would control pollutants in stormwater. Source control BMPs prevent pollutants from degrading water quality at the point of origin through reduction and elimination of pollutant sources while treatment BMPs are stormwater management control features used to improve water quality. Depending on the required treatment application, treatment BMPs use natural processes to manage and treat surface water and can operate alone or as part of a multi-component system to provide conveyance, detention, and infiltration. These systems reduce peak surface water flow, which increases time required for sediment to settle out (residence time) and also allows natural biological processes to

16 The Stormwater Concept Plan is referred to as a "concept plan" because its purpose is not to be prescriptive in all respects regarding the design of a future drainage system for the Marine Science Campus. For example, in matters regarding the layout of drainage features for specific buildings or groups of buildings, this plan is intended to provide only general guidance to planners and engineers that will work in the future to develop project-specific plans and designs for a particular construction plan. Regarding the sizing and ultimate location of detention basins, this plan makes gross assumptions about total future impervious area, and the detention basins shown in the conceptual plans are sized and located accordingly. The actual sizing and location of these basins, however, would depend on the amount of unimproved area retained around buildings. It would also depend on the degree to which programmed space is provided in one- or two-story buildings, and on various technical parameters like site-specific infiltration rates. These factors are not specified in the CLRDP and will only be known when specific development projects come forward for one or more portions of the Marine Science Campus.

treat the water. Details of specific source control and treatment BMPs are discussed in subsequent sections throughout this chapter.

Given that the Stormwater Concept Plan is conceptual in nature, the stormwater pond configurations and locations, final stormwater detention capacities, and alignment of vegetated swales and strips are primarily dependent on site design and would be determined during final design phases. Therefore, the ultimate size and location of the ponds and discharge structures under the plan are flexible provided the final locations are consistent with achieving the desired performance standards.

Conceptual Drainage Planning

The Stormwater Concept Plan developed a conceptual drainage plan for particular areas on the Marine Science Campus, which include the individual basins described earlier in this chapter (Figure 4.8-2). The plan combines the 11 basins into five main Drainage Planning Areas (referred to as A through E), shown below in Table 4.8-1, and provides a tailored, area-specific -conceptual drainage approach for each Planning Area.

TABLE 4.8-1
CONCEPTUAL DRAINAGE PLANNING AREAS

Drainage Plan Area	Basins Included into Drainage Planning Area	Location of Drainage Planning Area on Marine Science Campus
A	Basins 1 and 2	Upper Terrace
B	Basins 3 and 4	Middle Terrace
C	Basins 5 and 6	Middle Terrace
D	Basins 7 and 8	West of McAllister Way, Middle Terrace
E	Basins 9, 10, 11	Lower Terrace

SOURCE: Stormwater Concept Plan, 2003

The basic approach of conceptual drainage planning was to identify BMPs to maintain current peak flow rates under post-development conditions, to meet water quality standards, and to provide groundwater recharge to the extent practicable. The Stormwater Concept Plan establishes for each individual Drainage Planning Area, a drainage system designed to meet certain design and performance standards unique to each area. Design and performance standards include post-development discharge flows released at pre-development rates, elements to meet water quality goals of CAMMPR, improved discharge points, and maintenance and monitoring.

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program by about 2010. Amongst the building footprints depicted in the CLRDP prototype site plan are specific sites for these five near-term projects (see Figure 3-7). These projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area (Drainage Plan Area A, Basins 1 and 2). This proposed facility would convert approximately 2.4 acres of existing pervious surface to impervious surface with a considerable portion of that for equipment storage, maintenance and vehicle parking. Compared to other proposed development, this project would result in the largest area of impervious surface area and would have the highest the potential to generate surface contaminants and sediments.

  Three stormwater ponds located adjacent to wetland buffers would provide approximately 26,000 cubic feet of stormwater detention in Drainage Planning Area A and would serve the Shared Campus Warehouse and Laydown Facility plus the 38 apartment/townhouse units (to be constructed in the long term). Basin 1 would contain one stormwater pond with about 4,800 cubic feet of capacity while Basin 2 would contain two ponds with approximately 21,250 cubic feet of total capacity. Stormwater ponds would receive stormwater from developed areas through a system of vegetated swales as would discharge from the ponds to the wetlands. Simple energy dissipation systems would protect the discharge points from erosion. Stormwater ponds would include outlet structures designed so that post-development flow rates from the Basins would be the same as pre-development rates during the 25-year storm events. Typical structures to achieve multiple rate discharges are V-notch weirs or an outlet structure with a series of orifices of specific diameters.

- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area (Drainage Plan Area B, Basin 4). This project would require the conversion of about 1.3 acres of pervious surface to impervious surface. Basin 4 could ultimately contain two constructed stormwater ponds with a total detention capacity of about 48,260 cubic feet that would capture flows from this facility. Conceptually, stormwater ponds to accommodate flow from Basin 4 would be installed east of this project and in the southwest corner of the Basin. Both ponds would drain into wetland W4 and eventually into surface water features within De Anza Santa Cruz residential community.

  Stormwater ponds would receive stormwater from the project site area through a system of vegetated swales. Discharge from the ponds to the wetlands would also be through vegetated swales. Simple flow energy dissipation structures would reduce erosion potential at the discharge points in addition to the repair of the 24-inch corrugated drainage pipe that discharges into the surface water features within De Anza Santa Cruz residential community. It should be noted that the repair of the 24-inch corrugated drainage pipe at wetland W4 is planned independent of a specific development project on the campus. Stormwater pond design would include outlet structures designed to maintain post-development flow rates from the Basin at pre-development rates during the 25-year storm event. Typical structures to achieve multiple rate discharges are V-notch weirs or an outlet structure with a series of orifices of specific diameters.

- The United States Geological Survey (USGS) Western Coastal and Marine Geology facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area (Drainage Plan Area B, Basins 3 and 4). This project would involve the conversion of about 1.54 acres of pervious surface to impervious surface. Surface water drainage to accommodate this facility would include one of the two stormwater ponds (48,260 cubic feet combined capacity) installed within Basin 4, as discussed above. Considering its location, storm flows from this project would likely flow to a stormwater pond located in the southwest corner of the basin with proposed capacity of about 13,260 cubic feet. As with the other stormwater pond within this basin, vegetated swales would convey water into and from the ponds. Discharge from the ponds to the wetlands would likely be through vegetated swales. Simple energy dissipation systems would be installed where needed to protect the discharge point from erosion. The stormwater ponds would include outlet structures designed to maintain post-development flow rates from the Basins at pre-development rates during 2, 5, 10 and 25-year storm events. Typical structures to achieve multiple rate discharges are V-notch weirs or an outlet structure with a series of orifices of specific diameters.

- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 40,000 sf of building space would be located on the middle terrace development area (Drainage Plan Area D, Basin 8). Development of this project would convert approximately 0.7 acres of semi-pervious surface to impervious surfaces. The buildings and the outdoor research areas would be constructed within an open area that currently either discharges stormwater directly to the YLR or allows water to infiltrate through the semi-pervious surface cover. At this time, the final design of the buildings and the stormwater system to accommodate it has not been finalized. However, because of its location in Basin 8, which has limited space, the proposed building would require elements of the drainage features discussed below.

  The limited space available in the area of Basin 8 precludes the use of ponds for detention or treatment. Drainage from this small Basin would be detained and treated by a combination of subsurface detention and engineered stormwater treatment systems. Subsurface detention systems typically involve the use of pipes or vaults, to provide the required detention volumes. Since subsurface detention is not able to provide comparable water quality benefits to surface ponds in this location, additional engineered treatment units would be installed with the detention systems. Given the developed nature of this area, conveyance systems to the subsurface detention/treatment systems are most easily achieved through the use of conventional storm drains and asphalt/concrete swales. Discharge from the treatment units to the outfalls would require a simple pipe system. Drainage Planning Area D would undergo improvements not specifically tied to any specific project on the Marine Science Campus. These improvements are: reconstruction of the stormwater outfall and restoration of areas damaged by erosion in the YLR and YLR buffer area, construction of the percolation trench in the northeastern portion of Basin 8, and monitoring of existing discharge facility in the northwestern portion of Basin 8.

- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area (Drainage Plan Area E, Basin 9). The footprint of this project would be about 0.41 acres. Additionally, this proposed project would include the construction of two new public-access overlooks and improvement of an existing overlook. Given that this building would be constructed within a pre-developed area and that the structure would replace existing mobile trailers, the net increase in impervious surfaces should be minimal. Associated walking paths and vehicle access would require additional impervious surfaces. Storm drainage would be managed through the ocean discharge similar to the system currently managing stormwater in Basin 9. Basin 9 discharges stormwater to the laboratory seawater system through a mechanical water filtration system. This system will continue to function effectively given that post-development stormwater flows would be maintained at pre-development levels by the stormwater pond proposed in Basin 10.

MEASURES PROPOSED AS PART OF THE PROJECT

The policies and implementation measures identified below are intended to supplement and emphasize design and performance standards already contained in the Stormwater Concept Plan.

Policy 7.1: Productivity and Quality of Coastal Waters

The University will develop and use the Marine Science Campus in a manner that will sustain and, where feasible, enhance and restore, the biological productivity and quality of coastal waters on and adjacent to the campus through controlling runoff and other non-point sources of pollution, preventing depletion of groundwater supplies and substantial interference with surface water flow, encouraging wastewater reclamation, and maintaining natural vegetation buffer areas that protect riparian habitats.

<u>Implementation Measure 7.1.1 – Stormwater Management</u>. The University will design the stormwater system on the Marine Science Campus using a combination of good site planning, source control and treatment best management practices, and engineered stormwater treatment systems to achieve water quality objectives, as discussed in the Stormwater Concept Plan. Stormwater ponds constructed on the Marine Science Campus will be sized for water quality, and where feasible these ponds will be supplemented with vegetated filter strips and swales to further improve water quality. The drainage systems for parking lots will also include an engineered stormwater treatment system or equivalent system designed to treat urban contaminant runoff.

<u>Implementation Measure 7.1.2 – Stormwater Quality Standard</u>. Stormwater quality will meet the requirements set forth in “California’s Management Measures for Polluted Runoff” (State Water Resources Control Board and California Coastal Commission, 2000).

<u>Implementation Measure 7.1.3 – Pre- and Post-Development Flows</u>. The University will develop and manage a stormwater system on the Marine Science Campus that maintains pre-development drainage patterns and peak flow rates in the post-development drainage system. The one exception to this standard is drainage from Basin 10, part of which will flow to Basin 9 to avoid construction of a new outfall over the coastal bluff. The system will be designed to discharge water from all storm events, up to the 25-year return storm, at pre-development drainage peak flow rates.

<u>Implementation Measure 7.1.4 – Pre-Development Drainage Patterns Defined</u>. “Pre-development drainage patterns” will mean the destination of stormwater flows by basin prior to adoption of this CLRDP, as identified in Stormwater Concept Plan.

<u>Implementation Measure 7.1.5 – Pre-Development Drainage Peak Flow Rates Defined</u>. Except as provided below, “pre-development drainage peak low rates” will mean the estimated rates at which stormwater flowed on the site assuming the site was covered in grassland vegetation, as estimated in the Stormwater Concept Plan. In the case of drainage Basins 5 and 9, “pre-development drainage peak flows rates” shall mean the estimated rates

at which stormwater flowed on the site prior to adoption of this CLRDP, as estimated in the Stormwater Concept Plan.

Implementation Measure 7.1.6 – Groundwater Recharge. The University will develop and manage a stormwater system on the Marine Science Campus that maintains groundwater recharge at pre-CLRDP levels to the maximum extent practicable, through the use of infiltration systems designed into the stormwater ponds and swales.

Implementation Measure 7.1.7 – Drainage Discharge Rates. The University will design the stormwater system on the Marine Science Campus to ensure that post-development peak flow rates are the same as pre-development peak flow rates during the 2, 5, 10 and 25-year storm event unless different peak flow rates are determined to be necessary to maintain groundwater recharge or provide specific water quality benefits.

Implementation Measure 7.1.8 – Seawater System. The University will ensure that seawater pumped onto the site is contained and discharged so as not to impact freshwater resources and upland habitats on the Marine Science Campus.

Implementation Measure 7.1.9 – Irrigation and Use of Chemicals for Landscaping. The University will ensure that any water used for the irrigation of landscaping on the Marine Science Campus does not cause significant erosion and that any chemicals used for fertilizer and weed and pest control do not enter habitat areas or the ocean in sufficient concentrations to harm wildlife or degrade their habitat.

Implementation Measure 7.1.10 – Wastewater. The University will continue to discharge all wastewater generated on the Marine Science Campus to the City of Santa Cruz's sanitary sewer system.

Policy 7.2: Long-Term Maintenance and Monitoring

The University will maintain and monitor the stormwater system on the Marine Science Campus throughout the effective life of this CLRDP to provide control of water quantity and quality in a manner which maintains the quality and biological productivity of coastal waters on and adjacent to the campus.

Implementation Measure 7.2.1 – Inspections after Storm Events. The University will inspect the Marine Science Campus after major storm events to ensure that the integrity of the drainage system is maintained.

Implementation Measure 7.2.2 – Natural Drainage System Features Maintained. The University will maintain natural drainage system features to sustain their intended function as a drainage system.

Implementation Measure 7.2.3 – Stormwater Sampling. The University will sample stormwater discharges on the Marine Science Campus during at least one storm event each winter. Stormwater will be tested to ensure that it meets the Regional Water Quality Control Board's water quality objectives as specified in the Stormwater Concept Plan.

Implementation Measure 7.2.4 – Long-Term Maintenance of Stormwater System. The University will undertake maintenance activities on the Marine Science Campus for all components of the stormwater system, as specified in the Stormwater Concept Plan.

Policy 7.3 Drainage Discharge Points

The University will retain existing stormwater drainage discharge points and make improvements to them as necessary to correct existing erosion and/or other problems detrimental to maintenance of beneficial hydrology or water quality. No new discharge points will be created unless necessary to replace an existing discharge point, the improvement of which would cause a significant impact on the environment, and unless the creation of a new discharge point would have less impact than improving the existing discharge point.

> Implementation Measure 7.3.1 – Discharge to Younger Lagoon Reserve. Stormwater discharge facilities that discharge into Younger Lagoon Reserve will be designed to accommodate the 100-year storm event.

PROJECT IMPACTS AND MITIGATION MEASURES

WATER QUALITY

Entire Development Program

Under current conditions, surface water runoff travels across the site and eventually discharges into onsite drainage channels, seasonal wetlands, the YLR and the Pacific Ocean. This runoff can contain sediment, nutrients, and contaminants, such as petroleum products. Petroleum and other chemicals that originate from vehicles in parking lots and on roadways adhere to sediment particles and become entrained in the runoff. The CLRDP would develop approximately 20 acres of the 73-acre terrace area. Developed area would result in changes to runoff quantities and patterns and would increase impervious surfaces such as rooftops and parking lots that accumulate sediments and other contaminants. The drainage in the remainder of the site not included in the developed area would not change.

For the portions of the site developed that would be changed under the CLRDP, stormwater runoff would be treated prior to discharge. The Stormwater Concept Plan developed for the CLRDP addresses and incorporates measures to maintain the quality of stormwater runoff that is discharged into surface water features including the ESHA wetland areas and the YLR. The water quality protection measures developed for the Stormwater Concept Plan are designed to manage and treat the stormwater so that the proposed CLRDP would not degrade water quality or violate water quality standards.

The Stormwater Concept Plan is designed to meet the management measures set forth in the CAMMPR, which require that by design, the post-development average annual total suspended solids (TSS) loadings will be reduced by 80% or will be no greater than pre-development loadings. Although TSS is the contaminant of primary concern due to its many sources and ability to transport other contaminants, the Stormwater Concept Plan also addresses reducing concentrations of petroleum and heavy metals in surface water runoff. The management measures also require, that, to the extent practicable, a site must maintain the post-development peak runoff rate and average volume at levels that are similar to pre-development levels.

Control of pollutants in stormwater is achieved through a variety of BMPs. Stormwater treatment strategies prescribed in the Stormwater Concept Plan include both source control BMPs and treatment BMPs. Source Control BMPs (also known as pollution prevention BMPs) eliminate or reduce pollutants at the source and Treatment BMPs remove pollutants from stormwater by physical, biological, or mechanical means. Source control BMPs involve elimination of potential pollutants, or altering product use, reducing the quantity of pollutants in production processes and recycling waste materials. Source control BMPs incorporated into the Stormwater Concept Plan for the Marine Science Campus include appropriate storage and use of hazardous chemicals, providing convenient locations for recycling and disposal of commercial wastes, litter and dust control, landscaping using native plants with low nutrient and water requirements and use of the UCSC recycling and yard waste programs. Localized drainage systems would vary in each development area and could include one or more of the following Treatment BMPs.

- **Vegetated filter strips** are linear sections of vegetated land (usually more than 10 feet wide) that are placed parallel to a developed site to treat sheet flows. These reduce stormwater flow rates and enhance biological activity to treat stormwater.

- **Vegetated swales** are grass-lined channels designed to convey stormwater. They are similar to typical concrete/asphalt swales, but are generally somewhat wider and shallower. Vegetated swales reduce stormwater flow rates thereby promoting particulates and sediments to settle out of the stormwater.

- **Wet ponds** (stormwater ponds) are defined as detention basins that have a pool of water that is present between storms. These features treat stormwater by allowing enough residence time to allow sediment to settle out of the stormwater.

- **Engineered stormwater treatment systems** would provide additional treatment to reduce pollutants in stormwater runoff from parking lots prior to discharge to natural treatment systems and detention basins. Engineered filtration and treatment includes the use of underground detention (within pipes) and mechanical treatment systems to remove pollutants that would otherwise not be treated naturally (i.e., petroleum).

The CLRDP water quality policies and implementation measures on which the Stormwater Concept Plan is based are intended to reduce contaminants to surface water that may occur as part of the project. These implementation measures are listed above and include Implementation Measure 7.1.1 (Stormwater Management), Implementation Measure 7.1.2 (Stormwater Quality Standard), Implementation Measure 7.1.7 (Drainage Discharge Rates), Implementation Measure 7.1.8 (Seawater System), Implementation Measure 7.1.9 (Irrigation and Use of Chemicals for Landscaping), and Implementation Measure 7.1.10 (Wastewater).

Although the Marine Science Campus would undergo increased development under the proposed CLRDP, the Stormwater Concept Plan and the water quality policies and implementation measures on which it is based, would provide adequate and enhanced water quality protection. While the CLRDP would increase impervious surfaces and result in additional potential sources of surface water pollutants, the source control and treatment elements described above would be implemented as development progresses, thereby offsetting the potential threat to water quality. Overall, compared to the current conditions at the Marine Science Campus, the enhanced water quality protection resulting from the CLRDP would improve water quality by removing sediment and other pollutants from the stormwater runoff prior to discharge to the onsite wetland features and the YLR. The policies and implementation measures associated with water quality protection would ensure that impacts to water quality would remain less than significant.

Near-term Projects

Shared Campus Warehouse and Laydown Facility

This project would include the greatest impervious area dedicated to activities that can result in ground-borne contaminants such as petroleum, paint and other process chemicals. Sources of these pollutants include delivery trucks, automobiles, small labs, and inadvertent spills of chemicals including paints and solvents. Sources control measures that reduce, recycle, and properly dispose chemicals would greatly reduce the potential for an inadvertent release of these chemicals that could threaten water quality. In addition to natural treatment through the use of detention ponds and vegetated swales, this area would also employ engineered treatment systems (i.e., the Stormceptor ™ Systems to remove petroleum and other chemical contaminants) and bermed areas to reduce the migration of petroleum or other chemical from the impervious areas into the stormwater treatment areas. Source control and treatment measures associated with this project would ensure that water quality impacts would remain less than significant.

42 Apartment/Townhouse Units

Water quality concerns include petroleum products generated from parking lot runoff and sediment accumulation from roofs that would be flushed during a rainstorm. Parking lot runoff would be treated through engineered treatment systems to remove petroleum collected in surface water runoff. Source control BMPs incorporated into the Stormwater Concept Plan applicable to this area would include appropriate storage and use of commercial and household hazardous chemicals, such as lubricants, pesticides, solvents, acids, alkalis and paints and litter and dust/dirt control through regular sweeping of roads and parking lots. Source control and treatment BMP measures associated with this project would ensure that water quality impacts would remain less than significant.

United States Geological Survey Western Coastal and Marine Geology Facility

Parking areas associated with this development could potentially generate petroleum contaminants in stormwater and other chemicals associated with marine research activities could be flushed by stormwater from impervious surfaces. Similar to the water quality features discussed above for the apartment and townhouse units, possible stormwater facilities for Basin 3 include detention through the use of two ponds. Parking lot runoff would be treated through engineered treatment systems to remove petroleum collected in surface water runoff. Chemical usage in laboratories would take place indoors and would be isolated from entering the stormwater. Source control BMPs incorporated into the Stormwater Concept Plan applicable to this area would include appropriate storage and use of commercial and household hazardous chemicals, ensuring convenient locations for recycling/disposal of commercial and hazardous wastes, litter and dust/dirt control, and full utilization of the UCSC recycling and yard waste programs. Source control and BMP treatment measures associated with this project would ensure that water quality impacts would remain less than significant.

Sea Otter Research and Conservation Center

Overall, given the existing development on the site, there would not be a significant net increase in impervious surfaces. Stormwater quality concerns for this facility include petroleum in parking lot runoff. Since subsurface detention is not able to provide comparable water quality benefits to surface ponds in this location, additional engineered treatment units would be installed with the detention systems. Source control BMPs incorporated into the stormwater management plan applicable to this area would include appropriate chemical storage, litter and dust/dirt control through regular sweeping of roads and parking lots. Source control and treatment measures associated with this project would ensure that water quality impacts would remain less than significant.

Center for Ocean Health Phase II

This facility would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area. The net increase of impervious surfaces should be minimal. Water quality issues associated with this facility include accumulation and flushing of dirt and dust from impervious surfaces including roofs. Stormwater quality treatment would be managed through the ocean discharge similar to the system currently managing stormwater in Basin 9. Source control BMPs incorporated into the stormwater management plan applicable to this area would include appropriate storage and use of commercial and household hazardous chemicals, ensuring convenient locations for recycling/disposal of commercial and hazardous wastes, and litter and dust/dirt control through regular sweeping of roads and parking lots. Source control and treatment measures associated with this project would ensure that water quality impacts would remain less than significant.

GROUNDWATER RESOURCES

Entire Development Program

The standard of significance at the beginning of this chapter states that an impact would be considered significant if the project would substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or lowering of local groundwater levels. The proposed project does not depend on groundwater for water supply; therefore it would not deplete groundwater supplies or cause the lowering of the local groundwater levels through withdrawal of groundwater.

With the implementation of the CLRDP, an increase in impervious surfaces on the Marine Science Campus would occur which would reduce the permeable soil areas that currently provide surface water infiltration to the water table. Because the site groundwater is not used for water supply, the main concern with respect to decreased infiltration would not relate to a net deficit in aquifer volume. Rather, the concern would be whether reduced infiltration could lead to a decrease in groundwater supply to wetland habitats or seeps along the bluffs that are supplied in part by the water table. For a number of reasons that are presented below, the increase in impervious surfaces would not substantially reduce groundwater recharge and the impact would be less than significant.

As described in Section 3, the terrace portion of the site is approximately 73 acres in area. Of this acreage, new development would be limited to the three development zones that together make up about 33 acres, and the remaining 40 acres would remain in their current condition and no impervious surfaces would be placed in those areas. Of the 33 acres that would be developed, about 20 acres are already developed with existing facilities. Therefore under the CLRDP, new development would be located on about 13 acres of the 73-acre terrace site. Furthermore, with respect to this new development, the CLRDP requires that within each drainage basin (see Figure 4.8-2), no more than 70 percent of the land shall be impervious and that at least 30 percent of the land shall be maintained in pervious surfaces. To meet this requirement, new development will be required to minimize impervious surfaces, especially when developing outdoor areas. In addition, the CLRDP includes a policy that focuses on groundwater recharge. Implementation Measure 7.1.6, Groundwater Recharge, requires that the University will develop and manage a storm water system on the Marine Science Campus that maintains groundwater recharge rates at pre-CLRDP levels, to the maximum extent practicable, through the use of infiltration systems designed into the storm water ponds and swales. The vegetated swales and detention ponds would be designed to promote infiltration through the use of permeable pond linings. The promotion of surface water infiltration through the storm water ponds and swales would serve to offset the infiltration capacity lost due to impervious surfaces added under the CLRDP.

Groundwater supplying the wetlands and seeps along the bluffs would not be adversely impacted by the proposed CLRDP development. Based on the steeper topography along the southern end of the terrace and limited groundwater measurements indicating groundwater flows to the southeast, the infiltration area supplying ocean bluffs seeps would be the zone about 850 feet north of the bluffs (i.e., portions of Basins 10 and 11). No development is proposed for this area and therefore there would be no reduction in infiltration capacity. The presence and location of groundwater seeps along the bluffs adjacent to the YLR is difficult to confirm due the vegetation over the cliff face. Based on topography, the area that can infiltrate surface water to supply these seeps appears to be west of McAllister Way (Basins 7, 8 and 9). The development proposed for Basins 7, 8 and 9 would not significantly reduce the quantity of surface water available for infiltration because all three areas are currently disturbed, compacted, and developed with structures. There are no new structures proposed within Basin 7 under the CLRDP in order to keep all new development away from adjacent agricultural uses, therefore there would be minimal change in infiltration within that basin. With respect to Basin 8, existing greenhouses cover the majority of the basin area and would be replaced by the SORACC and other marine science research facilities. Furthermore, in redeveloping Basin 8, all projects that are proposed in that basin will be required to collectively leave at least 30 percent of the land in pervious surfaces. Similarly, about 70 percent of Basin 9 area is already developed, and even those areas that are not developed are compacted and provide limited infiltration. Any new development within this area would also be required to leave 30 percent of the land in pervious surfaces. Therefore, the change over existing conditions would be small in all three basins. Additionally because the CLRDP includes measures to maintain groundwater recharge at pre-development levels to the maximum extent feasible, the addition of the proposed impervious surfaces would not reduce groundwater supply to the YLR seeps.

In summary, implementation of the CLRDP would not adversely affect groundwater resources at the site.

Near-term Projects

The proposed near-term development projects involve the placement of impervious surfaces over areas that are currently capable of infiltration. For these projects, the Stormwater Concept Plan incorporates an infiltration component into each of the treatment BMPs to facilitate infiltration.

The proposed Shared Campus Warehouse and Laydown Facility would require the conversion of 2.4 acres of impervious surface area and could result in reduced infiltration capacity. However, the drainage system would convey the majority of runoff to detention ponds that would be designed to facilitate infiltration. Infiltration would also be an element of the BMP detention facilities in Basin 4 where the University would construct the 42 Apartment/Townhouse Units and USGS facility. The proposed development of the SORACC in Basin 8 would reduce groundwater infiltration by paving over about 0.7 acres of semi-pervious land in Basin 8.

However, consistent with the CLRDP, any subsequent projects that are developed in Basin 8 would be required to leave at least 30 percent of the basin's area in pervious surfaces. Groundwater infiltration capacity would remain the same in Basin 9 regardless of the proposed Center for Ocean Health because this area is currently overlain by impervious and compacted surfaces.

The design recommendations set forth in the Stormwater Concept Plan for detention design intended for infiltration, would ensure groundwater impacts associated with increased pervious surface area for all near-term projects would remain less than significant.

EROSION AND SEDIMENTATION DUE TO ALTERED DRAINAGE PATTERN

Entire Development Program

The development program proposed under the CLRDP would construct several new buildings on a relatively flat terrace with slightly-to-moderately erosive soils. The development would also add impervious surfaces to the site that would alter the hydrology by increasing stormwater runoff and reducing infiltration. Although throughout the life of the project, the natural drainage pathways would change compared to existing conditions, the project would not alter a stream or river.

Currently, the site is covered primarily by soil and during major rainstorms, water runs off the site through natural drainage ways and man made conveyances. Discharge from the site enters the YLR via culverts and unlined channels. Under existing conditions, flows discharge through the unlined drainages at uncontrolled volumes and velocities, leading to erosion within the drainages and slope erosion at discharge locations as described in the Onsite Drainage Basin discussion above. Locations with existing erosion and drainage issues requiring repair or redesign and constriction include the culvert at the De Anza Santa Cruz residential community and the outfall in Basin 8. Stormwater system improvements, as stated in the CLRDP, would be completed based on a predetermined implementation schedule. The drainage pipe to De Anza Santa Cruz residential community would be repaired initially, followed by the overflow protection from the seasonal pond. The drainage adjacent to the NMFS building would then be completed, prior to reconstruction of the stormwater outfall to the YLR in Basin 8. A new discharge facility in Basin 8 would be implemented last. These areas are currently damaged by erosion and are a source of sediment in the stormwater runoff. Improvement of these areas would eliminate primary sediment source areas and reduce discharges of sediment-laden runoff from the site.

The proposed CLRDP would implement stormwater management measures to control runoff and erosion resulting from the proposed increase in impervious surfaces. This impact analysis considered the policies of the CLRDP that focused on the reduction of erosion and sediment. Initially, through Implementation Measure 7.3.1, existing discharge points that drain to the YLR would be improved, thereby reducing their existing sources of sedimentation and erosion and eliminating conditions that potentially could increase erosion over time. Under Implementation Measure 7.1.1, the University would design a stormwater system that incorporates treatment best management practices, and engineered stormwater treatment systems that would control reduce or eliminate erosion caused by excessive stormwater flows. The Stormwater Concept Plan elements considered for inclusion into the design would be sufficient to reduce erosion on a site that currently is not a high erosion hazard. Implementation Measure 7.1.2 would ensure that stormwater quality will meet requirements of the CAMMPR. Erosion and siltation caused by peak stormwater flows would be further reduced by Implementation Measure 7.1.3 and 7.1.7, which requires that pre- and post-development flows and discharge rates remain the same. These measures would ensure that peak runoff caused by additional impervious surfaces would not initiate new erosion or exacerbate an existing erosion condition. Long-term maintenance and monitoring under Implementation Measure 7.2.1 (Inspection after storm events), 7.2.3 (Stormwater sampling), and 7.2.4 (Long-term maintenance of Stormwater system) provides a monitoring and corrective action maintenance mechanism that would further ensure compliance with stormwater management goals and water quality standards.

The stormwater management and water quality measures provided in the CLRDP would reduce the potential for erosion and siltation and ensure that impacts related to additional stormwater flows are less than significant in accordance with the criteria of significance listed at the beginning of this chapter.

Near-term Projects

Shared Campus Warehouse and Laydown Facility

This project would be located in the flat-lying upper terrace area in Basins 1 and 2. Under existing conditions these basins are free of erosion problems primarily because the area has a minor slope, is grass-covered and does not contain stormwater discharge points to other adjacent areas. The proposed development consists of buildings and paved or gravel laydown areas without earthen features such as berms or engineered slopes that could erode under high storm flows and result in sedimentation. The Stormwater Concept Plan elements that would manage stormwater to prevent erosion and sedimentation hazards for this new development include diverting the existing agricultural drainage ditch to wetland W1, constructing stormwater ponds to capture runoff and control its discharge, and conveying stormwater through vegetated swales. Implementation measures under the CLRDP and erosion control elements of the Stormwater Concept Plan would ensure that impacts related to erosion and sedimentation for this project would remain less than significant.

The 42 Apartment/Townhouse Units

This project would be located in Basin 4 in the relatively flat middle terrace, a basin that is free of erosion problems. Similar to Basins 1 and 2, the development would consist of paved areas and buildings with no features that are susceptible to erosion from excessive stormwater runoff. The Stormwater Concept Plan elements that would prevent erosion and sedimentation hazards consist of constructed stormwater ponds to capture and control runoff and the repair of the 24-inch culvert that conveys runoff into the De Anza Santa Cruz residential community. Stormwater controls also include outlet and flow dissipation structures to reduce erosion at discharge points. Short-term erosion and sedimentation occurring during construction would be controlled using standard construction practices required under the SWPPP as required for construction projects disturbing an acre or more. Implementation measures under the CLRDP and erosion control elements of the Stormwater Concept Plan would ensure that impacts related to erosion and sedimentation for this project would remain less than significant.

United States Geological Survey Western Coastal and Marine Facility

This project, similar to the apartments and townhouse development, would be located on the middle terrace in Basin 4 and portion of Basin 3. These two basins are free of significant erosion problems. The USGS facility would consist of buildings and paved areas with no features susceptible to erosion from stormwater flow. The Stormwater Concept Plan elements are similar to those proposed for the 42 Apartment/Townhouse Units, discussed above. Short-term construction erosion and potential temporary sedimentation would be managed under the required SWPPP. Implementation measures under the CLRDP and erosion control elements of the Stormwater Concept Plan would ensure that impacts related to erosion and sedimentation for this project would remain less than significant.

Sea Otter Research and Conservation Center

This project would be located in Basin 8. There are three stormwater discharge points to the YLR located in this basin and each requires some level of repair or monitoring. Under existing conditions, the large numbers of ground-burrowing animals in the area have contributed to undermining the protective berm which in turn accelerated erosion as stormwater flows through the animal holes. A third discharge point has caused erosion and allowed sediment to enter the YLR. This discharge point possibly pre-dates the Marine Science Campus and its condition is further degraded due to stormwater discharged to it from Basin 6. Erosion problems in Basin 8 associated with stormwater outfall, percolation trench and discharge would be repaired or monitored independent of any future coastal development permit requirements. The University plans to reconstruct the stormwater outfall in the lower portion of Basin 8 to manage 100-year storm flows and restore areas damaged by the outfall in the YLR and the YLR buffer area. A new discharge facility will replace the existing percolation trench and berm to reduce the need for annual repair and to correct existing erosion problems. The University will monitor the existing discharge facility in the northwestern portion of the site for signs of future erosion problems. The proposed project would consist of two buildings and an outdoor research area. Erosion at this facility would be minimal due to the presence of new structures and pavement. Storm drainage would be detained and treated though subsurface detention (pipes and faults) and engineered treatment systems. This would reduce sediment in the stormwater discharges to the YLR. No features are proposed for this project, such as earthen berms or sloped areas, which would be susceptible to erosion and be a sedimentation source. Existing problematic erosion conditions in Basin 8 would be repaired prior to development. Short-term construction erosion and potential temporary sedimentation will be managed under the required SWPPP. Although Basin 8 currently contains erosion problems, planned erosion improvements not tied to the CLRDP, and implementation of the CLRDP Stormwater Concept Plan elements would ensure that potential adverse erosion and sedimentation impacts associated with this project would remain less than significant.

Center for Ocean Health Phase II

This project would be located in Basin 9, which is a level, densely developed area of the Marine Science Campus. Buildings, and paved or graveled parking lots and roadways currently occupy most of the basin area. No existing erosion problems have been identified in this basin. All storm drainage originating from this basin is treated by engineered treatment systems prior to discharge to the ocean. Given the developed nature of this basin, there is a low potential that this project would cause erosion and contribute sediment to storm water that eventually enters the ocean. Short-term construction erosion and potential temporary sedimentation would be managed under the required SWPPP. Implementation measures under the CLRDP and erosion control elements of the Stormwater Concept Plan would ensure that impacts related to erosion and sedimentation for this project would remain less than significant.

The stormwater management features in each basin would be implemented simultaneously with the individual near-term projects and therefore would ensure that at the completion of each project, sufficient surface water and water quality management elements would be in place. These elements would reduce surface water flows thereby reducing erosion. Stormwater and water quality management elements associated with development of the near-term projects would ensure that erosion impacts associated with impervious surfaces increases as part of the project are less than significant in accordance with the standards of significance listed at the beginning of this chapter.

FLOODING DUE TO ALTERED DRAINAGE PATTERNS

Entire Development Program

Flooding is caused by rapid, localized accumulation of stormwater that cannot be adequately conveyed to a discharge location following a significant storm event. Drainage patterns on the relatively flat terrace would be slightly altered by the increase in impervious surfaces. As discussed above, CLRDP development would cause peak stormwater runoff to accumulate at a faster rate and at higher volumes due to additional impervious surface on the project site. Impervious surface area (buildings, parking lots, and roadways) constructed through development projects on the Marine Science Campus could increase peak stormwater volumes and flow rates that, if not managed properly, could temporarily overwhelm conveyance facilities (storm drains, gutters, discharge points) and result in local flooding.

This impact analysis was based on reviewing the Stormwater Concept Plan and determining whether the performance standards and methodologies incorporated into the plan adequately address the potential for flooding at the Marine Science Campus under the proposed development. Although the plan is conceptual in nature, as described earlier, it provides a sufficient framework for detailed drainage system design, including the evaluation of stormwater detention requirements for a 25-year storm event.

The Stormwater Concept Plan provides measures for the reduction of potential impacts related to localized flooding and, in turn, would mitigate potential impacts related to excessive flooding due to an exceedance of the capacity of downgradient stormwater conveyance structures. The primary component of the CLRDP that reduces localized flooding is the requirement that flows resulting from the project would be managed so that post-development peak flow and discharge rates would remain at pre-development rates. This would be accomplished by constructing a series of detention facilities that would designed to detain flows and release them at pre-development rates and volumes. The stormwater management system would be designed in accordance with the performance standards and methods outlined in the Stormwater Concept Plan. Impacts of development would be mitigated through Implementation Measure 7.1.1 because properly engineered detention ponds would detain flood flows and conveyance through maintained vegetated swales would further reduce peak flood flows possible in a 25-year storm event. Implementation Measure 7.1.3 would ensure that the ponds would be designed to maintain predevelopment drainage patterns and peak flows in the post-development drainage system. These facilities would be designed and constructed as required, based on the final design and placement of each facility.

The stormwater management and water quality measures provided in the CLRDP would reduce the potential for flooding due to an altered drainage pattern and ensure that impacts related to additional stormwater flooding are less than significant in accordance with the criteria of significance listed at the beginning of this chapter.

Near-term Projects

Potential flooding of near-term development could occur in localized areas where impervious pavement surfaces would be added such as the 2.4-acre centralized warehouse and laydown yard in the upper terrace and the 1.7-acre USGS facility over Basins 3 and 4. Temporary flooding impacts in Basins 9, 10 and 11 are expected to be minimal due to the minor amounts of new impervious surfaces resulting from CLRDP implementation. Surface flooding would be most extreme during the large storms (25-year), although smaller storms events (10-year) are capable of generating sufficient precipitation to cause localized flooding in low areas with insufficient conveyance capacity.

Flooding impacts related to near-term projects would be managed similar to those under the entire development program. The stormwater system for each individual, near-term project, as designed under the guidelines and performance standards set forth in the Stormwater Concept Plan would ensure that localized flooding due increased impervious surfaces would be less than significant.

CREATE OR CONTRIBUTE RUNOFF/ADDITIONAL RUNOFF

Entire Development Program

The CLRDP would result in additional semi-impervious (i.e. compacted gravel) and impervious surfaces within the five Drainage Planning Areas on the Marine Science Campus. These surfaces would produce peak stormwater flows above existing rates and volumes. Under current conditions, this additional runoff could exceed the capacity of existing stormwater drainage systems, leading to flooding, or could generate additional sources of polluted runoff. It was therefore necessary to determine the effect added impervious surfaces would have on the post-development peak flow rates and volumes. During the development of the Stormwater Concept Plan, hydrologists calculated peak pre-development and post-development storm runoff flow rates and volumes for the 2, 5, 10, and 25-year return storm event. This approach determined the detention capacity necessary to reduce post-development peak discharge rates to those occurring under existing conditions. Reduction of post-development peak discharge flow rates and volumes is one of the two general objectives used as a basis for the development of more refined stormwater management design and performance standards and the conceptual design of the post-development drainage systems.

Drainage basin detention requirements were determined using the Modified Rational Method, which calculates the volume of runoff in a specific time interval. Detention volumes were calculated to determine the runoff storage volume required to reduce runoff flow rates to a predetermined level. UCSC standards for release of stormwater require the post-development 25-year return storm be detained at a pre-development 25-year rate, thereby maintaining peak flows. Therefore, this impact analysis considers increases in stormwater peak flow, resulting from a 25-year storm event, to illustrate the potential increases in stormwater flows resulting from the CLRDP. Table 4.8-2 below summarizes, per basin, the predevelopment peak flow rates for 25-year storm attenuation, the post-development peak flow rates, and the detention volumes required to reduce those flows to pre-development rates.

Table 4.8-2 indicates that in all basins except 5 and 11, the proposed CLRDP development would result in an increase in peak flows during a 25-year rainfall event. Basins 5 and 11 would not change under the CLRDP because no development changes to these areas are planned. The increases in the other basins would be less in smaller storm events such as the 2, 5, and 10-year return storm but these data indicate that for the site overall, the peak flows will increase due to the

TABLE 4.8-2
COMPARISON OF PRE-DEVELOPMENT AND POST-DEVELOPMENT PEAK FLOW RATES AND REQUIRED POST-DEVELOPMENT DETENTION VOLUMES

Basin	Predevelopment 25-year storm Peak Flow (CFS)	Post-development 25-year Peak Flow (CFS)	Required Detention Volume 25-year (CF)
1	1.52	3.91	1,664
2	1.13	8.30	19,256
3	0.43	3.12	7,047
4	2.48	18.61	44,981
5	3.05	n/a	n/a
6	1.68	4.57	2,090
7	0.72	3.91	5,357
8	1.03	4.80	4,667
9	7.57	11.19	2,254
10	0.68	4.18	7,177
11	0.72	n/a	n/a

development project. In order to fulfill the objectives of the Stormwater Concept Plan and the requirements of the CLRDP, these increased flows must be temporarily detained and discharged at pre-development flow rates following a storm event. The placement and design of the stormwater detention facilities in each Drainage Planning Area is based on the calculated required detention volume.

The future development on the Marine Science Campus would increase peak flows due to the increased impervious surfaces resulting from CLRDP implementation. However, through implementation of the Stormwater Concept Plan, these increased flows would be attenuated by a series of stormwater management facilities (i.e., stormwater ponds, vegetated swales, and subsurface detention) that would be constructed simultaneously with site development. By determining increased peak flows during the 25-year storm event, calculating the required detention volume required to maintain discharge flows to existing rates and volumes, and designing stormwater facilities accordingly, impacts associated with increased runoff would remain less than significant.

Near-term Projects

Shared Campus Warehouse and Laydown Facility

This facility would be located in Drainage Planning Area A, which includes Basins 1 and 2. As shown in Table 4.8-2, peak stormwater flow rates in Basins 1 and 2 could increase substantially as a result of development on the upper terrace. The peak flow increase in Basin 2 reflects the total developed area in the basin and includes both the warehouse and laydown facility and support housing that would be constructed later. However, the majority of the peak flow increase would be attributable to the warehouse and laydown facility. This is because of the relatively large amount of impervious pavement in the laydown yard and the warehouse roofs. Peak storm flow increases resulting from development in Drainage Planning Area A during a 25-year event would require 1,664 cubic feet of stormwater detention capacity in Basin 1 and an estimated 19,256 cubic feet in Basin 2. The Stormwater Concept Plan provides three stormwater ponds (totaling 26,063 cubic feet) in the Drainage Planning Area A that would adequately accommodate the increase in peak flows while providing surface water infiltration and a water quality function. Although the project would result in additional runoff, Drainage Planning Area A would be designed to manage additional runoff and therefore would ensure that impacts associated with additional runoff would remain less than significant.

42 Apartment/Townhouse Units

These units are located in Drainage Planning Area B, which includes Basins 3 and 4. The construction of this project would be contained within Basin 4 and in addition to other proposed projects, would contribute to a basin-wide increase in peak stormwater flows. During a large 25-year storm, peak flows would increase substantially over the existing conditions resulting in a required detention capacity of 44,980 CF (Table 4.8-2). However, the total peak flow increase is attributable to all proposed development in Basin 4 and comparatively, this project would account for a smaller percentage of the increase. Other projects in Basin 4 include the U.S. Geological Survey facility (discussed below) and other proposed marine research and education facilities. Stormwater runoff would be directed into two basins with detention volume of approximately 48,260 CF. These basins would operate with infiltration capacity and a water quality function. Stormwater detention volume proposed for Basin 4 is adequate to detain the increase in 25-year peak flow volumes and therefore ensure that impacts due to additional runoff would remain less than significant.

United States Geological Survey, Western Coastal and Marine Geology Facility

This facility would be placed in Drainage Planning Area B, within Basin 3 and 4 but the majority of the facility would be in Basin 4. As discussed above, Basin 4 will also contain the 42 Apartment/Townhouse Units and several other development projects. This project would contribute to the basin-wide increase in peak flows during storm events. During a 25-year storm, this facility could contribute to basin wide increase in peak storm flow approximately of 44,980 CF or 7 times the existing 25-year peak storm flows. Stormwater generated by this project would be directed into one of the stormwater ponds within Basin 4 that combined, have a detention volume of 48,260 CF. This stormwater detention volume would be adequate to detain peak 25-year storm flows, provide an infiltration component, and provide adequate volume to function as water quality treatment feature. This would ensure that impacts due to additional runoff would remain less than significant.

Monterey Bay Aquarium Sea Otter Research and Conservation Center

This facility would be located in Drainage Planning Area C, Basin 8. The increase in impervious surface resulting from this near-term project and other future projects in the basin would increase stormwater flows discharged to the YLR. The development of this facility would contribute to a substantial increase in Basin 8 during a 25-year storm (Table 4.8-2). Post-development stormwater detention required for Basin 8 during a 25-year storm is approximately 4,667 CF. Stormwater detention in this basin would provided by subsurface detention facilities, which typically use underground pipes and vaults. The design and placement of these subsurface detention features are based on final design but would be constructed to accommodate the required detention volume. Stormwater detention would maintain pre-development peak flows and provide water quality. Stormwater detention facilities would be constructed to detain storm flows and release these flows at predevelopment rates and therefore, would ensure that impacts due to additional runoff would remain less than significant.

Center for Ocean Health Phase II

This facility would be constructed in Drainage Planning Area E, Basin 9. This area is currently developed and contains mostly impervious surfaces. This accounts for the comparatively high pre-development peak stormwater flows shown in Table 4.8-2. Future development projects in Basin 9, including future marine research and education facilities, would increase, to varying degrees, the amount of impervious surface. The increase in impervious surface would in turn increase post-development stormwater flows. However, this project is located in an area that is already covered by impervious and semi-impervious surfaces (gravel) and therefore, on its own, is not expected to increase stormwater flows over the current rates. In Basin 9 peak flows during a 25-year storm event, could increase somewhat over pre-development flow rates (Table 4.8-2). This estimate includes the entire basin and includes the conversion of pervious to impervious surfaces that would occur in future development projects. Stormwater runoff in Drainage Planning Area E will be detained by a constructed stormwater pond in Basin 10. Basin 9 currently discharges stormwater to the laboratory seawater system through an engineered treatment system. Under post-development conditions, this system should continue to function effectively provided post-development flows remain at pre-development levels. Given that this project would not contribute to significant increases to stormwater flows and that the current system of stormwater discharge in this basin remains effective, impacts of this project associated with creation of additional stormwater flows would remain less than significant.

FLOODING DUE TO 100-YEAR FLOOD ZONE

Entire Development Program

The Marine Science Campus is not located within a 100-year flood zone due to its location on the terrace. The closest stream system is Moore Creek and the associated connection with Antonelli Pond, which flows through the De Anza Santa Cruz residential community. However, in a 100-year flood there would likely be localized flooding of streets and low areas on and surrounding the Marine Science Campus, but it is improbable that the level of flooding would place people and structures at risk or cause structures related with the proposed project to impede or redirect on the site.

Flooding on the Marine Science Campus caused by ocean tides, flood stage in Younger Lagoon, or tsunamis is not expected considering that the campus is approximately 40 feet above sea level. Although large storms can generate waves that could potentially top the ocean bluffs, the flood risk from such an event is negligible. Flooding due to placement of the proposed project in a 100-year flood zone is remote and therefore, is less than significant in accordance with the criteria of significance listed at the beginning of this chapter.

Near-term Projects

Since the project site is not within a 100-year flood zone and for the reasons cited above for the entire development program, none of the near-term projects would result in significant flood zone impacts.

TSUNAMI, SEICHE, OR MUDFLOW

Entire Development Program

The proposed Marine Science Campus is not subject to seiches because it faces open ocean, is not subject to tsunami because it is 40 feet above sea level and is not subject to mudflows because the site is flat. Therefore, impacts would be less than significant.

Near-term Development

For the reasons stated above for the entire development program, there would be no significant effects from any of the near-term projects.

Development of under the CLRDP would not result in significant impacts related to water quality, hydrology, or flooding. The elements of the Stormwater Concept Plan and policies and implementation measures set forth in the CLRDP would ensure that adverse hydrologic impacts would remain less than significant.

CUMULATIVE IMPACTS

ENTIRE DEVELOPMENT PROGRAM

This analysis addresses the cumulative contribution of the proposed project in the context of existing development and other development projects, either proposed or currently under construction, near the Marine Science Campus. Specifically, this analysis focuses on effects associated with water quality degradation and increased volume of stormwater runoff to the YLR and to Monterey Bay. The geographical area considered in this analysis includes the Marine Science Campus, the Younger Ranch to the west of the Marine Science Campus, the light industrial area to the north and northeast, and the residential development adjacent and to the east and northeast (see Figure 4.9-2).

The Marine Science Campus site is essentially a closed drainage system, with little influence from upgradient or crossgradient sites. With the exception of the drainage from the light industrial areas to the north, drainage onto the site through overland flow from adjacent properties is minor. Therefore most of the runoff that is discharged from the site originates from the rainfall that falls on the site. As discussed earlier in this section, the Marine Science Campus currently discharges site runoff into the YLR from Basins 1 and 2 which make up the entire upper terrace area, Basins 3, 7 and 8 which make up the western portion of the middle terrace, and Basin 6 which makes up the lower western portion of the middle terrace. Site runoff from Basin 4 in the central and western portions of the middle terrace is discharged to a culvert that discharges into a drainage in De Anza Santa Cruz residential community. Basins 9, 10, and 11 in the lower portions of the middle terrace and the lower terrace areas discharge into Monterey Bay.

Cumulative Discharges into the YLR. Although the YLR receives runoff from a large area (see previous discussion), in the project vicinity, the areas that drain into the YLR include the agricultural fields of the Younger Ranch west of the Marine Science Campus and the campus. Runoff from the east side of these fields drains into the YLR and can carry recently applied pesticides, residual pesticides originating from past operations, and sediment, transported by runoff, into the YLR. Runoff from the light industrial areas north of the site (the Raytek and Reber Construction Co. sites) flows onto the Marine Science Campus site via a culvert under the railroad tracks and a shallow ditch. The Pacific Shores Apartments project to the northeast is currently partially occupied and partially under construction. When completed, this project would discharge into the municipal storm drain system. The De Anza Santa Cruz residential community is considered in the cumulative analysis because although this development operates a stormwater system that is largely independent of the Marine Science Campus site, as noted above the surface water from Basin 4 on the Marine Science Campus discharges into the surface water features in the De Anza Santa Cruz residential community. Also considered in the cumulative analysis is the future development within the Westside Study Area (see introduction to Chapter 4). Similar to the proposed CLRDP development, development projects within the Westside Study Area would convert open ground to impervious surface causing increased surface stormwater flows and potential for adverse effects on water quality of the receiving waters.

Uncontrolled flow would continue to discharge off Younger Ranch agricultural fields and into the YLR and would continue to contribute agricultural pollutants including sediment and pesticide residual into the YLR. There are no other vacant parcels in the project vicinity that drain into the YLR and could be developed in the future to result in increased polluted runoff into the YLR. Therefore, any change in the volume and quality of runoff that is received in the YLR compared to existing conditions would be the result of the implementation of the CLRDP. The CLRDP includes the Stormwater Concept Plan which would ensure that increased runoff volumes that would result from more impervious surfaces would be detained and released in a rate such that pre-development peak flows are not exceeded. Furthermore, contribution of pesticides and sediments from the campus to the YLR would be significantly reduced if not eliminated, through implementation of flow control and stormwater treatment strategies proposed under the Stormwater Concept Plan. In addition, Stormwater Concept Plan would route flows from the Raytek site through the stormwater control and treatment facilities proposed under the plan. Therefore, through implementation of the Stormwater Concept Plan, the stormwater pollutant load to the YLR would be reduced compared to existing conditions. While the total volume of water discharged to the YLR would not decrease, peak flows would be controlled to avoid problems of erosion and scour. In addition, the CLRDP would also rectify existing erosion problems in the YLR which would lead to improvement in water quality. There would not be a significant cumulative adverse impact on the YLR from cumulative development in the project vicinity.

Cumulative Discharge to Moore Creek Drainage. Future stormwater contributions to the Moore Creek drainage include runoff from Basin 4 of the Marine Science Campus and the development of the Swenson site, located on Schaffer Road, south of the railroad tracks. The existing contribution of stormwater flows to the De Anza Santa Cruz residential community from Basin 4 on the Marine Sciences Campus would be improved under the CLRDP. Uncontrolled and untreated flows that are now discharged directly from the Marine Science Campus through the culvert would be routed through the stormwater detention and treatment facilities proposed in the Stormwater Concept Plan prior to discharge. In addition, the existing 24-inch discharge culvert would be repaired under the CLRDP, thereby further reducing cumulative sediment load. Controlling and treating the discharge flow at this point would reduce any contribution of pollutants or sediment to the stormwater drainage system at the De Anza Santa Cruz residential community. Upon development of the Swenson site, stormwater would likely be managed by the municipal storm drainage system which would probably discharge to Moore Creek. This discharge could increase flows to Moore Creek and contribute non-point source pollutants to the Moore Creek drainage. However, the City of Santa Cruz municipal stormwater system would manage the quantity and quality of these discharges and dischargers would be required to comply with the City's programs to reduce stormwater pollutants in their discharge, and therefore, the cumulative impact would be less than significant.

Cumulative Discharges to the Pacific Ocean and Monterey Bay. With respect to the discharge of site runoff into Monterey Bay, the cumulative context is the discharges from the site in conjunction with stormwater discharged from other urban areas via the municipal stormwater drainage systems. Because of this, all projects in the region could be considered as cumulatively contributing to the water quality of the Monterey Bay and the Pacific Ocean. However, efforts at the state, county and city level to control and reduce pollutants in stormwater will offset and eventually reduce the overall cumulative contribution to water quality degradation of the ocean and bay resulting from the cumulative development in the region. The Stormwater Management Plan (SWMP) is the County of Santa Cruz response to the new statewide National Pollutant Discharge Elimination System (NPDES) General Permit for agencies designated by the State Water Resources Control Board. Under this General Permit, the agencies are mandated to implement specific types of urban runoff pollutant control measures and submit reports to the Central Coast Regional Water Quality Control Board. Urban runoff includes stormwater that is discharged by municipal storm drainage systems and any other water that flows, is discharged, or infiltrates into the storm drainage system. The City of Santa Cruz will be required to initiate programs to monitor stormwater for pollutants, improve stormwater system maintenance, and provide educational activities to individuals, businesses and agencies that impact stormwater. The City has adopted a Stormwater Ordinance establishing standards for reducing pollutants in stormwater. The City of Santa Cruz is currently developing and implementing best management practices for specific areas such as retail, industrial, and construction activities. In combination, these programs will reduce stormwater pollution. These activities support the goal of the City to minimize the pollutants from the City storm drain system entering the Monterey Bay National Marine Sanctuary. The proposed project would also minimize discharge of pollutants to the bay by implementing the Stormwater Concept Plan that is part of the CLRDP as well as broader implementation of measures required under the Basin Plan as administered by the Regional Water Quality Control Board. Under the Stormwater Concept Plan, stormwater drainage from the site would be treated through mechanical and natural treatment systems prior to discharge to the bay and to the YLR (which eventually flows into the ocean). Therefore the cumulative impact would be less than significant.

Other Cumulative Impacts. The existing stormwater drainage system at the Marine Science Campus and the system modified by implementing the Stormwater Concept Plan would not depend on municipal stormwater drainage conveyance or treatment facilities. The two future residential projects closest to the site, the Pacific Shores Apartments and the probable future development on the adjacent Swenson site, immediately across Shaffer Road from the project site, could generate increased flows that could result in downgradient flooding within the Marine Science Campus. However, this is not considered likely, because the stormwater drainage system for these projects would be routed to the municipal stormwater collection system and not overland. The industrial/commercial facilities evaluated as cumulative projects are too distant from the Marine Science Campus to cause a cumulative impact on hydrology. The effects of the other cumulative projects would not likely influence the local water table beneath the Marine Science Campus because, as discussed earlier in this section, the primary recharge for the water table occurs from precipitation falling on the site and not via underflow from offsite, upgradient, or crossgradient sources.

In summary, the cumulative impacts on hydrology and water quality from development in the Westside Area would be less than significant.

NEAR-TERM PROJECTS

The cumulative analysis pertaining to the entire development program is applicable to the five near-term projects. Project contributions would not be cumulatively considerable because they would be mitigated by mechanical and natural treatment systems as described above.

Considered cumulatively, the proposed CLRDP and the nearby development projects would not result in a significant cumulative impact on surface hydrology. When considered in conjunction with the other nearby projects, the development proposed under the CLRDP, including the five near-term projects, would not exacerbate an existing adverse hydrologic condition or cause a cumulatively adverse effect on water quality.

4.9 LAND USE AND PLANNING

This section evaluates the potential land use and planning impacts from the implementation of the CLRDP and the five near-term projects. This section provides information concerning relevant land use plans, policies, and regulations governing or otherwise affecting the area potentially affected by the CLRDP. Although state universities are exempt from regulation by local agencies, the EIR analyzes the consistency and potential conflicts of the CLRDP with relevant local agency land use plans, policies, and regulations. This section also considers the consistency of the CLRDP with relevant provisions of the California Coastal Act. Primary sources of information used in this section include the *City of Santa Cruz General Plan and Local Coastal Program 1990–2005*, the *County of Santa Cruz General Plan and Local Coastal Program 1994*, and the *California Coastal Act 1976, as amended through 2002.*

Based on CEQA Guidelines, a project may have a significant adverse impact on the environment if it would:

- Physically divide an established community.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.
- For projects exempt from local land use regulations and controls, substantially conflict with those regulations and controls such that a significant incompatibility is created with any existing land use at the periphery of the campus.

SETTING

REGULATORY CONTEXT

California Coastal Act

The project site is located within the California Coastal Zone, where all development is governed by provisions of the California Coastal Act (Public Resources Code, Division 20). Under the Coastal Act, each local government must prepare a Local Coastal Program (LCP). After the Coastal Commission certifies a LCP, the local government assumes authority for issuing coastal development permits in that area. The City of Santa Cruz has a certified LCP, but it excludes the project site, which is identified as an “area of deferred certification” within the LCP. The City’s General Plan does cover the project area, but under the previously noted constitutional principles, the plan does not have regulatory effect on University-owned land. The County of Santa Cruz also has a certified LCP. Under Section 30605 of the Coastal Act, the University must coordinate and consult with local governments in the preparation of CLRDPs so as to be consistent, to the fullest extent feasible, with the appropriate local coastal program. The City of Santa Cruz LCP, which applies to the areas north and east of the site, and the County of Santa Cruz LCP, which applies to the areas to the west of the site, are discussed further below.

To date, development on the project site has been permitted by the Coastal Commission on a case-by-case basis, as individual projects have been proposed on the basis of the previously approved Master Plan.[1] As an alternative to project-by-project review, the Coastal Act provides for a state university to prepare a Long Range Development Plan (LRDP) and submit it to the Commission for review for consistency with Coastal Act policies. Once the LRDP is approved by the Coastal Commission, primary development authority over University land will be exercised by the University, with the Coastal Commission retaining limited authority to review projects and impose conditions, as needed, to assure consistency with the CLRDP. The University of California has adopted long range development plans for all ten of its campuses. With acquisition of additional land at the project site and plans for expansion of the Marine Science Campus, the University and Coastal Commission have agreed upon the desirability of preparing a coastal LRDP ("CLRDP") to cover future development of this campus.

Section 30605 of the Coastal Act establishes standards for certification of the CLRDP, and implementing regulations (14 Cal. Code of Regulations, Sections 13500 - 13577) establish a methodology for preparation and certification. The CLRDP must be found by the Commission to be in conformity with the policies of Chapter 3 of the Coastal Act (Sections 30200 - 30265.5).

Consistency with specific Coastal Act Chapter 3 policies on public access and recreation, marine environment, land resources, and development is discussed below, under Consistency with the California Coastal Act.

City of Santa Cruz General Plan and Local Coastal Program 1990–2005

The project site is located entirely within Santa Cruz city limits adjacent to existing industrial and residential development. The City of Santa Cruz General Plan/LCP establishes comprehensive, long-term land use policy for the city. As required by state law, the General Plan includes the following elements: Environmental Quality, Community Design, Land Use, Circulation, Housing, Economic Development, Community Facilities and Services, Parks and Recreation, Cultural Resources, and Safety. The General Plan also includes the LCP, which applies to the portions of the city located within the coastal zone, for the purpose of preserving coastal resources pursuant to the requirements of the California Coastal Act. As previously noted, the City's LCP excludes the project site, and the General Plan lacks regulatory effect on the site. However, the following information is relevant to the evaluation of the CLRDP's general conformance with pertinent portions of this plan.

The project site is located within an area designated by the General Plan as "Lower Westside Planning Area" and by the LCP as "Westside Lands/Long Marine Lab." The General Plan/LCP divides the terrace portion of the project site (formerly known as Terrace Point) into two areas: the lands south of Delaware Avenue Extension are designated as "Coastal-Dependent/Coastal-Related," and the lands north of Delaware Avenue Extension are designated as "Low-Medium-Density Residential." The intent of the Coastal-Dependent/Coastal-Related designation is to "identify lands along or near the coastline that will be utilized for coastal-dependent industries such as small craft harbors, fisheries, boating, marine research and education, agriculture, aquaculture, mariculture, and attendant facilities that require direct proximity to the ocean." The intent of the Low-Medium-Density Residential designation is to "indicate where residential development may occur at particular densities." Low-Medium-Density Residential areas are

1 UCSC, *Institute of Marine Sciences Long Marine Laboratory Master Plan*, 1992; Revised and approved by the Coastal Commission, 1993.

typically multifamily residential areas with apartments, condominiums, cooperative housing, cohousing, townhouses, and detached units at densities ranging from 10.1 to 55 units per acre. Additionally, General Plan policy sets forth the types and intensity of development that should occur on the site, including 25 acres of coastal-depending/related uses, 6.5 acres along the coast for coastal recreation, at least 15 acres of housing and supporting uses, parks in accordance with City standards, and community gardens.

The portion of the project site located to the north of Delaware Avenue Extension is also within an existing "Redevelopment Area" that generally encompasses the industrial uses at the westernmost portion of the city. The YLR is designated by the Land Use Element as a "Natural Area," which includes "land that, for reasons of vegetation and wildlife habitat protection, aesthetic and recreational purposes and safety should remain in an undeveloped state." (See Figure 4.9-1, Existing Santa Cruz Land Use Designations of the Site and Vicinity.)

County of Santa Cruz General Plan and Local Coastal Program

The Santa Cruz County General Plan/LCP applies to county lands immediately adjacent the site to the west. As for the City General Plan/LCP, the County General Plan/LCP establishes comprehensive, long-term land use policy for the County. The General Plan/LCP designates the lands immediately adjacent to the west of the site as "Commercial Agricultural Land."

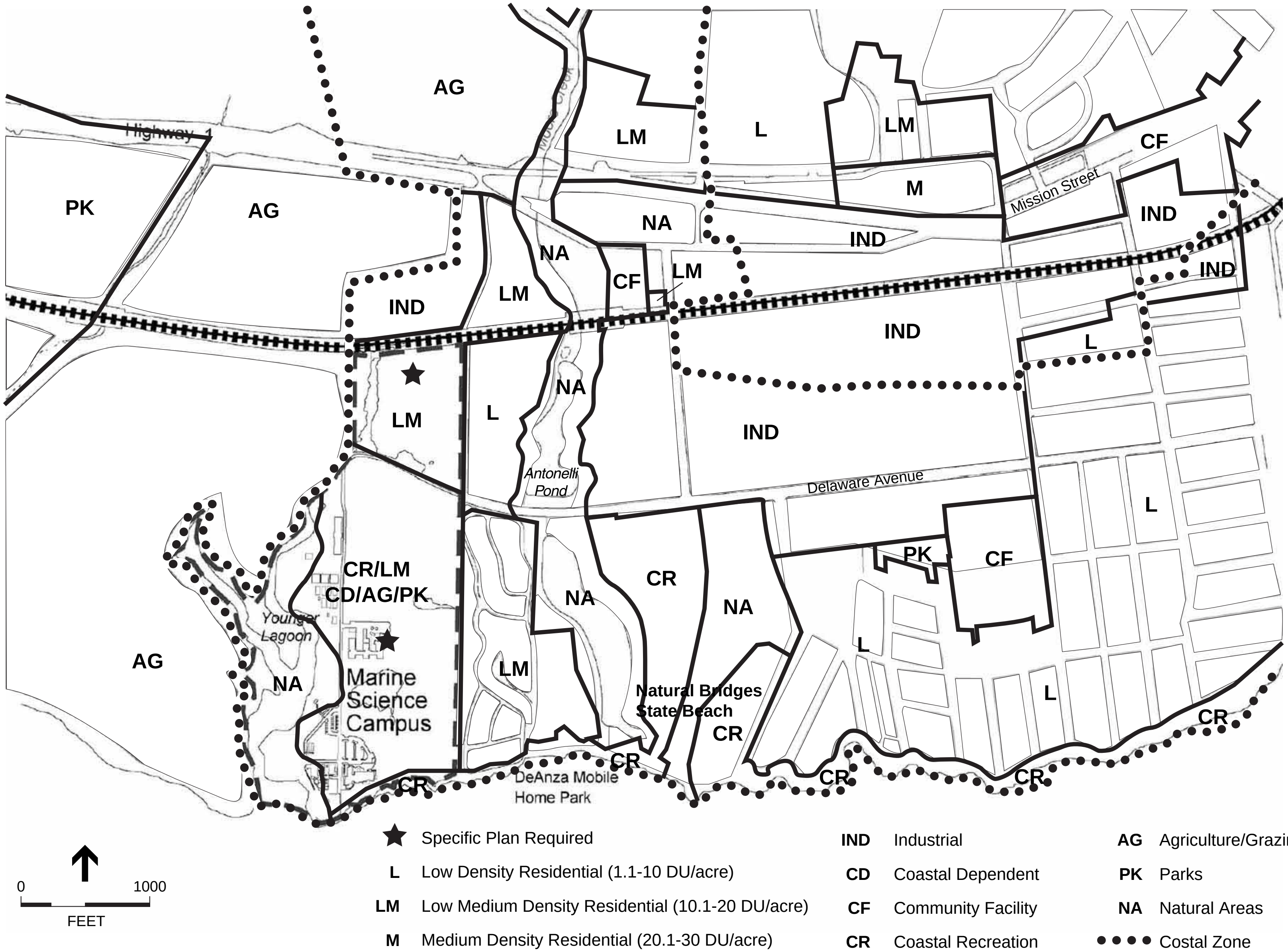
The intent of the Commercial Agricultural Land designation is "to maintain for exclusive agricultural use those lands identified on the County Agricultural Resources Map as best suited to the commercial production of food, fiber, and ornamental crops and livestock and to prevent conversion of commercial agricultural land to non-agricultural uses." In addition, the designation recognizes "that agriculture is a priority land use" and that resolution of "policy conflicts in favor of preserving and promoting agriculture on designated commercial agricultural lands" is preferred.

Consistency with specific County General Plan/LCP policies on agricultural-zoned land, conversion to non-agricultural uses, resolution of operational and land use conflicts, and applicable scenic corridor policies are discussed below under Consistency with the County General Plan/LCP.

REGIONAL AND LOCAL LAND USE

The project site is on the central California coast, near the center of the Monterey Bay National Marine Sanctuary, a 5,300-square-mile protected marine area. The project site is approximately 65 miles south of San Francisco and 40 miles north of Monterey, in the coastal zone at the western edge of the city of Santa Cruz within the city limits (which are co-terminus with the western boundary of the project site). The main UCSC campus is northwest of downtown Santa Cruz and approximately three miles northeast of the project site (see Figure 3-1, Project Location, in the Project Description). Access to the project site is provided at a gate at the western terminus of Delaware Avenue.

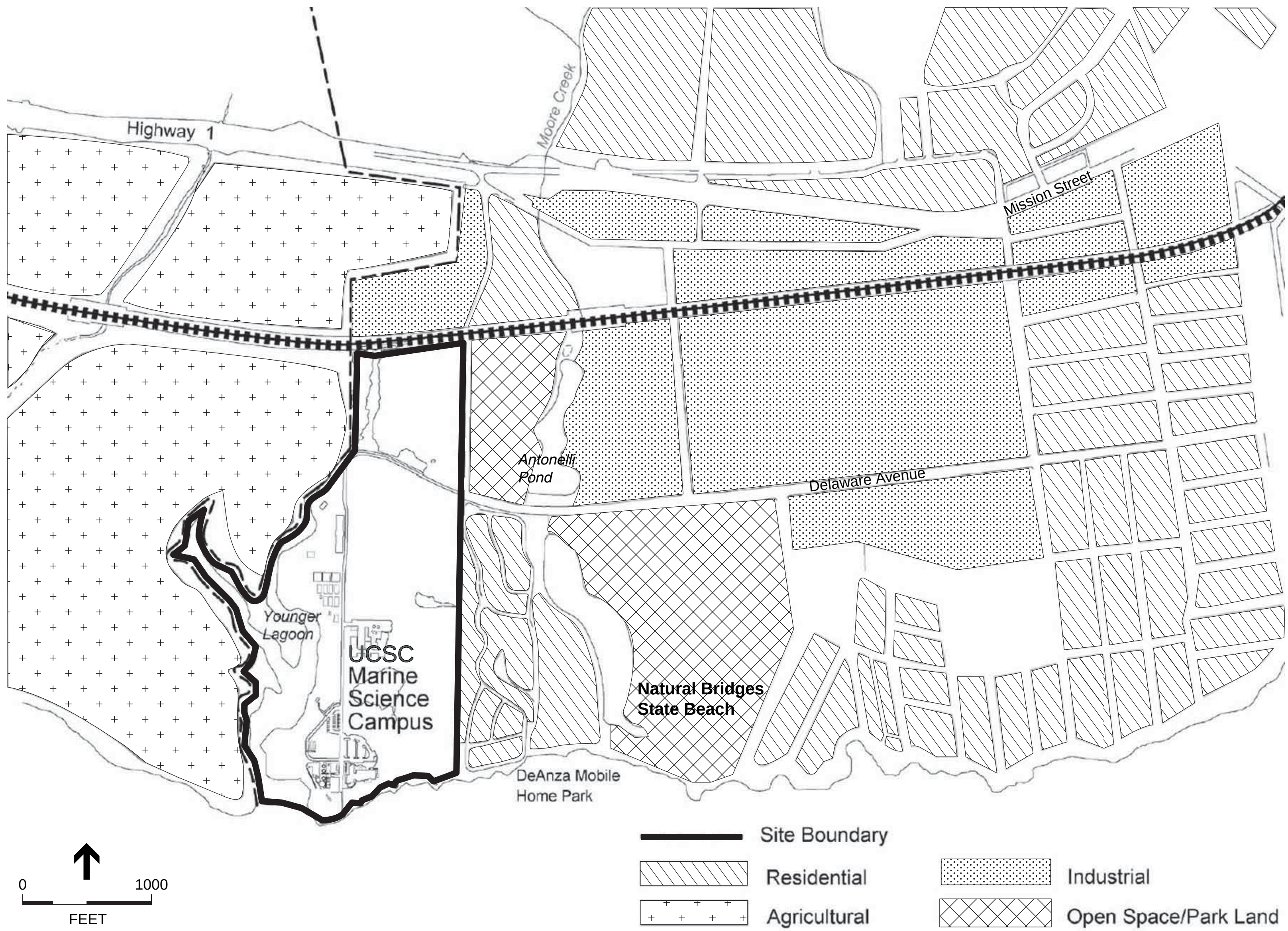
The Union Pacific Railroad right-of-way borders the project site on the north (see Figure 4.9-2, Existing Land Uses in the Vicinity of the Site). Agricultural lands within the jurisdiction of Santa Cruz County extend to the west and north of the project site. Agricultural uses are generally located along the coastal terraces just south of Highway 1 and are currently planted in crop rows.



SOURCE: City of Santa Cruz

Figure 4.9-1

Existing Santa Cruz General Plan Land Use Designations of the Site and Vicinity



SOURCE: Draft CLRDP

Figure 4.9-2
Existing Land Uses in the Vicinity of the Site

Historically, the upland terrace portion of the project site was in Brussels sprouts production; however, the majority of this area has been fallow since 1987 or 1988. The YLR separates the existing developed areas on the project site from the agricultural lands to the west; however, crop row fields are adjacent to the western edge of the site, north of Delaware Avenue Extension. Refer to Section 4.2, Agricultural Resources and Appendix D, for a more detailed analysis of project site agricultural viability.

Industrial uses north of the site and along Delaware Avenue northeast of the project site are part of the 150-acre Natural Bridges Industrial Park, an area bounded by Delaware Avenue to the south, Swift Street to the east, Mission Street to the north, and Moore Creek to the west, with some limited industrial uses such as Raytek that extend west beyond Moore Creek. High technology and local light industrial uses, such as biotechnology and fiberglass manufacturing for surfboards and windsurfing boards, are located in this area. Other major industrial uses in the area include Santa Cruz Biotechnology facilities.

The De Anza Santa Cruz residential community, a primarily senior residential community consisting of 198 units, is separated from the eastern edge of the project site by an approximately 1,900-foot-long, 4- to 5-foot-high masonry block wall and a few stands of trees. Approximately 30 mobile homes are within 50 feet of the wall's westernmost edge. Nine of these homes are oriented toward the project site. Farther east of De Anza Santa Cruz residential community are the neighborhoods of single-family detached homes that surround Natural Bridges State Beach and the West Cliff Drive area, generally located off of Swanton Boulevard, Delaware Avenue, and Swift Street.

Public open space near the project site includes Wilder Ranch State Park to the west and Natural Bridges State Beach to the east. The Bombay greenbelt property is located at the base of the hills to the north of the site across Highway 1. Antonelli Pond, the Moore Creek corridor, and an undeveloped residential property, currently used as a community garden, are located to the northeast of the site. The coastline and Pacific Ocean are immediately south, although no direct public access to the beach below the bluff is available from the project site.

PROJECT SITE LAND USE

The approximately 98-acre project site is generally bordered by the Union Pacific right-of-way and Raytek to the north; a community garden, undeveloped residential property, and the De Anza Santa Cruz residential community to the east; the Pacific Ocean to the south; and agricultural lands within the jurisdiction of Santa Cruz County to the west. UC owns and manages the YLR located in the western portion of the project site. Adjacent to the YLR, the LML complex has been in operation for about 20 years and serves the UCSC Institute of Marine Sciences. In 1999, 54.5 acres of the property east of McAllister Way was acquired by the University to accommodate future needs of the UCSC Institute of Marine Sciences.

Existing development on the 98-acre project site is located primarily west of McAllister Way on the original 16 acres of land owned by the University. However, development does exist east of McAllister Way on a 3-acre site, which is occupied by the 20,000 gsf Seymour Marine Discovery Center and associated parking area, and on an approximately 2.5-acre federal "inholding," which is occupied by the 53,400 gsf, two-story National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) Laboratory and associated parking area.

The LML complex consists of a combination of permanent buildings, temporary and ancillary support structures, and outdoor space, for a net total of 108,604 sf. The core of the existing LML research and education facilities includes the Center for Ocean Health (23,000 gsf), the Seymour Marine Discovery Center (20,000 gsf), the Research Support Building (6,200 gsf), the Younger Building (3,700 gsf), the Service Building (2,300 gsf), Temporary Trailers (3,000 gsf), the California Department of Fish and Game (CDFG) Marine Wildlife Center (20,000 gsf), the Avian Facility (2,160 gsf), Greenhouses (26,844 gsf), and Caretaker Housing (1,400 gsf), as well as an Outdoor Research Yard containing marine mammal pools (17,000 gsf) and a Service/Boat Yard (14,000 gsf). The majority of these facilities are located in the southern portion of the site west of McAllister Way; however, the CDFG Marine Wildlife Center, Avian Facility and the Greenhouses are located in the central portion of the site west of McAllister Way. Onsite facilities house laboratory and research space, office and administrative support space, meeting and teaching rooms, public education space, caretaker housing space, and outdoor staging, storage and research space. Buildings are mostly one-story tall; however, the Center for Ocean Health is two stories in height.

Younger Lagoon Reserve, an approximately 25-acre property that is part of the University of California Natural Reserve System, immediately adjoins the western edge of the developed portion of the project site. The aquatic and upland areas of the YLR provide wildlife value for birds and mammals. The YLR has met the requirements of the UC Reserve System for habitat value and appropriateness for research and educational activities and has been accepted into a select group of properties that are managed by the University Natural Reserve System. Due to the sensitive status of the wetland and upland areas within the YLR, public access is controlled; however, three existing lookout points are designated near the reserve for public viewing.

The undeveloped terrace portion of the site (approximately 54.5 acres) extends in an east-west direction along the coastal bluff approximately 850 feet and extends in a north-south direction approximately 3,000 feet. As noted previously, this area once supported Brussels sprouts production, but has been fallow since 1987 or 1988. Existing vegetation on the undeveloped portion of the site is low-lying and consists primarily of native and non-native grassland and coyote brush habitat. Seasonal wetlands have also been identified on this portion of the site.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP building program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new development of 529,856 square feet (sf) at the Marine Science Campus by about 2020. The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education; 70,000 sf for Outdoor Research Areas; 19,000 sf for Support Facilities; 98,100 sf for Support Housing; 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for Seawater System Expansion. The CLRDP is expected to result in the clustering of Marine Research and Education uses requiring seawater in the lower and middle terraces, although there are no locational restrictions for this use, while other related and support uses would be located in the middle and upper terraces.

The CLRDP also identifies other site improvements including modifying and extending public-access trails and roadways, constructing parking, providing utility services, installing stormwater management systems, expanding the seawater system, developing new public access overlook areas and modifying existing overlooks, installing lighting, installing landscaping and signage, and implementing resource management measures to protect and enhance remaining habitat on the site. While most of the above development activities would occur within the three development areas, some improvements and/or activities would also occur outside of these areas, including: limited parking, utility improvements, stormwater management systems, the intake and discharge portion of an expanded seawater system, public access overlooks, lighting for safety and wayfinding, signage, and resource management activities.

Proposed public access improvements under the CLRDP would provide new and improved public and controlled access trails, overlooks, and coastal access parking onsite. The public access improvements proposed as part of the CLRDP include (a) improvement of the existing public access trails (i.e., widening to a minimum of 5 feet); (b) improvement of an existing overlook (Overlook D)[1] (i.e., provide a closed observation blind) and construction of two new overlooks (Overlooks A and E); (c) construction of new public access trails (i.e., provide for a minimum width of 5 feet, materials include decomposed granite or similar permeable materials); and (d) construction of new public access road, trail, and overlook signage and other media. These improvements are generally identified in Figure 3-9.

The CLRDP would also allow for up to 550 new parking spaces to accommodate parking needs in proportion to the development of new building space, including parking for visitor-oriented facilities such as the Seymour Marine Discovery Center. Of these spaces, 50 would be designated for dual-use (i.e., either campus visitor or public coastal access parking) and 10 would be designated solely for public coastal access parking. Major proposed parking locations are shown in Figure 3-8.

CLRDP policies provide for the creation of a stable urban/rural boundary through onsite utility line limitations; fortification of the urban edge through the protection of adjacent agricultural resources, including maintenance of a 200- to 300-foot setback for new non-residential development (except at and south of the existing CDFG Marine Wildlife Center) and a 500-foot setback for new residential uses from adjacent agricultural uses; siting and designing development to sustain a logical transition from urban to rural and agricultural landscapes; and development of support housing intended solely for use by the University. (See Measures Proposed as Part of the Project below for a more detailed discussion of these policies.)

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program (by about 2010). Amongst the building locations depicted in the CLRDP prototype site plan are specific sites for these five near-term projects (see Figure 3-7). These projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area.

- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area.

[1] Improvement of Overlook D also includes construction of an ADA-accessible path and associated drainage redesign.

- The United States Geological Survey (USGS) Western Coastal and Marine Geology Facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area.
- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area.
- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area. Additionally, this proposed project would include the construction of two new public-access overlooks (Overlooks A and E) and improvement of an existing overlook (Overlook D).

The Marine Research and Education uses above (SORACC, USGS, and Ocean Health) are proposed for construction in the lower or middle terrace for proximity to seawater. Other related support uses (Shared Campus Warehouse and Laydown Facility, 42 Apartment/Townhouse Units) would be constructed in the middle or upper terrace. All of these projects would adhere to the agricultural setbacks noted in the section above.

According to the CLRDP Capital Improvement Program, the public access and recreation improvements described under Entire Development Program, above, would be implemented in the near-term, concurrently with construction of buildings, road improvements, or other improvements in specific areas. Specifically, improvement of the existing onsite public access trails would be completed concurrent with the completion of the first 10 percent of new building floor area contained in the entire development program, whereas the construction of new public access trails would be undertaken concurrent with the completion of any adjacent new building or road improvement. Construction of Overlooks A and E, and improvement of Overlook D (see Figure 3-9), would begin concurrent with the completion of the Center for Ocean Health Phase II facility on the lower terrace. The provision of 10 dedicated and 50 dual-use coastal access parking spaces onsite would be completed within one year of final adoption and Coastal Commission certification of the CLRDP.

MEASURES PROPOSED AS PART OF THE PROJECT

In addition to the following measures addressing land use issues, other measures incorporated into the CLRDP address specific Coastal Act policies. These are discussed separately under Consistency with the California Coastal Act below.

Land use policies within the CLRDP address the creation of a stable urban/rural boundary and provide restrictions on proposed CLRDP support housing. Specifically, the University proposes that "development and uses of the site will be carried out in a manner consistent with the expectation that the campus will provide a stable limit to further westward urban development in this area" (Policy 2.1, Creation of a Stable Urban/Rural Boundary). To accomplish this, the following implementation measures are proposed:

- The University will limit utilities on the campus to the size necessary to serve only the projected needs of the campus (Implementation Measure 2.1.1, Oversizing of Utility Lines Prohibited).

- The University will establish and maintain a one-foot utility prohibition zone at the western edge of the site wherein no new sewer or water utility lines will be allowed (Implementation Measure 2.1.2, Utility Prohibition Zone).

To “fortify the urban edge by minimizing and where feasible avoiding conflicts with adjacent agricultural uses” (Policy 2.2, Fortifying the Urban Edge through the Protection of Adjacent Agricultural Resources), the University proposes the following implementation measures:

- The University will maintain a 300-foot-wide setback in the northern one-third of the site (from the northern property line to the existing CDFG Marine Wildlife Center) to separate new occupied non-residential structures from the site’s western boundary with the Younger Ranch, unless at the time of development the Telone II setback requirement has been reduced, in which case the development setback would comply with the new requirement (and in no case would be less than 200 feet). The University will maintain a 200-foot-wide setback at and south of the CDFG Marine Wildlife Center, where adjacent agricultural land uses are separated from the development by existing topography and an earthen berm. (Implementation Measure 2.2.1, Setback of Non-Residential Uses from Adjacent Agricultural Uses).

- The University will maintain a 500-foot-wide setback to separate new residential development from adjacent agricultural use (Implementation Measure 2.2.2, Setback of Residential Uses from Adjacent Agricultural Uses).

- The University will limit utility capacity as set forth in Implementation Measure 2.1.1 in order to assure that public service and facility expansions and non-agricultural development do not impair agricultural viability (Implementation Measure 2.14.3, Agricultural Setbacks).

The CLRDP also includes the following related provision:

- The University will offer to enter into an indemnification and hold harmless agreement designed to protect adjacent agricultural operators from the economic burden of legal claims arising from normal and reasonable farming operations (Implementation Measure 3.8.2, Agreement to Indemnify and Hold Harmless).

In addition, “development on the Marine Science Campus will be sited and designed to sustain a logical transition from urban landscape to rural and agricultural landscape” (Policy 2.3, Designing for the Urban Edge). To achieve this goal, the following implementation measures are proposed:

- The University will cluster development and preserve open space outside of areas designated for Research and Education Mixed Use in the form of agricultural setbacks, habitat buffers, natural habitats, view corridors, and open space areas. This design approach is intended to reinforce the sense of urban edge created by the canyon topography of YLR, existing development, and the Santa Cruz city limit and urban limit lines (Implementation Measure 2.3.1, Cluster Development).

- The University will maintain at least 30 percent of land area within each of the three development clusters designated for Research and Education Mixed Use (i.e., the lower, middle, and upper terraces) free of impervious surfaces (Implementation Measure 2.3.2, Impervious Coverage).

PROJECT IMPACTS AND MITIGATION MEASURES

IMPACTS ON ESTABLISHED COMMUNITIES

Entire Development Program

Implementation of the CLRDP would not physically divide an established community as no established community exists within the project boundaries, or on either side of the project site. The De Anza Santa Cruz residential community, a primarily senior residential community consisting of 198 units, is separated from the eastern edge of the project site by an approximately 1,900-foot-long, 4- to 5-foot-high masonry block wall and a few stands of trees. As illustrated in Figure 3-6, the CLRDP land use diagram provides for a substantial (approximately 200-foot-wide or more) open space separation between the De Anza Santa Cruz residential community and proposed CLRDP development areas, and the CLRDP prototype site plan (Figure 3-7) shows a separation of approximately 300 feet or more between the De Anza Santa Cruz residential community and proposed buildings.

Near-term Projects

For the same reason noted above, none of the five near-term projects would physically divide an established community.

CONSISTENCY WITH APPLICABLE PLANS AND POLICIES

Entire Development Program

Although the project site is located within the City of Santa Cruz, under Article IX, Section 9 of the California Constitution, University land is exempt from local land use regulation. Therefore, there are no local plans and policies that are applicable to the proposed project site, and consequently the project would not conflict with any such plans or policies or result in a significant impact under CEQA related to such a conflict.[2] Nevertheless, to coordinate implementation of the proposed project with the City's overall planning efforts, and to respond to City goals, where feasible, the University has reviewed the City's General Plan/LCP land use designations and policies for the site. Moreover, as discussed under Consistency with Local Coastal Programs below, the University has consulted and coordinated with the City of Santa Cruz in order to make the CLRDP consistent to the fullest extent feasible with the City's Local Coastal Program (LCP), as required by the Coastal Act.

Based on this review, the proposed project would be in conformance with the City's General Plan. The General Plan Land Use Diagram identifies the site for future urban development with mostly coastal dependent/coastal related uses, low-medium density residential, and coastal recreation uses south of Delaware Avenue Extension, and low-medium density residential uses north of this road. The site was not rezoned after preparation of the most recent General Plan, and therefore, zoning for the site (Exclusive Agriculture and General Industrial) is not consistent with the General Plan land use designations for the site.

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[2] The only plan that "applies" to the site is the UCSC Institute of Marine Sciences Long Marine Laboratory Master Plan, which was prepared in 1993 and covers the approximately 16-acre LML site and the 24-acre YLR. However, that plan will be superseded by the CLRDP, and therefore a consistency evaluation relative to that plan is not necessary.

The CLRDP proposes to locate coastal-dependent and coastal-related uses, including support housing, within specifically designated development zones on the site, and proposes to leave about 66 percent of the site in open space and resource areas. Additionally, public-access trails and overlooks would be constructed and/or improved with the project. The proposed development generally conforms with the land uses envisioned in the City's General Plan, and would be at a much lower development density than what is provided for in the City's General Plan. Therefore the CLRDP would conform to the relevant City plans or policies for the site. After adoption of the CLRDP, the City may wish to amend its General Plan to redesignate the Marine Science Campus site with land use designations appropriate for the University, amend its land use diagram, and rezone the area as a public facility, as was done for the Main Campus.

It should also be noted that under Section 30605 of the Coastal Act, the University must coordinate and consult with local governments in the preparation of CLRDPs so as to be consistent, to the fullest extent feasible, with the appropriate local coastal program. The two LCPs that are applicable to the lands that surround the site, the City of Santa Cruz LCP and the County of Santa Cruz LCP, are discussed at the end of this chapter in the section entitled Consistency with the California Coastal Act.

Near-term Projects

For the same reason noted above for the entire development program, there are no plans that are relevant to the near-term projects.

CONFLICT WITH AN APPLICABLE HCP OR HCCP

Entire Development Program

There is no Habitat Conservation Plan (HCP) or Natural Community Conservation Plan (NCCP) in place that applies to the project site or vicinity. The proposed project would therefore not conflict with any applicable HCP or NCCP and would not result in a significant adverse impact under CEQA with respect to an HCP or NCCP.

Near-term Projects

For the same reason noted above, the near-term projects would not conflict with an HCP or NCCP.

LAND USE COMPATIBILITY

Entire Development Program

According to the fourth significance criterion presented above, an impact on land use would be considered significant if the proposed project conflicted substantially with any local land use regulations or controls that the project is exempt from, such that a significant incompatibility is created with any existing land uses at the periphery of the project site. For example, if by virtue of being inconsistent with a specific buffer requirement in a local coastal plan, a proposed project were to cause incompatible development to be located in close proximity to existing agricultural uses, such an impact might be considered significant if a significant incompatibility between the uses would result.

As shown in Tables 4.9-2 and 4.9-3, below, the proposed project would not conflict with any local land use regulations or controls, including the County of Santa Cruz General Plan/LCP policies and regulations, which apply to the agricultural uses to the west and northwest of the site, and the City of Santa Cruz General Plan/LCP policies and regulations, which apply to the industrial, open space, and residential uses located to the north and east of the site. The proposed Marine Research and Education facilities, Support Housing, Support Facilities, open space and recreational uses, and other proposed land uses necessary to support marine research activities onsite would be wholly compatible with the neighboring uses, and therefore no incompatibility with the existing land uses at the periphery of the site would be created by implementation of the CLRDP. Consistent with the County of Santa Cruz General Plan/LCP (see Table 4.9-2), the CLRDP would provide for an agricultural buffer of at least 200 feet in width between all proposed onsite non-residential uses and any common line shared with the adjacent commercial agricultural operation. The CLRDP would also prohibit extension of sewer and water lines beyond the city limit line, consistent with County General Plan/LCP policy prohibiting placement of water and sewer lines on commercial agricultural lands in the coastal zone.

Near-term Projects

For the same reasons noted above, the near-term projects would not conflict with local land use regulations or controls that the project is exempt from, such that a significant incompatibility is created with any existing land use at the periphery of the campus.

Based on the evaluation above, the proposed CLRDP, including the five near-term projects, would not result in significant land use or planning impacts under CEQA.

CUMULATIVE IMPACTS

ENTIRE DEVELOPMENT PROGRAM

Cumulative land use impacts associated with development of the Westside Study Area (including the Santa Cruz westside study area) by about 2020 are evaluated below. As shown in Figure 4.0-1, the Westside Study Area includes the project site.

The analysis assumes development of remaining undeveloped parcels in the Santa Cruz westside study area according to existing City of Santa Cruz General Plan land use designations (see Figure 4.9-1). Although the general plan is currently being updated, it is assumed that the undeveloped parcels in the Santa Cruz westside study area will be developed at similar intensities and densities as those described under the current general plan. A review of land use maps in the City of Santa Cruz General Plan/LCP indicates that a substantial part of the land east and northeast of the site is designated as Low Density Residential and Low Medium Density Residential. In addition, the lands east of Moore Creek and north of Highway 1 are also designated Low Medium Density Residential. Lands to the west are designated Agriculture/Grazing (see Figure 4.9-1).

The standards of significance that apply to the cumulative impact analysis are the same as those that apply to the project-level analysis. These standards address the potential for cumulative development to (1) physically divide an established community; (2) conflict with an applicable plan use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect; (3) conflict with any applicable habitat conservation plan or natural community conservation plan; or (4) for projects exempt from local land use regulations and controls, substantially conflict with those regulations and controls such that a significant incompatibility is created with any existing land use at the periphery of the campus.

Neither the proposed project nor other development in the study area would physically divide an established community. Therefore there would be no cumulative impact with respect to that standard of significance.

As discussed under Land Use Compatibility, above, the proposed project would be consistent with the pertinent policies of the County of Santa Cruz General Plan/LCP (see Table 4.9-2, below) and with the City of Santa Cruz General Plan/LCP (see Table 4.9-3, below). As such, the project would not introduce any land use onsite that would be incompatible with adjacent land uses, including the agricultural uses to the west and northwest, and the industrial, residential, and open space uses to the east and northeast. The proposed Marine Science Campus would be designed to continue serving as a transition zone between the urbanized City of Santa Cruz to the east and the agricultural operations located on County land to the west of the site. Through clustering of development within three development areas, height restrictions, standard setbacks, and screening landscaping and windbreaks, important visual corridors from offsite vantage points to the ocean, to the adjacent agricultural lands and to the hillsides to the north would be preserved, and about 66 percent of the entire site would be maintained as open space. In addition, specific design features and policies have been included in the CLRDP to minimize adverse effects offsite that may potentially result from implementation of the entire CLRDP development program, including visual change, light and glare, noise, traffic, and overall increase in activity.

Development of the remaining vacant parcels located within the Santa Cruz westside study area, would be guided by the City's General Plan/LCP and would therefore not introduce land uses that could result in incompatible development. Development as anticipated under the City General Plan/LCP, would intensify development near the western entrance to the city, and would contribute to the urbanization of the city adjacent to rural/agricultural uses located within the county. The proposed project would, however, continue to act as a transition zone between the encroaching development to the east and north and the rural/agricultural uses to the west through preservation of open space and important visual corridors, as described above. Therefore there would not be a cumulatively significant impact associated with incompatible development at the city's western city limit adjoining the agricultural lands to the west. See also Section 4.2, Agricultural Resources, of this EIR.

Although there are some plans for the protection of biological resources in the Westside Study Area such as management plans for the Moore Creek corridor, the Antonelli Pond and the YLR (see Section 4.3, Biological Resources), there are no HCPs or NCCPs that are applicable to the City's westside study area. Therefore, the proposed project and other past and reasonably foreseeable development in the project vicinity would not result in a cumulatively significant conflict with any applicable HCP or NCCP.

In conclusion, cumulative development, particularly development of the Santa Cruz westside study area in accordance with the City General Plan/LCP, would intensify development in the area but would not physically divide an established community or conflict with applicable land use regulations. The proposed project would provide a transition zone between urban development to the east and north and rural/agricultural uses to the west. The project in conjunction with other past and reasonably foreseeable future development in the Santa Cruz westside study area would not result in a cumulatively significant land use impact.

NEAR-TERM PROJECTS

For the reasons discussed above for the CLRDP as a whole, none of the near-term projects would result in cumulatively significant land use impacts.

Based on the information presented above, the implementation of the CLRDP and its near-term projects, in conjunction with other development in the vicinity of the Marine Science Campus would not result in cumulatively significant adverse impacts with respect to land use and planning.

CONSISTENCY WITH THE CALIFORNIA COASTAL ACT

As noted earlier in the EIR, the project site is located within the Coastal Zone where all development is governed by the provisions of the California Coastal Act and must be consistent with the policies of that Act. For lands owned by state universities, the Act provides for project-by-project approval by the Coastal Commission or approval by the University under a Commission-approved CLRDP. The University has developed the subject CLRDP for the latter purpose. As required by the Act, the University has consulted and coordinated with the City of Santa Cruz in order to make the CLRDP consistent to the fullest extent feasible with the City's Local Coastal Program (LCP). The University has also consulted with the County of Santa Cruz in order to achieve coordination with relevant provisions of the County's LCP.

This section presents an evaluation of the proposed CLRDP's consistency with the provisions of the California Coastal Act, and with the LCPs of the two neighboring jurisdictions. This evaluation is pertinent to the entire CLRDP development program, as well as the near-term projects, which are a subset of the entire development program. The evaluation has been prepared by UCSC staff with assistance from ESA, the EIR consultant.

COASTAL ACT CONSISTENCY ANALYSIS

The Coastal Act (CA) policies that form the basis for Coastal Commission review of this CLRDP are organized under five general headings within Chapter 3 of the Act. These are: Public Access, Recreation, Marine Environment, Land Resources, and Development. A sixth category, Industrial Development, is not relevant to this CLRDP. Specific Coastal Act policies within the five applicable categories are listed in Table 4.9-1. A summary conclusion about whether the CLRDP would be consistent with the CA policy is also provided in this table. Explanation in support of each of the summary conclusions in Table 4.9-1 is presented below.

This discussion focuses on Coastal Act-related issues identified through the scoping process, meetings with local officials and members of the public, discussions with Coastal Commission staff, and issue identification comments provided by the Coastal Commission in December 2000. All references to "CA section" are to sections of the Coastal Act, Public Resources Code Sections 30000 - 30900.

Public Access and Recreation

Coastal Act policies concerning public access and recreation essentially require the following:

- <u>Provision of Adequate Public Access</u>. Provide public access from the nearest public roadway to the shoreline and along the coast in new development projects except where:

(1) it is inconsistent with public safety or the protection of fragile coastal resources, (2) adequate access exists nearby (CA Sections 30210, 30211, and 30212 (a) (1) & (2)).

- Public Transportation and Parking. Enhance public access to coastal areas by facilitating extension of public transportation and providing adequate parking spaces (CA Sections 30252 and 30212.5).

- Regulation of Public Access. Implement access policies in a manner that takes into account the need to regulate the time, place, and manner of public access depending on the facts and circumstances of the individual case, and that balances the rights of the individual property owner with the public's constitutional right of access (CA Sections 30210, 30214 (a) and (b), and 30253 (1) and (2)).

- Water-Oriented Recreation. Protect and provide opportunities for water-oriented recreational activities, and protect oceanfront land suitable for such activities unless foreseeable demand for such activities is already adequately provided in the area (CA Sections 30210, 30220, 30221, 30223, and 30213).

- Avoidance of Overcrowding and Displacement of Public Access and Recreation. Avoid overcrowding on roadways supporting public access to coastal areas, and avoid overcrowding and displacing public access and recreational facilities by new development or introduction of additional population (CA Sections 30252 and 30211).

- Coastal Resources and Coastal-Dependent Developments. Resolve policy conflicts in a manner most protective of significant coastal resources (CA Section 30007.5). Give priority to coastal-dependent developments over other developments on or near the shoreline (CA Section 30255). ("Coastal-dependent development or use" is one that requires a site on, or adjacent to, the sea to be able to function at all (CA Section 30101).)

Project consistency with each of these CA policy areas is discussed below. See Table 4.9-1 for complete policy language and a policy-by-policy consistency evaluation. Other relevant CA sections are also cited in the text as appropriate.

Provision of Adequate Public Access

Historic Access to the Project Site. As discussed in Section 4.14, with the exception of the Seymour Center, which is a recreational and educational destination that attracts visitors, there are no formally established access trails or recreational uses on the project site. As discussed in more detail below, however, the Coastal Commission has designated public-access trails through the terrace portion of the site and to overlook areas on an interim basis. There is observational and anecdotal evidence that portions of the terrace, including informal trails, overlooks, and McAllister Way, have been used in the past (and currently) by the general public for walking, bicycling, and viewing the ocean. In addition, surfers have been observed occasionally climbing down the bluff face to the beach below, although land owner permission for this use has not been granted and no established accessway to the sea exists. There are no formally designated trails that currently exist onsite. No formal access to the beach below has been provided to date due to safety concerns and the potential harm to biological resources at the YLR.

According to the CLRDP, access to the YLR area has historically been very limited. Access to the Younger Lagoon Reserve Beach from up or down the coast is made difficult by a rocky intertidal shelf area with promontories extending into the ocean at either end of the beach. Previous analysis by the University of California, submitted in conjunction with submittal of interim access plans, concluded that unsupervised access to Younger Lagoon Reserve would directly lead to the loss of habitat and the loss of biodiversity.[3]

The Coastal Commission approved an *Interim Access Plan for the Marine Science Campus* and a *Younger Lagoon Beach/Wetland Area Management and Access Plan* in 2000 and 2001, respectively, in response to a condition of approval for the Ocean Health building. These plans reaffirmed access controls to YLR, designated public access trails through the terrace portion of the site and to overlook areas, and confirmed the significance of the docent-led tours by the Seymour Marine Discovery Center as important public access elements. As articulated in these access plans, the majority of the site is open to free public access during daylight hours on dedicated trails, including some 800 feet of bluff-top trail at the southern edge of the site. While access to research laboratory areas and the Younger Lagoon Reserve area is controlled, access and interpretation of these areas is provided through docent-guided tour programs of the Seymour Center.[4]

Public Access under Proposed CLRDP. The CLRDP would supersede the *Interim Access Plan for the Marine Science Campus* and the *Younger Lagoon Beach/Wetland Area Management and Access Plan*. The CLRDP states an intention, however, to carry forward the principles and concepts embodied in those interim plans.[5]

The building program under the CLRDP would introduce new structures on the project site, which is currently used for public access on an occasional and informal basis. Structures are not proposed in the areas of this informal use, however, and a suite of onsite access and recreational opportunities would be provided for public use. The CLRDP provides for an expanded and improved bluff-top trail system, three improved and two new overlooks into the YLR and along the ocean-facing southern bluff-top, docent-led tours of terrace and bluff, marine educational programs for school groups and others, visitor parking, and informational signage throughout. The plan would add and enhance overlooks adjacent to the bluff areas where the best views of the ocean and lagoon are available. Therefore, the CLRDP would establish improved public visual and recreational access in the area.

The CLRDP includes Public Access designations for onsite trail segments and overlooks according to the type of access afforded to the public, based on the location of the trail segment or overlook with respect to its proximity to environmentally sensitive areas or Resource Protection Areas on the site. Trails are primarily classified as Public Trails, Controlled Public Access Areas, and Controlled Access Trails. The Public Trails designation is intended to provide pedestrian and bicycle access to scenic areas of the campus where access restrictions are not needed for protection of public resources, public safety, or for maintaining security of sensitive University activity. The Controlled Public Access Areas designation is intended to provide pedestrian and bicycle access to scenic and coastal resource areas of the campus consistent with safety, security, and protection of sensitive coastal resources and research areas; only authorized personnel, authorized visitors, and members of the public on a supervised tour would have access to these areas. The Controlled Access Trails designation is intended to provide pedestrian access to overlooks located in controlled access areas of campus; only authorized personnel or members of the public on a supervised tour would have access to these trail segments.

3 *UC Santa Cruz Marine Science Campus Draft Coastal Long Range Development Plan*, July 2003, page II-18.
4 Ibid.
5 Ibid.

These CLRDP provisions for preserving, enhancing, and augmenting public access and recreational opportunities on the site provide responses consistent with CA Sections 30210, 30211, and 30212 (a).

Nearby Public Access. Continuous public access is available along almost the entire coastal frontage of the city of Santa Cruz. Along this frontage, there are 15 primary coastal access points within the city. Four of these access points are west of Lighthouse Point and include staircases at Lighthouse Field, Almar Avenue, Fair Avenue, and Natural Bridges. The Natural Bridges access provides general beach access approximately 800 yards east of the Marine Science Campus and serves as an entry point for the surfing break offshore Younger Beach. West of the Marine Science Campus, access includes Wilder Ranch State Park and other beaches in northern Santa Cruz County. This level of access could reasonably be considered adequate under the provisions of CA Section 30212 (a) (2).

Public Transportation and Parking

The CLRDP would allow for up to 550 new parking spaces to accommodate parking needs in proportion to the development of new building space, including parking for visitor-oriented facilities such as the Seymour Marine Discovery Center. Of these spaces, 50 would be designated for dual use (i.e., either campus visitor or public coast access parking) and 10 would be designated solely for public coastal access parking. The CLRDP prototype site plan (Figure 3-7 in Section 3, Project Description) indicates that parking facilities would be located throughout the development areas in the upper, middle, and lower terrace portions of the site. The number and location of parking spaces have been determined mainly based on parking ratios specified by the UCSC Main Campus Long Range Development Plan (LRDP) for various land uses.

To promote the use of University and public transit, CLRDP policies provide that the University would work with the Santa Cruz Metropolitan Transit District to increase the frequency of transit service to points adjacent to the campus (as warranted by demand), would provide expanded UCSC Transportation and Parking Services (TAPS) shuttle service between the main UCSC Main Campus and the Marine Science Campus (as warranted by demand), and would develop onsite transit infrastructure, such as covered transit stops. Additionally, the University would provide services and programs to promote the use of carpools and vanpools. (For more detailed information, see Section 4.15, Transportation/Traffic, of this EIR.) These provisions for public transportation and parking are consistent with the relevant CA policies.

Regulation of Public Access

Public access is currently restricted or prohibited in certain areas of the site. According to the University, these restrictions are based on three considerations: protection of sensitive resources, public safety, and security of sensitive research activities and equipment. Access into the YLR, which is a coastal-dependent research and educational area, is restricted for the protection of fragile coastal resources. Public access down the southern bluff/cliff is prohibited for public safety reasons, and access to some of the LML facilities is restricted for security reasons. Public access to these areas would continue to be restricted or prohibited under the CLRDP. Under the CLRDP, public access to some additional areas on the project site would be restricted. These additional areas include resource protection and buffer areas that the University believes need protection from human intrusion to protect biological resources present in these areas, and new marine research facilities that require access restrictions necessary for protection and security of sensitive research activities.

Regulation of public access to the YLR and other sensitive resource areas, as proposed by the CLRDP, appears to be reasonable, necessary, and consistent with CA Sections 30210, 30212 (a) (1), 30214 (a), and 30007.5 concerning protection of sensitive resource areas from potentially damaging public access. The proposed regulation of public access to sensitive marine research activities and equipment is consistent with CA Sections 30255, 30101, and Section 30214 (a) and (b) concerning the priority of coastal-dependent development and the need to regulate time, place, and manner of public access. The proposed restriction on public access down the steep cliffs is consistent with provisions of CA Sections 30210 and 30212 (a), which seek to maintain public safety, as well as with the Section 30214 (a) provisions concerning need for regulation of public access.

Water-Oriented Recreation

As discussed above, the CLRDP would provide for maximum public access to the coastal resources on the campus to the extent consistent with public safety, fragile habitats, implementation of the education and research missions of the campus, and security of sensitive facilities and research activities. Public access down the face of the coastal bluff to the beach below (e.g., for surfers) would be restricted due to public safety concerns, as would access to the YLR and other sensitive terrace wetland areas. The CLRDP would provide other water-oriented recreational opportunities, including trails, overlooks, and docent-led tours. About 8,000 sf of sports courts for use by onsite residents, researchers, and students, as well as public access to onsite trails, overlooks, and docent-led tours would be available in most parts of the site and also in nearby locations (e.g., Wilder Ranch State Park, Natural Bridges State Beach). These CLRDP provisions would be consistent with CA Sections 30210, 30213, 30220, 30221, and 30222 regarding public access and recreational opportunities, including water-oriented recreation.

Avoidance of Overcrowding and Displacement of Public Access and Recreation

Another potential issue under Coastal Act access and recreation policies (CA Sections 30252, 30211) involves the possible crowding of local facilities and displacement of established coastal access and recreational opportunities that may result from development and introduction of additional population in an area. However, as noted earlier, there has not been any formally established access or recreational use of this site. With the exception of informal access and overlooks, there are no parks, beaches, or other recreational spaces present on the site. There is some observational and anecdotal evidence that portions of the terrace have been used for walking and bicycling, but this use would not be displaced. Rather, it would be formalized through establishment of an improved network of trails onsite. Therefore there would not be any displacement of established coastal access and recreational facilities as a result of the CLRDP.

At full development under the CLRDP, the projected campus population would be about 1,313 persons, of whom about 150 persons would reside on the site, and the remainder would be daytime population. It is reasonable to assume that users of the campus would be engaged in education, research, and related activities, and would place a limited demand on local recreational facilities during the course of the day. Furthermore, the CLRDP includes onsite sports courts for use by the campus population which would diminish pressure on other nearby recreational facilities. In addition, the new campus population would also have access to recreational facilities on the UCSC Main Campus. For all of these reasons, the potential for overcrowding local coastal recreation facilities can reasonably be expected to be very low.

CA Section 30252 relates, in part, to the potential for project-related traffic to result in congestion on streets and parking areas such that public access to coastal areas or scenic vistas is adversely affected. With respect to the proposed CLRDP, this would relate to Highway 1 and West Cliff Drive, which currently provide access to the Wilder Ranch State Park and Natural Bridges State Beach, respectively. Generally speaking, project-related traffic volumes would be relatively low on West Cliff Drive (since drivers are mainly expected to use Highway 1 and other routes to travel to and from the site) and would not significantly affect intersections along Highway 1 in the immediate vicinity of the project site. (See Section 4.15, Transportation/Traffic, for details regarding trip distribution and resulting impacts on key intersections.) Furthermore, most of the new population would travel to and from the site on weekdays, when traffic to the area beaches and parks would generally be low. In addition, the CLRDP provides for onsite support housing, onsite dining facilities adjacent to work areas, and the enhancement of the shuttle service between the project site and the Main Campus, all of which would also serve to minimize vehicle trips. Consequently, the project would not significantly affect traffic flow in the vicinity of the site, and would add relatively small volumes of traffic to access roads leading to adjacent recreational areas such as the Wilder Ranch State Park and Natural Bridges State Beach. As a result, it would not preclude or otherwise adversely affect recreational use of these coastal facilities.

The CLRDP would allow for up to 98,100 sf of support housing space for visiting and resident scientists and students at the Marine Science Campus. The support housing would assist in reducing travel demand by allowing scientists and students who are working at the site to live there as well. CLRDP policies and implementation measures would also assist in reducing congestion by limiting the number of single-occupant vehicles traveling to the campus, controlling parking to discourage auto trips, promoting alternative transportation use (i.e., walking, bicycling, and using transit), and providing for transportation demand management measures.

For the above-noted reasons, the CLRDP would be consistent with CA Sections 30211 and 30252, regarding avoidance of overcrowding and displacement of public access and recreation.

Marine Environment

The California Coastal Act includes policies that require the protection and restoration of marine resources within the coastal zone. The California Coastal Commission implements these policies through decisions affecting the use of land and water resources. The Commission's certification of this CLRDP must be based upon findings of consistency with relevant Coastal Act policies. Broadly described, the key Coastal Act issues in this area involve:

- Wetlands and ESHAs. The location and extent of wetlands and environmentally sensitive habitat areas (ESHAs), and allowable uses in and adjacent to those areas (CA Sections 30121, 30107.5, 30230, 30231, 30233, and 30240). (CA Section 30107.5 defines "environmentally sensitive area" as "any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.")

- Protection from Hazardous Substances. Protection of sensitive coastal resources such as wetlands, ESHAs, and nearshore ocean waters from spillage or contamination by hazardous substances (CA Sections 30230, 30231, and 30232).

- Sensitive Species. Protection of sensitive species and their habitat (CA Sections 30230, 30231, 30233, 30240, and 30212 (a)(1)).
- Hydrology and Water Quality. Protection of site hydrology and water quality values (CA Sections 30230, 30231, 30233, and 30240).

Wetlands and ESHAs

The locations and extent of wetlands and ESHAs on the site were determined based upon extensive field studies and analysis by the Huffman-Broadway Group, and technical reports prepared by Ecosystems West Consulting Group. Two previous wetland delineations, conducted in 1993 and 1997, provided background information. The methodology for this investigation was established in consultation with the Coastal Commission's senior biologist in light of past wetland delineation practices under the Coastal Act. As the investigation proceeded, input from Commission staff and interested groups and individuals resulted in adjustments in methodology and additional study. The work spanned 28 months beginning in April 2001. The final report is summarized in Section 4.4, Biological Resources.

The Huffman-Broadway investigation identified and delineated ten wetland areas totaling approximately 18.05 acres that may meet Coastal Act standards as wetlands. These are: the 10.94-acre Younger Lagoon Reserve; a 0.11-acre drainage ditch near the northwestern boundary, designated W1; a combined 4.49-acre seasonal drainage swale on the northwest side of the terrace (W2) and associated seasonal wetland, just north of Delaware Avenue (W3); a 0.42-acre seasonal drainage swale in the eastern portion of the terrace (W4); a 1.99-acre seasonal pond on the lower terrace (W5); a 0.09-acre isolated wetland complex on the northwestern upper terrace (W6); a 43-square-foot depression in the northeastern corner of the property (W7), and a 0.01-acre low-lying seasonal wetland just south of Delaware Avenue immediately adjacent to the project site entry road (W8).

The smallest wetland (W7, a 43-square-foot depression in the northeastern corner of the site) does not have the characteristics necessary for ESHA classification under CA Section 30107.5. W7 is isolated from other wetlands on the upper terrace and is believed to be an anthropogenic feature created by demolition activities in the abandoned farm complex. This small area is not occupied by rare, threatened, or endangered species; is not a rare or especially valuable habitat in its own right; and is not known to have a special nature or role in the ecosystem. Therefore, it is not considered an ESHA. This wetland is subject to Coastal Act wetland protection policies, however, since hydrologic and soil criteria are met. Refer to Section 4.4, Biological Resources.

During the wetland investigation, an issue was raised concerning the significance of the widespread occurrence on site of false willow (*Baccharis douglasii)*, a species sometimes classified as a hydrophyte (wetland indicator) species. The preponderance of such a species can provide presumptive evidence of wetland conditions under Coastal Act practice. The Huffman-Broadway investigation probed this issue with extensive sampling of soils and plant material, hydrologic monitoring, and analysis. As a result, some areas of this plant's occurrence were determined to be wetlands and met the Coastal Act definition of wetland (CA Section 30121); these areas included W2, W3, and W4. Elsewhere, the hydrologic conditions necessary for this plant to function as a hydrophyte were not found to be present, and therefore Huffman concluded that these areas did not meet the Coastal Act definition of wetland (CA Section 30121). Refer to Section 4.4, Biological Resources.

Under the CLRDP, ESHA and wetland areas, with the exception noted below, are in the Resource Protection land use category, where allowed uses are limited to habitat creation, enhancement, and restoration; scientific and educational study; nature study; other resource-dependent activities; existing trails; and existing underground utility corridors, seawater systems on the coastal cliff area, stormwater discharge facilities, and repair and maintenance activities necessary to ensure their proper function. CLRDP policies and implementation measures tailored to specific resource types make provision for their preservation and enhancement. These allowed uses, policies, and implementation measures are derived from, and consistent with, the controlling provisions of CA Sections 30233, 30230, 30231, and 30240. The CLRDP would provide for onsite resource protection through incorporation of resource protection buffers into site design, through application of plan policies affecting Resource Protection areas, and through adherence to policies contained within the "Marine Science Campus Resource Management Plan" (Resource Management Plan). The Resource Management Plan was developed as part of the CLRDP to help ensure that open space areas outside of the three development zones are maintained, and that onsite terrace wetlands and special-status species, as well as the wildlife corridor on the upper terrace, are protected and enhanced. The Resource Management Plan also provides for the long-term maintenance of the terrace species and habitats. For a detailed discussion of these CLRDP policies and implementation measures, refer to Section 4.4, Biological Resources.

As part of a habitat restoration and enhancement program, the University would consolidate, expand, and enhance wetlands (excepting W7) in the northern part of the site; protect and enhance seasonal wetlands in accordance with the management measures contained in the CLRDP; establish a corridor for unimpaired movement of wildlife along the northern boundary of the site; protect special status species through protection and enhancement of wetland habitats and grassland/scrub-grassland habitats outside of development zones and through other management measures contained in the CLRDP; develop and manage trails; manage natural areas (i.e., areas other than those designated Research and Education Mixed Use); protect water quality through the Stormwater Concept Plan contained in the CLRDP; and develop long-term maintenance and monitoring programs for terrace habitats.

The CLRDP specifies that diking, filling, or dredging of open coastal waters and wetlands would be allowed only for specified purposes and only where there is no feasible less environmentally damaging alternative and where feasible mitigation measures have been provided. Such diking, filling, or dredging would be limited to (1) incidental public service purposes (e.g., burying cables and pipes), (2) restoration purposes, and (3) nature study or similar resource-dependent activities. Any diking, filling, or dredging of existing wetlands must maintain or enhance the functional capacity of the wetlands. Fill of W7, the small non-ESHA wetland depression near the northeast corner of the site, would take place as part of the restoration activities conducted under the Resource Management Plan (CLRDP Appendix B).

Protection of ESHAs would be addressed through buffering provisions as well as development restrictions that regulate the location of windows, lighting, access, signage, and noise-generating equipment. Noise sources would be required to be located at least 100 feet from the ESHA located in the terrace area. Noise from human activity in the terrace area would not be allowed to exceed 60 dBA CNEL, as measured at the boundary of the YLR. The buffer provisions reflect Huffman-Broadway recommendations that were based on site-specific factors concerning the various resources to be protected. This EIR concludes that the buffer provisions, combined with the wetland enhancement proposed as part of the project, would ensure that the project's impacts on wetlands and ESHAs would be less than significant (see Section 4.4, Biological Resources).

The CLRDP would allow filling of W7, the small wetland area that Huffman-Broadway found lacking in ESHA characteristics. The CLRDP wetlands restoration program provides for consolidation and enhancement of wetlands on the western side of the upper terrace development area, and concentration of active uses on the eastern side, south of the wildlife corridor. The latter area contains no wetlands other than the small wetland depression, which is in an area designated Research and Education Mixed Use. The CLRDP proposes that a laydown yard be located at the site of this wetland, with workshops and storage providing support necessary to the marine research activities. This wetland is extremely isolated. With location of the laydown yard in this area, restoration and enhancement activities would go forward on the higher value western upper terrace, establishing a stable and logical boundary between wetlands and the developed areas.

Under CA Section 30233(b)(7), filling of wetlands for restoration purposes is allowed when no feasible, less environmentally damaging mitigation measures are available. Under court interpretation of the Coastal Act, filling of ESHA is not allowed at all. The Shared Campus Warehouse and Laydown Facility would be a relatively large facility (37,500 sf of shared warehouse and 70,000 sf of shared laydown yard) providing workshops, storage, and laydown yard that the plan indicates are necessary to support the marine research activities. During the course of preparing the CLRDP, other potential locations for this facility on the site were found to be more environmentally damaging. (These potential locations included (1) the west side of the middle terrace, which was rejected as too close to the YLR and more appropriate for coastal-dependent uses, while warehouse/laydown is coastal-related but not coastal-dependent; and (2) the east side of the middle terrace, which has open space habitat values related to the seasonal pond.) See Chapter 5, Alternatives, of this EIR for more discussion of alternative sites. It is reasonable to conclude that the project site provides no feasible, less environmentally damaging location for this facility. As noted, Huffman-Broadway found W7 lacking in ESHA characteristics. Any impact from its filling would be limited to impacts on wetland values and would be offset by the restoration program. Considering these factors, the proposed designation of the W7 area as Research and Education Mixed Use and the likely fill of W7 in the context of a wetlands restoration program are consistent with the relevant Coastal Act policies.

Protection from Hazardous Substances

CA Section 30232 requires protection against the spillage of crude oil, gas petroleum products, or hazardous substances in relation to any development or transportation of such materials. It also requires that effective containment and cleanup facilities be provided and procedures implemented for accidental spills that do occur.

The California Office of Emergency Services administers the California Emergency Response Plan, which coordinates emergency services provided by federal, state, and local governmental agencies and private persons. Response to hazardous materials releases is one part of this plan. As required under the Hazardous Materials Release Response Inventory Law of 1985, UCSC has submitted a hazardous material Business Plan for the Marine Science Campus. One of the required components of the Business Plan is an emergency response plan. Additionally, UCSC has prepared several plans to facilitate the response to the accidental release of hazardous substances (see Section 4.7, Hazards and Hazardous Materials, for details).

CLRDP Implementation Measures 3.10.1 and 3.10.2 provide that the University, through its Office of Environmental Health & Safety, would manage hazardous materials in compliance with applicable federal and state regulations, and that appropriate features would be installed around the perimeter of the maintenance and laydown areas to keep any accidental spills from entering the drainage system or groundwater. In addition, UCSC's continuing compliance with all federal and state laws regulating petroleum products and hazardous materials results in any impacts associated with the release of hazardous materials being considered less than significant (see Section 4.7, Hazards and Hazardous Materials).

With the exception of the one small non-ESHA wetland in the upper terrace, described above, all ESHAs and wetland areas onsite (including the YLR and sensitive terrace wetlands) are located within the CLRDP Resource Protection land use category, where allowed uses are limited and CLRDP policies and implementation measures are tailored to specific resource types, to ensure long-term preservation and enhancement. In addition, to maintain biological productivity and quality of coastal waters when providing public works facilities, the University would only install new underground utility lines and facilities through wetlands and riparian corridors when there is no feasible less environmentally damaging alternative and where feasible mitigation measures have been provided to minimize adverse effects. Furthermore, the University would operate the seawater system in a manner that would protect against spillage and that would sustain the biological productivity and quality of coastal waters, streams, and wetlands. As discussed in Section 4.8, Hydrology and Water Quality, water quality of seawater discharge is subject to regulation by the Regional Water Quality Control Board. Monitoring data have indicated that water quality for existing seawater discharge has remained within permit limits.

For these reasons, the CLRDP would be consistent with CA Sections 30230, 30231, and 30232 as they relate to protection from hazardous substances.

Sensitive Species

The proposed project would provide for protection of sensitive species and their habitat through incorporation of resource protection buffers into site design, and through adherence to policies contained within the Resource Management Plan. The Resource Management Plan was developed as part of the CLRDP to help ensure that open space areas outside of the three development areas are maintained, and that onsite terrace wetlands and special-status species, as well as the wildlife corridor on the upper terrace, are protected and enhanced. The Resource Management Plan also provides for the long-term maintenance of the terrace species and habitats.

To further protect and enhance sensitive habitats, such as the YLR and the seasonal terrace wetlands, public access to the site would be limited to the designated public trails, roadways, and overlooks. All proposed development adjacent to the YLR would have height restrictions and would be limited to marine research and education uses such as laboratories and offices. Additionally, protection of biological productivity of sensitive habitat adjacent to development areas would be addressed through standards requiring shielding and/or downward direction of light so that the light source would not be visible.

As discussed above, ESHAs would be protected through buffering provisions as well as development restrictions that regulate the location of windows, lighting, access, signage, and noise-generating equipment. Noise sources would be required to be located at least 100 feet from the ESHA located in the terrace area. To protect the YLR, noise from human activity in the terrace area would not be allowed to exceed 60 dBA CNEL, as measured at the boundary of the YLR.

The CLRDP's Resource Management Plan identifies the northern and western margins of the site as areas that should be maintained for wildlife movement. The movement is thought to involve linkages between Moore Creek and Antonelli Pond, on adjacent property to the east, and Younger Lagoon. The movement area would include portions of wetlands W1 and W2 along the northwestern side of the site, as well as non-native grassland, coyote brush scrub-grassland, and ruderal areas along the northern edge. The CLRDP would establish a continuous corridor for movement of wildlife along the northern and western perimeter, maintaining the linkage across the property to Younger Lagoon. The wildlife corridor would be 20 feet wide with an adjacent 80-foot-wide landscaped buffer to the south (for a total of 100 feet). The corridor would connect to wetlands W1, W2, and W6, which would in turn connect with the YLR to create a continuous corridor for wildlife movement across the site. The approximately 50 feet of railroad right of way between the property line and the tracks would increase the functional width of the corridor. An additional area located on the western side of the upper terrace, while not designated as a "wildlife corridor," would serve to connect the YLR to the designated corridor on the northern perimeter and Antonelli Pond beyond.

The CLRDP contains measures to increase screening and protection of wildlife that use the corridor for movement across the property. Conditions for wildlife movement would be enhanced by eliminating highly invasive weeds, planting native species to provide better protective cover and visual screening for wildlife than existing vegetation, controlling access by humans and non-native animals, and other enhancement measures in accordance with the management measures contained in the CLRDP.

For these reasons, the CLRDP would be consistent with CA Sections 30230, 30231, 30233, 30340, and 30212 (a)(1) as they relate to protection of sensitive species and their habitat.

Hydrology and Water Quality

Protection of the quality of adjacent coastal waters would be carried out under the CLRDP principally through a Stormwater Concept Plan that was developed as part of the project and incorporated into CLRDP hydrology and water quality policies. The plan calls for the correction of various existing drainage deficiencies on the campus (e.g., deposition of eroded soil on the bluffs of the YLR adjacent to the National Marine Fisheries Service (NMFS) facility) and protection of sensitive habitat areas through a combination of natural drainage systems (Best Management Practices) and engineered filtration systems. CLRDP policies and implementation measures provide that the University would (a) design the stormwater system using a combination of good site planning, source control and treatment best management practices, and engineered stormwater treatment systems; (b) ensure that stormwater quality meets the requirements set forth in "California's Management Measures for Polluted Runoff" (State Water Resources Control Board and California Coastal Commission, 2000); (c) maintain pre-development peak flows during the 2-, 5-, 10-, and 25-year storm event in the post-development drainage system; (d) maintain groundwater recharge at pre-development levels to the maximum extent practicable; (e) ensure that seawater pumped onto the site is contained and discharged; (f) ensure that any water used for landscape irrigation does not cause significant erosion and that any chemicals used for fertilizer and weed and pest control do not enter habitat areas or the ocean in sufficient concentrations to harm wildlife or habitat; (g) maintain and monitor stormwater to provide control of water quality and quantity; and (h) improve existing discharge points as necessary to correct existing erosion and/or other problems and to ensure that discharge facilities that drain into the YLR are designed to accommodate the 100-year storm event.

For these reasons, the CLRDP would be consistent with CA Sections 30230, 30231, 30233, and 30240 as they relate to hydrology and water quality.

Land Resources

The California Coastal Act includes policies that require the protection and restoration of land resources within the coastal zone. Broadly described, the key Coastal Act issues in this area involve:

- Agriculture and Urban Boundary. Protection of agriculture, including maintaining the maximum amount of prime agricultural land in agricultural production, minimizing conflicts between urban and agricultural uses through application of several standards, and limiting conversions to areas where the viability of existing agricultural use is already severely limited or where conversion would complete a logical, viable neighborhood and contribute to a stable limit to urban development (CA Sections 30241 and 30242).

- Archaeological and Paleontological Resources. Mitigation of impacts on archeological and paleontological resources (CA Section 30244).

These issues are discussed below. Other policies in the Coastal Act's Land Resources group deal with protection of ESHA (CA Sections 30240 (a) and (b)), and were addressed above in connection with the marine environment.

Agriculture and Urban Boundary

The California Coastal Act defines prime agricultural land as having Capability Class I or II soils, or soils with a Storie Index between 80 and 100, or a livestock carrying capacity of one animal unit (1,000 pounds of grazing animal) per acre, or a gross annual crop income of $200 or more. The capability classes and Storie Index are discussed in Section 4.2, Agricultural Resources. As indicated by the information in that section, the capability class and Storie Index data for the project site do not meet the CA definition of prime land. The land has not been used for grazing so the carrying capacity does not apply, and the land has not produced crops since the late 1980s so specific site gross income is not available. The majority of the project site has been fallow for over 15 years and about 5.5 acres located near the southern portion of the site where the LML complex is located have been fallow since 1977. Agricultural uses no longer exist on the project site except for about one-third acre of greenhouse space that is still in agricultural use by an organic seed propagation company.

Based on this information, it is reasonable to conclude that the project would not convert existing prime agricultural land as defined by the Coastal Act. To the extent that this site may still be considered "agricultural" as a matter of land use designation, conversion would not conflict with the Coastal Act. As discussed in Section 4.2, Agricultural Resources, the entire site has been mapped as Unique Farmland that contains lesser quality soils. The only prime soils are 26 acres of Elkhorn sandy loam #132, and these soils are considered prime only if they are irrigated. Any site development would be on Unique Farmland; however, the Unique Farmland designation may not be valid without irrigation water and, according to the Land Evaluation and Site Assessment (LESA) evaluation, the agricultural resource on the site is not considered significant. Furthermore, the analysis shows that renewed agriculture on this site is not viable for a number of reasons. These factors suggest that conversion of portions of the site to non-agricultural use would be consistent with CA Section 30242.

Where conversion of agricultural lands is proposed in a local coastal program and the viability of existing agriculture is an issue under Section 30241, the Coastal Act provides specific guidance on how to analyze the viability issue. This guidance, under Section 30241.5, is not applicable to this project because there are no existing agricultural uses at this site except for the greenhouses and because the policy applies to local coastal programs. Even so, the EIR includes an agricultural economic viability analysis of the project site in Appendix D. This analysis shows that the viability of any potential agricultural use on the project site is severely limited by conflicts with urban uses and other factors, and reintroduction of agriculture to the site is not feasible.

As stated above, agricultural use currently exists only on about one-third acre (about 13,860 square feet of space) in seven greenhouses on the project site. These greenhouses are part of a complex of 11 greenhouses that were constructed on the middle terrace west of McAllister Way between 1986 and 1988 under permit from the Coastal Commission. The original greenhouse complex was authorized under Permit 3-83-76-A3 for an aquaculture facility to grow algae in mass culture and process it for sale. The permit noted aquaculture as a form of agriculture and also made a finding that the 8.3 acres of the aquaculture facility site were Class I prime agricultural land that must be protected and the site made available for row-crop use again upon project termination. The permit anticipated the operation of the facility for 15 years, and that period is now over. Since the original authorization, with three permit amendments approved by the Coastal Commission, the uses housed in the greenhouses have changed to a bioassay facility, an avian facility, and an organic seed propagation facility.

With the implementation of the CLRDP, the greenhouse complex and this remaining agricultural use on the Marine Science Campus would be removed. Furthermore, the construction of new facilities would foreclose the possibility of using the greenhouse complex land for row crops. The conversion of the greenhouse complex area to marine research uses would not conflict with CA Section 30241, however. Several changes have occurred since the permit was issued that preclude the possibility of replacing the greenhouse agriculture or restoring the underlying land to agricultural use. At the time that the permit was issued, the land at the greenhouse site was classified as Class 1 prime farmland by the Coastal Commission because of the site soils (Elkhorn sandy loam series #132) and because an irrigation water source was present. (According to the California Department of Conservation, this soil series is considered prime only if irrigated.) The onsite well collapsed in 1988 and this change caused the site to be designated Class III non-prime. Furthermore, at the time that the permit was issued, there was active agriculture elsewhere on the terrace and future use of the greenhouse complex area west of McAllister Way for row crops seemed viable. However, no part of the terrace site has been farmed since 1988. In addition, as the agricultural viability study of the terrace area east of McAllister Way shows, agriculture is not viable on those lands because of the lack of a water supply source onsite, high crop production costs including the cost of obtaining water from other sources, other economic factors such as lower revenues, and constraints on agriculture from proximity to on-campus and off-campus (De Anza Santa Cruz residential community) urban uses. All of these constraints also apply to the greenhouse complex site west of McAllister Way, which has an additional drawback in that it is an isolated piece of land that is not contiguous with other agricultural land and is separated from the rest of the terrace site by existing development to the north and McAllister Way to the east. For all of these reasons, renewed agricultural use of this land is not viable. Furthermore, conversion of this area to campus uses would not conflict with CA Section 30241 because the new facilities proposed at this site would complete a logical and viable neighborhood of marine research-related uses (the existing LML is to the south of this land and the CDFG Marine Wildlife Center is immediately north) and contribute to the establishment of a stable limit to urban development. Also this area, which is immediately adjacent to the coast, would be more appropriately used if placed under coastal-dependent uses such as marine research.

Under CA Sections 30241(a) and (b), urban-agricultural conflicts are to be minimized by: (i) establishing stable boundaries separating the two kinds of uses, using buffer areas where necessary; (ii) assuring that public service and facility expansions and nonagricultural development do not impair agricultural viability through increased assessment costs or degraded air and water quality; and (iii) assuring that development adjacent to prime agricultural lands does not diminish their productivity. The policy of establishing stable urban-rural boundaries is also reflected in two other Coastal Act policies not part of the Land Resources group. Section 30250 calls for location of certain development in close proximity to existing developed areas. Section 30254 imposes limitations on the expansion of public works facilities and formation of special districts.

Younger Ranch lands adjacent to the project site and the nearby Wilder Ranch lands are in active production of Brussels sprouts and other crops and are classified as prime agricultural land. They thus constitute the kind of lands that fall within the scope of CA Section 30241 policies. Under the CLRDP, restrictions on proposed residential uses and agricultural setbacks would be incorporated into site design. The proposed residential uses would be limited to sites in the middle and upper terrace development areas, with the exception of the caretakers' housing, which would continue to be in the lower terrace development area. The CLRDP proposes that no occupied non-residential structures be constructed within a 300-foot-wide setback in the upper portion of the site, and that no residential use be located within a 500-foot-wide setback from adjacent agricultural use. Additionally, the residential uses would be developed solely for use by the Marine Science Campus and would not be sold or leased to other private parties. The CLRDP also includes a policy that requires the campus to offer to implement a hold harmless indemnification agreement in favor of the owners and operators of the Younger Ranch. Mitigation measures recommended in Section 4.2, Agricultural Resources, of this EIR would call upon the University to install a landscaped fence to preclude access to the Younger Ranch. Thus, while the project site is adjacent to prime agricultural lands, development setbacks and other measures incorporated into the CLRDP and other mitigation measures included in this EIR would minimize potential for conflict that could diminish productivity of the prime lands.

CA Section 30241(e) states that maximum amount of agricultural land shall be maintained by assuring that public service and facility expansions and non-agricultural development do not impair agricultural viability either through increased assessment costs or degraded air and water quality. The CLRDP would require that utility infrastructure be sized only to serve the site and that a utility prohibition zone be created at the western edge of the site. The project site and adjoining agricultural land to the west are in different jurisdictions (the project site is in the City of Santa Cruz, while the adjoining Younger Ranch is in Santa Cruz County), and therefore have separate water supplies and are subject to separate taxation regimes; these factors would assist in stabilizing and maintaining the urban-rural boundary. The CLRDP contains policies and implementation measures to protect air and water quality, and this EIR recommends mitigation measures to assist in protecting these resources (see Section 4.3, Air Quality, and Section 4.8, Hydrology and Water Quality).

The Coastal Act policies also concern subdivision of land that could adversely affect prime farmland. The project would involve no division of land. Long-range planning and commitment of the site to research and education use by the University of California can be expected to eliminate the risk of adverse impacts from land divisions.

Most of the project site is separated from adjacent agricultural uses by the Younger Lagoon Reserve, as noted above. Within the northern portion of the site, where the topographic separation diminishes, a band of wetlands running north-south effectively establishes a limit to development in that area. On the three landward sides of the area to be developed, substantial development already exists. On the east is the De Anza Santa Cruz residential community with 198 dwelling units. On the west are the existing facilities of LML as well as state and federal marine research facilities. On the north are several light industrial facilities. To the northeast, the Pacific Shores Apartments, recently approved by the Coastal Commission, are now under construction. Thus development under the CLRDP will essentially constitute infill of the area near the city limit. The support housing component of the plan locates most residential uses on portions of the site closest to existing residential uses at the De Anza Santa Cruz residential community. Given these characteristics of the CLRDP and the setting, and by terminating development at the permanently protected open space of the YLR and the city limit line, the CLRDP can be expected to have the effect of completing a logical and viable neighborhood as well as establishing a stable limit to urban development.

The CLRDP includes other provisions that would contribute to minimizing urban/agricultural conflicts, stabilizing the urban-rural boundary, and minimizing conflict with adjacent agriculture. These are (1) requiring that utility infrastructure to be sized to serve only the projected needs of the campus; (2) creating a utility prohibition zone at the western edge of the site to prohibit utility lines from being extended offsite; (3) adopting mitigation measures, including landscaping and fencing to screen agricultural operations; and (4) implementing an indemnification agreement to shield adjacent agricultural operations from the effects of adverse claims and lawsuits. For a detailed discussion of these CLRDP policies and implementation measures, refer to Table 4.9-1.

It should be noted that this analysis reflects significant changed circumstances since the Coastal Commission's 1981 certification of the City of Santa Cruz Local Coastal Program (LCP). At that time, the Commission treated the eastern boundary of the Terrace Point property as the urban limit and deferred certification of the LCP for that area partly because the City proposed to allow development there. Terrace Point was in agricultural production then, and most of the development to the north, northeast, within LML, and on the NMFS property had not yet occurred. The significant changes since that time include the addition of substantial new development to the area, the end of farming at Terrace Point 15 or more years ago and long before the University's acquisition of the 54.5-acre terrace site, and the demonstrated infeasibility of renewed farming. These changes support the establishment of the urban boundary along the line which is the western boundary of the Marine Science Campus and the City of Santa Cruz.

For the foregoing reasons, the CLRDP provides for development consistent with CA Sections 30241 and 30242.

Archaeological and Paleontological Resources

The Coastal Act requires that where development would adversely affect archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required (CA Section 30244). As discussed in detail in Section 4.5, Cultural Resources, of this EIR, there are no known cultural resources onsite. The mast of the shipwreck *La Feliz*, which has not been evaluated for its historic significance, is wedged into the bluff face adjacent to the southern edge of the site. The project would not have any direct or indirect impact on the mast and would maintain the informational sign above the mast's location. To ensure that any unknown onsite archaeological or paleontological resource is conserved and protected, the CLRDP (Implementation Measure 3.9.1) would require that, should resources be disclosed during construction, all activity that could damage or destroy the resources would be temporarily suspended until the site has been examined by a qualified archaeologist and mitigation measures have been developed. The implementation measure specifies that such mitigation measures would require review by the State Office of Historic Preservation and approved by the Executive Director of the California Coastal Commission. Furthermore, Section 4.5, Cultural Resources, recommends additional measures to protect any previously undiscovered human burial sites of Native American groups. These measures would comply with the Coastal Commission's archaeological guidelines (December 16, 1981, page 90), which specify procedures to be followed if a cultural resource is found during construction. (These guidelines are available for review at the UCSC Environmental Assessment Group (EAG) office at 515 Swift Street, Santa Cruz.)

Development

The California Coastal Act also includes specific policies to guide development within the coastal zone. Broadly described, the key Coastal Act issues in this area involve:

- Location of new residential, industrial or commercial development within, contiguous with, or in close proximity to existing developed areas that can accommodate it or in areas with adequate public services (CA Section 30250(a)).
- Priority to coastal-dependent development over other developments on or near the shoreline, and accommodation of coastal-related developments within reasonable proximity to the coastal-dependent uses they support (CA Section 30255).
- Protection of scenic and visual qualities (CA Section 30251).
- Parking, circulation, and transit (CA Section 30252 (1), (3), (4)).
- Geologic considerations (CA Section 30253 (1) and (2)).
- Energy consumption (CA Section 30253 (4)).
- Services and utilities (CA Sections 30241(e), 30250, and 30254).
- Air quality (CA Sections 30253 (3) and 30241(e)).

Other policies in the Coastal Act's Development policy group deal with establishing a stable urban limit. That issue was covered in the discussion of protecting agriculture, above.

Location of Development

The CLRDP is a plan for an educational facility, which is not one of the three types of development expressly addressed by CA Section 30250(a). Although the CLRDP covers some support housing, under regulations adopted by the Coastal Commission residential use is included as part of an "educational facility." 14 CCR Section 13502 (c) provides this definition:

> " 'Educational Facility' means any real property owned or controlled by the University of California or the California State University and Colleges, and used or contemplated for use for educational, residential, recreational or research purposes related to the purposes of the University of California or the California State University and Colleges. This shall not

include properties owned by the state university or college systems held for investment purposes only."

Although CA Section 30250(a) may not be expressly applicable to this project, the expanded campus contemplated by the CLRDP does meet the terms of Section 30250(a) regarding location of new development. The project site is contiguous with, and in close proximity to, existing developed areas of the City of Santa Cruz. In addition, the CLRDP includes policies and implementation measures that address preserving and maintaining of sensitive onsite habitats, species, and scenic resources, as well as minimizing conflict with adjacent agricultural uses, to help ensure that no significant adverse effects on coastal resources would occur. The project would not involve land division, and therefore the portion of CA Section 30250(a) regarding division of land outside existing developed areas would not apply. (See also Sections 4.1 (Aesthetics), 4.2 (Agricultural Resources), and 4.4 (Biological Resources) of this EIR.)

Development Priorities

As described in the CLRDP, the core research and educational facilities and uses proposed for the site must have access to fresh seawater and to outdoor research areas. As a result, these uses must be sited adjacent to the sea, where they can be served by the University's seawater system. These uses are thus consistent with the Coastal Act definition of "coastal-dependent" development. ("Coastal-dependent development or use" is one that requires a site on, or adjacent to, the sea to be able to function at all (CA Section 30101).) This conclusion is consistent with prior Coastal Commission actions involving this campus. In approving the first LML building in 1976, the Coastal Commission found that the laboratory was a coastal-dependent facility. The Commission's 2000 issue identification comments on preliminary CLRDP proposals recognized the high priority nature of the marine research facilities.

Under the CLRDP, the coastal-dependent research and educational facilities have been sited in the middle and lower terrace development areas in portions of the site closest to the shoreline, consistent with Section 30255. Support facilities, such as meeting and conference rooms, a dining facility, an auditorium laydown and storage facilities, and support housing, are to be located on the eastern portion of the middle and upper terrace, relatively distant from the shoreline.

Some EIR scoping comments questioned the appropriateness of locating support facilities anywhere on the site. Considered in isolation from other components of the campus, these facilities might not qualify for priority siting under the Coastal Act. However, the CLRDP program description and project objectives explain the importance of the support facilities to the efficient and effective operation of the coastal-dependent research and educational programs. Meeting and dining facilities would provide places where scientists, faculty, and students can meet with their peers to discuss ideas and set agendas for future research. An auditorium suitable for lectures and presentations would enhance the conduct of meetings and workshops. A warehouse, technical shops, and laydown yard would enable outfitting of ocean-going vessels, staging for scientific field work, and maintenance, repair, and development of instrumentation and equipment. Proximity of technical support facilities such as these and the attendant technical staff to the end-user science staff and laboratories at the Marine Science Campus is central to the efficiency and efficacy of field marine research endeavors. This is an identified need and objective of the CLRDP. These land uses are all dependent on, and needed by, the proposed coastal-dependent uses at the Marine Science Campus. They are therefore consistent with the Coastal Act definition of "coastal-related" development and, under Section 30255, are appropriately located on the site. ("Coastal-related development" means any use that is dependent on a coastal-dependent development or use (CA Section 30101.3).)

The Coastal Act consistency of locating support housing on campus has also been questioned. As described in Section 3, Project Description, of this EIR, the CLRDP program identifies the need for up to: (a) 82,000 sf of support housing (up to 80 apartment/townhouse units) for visiting scientists, graduate students, and new faculty and researchers; (b) 2,500 sf of overnight accommodations (up to 10 visitor rooms) for visiting scientists; (c) 12,000 sf of group housing (up to 30 rooms) to accommodate visiting teachers and students during summer residence programs and teacher immersion programs; and (d) 1,600 sf of caretaker quarters (up to two units) that would replace the existing caretaker units on the site. Support housing would provide onsite accommodations for visiting and resident Marine Science Campus scientists and students, whose learning experience or research requires or would be enhanced by their presence on the campus during extended hours. All of the support housing on the site would provide for temporary housing needs of the Marine Science Campus. No long-term or for-sale housing is anticipated. The CLRDP describes the onsite work-live capabilities provided by the support housing as integral to achieving the adopted educational and research goals. The housing would be available to scientists and degree candidates who would benefit from ready access to laboratories, classrooms, aquaria, and marine mammal pools at all hours, students and K-12 teachers involved in immersion research and education programs, visiting scientists, young people attending short-term educational programs, and certain others whose learning experience would be enhanced by presence on the campus during extended hours.

The provision of support housing at research institutes is well recognized as an important component of the overall program. Bodega Marine Laboratory has 65 accommodations for visiting scientists, faculty, and graduate students.[6] Friday Harbor Marine Laboratory of the University of Washington houses 140 scientists and students onsite.[7] A communication from the director of the Wrigley Institute for Environmental Studies, located on Santa Catalina Island, explained: "[T]he creation of a marine lab science community is in large part a reason for the success of these labs. When the community is an ever-changing cross-section of the people in our fields, it leads to the coincidental co-location of people from different disciplines and approaches....The shared experience of the marine lab also leads them to be advocates for it in the future."[8] Because the proposed support housing is needed by the proposed coastal-dependent uses, this housing is consistent with the Coastal Act definition of "coastal-related" development in CA Section 30101.3, and under Section 30255, is appropriately located in the middle and upper terrace development areas, relatively distant from the shoreline but within reasonable proximity of the coastal-dependent marine research facilities.

Considering the integral role of the support uses to be established on the campus and their location in portions of the site most removed from the shoreline, the proposed land uses are consistent with applicable Coastal Act policy.

6 Personal communication from Dr. Paul Siri, Assistant Director, Bodega Marine Laboratory, University of California, Davis.
7 Personal communication from Dennis Willows, Director, Friday Harbor Marine Laboratory, University of Washington.
8 Personal communication from Dr. Anthony F. Michaels, Director, Wrigley Institute for Environmental Studies, University of Southern California.

Protection of Scenic and Visual Qualities

CA Section 30251, which provides for the protection of scenic and visual qualities, states that the scenic and visual quality of coastal areas shall be considered and protected as a resource of public importance. The section further states that development shall protect views to and along the ocean to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, to protect highly scenic areas, and, where feasible, to restore and enhance visual quality in visually degraded areas.

The following points relate to the provisions of CA Section 30251:

- Impacts to Public Vistas. The project site is visible from a number of public important vantage points, including portions of Highway 1 to the immediate north and west, Wilder Ranch State Park to the west, Santa Cruz's greenbelt Bombay property (part of the City of Santa Cruz greenbelt) farther north, and Natural Bridges State Beach to the east. Views of the site are also available from adjacent areas, including from Delaware Avenue, near the De Anza Santa Cruz residential community, from the Shaffer Road extension adjacent to the community garden, and from the ocean immediately south.

  To protect and maintain scenic and visual resources found on the project site, the CLRDP has delineated development areas and open space areas on the Land Use Diagram (see Project Description, Figure 3-6) to allow significant view corridors to the ocean and surrounding hillsides and coastline to remain open. The Scenic and Visual Qualities Element of the CLRDP states that "the University will site new development at the Marine Science Campus in a manner that protects the public view corridors depicted in (CLRDP) Figure 3.16" (Policy 4.1, Protection of Scenic Corridors). This EIR concludes that implementation of the proposed CLRDP development program would not have a significant adverse effect on scenic vistas. (See Section 4.1, Aesthetics.)

- Minimizing of Alteration of Natural Land Forms. The CLRDP coastal bluff protection policy (Policy 3.7) states that the University will not allow new development that creates or contributes to erosion or geologic instability or substantially alters natural landforms along the bluffs, and that the University will expand coastal bluff vegetation in accordance with the management measures of the CLRDP. This EIR does not identify any significant impacts related to grading or other alteration of landforms. (See Section 4.6, Geology and Soils.)

- Visual Compatibility with Character of Surrounding Areas. The CLRDP specifies that "the University will design new development at the Marine Science Campus to be compatible with surrounding uses" (Policy 4.2, Protection of Scenic Quality). The CLRDP includes design guidelines as well as prototype plans and building studies to guide decisions on siting, materials, height, clustering, and other aspects of design. Buildings on the Marine Science Campus would generally be two stories (36 feet) tall. In the middle terrace, buildings would be stepped down in height as they near the eastern, northern, and western edges of the development zone so that building segments along these edges are limited to 30 feet. This EIR concludes that the height and scale of proposed development would be compatible with the height and scale of existing development at the site, and that the final design of future buildings would reflect the coastal architectural style prescribed in the CLRDP design guidelines, policies, and implementation measures. In addition, the establishment of open space areas and the proposed landscaping would create a graduated visual link to adjacent rural areas. As such, implementation of the proposed CLRDP development program would not cause significant adverse impacts on the visual character or quality of the site and its surroundings. (See Section 4.1, Aesthetics.)

- Impact on Highly Scenic Areas. If an area is designated as a "highly scenic area," development must be subordinate to the character of the setting. There has been no such designation affecting the project site. Under the Caltrans Scenic Highway Program, the segment of Highway 1 from the Santa Cruz County line north to Half Moon Bay (in San Mateo County) has been designated a California scenic highway. The portion of Highway 1 located just north of the project site is not an officially designated state scenic highway. The Santa Cruz County General Plan and Local Coastal Program, however, identifies Highway 1 from San Mateo County to Monterey County as a Scenic Road, and states that "the public vistas from [scenic] roads shall be afforded the highest level of protection" (Policy 5.10.10, Designation of Scenic Roads). As noted above, the CLRDP contains provisions to protect important view corridors. This EIR concludes that the new buildings in the middle and lower terrace development areas would be visible to motorists traveling eastbound along Highway 1, but that agricultural fields would continue to dominate the foreground views, with the ocean horizon remaining visually accessible in the background. Moreover, the new development would be similar in height to the existing LML buildings and would be designed to blend visually with the coastal rural landscape through appropriate use of exterior materials, colors, landscaping, and architectural treatments. For these reasons, this EIR concludes that the project would not have a significant adverse effect on this scenic vista. (See Section 4.1, Aesthetics.)

In summary, the project would maintain important view corridors to the ocean and hillsides and would cluster development into three onsite development areas. Open space and natural resource areas would be preserved throughout the site through the designation of resource protection and open space areas and buffers. The project would limit building heights and would step down the heights of buildings located on the perimeter of the development zones. The project includes policies, implementation measures, and design guidelines to ensure visual continuity at the site through appropriate use of exterior materials, building setbacks and lengths, lighting controls, and the undergrounding of utilities. Although the new development would be visible from offsite public viewpoints, the buildings would not significantly affect any scenic vistas. For a detailed discussion, refer to Section 4.1, Aesthetics.

Parking, Circulation, and Transit

CA Section 30252 (Items (1), (3), and (4)) concerns parking, circulation, and transit. The existing parking spaces associated with the Seymour Marine Recovery Center (76 spaces north of the center and nine spaces west of the center) would continue to be available to the public for parking. In addition, 50 spaces would be designated for dual use (i.e., either campus visitor or public coast access parking) and 10 would be designated solely for public coastal access parking (controlled through the use of permits and time-limited parking). Based on analysis of estimated parking demand (see Section 4.15, Transportation/Traffic), this amount of parking is anticipated to be adequate. Additionally, to promote alternative modes of transportation to the site, including bicycle use, walking, and public transit, the Marine Science Campus would allow bikes on the designated trails and would work with the City of Santa Cruz to identify and designate bike routes to the site. The designated trails would also facilitate non-automobile circulation within the site. The Marine Science Campus would work with the Santa Cruz Metropolitan Transit District to extend and increase its services to the site, and would also develop onsite transit infrastructure, such as covered transit stops. For a detailed discussion of these CLRDP policies and implementation measures, refer to Section 4.15, Transportation/Traffic. These CLRDP provisions would achieve consistency with the relevant requirements of CA Section 30252.

Geologic Considerations

CA Section 30253 (Items (1) and (2)) imposes the following requirements on new development. It must minimize risk to life and property in areas of high geologic hazard and assure stability and structural integrity. Also, new development must not contribute significantly to erosion, geologic instability, or destruction of the site and must not result in the need for structural protection of the bluff.

The proposed CLRDP development would not be located on a geologic unit that is geologically unstable or one that would become unstable because of the project. Erosion of coastal bluffs is an issue of concern in the developed parts of Santa Cruz County. The bluffs adjacent to the Younger Lagoon Reserve are not undergoing active wave erosion, however, and with respect to mechanical weathering are considered stable in their current configuration. The CLRDP provides that a setback of 100 feet would be maintained for buildings and facilities along the coastal bluff in recognition of potential geologic coastal cliff erosion and to minimize the risk to human life. Development in the cliff setback would be limited to existing streets, existing and proposed pedestrian and bicycle pathways, and infrastructure improvements such as seawater system facilities that are consistent with the CLRDP. Additionally, to protect the bluffs from increased erosion and the need for protective devices, native coastal bluff vegetation would be expanded and enhanced onto the terrace, and no development that would require a coastal protection structure (e.g., seawall) would be allowed on the lower terrace. This EIR concludes that the proposed setbacks would reduce the potential for hazards related to construction on an unstable geologic unit such as an eroding sea cliff or a bluff overlying a sea cave, and would ensure that impacts related to geologic instability and seismically-induced slope failure are less than significant. For a detailed discussion, refer to Section 4.6, Geology and Soils. The above-noted provisions would ensure consistency with the relevant requirements of CA Section 30253.

Energy

CA Section 30253 (4) requires that new development minimize energy consumption and vehicle miles traveled. The project would implement energy conservation and trip reduction measures and would incorporate sustainable practices into the design and construction of new development. Additionally, the project includes transportation demand management practices to encourage the use of alternative modes of travel, such as bicycles and public transportation. The CLRDP also provides for onsite dining facilities that would reduce vehicle trips and associated air emissions. For a detailed discussion of these CLRDP policies and implementation measures, refer to Section 4.15, Transportation/Traffic. These provisions would achieve consistency with CA Section 30253 (4).

Services and Utilities

CLRDP policies would require the University to size all utility and service lines serving the project site consistent with, and limited to, that needed to accommodate the proposed building program. In addition, the seawater system would be maintained and expanded consistent with the proposed building program. Furthermore, a utility prohibition zone, in which the extension of sewer and water utilities outside the City of Santa Cruz is precluded, would be established at the western edge of the project site. See additional discussion of these policies as they relate to agricultural resource protection and new development. These provisions of the CLRDP are consistent with the relevant provisions of Sections 30254 and 30241 (d) of the Coastal Act, concerning public services and utilities.

Air Quality

Air quality would be addressed through CLRDP policies requiring use of sustainable practices where feasible in the design and construction of new facilities, and through land use and transportation controls. To reduce travel demand to the site, the CLRDP includes onsite support housing for researchers and staff, transportation demand management measures, promotion of alternative forms of transportation, such as walking, bicycle use, and transit use, and parking controls. The CLRDP also provides onsite dining facilities to reduce vehicle trips. The project would be consistent with Monterey Bay Unified Air Pollution Control District standards and the *2000 Air Quality Management Plan for Monterey Bay* (Association of Monterey Bay Area Governments, 2003). See further discussion in Section 4.3, Air Quality, of this EIR.

CONSISTENCY WITH LOCAL COASTAL PROGRAMS

As discussed earlier, there is no local coastal program that is applicable to the project site, and the site is identified in the City's LCP as an "area of deferred certification." However, under Section 30605 of the Coastal Act, the University has consulted and coordinated with the City of Santa Cruz in order to make the CLRDP consistent to the fullest extent feasible with the City's LCP. The University has also consulted with the County of Santa Cruz in order to achieve coordination with relevant provisions of the County's LCP. (See further discussion in the introductory paragraph to Consistency with the California Coastal Act above.)

County of Santa Cruz General Plan/LCP

All pertinent LCP policies in the County's General Plan/LCP are listed in Table 4.9-2, below. LCP policies are marked with asterisks. As shown in the table, the proposed project would be consistent with all pertinent LCP policies.

City of Santa Cruz General Plan/LCP

Project consistency with pertinent General Plan/LCP policies is evaluated in Table 4.9-3, at the end of this section. LCP policies are marked with asterisks. As shown in Table 4.9-3, the proposed project would be consistent with all pertinent LCP policies.

TABLE 4.9-1
CLRDP CONSISTENCY WITH CALIFORNIA COASTAL ACT

Section	Policy Number	Policy	Project Consistency
Public Access	30210	In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all people consistent with public safety needs and the need to protect public rights of private property owners, and natural resource areas from overuse.	Consistent. The CLRDP would provide for maximum public access to the coastal resources on the campus to the extent consistent with public safety, fragile habitats, implementation of the education and research missions of the campus, and security of sensitive facilities and research activities. The University would provide 10 dedicated and 50 dual-use coastal access parking spaces onsite, construct two new and improve three existing overlooks, establish a formal network of new and improved trails, and would provide for docent-led tours and educational programs.
	30211	Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.	Consistent. A blufftop public trail system would be established. Due to existing public safety and security concerns and need to protect sensitive coastal habitat, no formal access to the beach below the bluff or through YLR would be provided. However, five overlooks providing visual access to the ocean, terrace wetlands, and YLR would be provided onsite.
	30212 (a)	Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where: (1) It is inconsistent with public safety, military security needs, or the protection of fragile coastal resources, (2) Adequate access exists nearby, or (3) Agriculture would be adversely affected. Dedicated accessway shall not be required to be opened to public use until a public agency or private association agrees to accept responsibility for maintenance and liability of the accessway.	Consistent (see above).
	30212 (c)	Nothing in this division shall restrict public access nor shall it excuse performance of duties and responsibilities of public agencies which are required by Sections 66478.1 to 66478.14, inclusive, of the Government Code and by Section 4 of Article X of the California.	Consistent. Public access would be provided to the extent consistent with safety, security, and resource protection, as described above. A formal network of public trails, controlled trails, and informational signage would be provided onsite, as would overlooks providing visual access to the beach, terrace wetlands, and the YLR.
	30212.5	Wherever appropriate and feasible, public facilities, including parking areas or facilities, shall be distributed throughout an area so as to mitigate against the impacts, social and otherwise, of overcrowding or overuse by the public of any single area.	Consistent. Up to 550 parking spaces within several designated parking areas (see Figure 3-8) would be provided, as demand warrants. Ten of these spaces would be dedicated for coastal access parking, whereas 50 would be dual-use spaces (i.e., visitors to Seymour Center and public accessing site resources). To encourage the use of alternative modes of travel to the site, such as bicycle and transit use, walking, and carpools and vanpools, demand-management measures, such as provision of secured bicycle racks, pedestrian crossings, onsite transit infrastructure, and expanded TAPS shuttle service would be implemented.

TABLE 4.9-1 (Continued)
CLRDP CONSISTENCY WITH CALIFORNIA COASTAL ACT

Section	Policy Number	Policy	Project Consistency
Public Access (cont.)	30213	Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided. Developments providing public recreational opportunities are preferred.	Consistent. The CLRDP would provide a formal network of public access trails, overlooks, and docent-led tours and educational programs, as described above.
	30214 (a)	The public access policies of this article shall be implemented in a manner that takes into account the need to regulate the time, place and manner of public access depending on the facts and circumstances in each case including, but not limited to, the following: (1) Topographic and geologic site characteristics. (2) The capacity of the site to sustain use and at what level of intensity. (3) The appropriateness of limiting public access to the right to pass and repass depending on such factors as the fragility of the natural resources in the area and the proximity of the access area to adjacent residential uses. (4) The need to provide for the management of access areas so as to protect the privacy of adjacent property owners and to protect the aesthetic values of the area by providing for the collection of litter.	Consistent. Although the CLRDP includes some restrictions on public access to existing and new marine research facilities and sensitive habitat areas, such as the YLR and terrace wetlands, public access to onsite trails, overlooks, and docent-led tours would be available in most parts of the site and also in nearby locations (e.g., Wilder Ranch State Park, Natural Bridges State Beach).
	30214 (b)	It is the intent of the Legislature that the public access policies of this article be carried out in a reasonable manner that considers the equities and that balances the rights of the individual property owner with the public's constitutional right of access pursuant to Section 4 of Article X of the California Constitution. Nothing in this section or any amendment thereto shall be construed as a limitation on the rights guaranteed to the public under Section 4 of Article X of the California Constitution.	Consistent. The improvement of public trails and three existing overlooks, as well as construction of two new overlooks, which would provide visual access to the beach, terrace wetlands, and the YLR, would begin concurrent with construction of any new building onsite. The dedication of coastal access parking would occur within one year of Coastal Commission approval of the CLRDP. Proposed sports courts would be constructed concurrent with construction of Support Housing.
	30214 (c)	In carrying out the public access policies of this article, the commission and any other responsible public agency shall consider and encourage the utilization of innovative access management techniques, including, but not limited to, agreements with private organizations which would minimize management costs and encourage the use of volunteer programs.	Consistent. The CLRDP provides for docent-led tours and educational programs as part of the Seymour Center's mission statement, which would allow for controlled access to many restricted sensitive habitats. An onsite caretaker would provide 24-hour security and management of the research buildings and the public access trails and overlooks.
	30252	The location and amount of new development should maintain and enhance public access to the coast by: (1) facilitating the provision or extension of transit service, (2) providing commercial facilities within or adjoining residential development or in other areas that will minimize the use of coastal access roads, (3) providing non-automobile circulation within the development,	Consistent. The CLRDP includes transportation demand management measures to encourage alternative modes of transportation to the site. Ten dedicated and 50 dual-use coastal access parking spaces would be provided, and carpool and vanpools, as well as bicycle use and walking would be encouraged through provision of secure bike racks, transit infrastructure, allowing bicycles on public trails, and extended SCMTD and

TABLE 4.9-1 (Continued)
CLRDP CONSISTENCY WITH CALIFORNIA COASTAL ACT

Section	Policy Number	Policy	Project Consistency
Public Access (cont.)	30252 (cont.)	(4) providing adequate parking facilities or providing substitute means of serving the development with public transportation, (5) assuring the potential for public transit for high intensity uses such as high-rise office buildings, and by (6) assuring the recreational needs of new residents will not overload nearby coastal recreation areas by correlating the amount of development with local park acquisition and development plans with the provision of onsite recreational facilities to serve the new development.	TAPS shuttle service to the site. Sports courts would be provided for the residents, employees, and students accessing the site on a daily basis, and a "campus common" would be located within the middle terrace development area. In addition, provision of Support Facilities (such as the food service space) would reduce the need for onsite researchers, staff, and students to leave the campus for meals.
Recreation	30220	Coast areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.	Consistent. Although public access down the face of the coastal bluff to the beach below would be restricted, as would access to the YLR and other sensitive terrace wetland areas, the CLRDP would provide ample recreational opportunities, including trails, overlooks, and docent-led tours.
	30221	Oceanfront land suitable for recreational use shall be protected for recreational use and development unless present and foreseeable future demand for public or commercial recreational activities that could be accommodated on the property is already adequately provided for in the area.	Blufftop trails viewing areas overlooking the ocean and wetlands, and docent-led tours would be provided, augmenting coastal recreational opportunities available at nearby locations such as Wilder Ranch State Park, Natural Bridges State Beach
	30222	The use of private lands suitable for visitor-serving commercial recreational facilities designed to enhance public opportunities for coastal recreation shall have priority over private residential, general industrial, or general commercial development, but not over agriculture or coastal-dependent industry.	Consistent. Although no private lands are involved in this project, the proposed uses of the University's land include high priority public access and recreational uses as well as coastal-dependent and coastal-related uses, which are also high priority uses under the Coastal Act.
Marine Environment	30230	Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.	Consistent. With the exception of one small non-ESHA wetland in the upper terrace, described above, all ESHA and wetland areas onsite (including YLR and sensitive terrace wetlands) are located within the CLRDP Resource Protection land use category, where allowed uses are limited and CLRDP policies and implementation measures are tailored to specific resource types, to ensure long-term preservation and enhancement. CLRDP policies would protect the quality and biological productivity of coastal waters, as described below.
	30231	The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of wastewater discharges and entrainment, controlling runoff, preventing depletion of groundwater supplies and	Consistent. See above discussion. In addition, the CLRDP would provide necessary protections by including sensitive aquatic areas in resource protection and buffer ones where allowed uses are only those consistent with protection and enhancement of the aquatic and biological values. In addition, policies and implementation measures and a Stormwater Concept Plan make specific provision for controlling runoff, handling of wastewater discharge,

TABLE 4.9-1 (Continued)
CLRDP CONSISTENCY WITH CALIFORNIA COASTAL ACT

Section	Policy Number	Policy	Project Consistency
Marine Environment (cont.)	30231 (cont.)	substantial interference with surface water flow, encouraging wastewater reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.	maintaining and enhancing natural vegetation buffers, and other measures to protect water quality, maintain hydrology, maintain biological productivity, and restore wetland habitat.
	30232	Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.	Consistent. The CLRDP includes policies intended to protect against contamination caused by the use of hazardous substances. The University, through its Office of Environmental Health & Safety, would manage hazardous materials in compliance with applicable federal and state regulations, and appropriate features would be installed around the perimeter of the maintenance and laydown areas to ensure accidental spills do not enter the drainage system or groundwater.
	30233 (a)	The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following: (1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities. (2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps. (3) In wetland areas only, entrance channels for new and expanded boating facilities…The size of a the wetland area used for boating facilities, including berthing space, turning basins, necessary navigation channels, and any necessary support service facilities shall not exceed 25 percent of the degraded wetland. (4) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities. (5) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines. (6) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas. (7) Restoration purposes. (8) Nature study, aquaculture, or similar resource dependent activities.	Consistent. No wetlands onsite would be filled, with the exception of one small, isolated, non-ESHA wetland located in the upper terrace. This fill would function as part of an overall restoration program, allowing consolidation of development on the eastern side of upper terrace, and enabling consolidation, restoration, and enhancement of wetland and other habitat areas on the western side of upper terrace. Other wetland areas, including YLR and seasonal wetlands on the terrace would be protected from development as well as intrusive human disturbance. The CLRDP would provide for some restoration and research activities, consistent with section 30233. As provided in subsection (5), installation of new underground utility lines and facilities through wetlands and riparian corridors would be allowed only when there is no feasible less environmentally damaging alternative and where feasible mitigation measures have been provided to minimize adverse effects.

TABLE 4.9-1 (Continued)
CLRDP CONSISTENCY WITH CALIFORNIA COASTAL ACT

Section	Policy Number	Policy	Project Consistency
Marine Environment (cont.)	30233 (c)	In addition to the other provisions of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain the functional capacity of the wetland or estuary.	Consistent (see section 30233 (a), above).
	30233 (d)	Erosion control and flood control facilities constructed on watercourses can impede the movement of sediment and nutrients which would otherwise be carried by storm runoff into coastal waters. To facilitate the continued delivery of these sediments to the littoral zone, whenever feasible, the material removed from these facilities may be placed at appropriate points on the shoreline in accordance with other applicable provisions of this division, where feasible mitigation measures have been provided to minimize adverse environmental effects. Aspects that shall be considered before issuing a coastal development permit for such purposes are the method of placement, time of year of placement, and sensitivity of the placement area.	Consistent. The CLRDP does not include development that would impede movement of sediment or nutrients to nearby beaches or coastal waters. The CLRDP does not require placement of sand on the shoreline.
Marine Environment (cont.)	30235	Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion, and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply. Existing marine structures causing water stagnation contributing to pollution problems and fish kills should be phased out or upgraded where feasible.	Consistent. According to CLRDP policy, no new development that creates or contributes to erosion or geologic instability or that substantially alters natural landforms along the bluffs would be allowed. In addition, coastal bluff vegetation would be expanded in accordance with the management measures of the CLRDP.
Land Resources	30240 (a)	Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.	Consistent. All ESHAs are encompassed within the Resource Protection designation, where no development or other disruption of habitat values would be allowed. (See comments to section 30233, above.) ESHAS are protected by buffers and development restrictions, such as regulating the location of windows, lighting, access, signage, and noise-generating equipment to avoid disruption of habitat values for buildings located adjacent to such habitats, as well as controlled physical access.
	30240 (b)	Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.	Consistent. The CLRDP would designate buffer areas around all ESHAs. Within the Resource Protection Buffer designation, uses would be restricted to those that do not significantly disrupt, and are compatible with continuance of ESHA biological values. The CLRDP would establish a buffered wildlife corridor across the northern perimeter of the project site, providing connectivity for biologically important areas to the east (Moore Creek Corridor, Antonelli Pond) and west (onsite enhanced wetlands and YLR).

TABLE 4.9-1 (Continued)
CLRDP CONSISTENCY WITH CALIFORNIA COASTAL ACT

Section	Policy Number	Policy	Project Consistency
Land Resources (cont.)	30241	The maximum amount of prime agricultural land shall be maintained in agricultural production to assure the protection of the areas' agricultural economy, and conflicts shall be minimized between agricultural and urban land uses through all of the following: (a) By establishing stable boundaries separating urban and rural areas, including, where necessary, clearly defined buffer areas to minimize conflicts between agricultural and urban land uses. (b) By limiting conversions of agricultural lands around the periphery of urban areas to the lands where the viability of existing agricultural use is already severely limited by conflicts with urban uses or where the conversion of the lands would complete a logical and viable neighborhood and contribute to the establishment of a stable limit to urban development. (c) By permitting the conversion of agricultural land surrounded by urban uses where the conversion of the land would be consistent with Section 30250. (d) By developing available lands not suited for agriculture prior to the conversion of agricultural lands. (e) By assuring the public service and facility expansions and nonagricultural development do not impair agricultural viability, either through increased assessment costs or degraded air and water quality. (f) By assuring that all divisions of prime agricultural lands, except those conversions approved pursuant to subdivision (b), and all development adjacent to prime agricultural lands shall not diminish the productivity of such prime agricultural lands.	Consistent. Agricultural use of site lands has not existed for many years, so that conversion of existing agriculture would not occur. Since collapse of the irrigation well in 1988, land that might otherwise be considered prime agricultural land no longer is. The lack of irrigation water and presence of developed uses have made agricultural use of the site no longer viable. The same conditions severely limit continued use of the site for greenhouse farming. The CLRDP project would place development contiguous with adjacent developed areas, completing the Westside neighborhood and establishing at the city limit a stable boundary between urban and agricultural uses. The project would minimize conflicts with adjacent agriculture and potential adverse effects on productivity through 200-to-300-foot setbacks from farmland (500 feet for residential uses) and a hold harmless and indemnity agreement with adjacent farm operators. Pressure for future conversion of farmland to the west and increased assessment costs would be curbed by sizing of MSC utility infrastructure to serve only the project's needs, and by a zone along the site's western perimeter, barring westward extension of utility corridors. No division of land is proposed. The EIR has not identified effects on air or water quality which would impair agricultural productivity.
	30242	All other lands suitable for agricultural use shall not be converted to nonagricultural uses unless: (1) continued or renewed agricultural use is not feasible, or (2) such conversion would preserve prime agricultural land or concentrate development consistent with Section 30250. Any such permitted conversion shall be compatible with continued agricultural use on surrounding lands.	Consistent. Based on the LESA Model analysis conducted for the project site, the site is not a significant agricultural resource and renewed agriculture onsite is not viable due to conflicts with urban uses and other factors described in Section 4.2, Agricultural Resources, and Appendix D.
	30243	The long-term productivity of soils and timberlands shall be protected.	Consistent (see sections 30241 and 30242, above).
	30244	Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measure shall be required.	Consistent. There are no known cultural resources onsite. To ensure that any unknown cultural resource is conserved and protected, the CLRDP would require construction monitoring during construction activities that could damage or destroy such resources. If any were discovered, activity would be suspended pending examination by a qualified archaeologist and

TABLE 4.9-1 (Continued)
CLRDP CONSISTENCY WITH CALIFORNIA COASTAL ACT

Section	Policy Number	Policy	Project Consistency
Land Resources (cont.)	30244 (cont.)		implementation of mitigation measures reviewed by the State Office of Historic Preservation and the Coastal Commission executive director.
	30222.5	Ocean front land that is suitable for coastal-dependent aquaculture shall be protected for that use, and proposals for aquaculture facilities located on those sites shall be given priority, except over other coastal-dependent developments or uses.	Consistent (see discussion under Recreation, above).
Development	30250 (a)	New residential, commercial, or industrial development, except as otherwise provided in this division, shall be located within, contiguous with, or in close proximity to, existing developed areas able to accommodate it or, where such areas are not able to accommodate it, in other areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on coastal resources. In addition, land divisions, other than leases for agricultural uses, outside existing developed areas shall be permitted only where 50 percent of the usable parcels in the area have been developed and the created parcels would be no smaller than the average size of surrounding parcels.	Consistent. The project site is contiguous with, and in close proximity to existing developed areas within the City of Santa Cruz, including the Natural Bridges industrial area to the north and northeast, the De Anza Santa Cruz residential community to the east, and the neighborhoods surrounding Natural Bridges State Beach farther east. The plan includes provisions to minimize significant adverse effects on coastal resources. Policies and implementation measures would preserve and maintain sensitive onsite habitats, species, and scenic resources, minimize conflicts with adjacent agricultural uses, and provide for wildlife movement across the site in an area enhanced and protected for that purpose. No land division is proposed.
	30250 (c)	Visitor-serving facilities that cannot feasibly be located in existing developed areas shall be located in existing isolated developments or at selected points of attraction for visitors.	Consistent (see above).
	30251	The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural landforms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.	Consistent. New development under the CLRDP building program would be clustered within three development areas, thereby allowing for important view corridors to the ocean, adjacent agricultural lands, and hillside to remain open. New buildings would be limited to 36 feet in height (at the midpoint of the roof) and building heights along the edges of the development areas would be stepped down to no more than 30 feet in height. In addition, the CLRDP design guidelines would help to ensure that all new development maintains the vernacular coastal rural architecture through appropriate use of exterior building materials, colors, and lighting. As about 66 percent of the site would remain as open space, the project would maintain its distinction as an urban-to-rural transition zone.

TABLE 4.9-1 (Continued)
CLRDP CONSISTENCY WITH CALIFORNIA COASTAL ACT

Section	Policy Number	Policy	Project Consistency
Development (cont.)	30252	The location and amount of new development should maintain and enhance public access to the coast by: (1) facilitating the provision or extension of transit service, (2) providing commercial facilities within or adjoining residential development or in other areas that will minimize the use of coastal access roads, (3) providing non-automobile circulation within the development, (4) providing adequate parking facilities or providing substitute means of serving the development with public transportation, (5) assuring the potential for public transit for high intensity uses such as high-rise office buildings, and by, (6) assuring that the recreational needs of new residents will not overload nearby coastal recreation areas by correlating the amount of development with local park acquisition and development plans with the provision of onsite recreational facilities to serve the new development.	Consistent. Under the CLRDP, the University would expand shuttle linkage with the Main Campus, work with the City to increase transit linkage with other areas, and implement transportation demand management measures to reduce reliance on single-occupancy automobile trips, adopting a goal of having at least 30 percent of trips to campus made using alternatives to single-occupant automobiles. The University would implement measures to encourage and facilitate bicycles and walking as means of traveling to and from the MSC. On-campus support housing would reduce need for commuting to campus. Parking for 550 cars would be added as needed, including 10 exclusively for visitor use and 50 for dual use. On-campus dining facilities would reduce need for automobile trips. Recreational facilities at the MSC as well as the main campus would curb impacts on nearby public coastal recreation facilities.
	30253	New development shall: (1) (Public Safety.) Minimize risks to life and property in areas of high geologic, flood, and fire hazard. (2) (Geologic Stability.) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs. (3) (Air Quality Controls.) Be consistent with requirements imposed by an air pollution control district or the State Air Resources Control Board as to each particular development. (4) (Energy Consumption.) Minimize energy consumption and vehicle miles traveled.	Consistent. The CLRDP would prohibit public access down the steep bluffs, thereby minimizing risk of injury to climbers and entrapment by rising tides on pocket beaches below the seacliffs. A setback of 100 feet would be maintained along the coastal bluffs, and no new development would be allowed excepting pedestrian and bicycle pathways and infrastructure improvements including seawater system facilities. Bluff stability would be further enhanced by planting of native bluff vegetation. Protective structures or other devices that would alter natural landforms along the bluffs would not be allowed under the CLRDP. Air quality effects of the project during construction and operation would remain below state and federal standards for relevant emissions. Concerning measures to minimize energy consumption and vehicle miles traveled, see section 30252, above.
	30254	New or expanded public works facilities shall be designed and limited to accommodate needs generated by development or uses permitted consistent with the provisions of this division; provided, however, that it is the intent of the Legislature that State Highway Route 1 in rural areas of the coastal zone remain a scenic two-lane road. Special districts shall not be formed or expanded except where assessment for, and provision of, the service would not induce new development inconsistent with this division. Where existing or planned public works facilities can accommodate only a limited amount of new development, services to coastal-dependent land uses,	Consistent. CLRDP policy would require the University to size all utility and service lines serving the project site consistent with, and limited to, that needed to accommodate the proposed building program. In addition, the seawater system would be maintained and expanded consistent with the proposed building program. Furthermore, a utility prohibition zone, in which the extension of sewer and water utilities outside the City of Santa Cruz is precluded, would be established at the western edge of the project site. Allocation of limited public works resources to coastal-dependent land uses of the MSC is consistent with Coastal Act priorities.

TABLE 4.9-1 (Continued)
CLRDP CONSISTENCY WITH CALIFORNIA COASTAL ACT

Section	Policy Number	Policy	Project Consistency
Development (cont.)	30254 (cont.)	essential public services and basic industries vital to the economic health of the region, state, or nation, public recreation, commercial recreation, and visitor-serving land uses shall not be precluded by other development.	
	30255	Coastal-dependent developments shall have priority over other developments on or near the shoreline. Except as provided elsewhere in this division, coastal-dependent developments shall not be sited in a wetland. When appropriate, coastal-related developments should be accommodated within reasonable proximity to the coastal-dependent uses they support.	Consistent. Proximity to the marine environment is essential to the research and educational programs of the Marine Science Campus. The Marine Research and Education uses are therefore proposed for construction in the lower or middle terrace for proximity to the seawater system, whereas the other coastal-related and ancillary uses would be constructed in the middle or upper terrace. One small, non-ESHA wetland located in the upper terrace would be filled for construction of the Shared Campus Warehouse and Laydown Facility. This facility would provide support necessary to the marine research activities. The wetland is extremely isolated. With location of the laydown yard in this area, restoration and enhancement activities would go forward on the higher value eastern upper terrace, establishing a stable and logical boundary between wetlands and the developed areas.

TABLE 4.9-2
CLRDP CONSISTENCY WITH COUNTY OF SANTA CRUZ GENERAL PLAN/LCP

Element	Policy Number	Policy	Project Consistency
Land Use	2.1.4*	Locate new residential, commercial, or industrial development, within, or next to, or in close proximity to existing developed areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on environmental and natural resources, including coastal resources.	Consistent (see discussion under Consistency with the California Coastal Act, Policy 30250 (a), above).
Conservation and Open Space – Visual Quality Section	5.10.2*	Recognize that visual resources of Santa Cruz County possess diverse characteristics and that the resources worthy of protection may include, but are not limited to, ocean views, agricultural fields, wooded forests, open meadows, and mountain hillside views. Require projects to be evaluated against the context of their unique environment and regulate structure height, setbacks and design to protect these resources consistent with the objectives and policies of this section.	Consistent. The scenic resources located onsite, including the open grassland portions of the terrace set against an ocean backdrop and the YLR, would be preserved under the project through policy and implementation measures requiring clustering of development within three development areas and preservation of open space, including the terrace wetlands and the YLR. In addition, new development adjacent to these scenic resources would be designed and sited to avoid impacts.
	5.10.3*	Protect significant public vistas as described in policy 5.10.2 from all publicly used roads and vista points by minimizing disruption of landform and aesthetic character caused by grading operations, timber harvest, utility wires and poles, signs, and inappropriate landscaping and structure design. Provide necessary landscaping to screen development which is unavoidably within these vistas.	Consistent. The proposed CLRDP would cluster new development within three development areas onsite, would implement building height restrictions and standard setbacks, and would include screening landscaping consistent with the CLRDP landscape design guidelines in order to preserve and maintain important view corridors of and across the site to the ocean, adjacent agricultural land, and hillsides.
	5.10.10	The public vistas from [scenic] roads (including Highway 1) shall be afforded the highest level of protection.	Consistent. Although the portion of Highway 1 immediately north of the site is not designated a scenic road because for about 2,000 feet the road is below grade and no ocean views exist, the project site is visible from a vantage point located northwest of the site on Highway 1 (marker # 21.51). The CLRDP design guidelines would help to ensure that new visible development is sensitive to the coastal rural agricultural architecture of the area. In addition, proposed landscaping and windbreaks would screen new development while maintaining a visual connection to the open space areas nearby.

* Indicates a coastal land use policy.

TABLE 4.9-2 (Continued)
CLRDP CONSISTENCY WITH COUNTY OF SANTA CRUZ GENERAL PLAN/LCP

Element	Policy Number	Policy	Project Consistency
Conservation and Open Space – Visual Quality Section (cont.)	5.10.11*	In the viewsheds of rural scenic roads, require new discretionary development, including development envelopes in proposed land divisions, to be sited out of public view, obscured by natural landforms and/or existing vegetation. Where proposed structures on existing lots are unavoidably visible from scenic roads, identify those visual qualities worthy of protection (See policy 5.10.2) and require the siting, architectural design and landscaping to mitigate the impacts on those visual qualities.	Consistent (see above).
Conservation and Open Space – Agriculture Section	5.13.10*	Prohibit the placement of water or sewer lines on commercial agricultural lands in the Coastal Zone. Allow exceptions to this policy only under the following circumstances and require safeguards (see 5.13.11) to be adopted which ensure that such facilities will not result in the conversion of commercial agricultural lands to non-agricultural uses: (a) Allow water transmission lines from the North Coast to the City of Santa Cruz and allow service lines to be placed on commercial agricultural lands for the purpose of irrigation and related agricultural uses. (b) Allow sewer transmission lines to and from the City of Watsonville sewage treatment plant to cross commercial agricultural lands without service to the affected parcels. (c) Allow water and sewer lines to be placed on commercial agricultural lands only to serve existing development which has failing wells and/or sewage disposal systems.	Consistent. The CLRDP provides for a utility prohibition zone, in which no sewer or water lines may be extended beyond the city limit line, along the western edge of the project site. In addition, the utility and service lines serving the proposed Marine Science Campus would be limited in size to only accommodate the projected needs of the site.
	5.13.11*	For the purposes of policy 5.13.10, safeguards shall include, but not be limited to: (a) prohibiting hookups to trunk lines through commercial agricultural lands, and (b) prohibiting the levying of assessment fees against commercial agricultural land for the construction of sewage transmission lines running through them.	Consistent (see above).
	5.13.23*	Require a 200 foot buffer area between commercial agricultural and non-agricultural land uses to prevent or minimize potential land use conflicts, between either existing or future commercial agricultural and non-agricultural land uses.	Consistent. The CLRDP includes a minimum 200-foot-wide buffer from adjacent agricultural use.

* Indicates a coastal land use policy.

TABLE 4.9-2 (Continued)
CLRDP CONSISTENCY WITH COUNTY OF SANTA CRUZ GENERAL PLAN/LCP

Element	Policy Number	Policy	Project Consistency
Conservation and Open Space – Agriculture Section (cont.)	5.13.24*	A 200 foot buffer setback is required between habitable development and commercial agricultural land (including residential development, farm labor housing, commercial or industrial establishments on commercial agricultural land), unless a lesser distance is established as set forth in the Agricultural Land Preservation and Protection ordinance. Any amendments to the language of the agricultural buffer ordinance shall require a finding demonstrating that agricultural lands shall be afforded equal or greater protection with the amended language.	Consistent. The CLRDP includes a 500-foot agricultural buffer from any common line shared with the adjacent commercial agricultural operation, for all residential uses proposed onsite.
	5.13.26*	Buffers shall include windbreaks designed to reduce or eliminate the hazard of pesticide drift or other use conflicts based on the prevailing wind direction.	Consistent. The CLRDP landscape design guidelines include provision of windbreaks at strategic locations around the three development areas, and planted in a north-south linear direction to mitigate winds and maintain view corridors.

* Indicates a coastal land use policy.

TABLE 4.9-3
CLRDP CONSISTENCY WITH CITY OF SANTA CRUZ GENERAL PLAN/LCP

Element	Policy Number	Policy	Project Consistency
Environmental Quality Air Quality Section	1.1 *	Ensure that population growth does not exceed AQMP population projections, and review proposed land use projects for their consistency with the AQMP and for potential air quality impacts.	Consistent, as determined by AMBAG.
	1.2	Locate air-pollution-sensitive land uses (hospitals, schools, day care facilities, recreational areas) away from major sources of air pollution or require mitigation measures (e.g., buffer zones, landscaping) to protect residential and sensitive land uses from freeways, arterials, point source polluters, and hazardous material locations.	Consistent. Proposed development would be distant from Highway 1, and appropriate buffers would be incorporated into site design.
	1.5	Maintain vegetated and forested areas, and encourage street trees and yard trees in urban areas for their contribution to air quality.	Consistent. Proposed development would avoid important vegetative communities onsite and maintain a substantial amount of land in open space.
Environmental Quality Water Quality Section	2.1*	Meet or exceed State Water Resources Control Board standards for discharge of sewer and storm water to the Monterey Bay.	Consistent. The project includes a Stormwater Concept Plan to ensure consistency with state and regional standards. Wastewater would not be discharged to the bay.
	2.3*	Ensure that new development or land uses near surface water and groundwater recharge areas do not degrade water quality.	Consistent. The CLRDP includes policies and implementation measures, mirrored within its Stormwater Concept Plan, to ensure that groundwater recharge areas are maintained at pre-CLRDP levels through the use of infiltration systems designed into stormwater ponds and swales.
	2.3.1*	Design and site development to minimize lot coverage and impervious surfaces, to limit post-development runoff to predevelopment volumes, and to incorporate storm drainage facilities that reduce urban runoff pollutants to the maximum extent possible.	Consistent. Proposed development is clustered and limited to about 33 acres of the 98-acre site. Proposed development could increase runoff volumes, but the CLRDP includes policies and implementation measures that would help to ensure that post-development peak flow rates are the same as pre-development rates (unless different peak rates are determined to be necessary to maintain groundwater recharge or for specific water quality benefits).
	2.3.1.1	Where feasible, direct runoff from rooftops and other areas to drywells.	Consistent. Proposed development would include a drainage system that would maintain peak stormwater flows.
	2.3.1.2	Implement policies resulting from AMBAG's Urban Runoff Water Quality Management Study.	Consistent. Project includes policies, implementation measures, and best management practices (BMPs) within its Stormwater Concept Plan in adherence to AMBAG's Urban Runoff Water Quality Management Study.

* Indicates a coastal land use policy.

TABLE 4.9-3 (Continued)
CLRDP CONSISTENCY WITH CITY OF SANTA CRUZ GENERAL PLAN/LCP

Element	Policy Number	Policy	Project Consistency
Environmental Quality Water Quality Section (cont.)	2.3.1.3*	Require low-flow velocity, vegetated open channels, area drains incorporating grease and sediment traps, groundwater recharge facilities, and detention ponds directly connected to impervious areas.	Consistent. The Stormwater Concept Plan calls for a combination of natural drainage systems and engineered filtration systems to protect sensitive habitats from future onsite development. Natural systems, which are referred to as BMPs, would be supplemented with engineered filtration systems used in parking lot areas to ensure cleansing prior to entering onsite stormwater ponds.
	2.6.1	Coordinate with the County Environmental Health Services to regulate and oversee storage and disposal of hazardous material to protect against groundwater pollution and possible distribution line contamination.	Consistent. As the project site is exempt from local land use regulations and policies, the regulation and management of hazardous materials would be the sole responsibility of the University Office of Environmental Health & Safety (EH&S). The EH&S would manage all hazardous materials in compliance with federal and state regulations.
Environmental Quality Soils Section	3.1*	Require site design and erosion control measures in areas subject to erosion hazards or adjacent to streams and wetland areas to minimize grading activities and vegetation removal.	Consistent. Proposed development includes erosion control measures, and buffer areas are incorporated into site design to protect the terrace wetlands and the YLR.
	3.1.2*	Prohibit grading and earth disturbance during wet winter months and ensure that any grading or stockpiles are stabilized and revegetated (or covered) before winter months.	Consistent. BMPs are included as part of the project.
	3.2.3*	Generally requires at least a 20-foot setback from slopes over 30 percent, unless the criteria in 3.2.2 are met; in no case shall the setback be less than 10 feet from the top edge of the slope.	Consistent. Proposed development includes setbacks of at least 20 feet.
	3.3*	Protect ocean cliffs and cliff edges from human activity that creates erosion and cliff retreat.	Consistent. The project would limit access to the designated trails onsite, and no direct access would be provided down the bluff face.
	3.4*	Protect significant agricultural and grazing lands within and along the periphery of the city from development utilizing exclusive agriculture/grazing zoning and Williamson Act contracts.	Consistent. Land is not designated prime farmland and is not under Williamson Act contract. Furthermore, due to the cost of water and issues of incompatibility with existing onsite and offsite uses, agriculture is no longer viable at the site.

* Indicates a coastal land use policy.

TABLE 4.9-3 (Continued)
CLRDP CONSISTENCY WITH CITY OF SANTA CRUZ GENERAL PLAN/LCP

Element	Policy Number	Policy	Project Consistency
Environmental Quality ***Biotic Resources Section***	4.1*	Protect the natural ecosystem of the Monterey Bay Marine Sanctuary and the shoreline.	Consistent. The project would incorporate resource buffers into site design. The project does not propose any changes in the YLR.
	4.1.2*	Preserve the habitat of and minimize disturbance to seabird rookeries and roosting areas along the coastline.	Consistent. The project would incorporate resource buffers into site design.
	4.2*	Preserve and enhance the character and quality of riparian and wetland habitats, as identified on General Plan Maps EQ-8 and EQ-11.	Consistent. The proposed development would avoid all wetlands onsite except one non-ESHA wetland (see 4.2.2 below). The project includes a management plan to protect the YLR and terrace wetlands onsite.
	4.2.1 *	Develop, adopt, and implement management plans for City-owned wetland and riparian areas, including the San Lorenzo River and Neary Lagoon. Require management plans for sites not owned by the City in connection with development, and/or encourage other agencies to implement management plans for Younger Lagoon, Jessie Street Marsh, Arana Gulch, Moore Creek, Natural Bridges Marsh, and Antonelli Pond.	Consistent. A management plan for the YLR and a Resource Management Plan have been developed as part of this project. These plans would ensure project consistency because they are designed to protect all wetlands and other sensitive biological resources onsite.
	4.2.2*	Minimize the impact of development upon riparian and wetland areas through setback requirements of at least 100 feet from the center of a watercourse for riparian areas and 100 feet from a wetland. Include all riparian vegetation within the setback requirements, even if it extends more than 100 feet from the watercourse or if there is no defined watercourse present.	Consistent. The proposed development would result in the fill of one small wetland area located within the upper terrace development zone. The fill would be designed in accordance with provisions of the Coastal Commission's wetland guidelines. All other onsite wetlands would be preserved and would include appropriate buffers. The project includes a management plan to monitor terrace wetlands and the YLR so that they would not be adversely affected.
	4.2.2.3*	Prohibit uses such as construction of main or accessory structures, grading, or removal of vegetation within riparian and wetland resource and buffer areas.	Consistent. The project, although resulting in the fill of a small wetland in the upper terrace, would preserve all other wetlands onsite and would include the appropriate buffers (see above).
	4.2.3*	Minimize increased runoff into riparian and wetland areas unless biological evaluation recommends increased inflows.	Consistent. Proposed development could result in increased runoff, but the project includes detention features as mitigation.

* Indicates a coastal land use policy.

TABLE 4.9-3 (Continued)
CLRDP CONSISTENCY WITH CITY OF SANTA CRUZ GENERAL PLAN/LCP

Element	Policy Number	Policy	Project Consistency
Environmental Quality Biotic Resources Section (cont.)	4.2.4*	Preserve riparian and wetland vegetation by minimizing removal and allowing only for uses dependent on the resources. • Remove non-native invasive plants as specified in management plans. • Where consistent with the protection of riparian and wetland areas, provide actual or visual access of a low-impact nature.	Consistent. Development would be clustered on non-native grassland portions of site. The project would also implement the Resource Management Plan.
	4.2.5*	Protect and minimize the impact of development on bird, fish, and wildlife habitat in and adjacent to waterways.	Consistent. The project would preserve important habitat areas on the site.
	4.2.6*	River or stream alterations must be consistent with the natural characteristics of the stream and limited to those allowed under Coastal Act Section 30236, which includes those necessary for water supply, flood control, and habitat improvement projects.	Consistent. The project would not involve river or stream alteration.
	4.5*	Continue the protection of rare, endangered, sensitive, and limited species and the habitats supporting them.	Consistent. Proposed development could result in temporary construction-related impacts, but the EIR identifies mitigation.
	4.6*	Encourage the planting and restoration of native rather than non-native vegetation throughout the city and also in areas where plants or habitats are diseased or degraded.	Consistent. The project includes the planting of native vegetation.
	4.7*	Minimize the impact of grading and filling on plant and animal life.	Consistent. The project, with mitigation identified in this EIR, would not significantly affect plant and animal life.
Environmental Quality Noise Section	6.1	Require land uses to operate at noise levels that do not significantly increase surrounding background (ambient) noise levels.	Consistent. Proposed uses would be typical of uses in the area.
	6.1.1	Use site planning and design approaches to minimize noise impacts from new development on surrounding land uses.	Consistent. The project includes design guidelines to ensure sensitive onsite development.
	6.1.2	Ensure that construction activities are managed to minimize overall noise impacts.	Consistent, with mitigation identified in this EIR.

* Indicates a coastal land use policy.

TABLE 4.9-3 (Continued)
CLRDP CONSISTENCY WITH CITY OF SANTA CRUZ GENERAL PLAN/LCP

Element	Policy Number	Policy	Project Consistency
Community Design	1.3*	Preserve open space land uses at the edge of the City to inhibit urban sprawl and maintain identity.	Consistent. The project would preserve portions of the site in open space.
	1.3.1.2*	Work with the County to maintain lands between Moore Creek Canyon (west branch), the city's western boundary below Highway 1, Younger Lagoon, and Wilder Ranch State Park in open space land uses through agricultural zoning, Williamson Act contracts, and open space easement agreements.	Consistent. This policy refers to county land, which would not be affected by the proposed project (see Figure 4.9-1). In addition, City GP/LCP policy calls for the development of the project site.
	1.3.2*	Establish the city's urban development boundary at Moore Creek Canyon (east branch above Highway 1) and along the city limits below Highway 1 by assigning exclusive agricultural and very-low density and intensity land use designations to areas west of the boundary, and prohibiting the extension of wastewater services beyond this line. Extension of other urban services may be permitted only if sized and designed to serve permitted uses where onsite services are unavailable and if consistent with environmental quality policies.	Consistent. The project would establish a utility prohibition zone to restrict any growth westward of the site.
	1.4*	Where development abuts open space land uses, utilize careful site planning to emphasize the natural edges provided by topography and vegetation and maintain visual and physical access to open space areas.	Consistent. Proposed development would be clustered within one of three development zones and would provide access to open space.
	2.1*	Preserve natural features that provide visual definition to an area within the city.	Consistent. The project would preserve portions of the site in open space uses and would maintain and preserve important view corridors to the ocean and hillsides.
	2.1.2*	Minimize the impact of grading and development on important natural features such as bluffs and foothills.	Consistent, with mitigation identified in this EIR.
	2.1.3*	Protect the Monterey Bay National Marine Sanctuary and the shoreline and views to and along the ocean, recognizing their value as natural and recreational resources.	Consistent. Important view corridors to the ocean would be preserved as part of the project.
	2.2 *	Preserve important public views and viewsheds by ensuring that the scale, bulk, and setback of new development does not impede or disrupt them.	Consistent. The project would preserve views from important offsite public viewpoints in the area.

* Indicates a coastal land use policy.

TABLE 4.9-3 (Continued)
CLRDP CONSISTENCY WITH CITY OF SANTA CRUZ GENERAL PLAN/LCP

Element	Policy Number	Policy	Project Consistency
Community Design (cont.)	2.2.1*	Develop siting, scale, landscaping, and other design guidelines to protect visually sensitive areas and ensure that development is compatible with the character of the area. Areas to be protected include: open space land uses, foothills, bluffs, scenic coastal areas, Beach Hill, Pogonip, Far Westside, Mission Hill, Moore Creek, DeLaveaga Park, and San Lorenzo River.	Consistent. The project includes building design guidelines and landscaping plans for the site, and establishes view corridors to preserve important views of the ocean and hillsides.
Land Use	1.6*	Minimize, when practical, obstruction of important views and viewsheds by new development. In the coastal zone, development shall be sited and designed to and along the ocean and in scenic coastal areas to minimize the alteration of landforms, to be visually compatible with the character of the surrounding areas, and to restore visual quality in visually degraded areas.	Consistent. The project would maintain important view corridors of the ocean and hillsides, would limit building heights, and would preserve open space onsite through designation of resource protection and open space areas and buffers.
	2.2.4*	Require a Specific Plan for the 60-acre Terrace Point property before development occurs.	Consistent. The CLRDP would fulfill this requirement by providing coastal-dependent marine research and education facilities within the lower and middle terrace and by creating and establishing a formal network of public access trails, overlooks, and docent-led tours throughout the site, as well as through provision of support housing intended solely for use by the University in the middle and upper terrace. In addition, about 8,000 sf of sports courts would be provided to serve onsite residents, researchers, and students. To reduce vehicle trips to and from the site, the CLRDP includes transportation demand management measures, and onsite support facilities (i.e., food services). The CLRDP would also provide these uses at densities lower than those established under the General Plan/LCP, thereby maintaining most of the site in open space.
	3.3*	Require development adjacent to natural areas and agricultural/grazing lands to be compatible with adjacent lands in terms of land use, visual transition, and siting.	Consistent. Proposed development would be clustered and limited to three onsite development zones. Agricultural setbacks would be incorporated into site design.
	3.3.2*	Where important natural areas would be impacted, require management plans as a condition of development.	Consistent. The CLRDP Resource Management Plan would fulfill this requirement.
	3.4.8*	Encourage UCSC to implement the “Management Plan for the Joseph M. Long Marine Laboratory,” 1987, as it applies to Younger Lagoon and update as necessary.	Consistent. The CLRDP would fulfill this requirement.

* Indicates a coastal land use policy.

TABLE 4.9-3 (Continued)
CLRDP CONSISTENCY WITH CITY OF SANTA CRUZ GENERAL PLAN/LCP

Element	Policy Number	Policy	Project Consistency
Land Use (cont.)	3.5.1*	Protect coastal bluffs and beaches from intrusion by non-recreational structures and incompatible uses along the shoreline, require new development or remodeling to be sited and designed so as to avoid a "wall" of buildings.	Consistent. The project would not allow development on the lower terrace within a 100-foot setback, or any development that would require a shoreline protection device.
	3.5.3*	Require new development and public works projects to provide public access from the nearest public roadway to the shoreline and along the coast, except where it is inconsistent with public safety, protection of fragile coastal resources, or where adequate access exists nearby.	Consistent. The project would include publicly accessible trails, overlooks, and roadways onsite. Public access would be limited to the designated trails and roadways on the top of the bluff to protect sensitive habitats. No access would be provided down the bluff to the beach due to safety constraints.
	4.1.1*	Extend no sanitary sewer services beyond the eastern branch of Moore Creek Canyon above Highway 1 and the city's western boundaries and Younger Lagoon below Highway 1, except for a leachate line serving the landfill site.	Consistent. The project would include a utility prohibition zone wherein no westward expansion of onsite utility lines would be permitted.
	5.1	Evaluate development proposals for their direct traffic impact and effect on the overall number of automobile trips and require mitigation measures focused on reducing the number of automobile trips and effects of increased trips.	Consistent. This EIR address the project's traffic impact and offers additional measures to reduce the number of automobile trips.
	5.4	Ensure that new streets required by new development are proportionate and appropriate to development densities and use intensities, and not oversized.	Consistent. Project roadways would be two lanes and 20 to 22 feet in width.
	5.6.1	Reserve land in new development for areawide bike and pedestrian path systems.	Consistent. The project would provide trails onsite that would be both bike and pedestrian accessible.
	5.6.2*	Provide public access from and through new development to adjacent or nearby schools, parks, natural areas, and coastal recreation areas.	Consistent. The project would provide trails and roadways onsite; however, due to safety constraints, no access to the beach below would be provided.
Circulation	1.7*	As a condition of development, expansion, or change of land use, developers or employers shall mitigate their impacts on circulation (consistent with circulation planning policy and the Congestion Management Plan), provide incentives to enhance the use of alternative transportation, and when necessary, shall prepare transportation impact studies and phase improvements to reduce traffic impacts and ensure that circulation facilities are adequate to serve the development.	Consistent. The project provides for mitigation of circulation impacts through several transportation demand management strategies as well as other relevant policies.

* Indicates a coastal land use policy.

TABLE 4.9-3 (Continued)
CLRDP CONSISTENCY WITH CITY OF SANTA CRUZ GENERAL PLAN/LCP

Element	Policy Number	Policy	Project Consistency
Circulation (cont.)	1.7.3	Design parking areas so that they have adequate lighting, landscaping, minimal amount of pavement for parking, adequate numbers of physically disabled spaces, and allow for safe pedestrian circulation.	Consistent. Proposed parking areas would be designed according to project design guidelines and policies.
Housing	5.3.2	Encourage the development of housing along existing or planned transit corridors and in proximity to large employment centers or destinations such as downtown or the UCSC campus.	Consistent. Proposed housing uses are near Highway 1 and are intended solely to serve the needs of the UCSC Marine Science Campus.
Economic Development	3.1.1*	Encourage the development of appropriate coastal-dependent uses supporting marine research and other activities related to the Monterey Bay National Marine Sanctuary.	Consistent. The proposed CLRDP program would fulfill this requirement.
	5.5.2*	Promote the development of ecotourism programs associated with the National Marine Sanctuary, Long Marine Lab, whale watching, the UCSC Farm and Arboretum, and other environmental resources to promote visits by environmentally minded people and researchers.	Consistent. The project would continue to operate docent-led tours and education programs through the Seymour Marine Discovery Center.
Community Facilities and Services	6.6	Ensure that new development occurs only when adequate water services are provided and require new development to install the infrastructure necessary to distribute water within and around the site.	Consistent. The project would include a local distribution system to provide water to the proposed development.
	9.6*	Analyze and design flood control projects and storm drainage facilities on private or public lands to ensure that retention and detention facilities are used where practical and economical, erosion impacts on natural terrain are minimized, and urban runoff pollutants are reduced to the maximum extent possible.	Consistent. The project includes a Stormwater Concept Plan to address potential erosion issues and ensure that urban runoff pollutants are reduced.
Parks and Recreation	1.2.7	Require adequate park, recreational facility, as well as community garden space in conjunction with development of the Westside area.	Consistent. The project would provide onsite public access trails, overlooks, and recreational sports courts.
	4.2 *	Develop a system of recreational trails providing access to and connections between the city’s various parks, recreational facilities, and natural, coastal, and urban areas.	Consistent. The project would provide onsite public access trails, overlooks, and recreational sports courts.

* Indicates a coastal land use policy.

TABLE 4.9-3 (Continued)
CLRDP CONSISTENCY WITH CITY OF SANTA CRUZ GENERAL PLAN/LCP

Element	Policy Number	Policy	Project Consistency
Cultural Resources	1.2*	Identify sensitive archaeological and paleontological sites early in land use planning and/or development process so archaeological and paleontological resources can be given consideration during the conceptual design phase of private or public projects.	Consistent. The constraints analysis and this EIR include cultural resource studies. The project site does not contain identified paleontological resources.
	1.2.2*	Evaluate the extent of on site archaeological and paleontological resources through archival research, site surveys, and necessary supplementary testing as part of the initial environmental assessment on each potentially significant site.	Consistent. The constraints analysis and this EIR include cultural resource studies. The project site does not contain identified archaeological or paleontological resources.
	1.2.3*	Develop a mitigation plan for proper site disposition prior to approval of any project that may adversely impact an archaeological site.	Consistent. The project site does not contain any recorded archaeological sites. The CLRDP provides a policy that would protect previously unidentified resources discovered during excavation, consistent with Appendix K of the CEQA Guidelines. The EIR identifies mitigation measures for discovery of previously unknown human remains.
	1.2.4*	Require consultation of a Native American authority in the identification of burial or most sacred sites and include Native American participation in the development of, and recommendations for, site disposition and mitigation programs.	Consistent (see above).
	1.3.1*	Upon discovery of an archaeological or paleontological resource, work must halt on a project and a mitigation plan be developed to determine the extent and value of the site and its proper disposition, prior to resumption of the project.	Consistent (see above).
Safety	1.2.1*	For development adjacent to cliffs, require setbacks for buildings equal to 50 years of anticipated cliff retreat.	Consistent. The project would incorporate setbacks for buildings adjacent to the cliff equal to 100 years of anticipated cliff retreat.
	1.2.2*	Require site-specific geologic investigations for all development within 100 feet of existing coastal bluffs.	Consistent. The CLRDP prohibits new development, except trails and the seawater system, within 100 feet of the coastal bluffs.
	4.3.1*	Where preservation of fire-prone vegetation in undeveloped areas is desirable, require development setbacks as determined by the fire department on a project-by-project basis. (Note: Younger Lagoon is identified as a fire hazard area.)	Consistent. While the YLR and the Moore Creek corridor are located within a designated fire hazard zone in the City of Santa Cruz General Plan Safety Element, the risk posed to facilities by wildland fire is relatively low, due to the nature of the development constructed on the project site and its coastal

* Indicates a coastal land use policy.

TABLE 4.9-3 (Continued)
CLRDP CONSISTENCY WITH CITY OF SANTA CRUZ GENERAL PLAN/LCP

Element	Policy Number	Policy	Project Consistency
Safety (cont.)	4.3.1* (cont.)		location. Furthermore, development will be set back at least 50 feet from the Younger Lagoon. (See Section 4.7, Hazards and Hazardous Materials, of this EIR.) The Santa Cruz Fire Department has confirmed that it will review development on the project site on a project-by-project basis (letter from Mark Latham, Fire Marshal, City of Santa Cruz Fire Department, to Michael Jacinto, Associate Planner, ESA, January 30, 2002). This review would ensure that development on the campus is not inconsistent with the Fire Department standards.
	4.3.3 *	In no case shall a roadway in a wildfire hazard area be less than 20 feet wide (with the exception of unpaved clear zones and occasional turnouts) and determination of the width of an all-weather surface shall be made at the time of project approval.	Consistent. Proposed roadways would be 20 to 22 feet.
	4.5 *	Ensure that new developments allow fire equipment adequate access to all structures on a site.	Consistent. The project provides for continued emergency vehicle access via the Delaware Avenue Extension through the main gate. This EIR has determined that emergency access impacts of the project would be less than significant. (See Section 4.15, Transportation/Traffic.) The Santa Cruz Fire Department has confirmed that it will review development on the project site on a project-by-project basis (letter from Mark Latham, Fire Marshal, City of Santa Cruz Fire Department, to Michael Jacinto, Associate Planner, ESA, January 30, 2002). This review would allow the opportunity for ensuring that adequate fire equipment access is provided to new structures.
	6.1	Require proper storage and disposal of hazardous wastes to prevent leakage, explosions, fires, or escape of harmful gases, and to prevent materials from combining to form hazardous substances.	Consistent. The project, through the UCSC Office of Environmental Health & Safety, would comply with all applicable federal and state regulations related to storage, disposal, and transportation of hazardous substances. The University would impose contractual obligations on non-UC entities on the campus (i.e., USGS, Monterey Bay Aquarium) to assure that they also comply with federal and state regulations.

* Indicates a coastal land use policy.

4.10 MINERAL RESOURCES

This section evaluates the potential loss of availability of known mineral resources due to land use conversions that would result from the implementation of the CLRDP and the five near-term projects. Information in this section is derived primarily from the *Mineral Land Classification: Aggregate Materials in the San Francisco–Monterey Bay Are,* prepared by the California Division of Mines and Geology (CDMG)[1], 1983; and the *County of Santa Cruz General Plan and Local Coastal Program*, prepared by the County of Santa Cruz, 1994. Additional information contained in this section is derived from *Update of Mineral Land Classification: Aggregate Materials in the South San Francisco Bay Production-Consumption Region,* prepared by the California Geological Survey (CGS), 1996.

Based on the following CEQA criteria, a project may have a significant adverse impact on the environment if it would:

- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.
- 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.

SETTING

REGULATORY CONTEXT

California Surface Mining and Reclamation Act of 1975

The California Surface Mining and Reclamation Act (SMARA) of 1975 requires the State Geologist to classify land into Mineral Resources Zones (MRZs), according to the known or inferred mineral potential of that area. The process is based solely on the underlying geology without regard to existing land use or land ownership. The primary goal of the mineral land classification is to ensure that the mineral potential of the land is recognized by local government decision-makers and considered before making land use decisions that could preclude mining.[2]

County of Santa Cruz General Plan and Local Coastal Program

Policy 5.16.1, Designation of Mineral Resources Areas

Areas classified by the State Geologist and designated by the State Mining and Geology Board as Regionally or Statewide Significant Mineral Resource Areas and classified by the state as MRZ-2 zones (areas containing significant mineral deposits), excluding areas with existing land uses and/or land use designations that conflict with mineral resource extraction, are shown on the

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1 The CDMG has recently been renamed and is now the California Geological Survey (CGS).

2 Kohler, Susan, Department of Conservation, Division of Mines and Geology (now referred to as the California Geological Survey), "Update of Mineral Land Classification: Aggregate Materials in the South San Francisco Bay Production-Consumption Region," Open-File Report 96-03, 1996.

General Plan and Local Coastal Program (LCP) Resources and Constraints Maps as Mineral Resource lands.[3]

California Coastal Act

The California Coastal Act (CCA) does not contain regulations specific to mineral resources extraction nor does it define what would comprise a mineral resource. However, CCA Section 30251 requires that permitted development be sited to minimize the alteration of natural land forms, which could include mining, processing or stockpiling of rock, gravel and other aggregate materials.

REGIONAL CONTEXT

Mineral resources in the county of Santa Cruz include aggregate and stone for commercial, industrial, and construction uses. There are several active mining operations in the county, which generate essential aggregate and mineral resources for glass manufacturing and the production of Portland Cement. These materials are extracted from quarries throughout the region. One of the largest active mines is the RMC/Pacific Materials operation at the Bonny Doon and Davenport Cement Plant quarry, located approximately 10 miles north of the Marine Science Campus. In addition to the active quarries, there are lands elsewhere in the county that are classified by the State Geologist as containing significant mineral resources.[4]

The majority of the county's aggregate and mineral resources is derived from alluvial deposits and bedrock complexes. These resources occur east of the Marine Science Campus in the foothills and higher elevations of the Santa Cruz Mountains. Bedrock complexes include very old basement rock such as marble, which is quarried for the RMC/Pacific Materials cement production in Davenport, and younger sedimentary rock such as the distinctively white Santa Margarita Sandstone that is extracted throughout the county for construction sand. The Santa Cruz Mudstone in some locations north of the project site been intruded by asphaltic sands. Mining operations from 1878 to 1915 removed the natural asphalt from several quarries in Bonny Doon for use as road surfacing material, especially for new streets in San Francisco. Younger alluvial deposits of sand and gravel also occur in Santa Cruz County and are typically found in stream valleys.

The CGS has classified lands within the San Francisco–Monterey Bay region into Mineral Resource Zones (MRZs) based on guidelines adopted by the California State Mining and Geology Board, and as mandated by SMARA. Santa Cruz County and the Marine Science Campus are located in the Monterey Bay Production-Consumption Region (P-C Region), which also encompasses Monterey County, San Benito County, and Santa Clara County.

Mineral resource classification within this region is based on the presence or absence of significant sand, gravel, and stone deposits that are suitable as sources of aggregate. Deposits of other mineral resources, such as crude oil, gold, and silver, are not considered for this region because the geologic conditions are not suitable.

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3 Mineral Resources are classified in Special Report 146, Part IV, "Mineral Land Classification: Aggregate Materials in the San Francisco-Monterey Bay Area"; and designated by the State Mining and Geology Board through SMARA Designation Report No 7, "Designation of Regionally Significant Construction Aggregate Resource Areas in the South San Francisco Bay, North San Francisco Bay, Monterey Bay Production-Consumption Regions."

4 County of Santa Cruz, "County of Santa Cruz General Plan and Local Coastal Program," 1994.

The criteria used by the CGS for establishing the mineral resource zones in this region are based on four general categories, as discussed below.

- MRZ-1 are areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.
- MRZ-2 are areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence.
- MRZ-3 are areas containing mineral deposits, the significance of which cannot be evaluated.
- MRZ-4 are areas where available information is inadequate for assignment to any other MRZ zone.

MINERAL RESOURCES AT THE PROJECT SITE

The Marine Science Campus is situated on the lowest and youngest marine terrace (commonly referred to as the "100-foot terrace"). The marine terraces along this stretch of the coast consist of the regionally abundant Santa Cruz Mudstone and are overlain by younger, unconsolidated terrace deposits. The Santa Cruz Mudstone formation is approximately 8,860 feet thick and is composed primarily of silica-rich (siliceous) mudstones and sandy siltstone. Most of this rock, similar to the Monterey Formation, is considered diatomaceous because it contains numerous diatoms or their siliceous remains. The area encompassing the Marine Science Campus is considered to be within MRZ-4.[5] The Santa Cruz Mudstone underlying the proposed campus site is not considered a significant mineral resource and is not actively quarried for commercial use. The closest MRZ-2 zone (an area of significant mineral resources) is a large deposit of Santa Margarita Sandstone east of Highway 1 near Needle Rock Point, about 2.8 miles to the east.

The beach area along the southern portion of the project site is substantially comprised of rock.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP building program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new development of 545,356 square feet (sf) at the Marine Science Campus by about 2010. The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education; 70,000 sf for Outdoor Research Areas; 19,000 sf for Support Facilities; 98,100 sf for Support Housing; 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for Seawater System Expansion. The project site would be subject to grading and excavation for building pads as well as other land-disturbing activities required to implement other site improvements. These improvements include modifying and extending public-access trails and roadways, constructing parking, undergrounding utility improvements,

[5] Stinson et al., "Mineral Land Classification: Aggregate Materials in the San Francisco-Monterey Bay Area, Part II, Classification of Aggregate Resource Areas South San Francisco Bay Production-Consumption Region," California Division of Mines and Geology Special Report 146, 1983.

installing stormwater management systems, expanding the seawater system, developing new public access overlook areas, and providing for lighting, landscaping, and signage. While most of the above development activities would occur within the three development areas, some improvements and/or activities would also occur outside of these areas, including: limited parking, utility improvements, stormwater management systems, the intake and discharge portion of an expanded seawater system, public access overlooks, lighting for safety and wayfinding, signage, and resource management activities.

CLRDP development would not occur in areas with known mineral resources.

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program by about 2010. Amongst the building footprints depicted in the CLRDP prototype site plan are specific sites for these five near-term projects (see Figure 3-7). These projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area.
- The United States Geological Survey (USGS) Western Coastal and Marine Geology facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area.
- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area.
- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area.
- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area. Additionally, this proposed project would include the construction of two new public-access overlooks and improvement of an existing overlook.

Construction of each of these projects would involve excavation and other ground disturbing activities, such as those described above for the CLRDP building program. As for the CLRDP these projects would not occur in areas containing any known mineral resources.

MEASURES PROPOSED AS PART OF THE PROJECT

Because there are no mineral resources at the Marine Science Campus, the CLRDP does not provide mineral resource protection plans, policies, or implementation programs.

PROJECT IMPACTS AND MITIGATION MEASURES

Entire Development Program

The area encompassing the project site is considered to be within MRZ-4, an area for which available geologic information is inadequate for assignment to another zone. The underlying Santa Cruz Mudstone and the younger terrace deposits overlying the mudstone are not mineral-yielding formations and consequently no substantial mineral resources would be expected to occur. Therefore, the development proposed under the CLRDP would not result in the loss of a known or expected mineral resource that would be of value to the region and the residents of the state.

As discussed in the Regulatory Context section above, the County of Santa Cruz General Plan/LCP designates Mineral Resource lands that are classified by the state as MRZ-2 (areas containing significant mineral deposits), but excludes areas in the county with existing land uses or those that conflict with mineral resource extraction. Because there are no mineral resources known or expected to occur on the Marine Science Campus given its geologic character, development proposed under the CLRDP would not result in the loss of availability of a locally important mineral resource recovery site.

Near-term Projects

The five near-term projects are located with the MRZ-4 zone which is not a mineral-yielding zone and therefore, the development of the five projects would not result in the loss of a known or expected mineral resource. As with the Entire Development Program, the five near-term projects would not be located in an area with known or expected mineral resources and therefore, near-term project development would not result in the loss of availability of a locally important mineral resource recovery site.

Based on applicable CEQA impact criteria, neither the CLRDP, nor any of the near-term projects identified in the CLRDP, would have a significant adverse impact on mineral resources.

CUMULATIVE IMPACTS

There is no known, extractable mineral resource within the project site vicinity (i.e., the Westside Study Area, as defined in the introduction to Chapter 4), nor are there ongoing mineral extraction activities within this immediate region of Santa Cruz. Therefore, the CDLRP, including the five near-term projects, in conjunction with other past and reasonably foreseeable future development would not result in cumulative mineral resource impacts in the cumulative study area.

There would be no cumulative mineral resource impacts associated with the CLRDP and other development in the project vicinity.

4.11 NOISE

This section evaluates the potential noise impacts associated with implementation of the CLRDP and the five near-term projects. Information in this section is based on a comprehensive noise study conducted for the project, including on-site short- and long-term sound level measurements and sound level modeling.

Based on CEQA criteria, a project would generally be considered to have significant adverse impact on the environment with respect to noise if it would result in:

- Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies.
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels existing without the project.
- Exposure of people residing or working in the project area to excessive noise levels if the project is located within an area covered by an airport land use plan, or where such plan has not been adopted, within two miles of a public airport or public use airport.
- Exposure of people residing or working in the project area to excessive noise levels if the project is located in the vicinity of a private airstrip.

The thresholds by which the above impact criteria are analyzed are discussed below.

EXCESSIVE NOISE EXPOSURE

To assess whether the development under the CLRDP would expose persons to or generate noise levels that are excessively high, the EIR evaluates the absolute change in noise levels due to the project and the relationship between the resultant noise level and the noise/land use compatibility guidelines of the State of California Governor's Office of Planning and Research (OPR), (1998) OPR has developed specific planning guidelines for noise/land use compatibility, which are shown in Table 4.11-1, *Acceptable Noise Levels for Land Use Categories*. These same standards have also been adopted by the City of Santa Cruz in the Noise Element of its General Plan.

For low-density residential uses, normally acceptable exterior noise levels are those below 60 dBA DNL or CNEL. For multi-family residences, normally acceptable noise levels are those below 65 dBA DNL or CNEL. Campus support housing falls into the category of multi-family housing (medium- to high-density) and therefore is subject to the 65-dBA acceptability level for normally acceptable noise levels. Offices, laboratories, and academic buildings on campus would be subject to the 70-dBA acceptability level for normally acceptable noise levels, which is the same threshold for schools and office buildings.

TABLE 4.11-1
ACCEPTABLE NOISE LEVELS FOR LAND USE CATEGORIES

	Levels of Acceptability[a], DNL[b] or CNEL[c] (dBA)[d]			
Land Use Category	**Normally Acceptable**	**Conditionally Acceptable**	**Normally Unacceptable**	**Clearly Unacceptable**
Residential –Low Density Single Family, Duplex, Mobile Homes	Less than 60	55 to 70	70 to 75	More than 75
Residential –Multi Family	Less than 65	60 to 70	70 to 75	More than 75
Transient Lodging – Motels, Hotels	Less than 65	60 to 70	70 to 80	More than 80
Schools, Libraries, Churches, Hospitals, Nursing Homes	Less than 70	60 to 70	70 to 80	More than 80
Auditoriums, Concert Halls, Amphitheaters	-	Less than 70	-	More than 65
Sports Arena, Outdoor Spectator Sports	-	Less than 75	-	More than 70
Playgrounds, Neighborhood Parks	Less than 70	-	67 to 75	More than 73
Golf Courses, Riding Stables, Water Recreation, Cemeteries	Less than 75	-	70 to 80	More than 80
Office Buildings, Business Commercial and Professional	Less than 70	68 to 73	More than 75	-
Industrial, Manufacturing, Utilities, Agriculture	Less than 75	70 to 80	More than 75	-

[a] Levels of Acceptability are defined as follows:

Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Normally Unacceptable: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Unacceptable: New construction or development clearly should not be undertaken.

[b] Day-Night Level (DNL) is a descriptor of the community noise environment that represents the energy average of the A-weighted sound levels occurring during a 24-hour period, and that accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 PM and 7:00 AM is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.

[c] Community Noise Equivalent Level (CNEL) is the average A-weighted noise level during a 24-hour day, obtained by addition of five decibels in the evening from 7:00 to 10:00 PM, and an addition of a ten-decibel penalty in the night between 10:00 PM and 7:00 AM.

[d] A definition of decibels and A-weighted decibels (dBA) is provided under the description of Noise Principles later in this section.

SOURCE: Governor's Office of Planning and Research, *General Plan Guidelines*, Appendix A: Guidelines for the Preparation and Content of the Noise Element of the General Plan, 1998.

For the purposes of this EIR, noise impacts would be considered significant if the project resulted in the following DNL levels at locations that affect human receptors:

- An increase in noise that causes the OPR noise/land use compatibility standards (60 dBA DNL for low-density residential uses, 65 dBA DNL for multi-family residential, and 70 dBA DNL for campus academic buildings) to be exceeded, and the project results in a permanent noise increase of 3 dBA or more;

- An increase of 3 dBA DNL where the noise levels without the project are above the OPR standards for "normally acceptable" noise levels;

- An increase of 5 dBA DNL, where the noise levels without the project are 50 to 65 dBA DNL for residential uses and the increase in noise from the project does not cause the OPR standards to be exceeded; or

- An increase of 10 dBA DNL, where the noise levels without the project are less than 50 dBA DNL for residential uses.

It should be noted that a noise increase of 3 decibels is a perceptible increase and has been used as a standard in this EIR to evaluate impacts in areas where the ambient or background noise levels without the project are close to or exceed the OPR noise/land use compatibility standard for affected land uses. Increases of 5 and 10 decibels have been used as a standard in areas where the ambient or background noise levels without the project are low or moderate. The use of this "sliding scale" is appropriate because where ambient/background levels are low, an increase over 3 decibels would be perceptible but would not cause annoyance or activity interference. In contrast, if the ambient/background noise levels are high (above 65 dBA in multi-family residential areas), any perceptible increase could cause an increase in annoyance.

These standards described above have been used to assess the significance of any long-term increases in noise generated by the project. Long-term increases are associated with campus operations and campus-related traffic. They are also used to evaluate whether the project would expose persons to existing noise levels (such as train noise) that are considered excessive.

GROUND-BORNE VIBRATION AND GROUND-BORNE NOISE

To assess whether the CLRDP would expose persons to or generate excessive ground-borne vibration or ground-borne noise levels, this EIR analyzes the effect of ground-borne vibration associated with implementation of the CLRDP according to vibration impact measures presented by the California Department of Transportation (Caltrans) in its Technical Advisory Report, *Transportation Related Earthborne Vibrations* (2002).

PERMENANT INCREASE IN AMBIENT NOISE LEVELS

The thresholds applied to assess whether the CLRDP would result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without implementation of the CLRDP are the same as the thresholds used to determine whether development under the CLRDP would expose persons to or generate noise levels that are excessively high. A substantial permanent increase in ambient noise levels resulting from implementation of the CLRDP would not be detectable unless the CLRDP exposes persons to or generates noise levels that are excessively high.

TEMPORARY INCREASE IN AMBIENT NOISE LEVELS

Construction-related noise associated with the implementation of the CLRDP is analyzed to assess whether the CLRDP would result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without implementation of the CLRDP. The criterion noise level for determining the impact significance of construction noise on sensitive receptors varies according to the time of day. Construction noise is considered a significant impact if it is greater than 80 dBA Leq during daytime or evening hours (7:00 AM to 10:00 PM), or 70 dBA Leq period during nighttime hours (10:00 PM to 7:00 AM) at noise-sensitive land uses.[1]

EXPOSURE TO AIRPORT NOISE

To assess whether implementation of the CLRDP will expose people residing or working on the campus to excessive noise levels from airport noise, the report examines the noise levels generated by any nearby airports, including public use airports and private airstrips.

Noise impacts on biological resources are addressed in the Biological Resources section of this EIR (Section 4.4).

SETTING

NOISE PRINCIPLES

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise is defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. Sound pressure level is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. Because sound pressure can vary by over one trillion times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear’s decreased sensitivity to low and extremely high frequencies instead of the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting

[1] These standards have been derived from noise ordinances of other jurisdictions.

follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements.

Noise is an undesirable by-product of society's normal day-to-day activities. The definition of noise as unwanted sound implies that it has an adverse effect on people and their environment.

Noise Exposure and Community Noise

An individual's noise exposure is a measure of the noise experienced by the individual over a period of time. A noise level is a measure of noise at a given instant in time. However, noise levels rarely persist consistently over a long period of time. Rather, community noise varies continuously with time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources that crease a relatively stable background noise, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable.

These successive additions of sound to the community noise environment cause the community noise level to vary from instant to instant, requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate effects of cumulative noise. This time-varying characteristic of the community noise environment is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

Leq: The equivalent sound level (Leq) is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The Leq is the constant sound level that would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

Lmax: The instantaneous maximum noise level (Lmax) it the maximum noise level measured during the measurement period of interest.

DNL: The Day-Night Level (DNL) is the energy average of the A-weighted sound levels occurring during a 24-hour period. The DNL accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 PM and 7:00 AM is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises. This measure is also referred to as Ldn.

CNEL: Community Noise Equivalent Level (CNEL) is the average A-weighted noise level during a 24-hour day, obtained by addition of five decibels in the evening from 7:00 to 10:00 PM, and an addition of a ten-decibel penalty in the night between 10:00 PM and 7:00 AM.

Effects of Noise on People

Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm, or when it has adverse effects on health. The effects of noise on people can be placed into three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction;
- Interference with activities such as speech, sleep, and learning; and
- Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants generally experience noise in the last category. There is no complete satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation exists in the individual thresholds of annoyance, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:[2]

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;

- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;

- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and

- A 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion, hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate between 6 dBA for hard sites and 7.5 dBA for soft sites for each doubling of distance from the reference measurement. Hard sites are those with a reflective surface between the source and the receiver, such as parking lots or smooth bodies of water. No excess ground attenuation is assumed for hard sites, and the change in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an

[2] California Department of Transportation (Caltrans), Technical Noise Supplement, October 1998.

absorptive ground surface such as soft dirt, grass, or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dBA (per doubling distance) is normally assumed for soft sites. Line sources (such at traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement.[3]

REGULATORY CONTEXT

The pertinent State of California regulations are contained in the California Code of Regulations (CCR). Title 24 “Noise Insulation Standards” establish the acceptable interior community noise level for multi-family dwellings (and may be extended by local legislative action to include single-family dwellings).

The City of Santa Cruz Noise Ordinance (Municipal Code Section 24.14.260) states that noise levels shall not exceed the local ambient noise level on residential property by more than 5 dBA or the local ambient noise level on non-residential property by more than 6 dBA. Section 9.36.010 of the Municipal Code prohibits offensive noise from 10:00 PM to 8:00 AM that is made within 100 feet of any building or place regularly used for sleeping purposes, or that disturbs, or would tend to disturb, any person within hearing distance of such noise. The Municipal Code defines “offensive noise” as any noise that is likely to disturb people in the vicinity of such noise, and includes, but is not limited to, noise made by any device, structure, machine, or construction.

Although the University, as a State entity, is not subject to municipal regulation, it is University policy to seek consistency with local plans and policies where feasible. For impact determinations, this EIR uses the standards presented in the introduction of this section, which have been developed at the State level.

REGIONAL CONTEXT

The noise environment in the project area is influenced by car traffic, delivery trucks, occasional trains passing on the Union Pacific Railroad, planes flying overhead, neighboring agricultural activities, and natural noise sources such as wind and ocean surf. Ambient noise levels on and around the project site are primarily influenced by vehicle travel on local roadways (e.g., McAllister Way and Delaware Avenue).

ON-SITE NOISE ENVIRONMENT

The UCSC Marine Science Campus consists of approximately 98 acres located at the western edge of the City of Santa Cruz. Activity currently taking place on the site centers on the existing Marine Science Campus complex; the remainder of the site is undeveloped. The northern edge of the Marine Science Campus is located about one quarter of a mile directly south of Highway 1. Agricultural land lies adjacent to the western perimeter of the campus and is part of unincorporated Santa Cruz County. A residential community (De Anza Santa Cruz residential community) borders the eastern edge of the Marine Science Campus and is separated by a masonry wall approximately five feet high. The “beeping” noise of delivery trucks originating from the delivery lots of light industrial facilities located immediately north of the railroad tracks can be heard on the campus.

3 California Department of Transportation (Caltrans), Technical Noise Supplement, October 1998.

A long-term (24-hour) measurement was recorded on the site to characterize the existing ambient noise environment. A sound level of 52 DNL dBA was measured at a point near the center of the site that is approximately 400 feet due east of the Marine Wildlife Center and approximately 400 feet west of the De Anza Santa Cruz residential community.

In addition, a short-term measurement of 53.2 dBA was recorded near the De Anza Santa Cruz residential community, the closest receptor to the campus property. This measurement was recorded approximately 30 feet west of the De Anza Santa Cruz residential community and 400 south of entrance gate to the campus.

OFF-SITE NOISE ENVIRONMENT

Vehicular traffic from Highway 1 is the dominant source of noise in the vicinity of the property. A number of single-family homes are located to the east of the property (in the De Anza Santa Cruz residential community), but these do not contribute a significant amount of noise in the area. An area of industrial and commercial uses is located to the north and northeast, but none of the existing operations contribute substantial noise to the area. In general, off-site noise levels are typical of a suburban environment.

Roadway Noise

The project site is located approximately one quarter of a mile directly south of Highway 1. One of the major roads serving the area is Shaffer Road, which adjoins the northeastern edge of the site. There are no major existing land uses along Shaffer Road which generate vehicle trips south of the railroad tracks. To the east, Delaware Avenue is a major access route to the project site, and continues on the site until it meets with McAllister Way. Delaware Avenue passes by a variety of off-site areas that are designated by the Santa Cruz General Plan as residential, industrial, natural areas, and coastal reserve. The segment of Delaware Avenue approaching the project site passes adjacent to a residential area, the De Anza Santa Cruz residential community. Based on the traffic volume alone, the noise level at this location is approximately 53.1 dBA (as shown in Table 4.11-2 later in this section).

Union Pacific Railroad

The Union Pacific Railroad tracks are located along the project site's northern boundary. Train activity along these tracks is minimal; about six pass by events occur per week.[4] A 24-hour measurement was taken of the sound level generated by this train activity in September 2002. The sound level generated on the project site at a distance of 30 feet from the train tracks was less than 55 DNL. This sound level is relatively low because the trains pass by the site only in the daytime hours at a relatively low speed. Maximum levels reach 85 to 87 dBA Lmax for a brief period of time when the trains pass.

Agricultural Operations

The project site is also potentially affected by mobile noise sources associated with the existing agricultural uses at the Younger Ranch west of the site. The primary crop grown on the Younger Ranch agricultural site is Brussels sprouts. A cost study prepared in 1985 by the University of California Cooperative Extension Service lists the various operations that take place for the

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4 Union Pacific runs three round trips (six train passes) per week past the project site, according to Denise Duffy & Associates, Inc., *Draft Initial Study for the Santa Cruz Rail Line Acquisition,* January 2001.

cultivation of Brussels sprouts. Most of this information is still current and provides the background information for the analysis of the noise issues. Land preparation involves the use of a large tractor for tillage.[5] Newer tractors of all types generate noise levels in the range of 90 dBA or less next to the tractor, and the levels drop as the distance from the tractor increases. This would be true for all the operations using tractors, including transplanting, cultivating, fertilizing, and pest control. Aerial application of pesticides is not conducted in the Santa Cruz area.[6]

SENSITIVE RECEPTORS

Some land uses are considered more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities they typically host. Residential uses, such as the De Anza Santa Cruz residential community east of the project site, the residences along Shaffer Road north of the railroad tracks, and the caretaker units in the southern portion of the project site, are considered sensitive receptors for noise; they are more sensitive to noise than are office, commercial, industrial, and agricultural land uses.[7] The nearest schools to the project site are Ark Alternative School (public elementary), located at 313 Swift Street approximately ¾ mile east of the site, and Natural Bridges Elementary, located at 225 Swift Street approximately one mile east of the site. Another elementary school, Santa Cruz Waldorf School, is located at 2190 Empire Grade Road. Empire Grade Road is a major access route between the Main Campus of UC Santa Cruz and the State Highway 1 and the coast. All three schools are considered noise-sensitive receptors.

Noise impacts on biological resources including those in the Younger Lagoon Reserve are addressed in the Biological Resources section of this EIR (Section 4.4).

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP building program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new building area of 377,856 square feet (sf) at the Marine Science Campus by about 2020. In addition, the proposed CLRDP would allow approximately 152,000 sf of outdoor development and approximately 550 additional parking spaces. The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education, 70,000 sf for Outdoor Research Areas, 19,000 sf for Support Facilities, 98,100 sf for Support Housing, 107,500 sf for Equipment Storage and Maintenance, and 12,000 sf for Seawater System Expansion. Implementation of the CLRDP would include construction of multiple facilities and some building demolition. Operation of the Marine Science Campus under the CLRDP would result in the addition of residential uses on the campus, increased vehicle traffic along access routes to the campus, and an overall increase in activity on the campus.

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5 Bean, Thomas L., Noise on the Farm can Cause Hearing Loss, an Ohio State University Extension publication, available at http://ohioline.osu.edu/aex-fact/0590.html

6 Inman, John, P.E. as referenced in City of Santa Cruz, *Shaffer Road/Pacific Shores Apartments EIR*, (Prepared by Impact Sciences), 2001.

7 State of California, Governor’s Office of Planning and Research (OPR), General Plan Guidelines, November 1998

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program by about 2010. Amongst the building footprints depicted in the CLRDP prototype site plan are specific sites for these five near-term projects (see Figure 3-7). These projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area. Operation of this facility would include use of delivery trucks, maintenance equipment, and fork lifts.

- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area, introducing a new noise-sensitive receptor to the campus. These would be located approximately halfway between McAllister Way and the east property line of the campus.

- The United States Geological Survey (USGS) Western Coastal and Marine Geology facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area. Expansion of the USGS facility would also draw additional vehicle trips to the campus.

- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area. Operation of the SORACC would include activities at outdoor research tanks and the introduction of additional vehicle trips to the site.

- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area. Additionally, this proposed project would include the construction of two new public-access overlooks and improvement of an existing overlook. Development of this facility would result in increased vehicle traffic to the campus from staff, researchers, and visiting members of the general public.

MEASURES PROPOSED AS PART OF THE PROJECT

The CLRDP states that “the University will fortify the urban edge by minimizing, and where feasible, avoiding conflicts with adjacent agricultural uses” (Policy 2.2, Fortifying the Urban Edge through the Protection of Adjacent Agricultural Resources). To achieve this goal, the following implementation measures are proposed:

- The University will maintain a 300-foot-wide setback to new non-residential development from adjacent agricultural use except at and south of the existing CDFG Marine Wildlife Center where topography and an earthen berm separate the development area from adjacent agricultural lands. (Implementation Measure 2.2.1, Setback of Non-Residential Uses from Adjacent Agricultural Use).

- The University will maintain a 500-foot-wide setback to separate new residential development from adjacent agricultural use (Implementation Measure 2.2.2, Setback of Residential Uses from Adjacent Agricultural Use).

These setback measures would help prevent exposure of persons on the campus to excessive noise levels generated by agricultural activities on neighboring agricultural land.

In addition, the CLRDP includes measures to protect environmentally sensitive habitat areas (Policy 3.4, Protection of Environmentally Sensitive Habitat Areas). The following implementation measures are proposed:

- Buffering of sensitive habitat areas may also be achieved through development restrictions consistent with the policies and programs of this CLRDP which regulate the location of windows, lighting, access, signage and noise-generating equipment that would disrupt protected habitat values (Implementation Measure 3.4.1 – Additional Measures to Protect Habitat Areas).

- Buildings and parking lots will be designed so that noise sources are at least 100 feet from ESHA [Environmentally Sensitive Habitat Areas] located in the terrace portion of the Marine Science Campus (Implementation Measure 3.4.2 – Noise Intrusion into Terrace ESHA).

- Younger Lagoon Reserve will not be exposed to noise generated by human activity on the terrace portion of the Marine Science Campus in excess of 60 dBA CNEL, as measured at the boundary of the Younger Lagoon Reserve (Implementation Measure 3.4.3 – Noise Intrusion into Younger Lagoon Reserve).

PROJECT IMPACTS AND MITIGATION MEASURES

EXCESS NOISE EXPOSURE

Entire Development Program

Operation of the Marine Science Campus under the CLRDP has the potential to result in excessive noise or expose persons to excessive noise from three types of sources: train noise, traffic noise, and operational noise associated with the operation of campus facilities. These types of noise sources are analyzed separately below.

Train Noise

The Union Pacific Railroad tracks are located adjacent to the northern boundary of the project site. As described in the Setting subsection above, the existing sound level at a distance of 30 feet from the tracks is approximately 55 DNL. This sound level is well below the 65 DNL standard for multi-family residences established by OPR. The 38 apartments are the only sensitive receptors proposed on the upper terrace under the CLRDP. All buildings proposed on the upper terrace would be set back at least 150 feet from the railroad tracks. Although maximum noise levels would reach as high as 77 Lmax dBA for brief periods of time when trains pass, the duration of the noise would be brief, relatively infrequent, and during the daytime. Therefore, the CLRDP would not expose persons to train noise levels in excess of standards established by OPR (see Table 4.11-1).

Traffic Noise

With operation of the Marine Science Campus under full development of the CLRDP, additional motor vehicle traffic is expected on nearby roads that provide access to and from the campus. Additional motor vehicle trips would result from additional employees, visitors, visiting researchers, residents, and delivery trucks to the campus. To evaluate the effect of increased traffic resulting from campus operation, roadside noise levels were estimated under existing conditions and at full development. These estimates were made using the Federal Highway Administration's (FHWA) noise prediction model and weekday PM peak-hour traffic volume estimates prepared for the traffic analysis of this report.[8] The model was applied to 22 roadway segments (from seven different intersections) that are found to experience a doubling of traffic volumes (as determined in the traffic section of this report) and/or pass by noise-sensitive receptors near the project site. The estimated noise levels shown in Table 4.11-2 correspond to a distance of approximately 15 meters (approximately 50 feet) from the centerline of a given road segment.

The PM peak-hour Leq typically is equivalent to the DNL at locations where the predominant source of noise is from traffic sources.[9] Thus, the roadside noise levels shown in Table 4.11-2 are compared to the four DNL significance thresholds for excessive noise exposure, as presented in the introduction of this section. As shown in Table 4.11-2, traffic noise along three of the road segments would increase by more than 3 dBA due to CLRDP-related traffic.

Traffic on Roadway Segment 2 (Delaware Avenue just east of Shaffer Road) would increase the roadside noise level by 8.5 dBA to 61.6 DNL at a distance of 50 feet. The nearest sensitive receptors, residents of the De Anza Santa Cruz residential community, would not be exposed to this increase, however. The wooden wall, approximately five feet high, which currently stands on the north property line of the nearest mobile home residence would attenuate the traffic noise by a minimum of 6 dBA. Thus, the resultant noise level would be approximately 55.6 DNL at the nearest sensitive receptor, which is less than the OPR land/use compatibility standard of 60 DNL for mobile home residences (see Table 4.11-1). Moreover, this level represents an increase that is less than 3 dBA higher than the existing noise level of 53.2 dBA observed by the nearby short-term measurement.

The resultant noise level along Roadway Segment 6 (Delaware Avenue west of Natural Bridges Drive) would increase by 4.8 dBA to 62.7 DNL. This increase of less than 5 dBA would result in a noise level that is less than the OPR noise/land use compatibility standards for the adjacent industrial land use (75 DNL) and the adjacent recreational open space (70 DNL).

The noise level along Roadway Segment 3 (the extension of Delaware Avenue onto the project site, just east of Shaffer Road) is estimated to increase by 9.5 dBA to 59.9 DNL; however, there are currently no receptors along this road segment that would be affected by this increase.

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8 Barry, T.M. and J.A. Reagan, 1988. FHWA Highway Traffic Noise Prediction Model, U.S. DOT, Federal Highway Administration, Office of Environmental Policy, December 1988.

9 California Department of Transportation (Caltrans), Technical Noise Supplement, October 1998.

TABLE 4.11-2
ESTIMATED WEEKDAY PM PEAK-HOUR TRAFFIC NOISE LEVELS
ALONG ROAD SEGMENTS NEAR THE UCSC MARINE SCIENCE CAMPUS

			Peak-Hour Sound Level, Leq[a]			
Segment #	**Roadway Segment**	**Intersection No.[b]**	**Existing**	**Existing + 5 Near-term projects[c]**	**Existing + CLRDP[c]**	**CLRDP + 2020 Background[d]**
1	Shaffer Rd. north of Delware Ave.	1	47.9	47.9	47.9	51.4
2	Delaware Ave. east of Shaffer Rd.	1	53.1	58.7	61.6	62.0
3	Delaware Ave. west of Shaffer Rd.	1	50.4	56.8	59.9	60.0
4	Natural Bridges Dr. north of Delware Ave.	2	59.2	60.0	60.9	61.6
5	Delaware Ave. east of Natural Bridges Dr.	2	60.5	61.7	62.9	63.6
6	Delaware Ave. west of Natural Bridges Dr.	2	57.9	60.6	62.7	63.2
7	Swanton Blvd. south of Delware Ave.	3	58.1	58.1	58.1	59.0
8	Delaware Ave. east of Swanton Blvd.	3	61.1	62.1	63.3	63.9
9	Delaware Ave. west of Swanton Blvd.	3	61.1	62.2	63.3	63.9
10	Laguna south of Bay St.	4	60.2	60.5	60.9	62.1
11	Bay St. east of Laguna	4	65.2	65.2	65.3	66.8
12	Bay St. west of Laguna	4	63.1	63.3	63.5	65.0
13	Shaffer Rd. south of State Highway 1	5	54.8	55.2	55.7	59.6
14	State Highway 1 east of Shaffer Rd.	5	68.6	68.6	68.6	70.4
15	State Highway 1 west of Shaffer Rd.	5	68.5	68.5	68.6	69.9
16	Swift St. north of Delware Ave.	6	59.7	60.1	60.6	61.6
17	Swift St. south of Delware Ave.	6	60.1	60.1	60.1	61.1
18	Delaware Ave. east of Swift St.	6	62.2	62.8	63.4	64.4
19	Delaware Ave. west of Swift St.	6	61.8	62.7	63.7	64.4
20	Empire Grade Rd. north of Heller Dr.	24	62.2	62.5	62.8	65.2
21	High St. south of Heller Dr.	24	68.8	68.8	68.9	71.0
22	Heller Dr. east of Empire Grade Rd.	24	68.1	68.1	68.1	70.1

[a] Noise levels were calculated using the FHWA Traffic Noise Prediction Model for weekday PM peak-hour conditions. Noise levels were calculated at 15 meters from the centerline of the roadway. For each of the roadway segments, the analysis assumes a vehicle mix consisting of 98% automobiles, 1.5% medium trucks, and 0.5% heavy trucks. The analysis assumes an average vehicle speed to be 30 miles per hour (mph) for Roadway Segments 3, 7, 10, 16, and 17; 35 mph for Segments 1, 2, 4, 5, 6, 8, 9, 11, 12, 13, 18, and 19; 45 mph for Segments 20, 21, and 22; and 50 mph for Segments 14 and 15.

[b] The intersection number indicates the intersection of which the road segment is a part, and corresponds directly to the intersection numbers referred to in Section 4.15, Transportation/Traffic.

[c] The scenarios for "Existing + 5 Near-term projects" and "Existing + CLRDP," by definition, would not actually occur because project-related traffic would be added to future levels, rather than existing levels. They show the project's influence on future traffic volumes in comparison to cumulative growth and development not related to the project.

[d] The scenario "CLRDP + 2020 Background" represents noise levels from traffic generated by development of the CLRDP and the development of all remaining undeveloped parcels located within the City of Santa Cruz's Westside area by about 2020. The data in this column is used to evaluate the CLRDP's cumulative impact on roadside noise levels.

SOURCE: Environmental Science Associates, 2003

Operational Noise

Noise associated with campus operational activities (non-transportation noise) under implementation of the CLRDP has the potential to substantially increase ambient noise levels at nearby sensitive receptors. Increased sound levels would result from noise generated by mechanical devices associated with building heating, ventilation, and air conditioning systems installed as part of the new campus facilities. Operation of noise-generating equipment would generally occur on a constant 24-hour basis. Activities associated with campus facilities, including use of research equipment or landscaping, could also affect ambient noise levels.

As shown by the *Illustrative Site Plan* in Figure 3-7, the marine research and educational facilities planned on the lower and middle terraces would not be in close proximity to sensitive receptors. Noise associated with the marine research and educational facility planned just north of the Seymour Marine Discovery Center on the lower terrace would be adequately shielded from the caretaker housing by both the Seymour Marine Discovery Center and the Younger Building. Similarly, noise associated with facilities located west of McAllister Way on the middle terrace would be shielded from the 42 Apartment/Townhouse Units by the USGS Western Coastal and Marine Geology facility that would be constructed in the near-term.

Noise generated by the operation of a Seminar and Dining Center and other facilities proposed for the middle terrace development area is not expected to affect the residents of De Anza Santa Cruz residential community because they would be set back from the east property line by approximately 300 feet given that the east side of the Marine Science Campus is designated as either Open Space or Resource Protection area. Additional attenuation would be provided by the masonry wall on the property line and from ground effects.

Noise from marine research and education facilities located adjacent to the housing units on the middle terrace (that would be developed in the near-term) could affect the existing ambient noise level at those residences. In addition, a similar conflict could arise from locating additional housing units on the upper terrace near the warehouse and laydown area (that also would be developed in the near-term). Delivery truck activity and operation of warehouse equipment could produce noise levels that exceed the standard of 65 DNL for “normally acceptable” noise levels for multi-family residences.

<u>Impact 4.11-1</u>: Development of the UCSC Marine Science Campus under the CDLRP could locate noise sources and sensitive receptors in close proximity on the campus, creating the potential to expose persons to, or generate, noise levels in excess of noise/land use compatibility standards. This would be a potentially significant impact.

> **<u>General Mitigation Measure 4.11-1</u>: Prior to developing marine research and education facilities on the middle terrace east of McAllister Way, or additional support housing on the upper terrace, the University shall conduct a project-specific noise analysis. Project-level mitigation measures shall be incorporated into the design of these facilities to reduce potentially significant noise impacts, if necessary.**

Further analysis of potential noise effects and the project level and implementation of specified design features or measures similar to those presented in Project-Specific Mitigation Measure 4.11-1 (later in this section) would reduce noise exposure to nearby sensitive uses to a less-than-significant level.

Near-term Projects

Operation of the five projects to be developed in the near-term on the Marine Science Campus under the CLRDP has the potential to result in excessive noise levels from three types of sources: train noise, traffic noise, and operational noise associated with the operation of campus facilities. These types of noise sources are analyzed separately below for the five near-term projects.

Train Noise

Exposure of persons to noise levels from trains in excess of noise/land use compatibility standards would not be a concern at the Sea Otter Research and Conservation Center, the USGS Western Coastal and Marine Geology facility, the 42 Apartment/Townhouse Units, or the expanded Center for Ocean Health. These four facilities would be located at least 1,200 feet away from the railroad tracks. Passing trains generate maximum sound levels as high as 87 Lmax dBA from a distance of 30 feet, which would attenuate to 55 dBA at a distance of 1,200 feet. This sound level is well below the 65 DNL standard for the development of 42 Apartment/ Townhouse Units, which has the lowest noise level standard of the five near-term projects.

Because train passes are relatively brief and only occur during daytime hours, maximum noise levels generated by passing trains would not result in exceedance of the 75 DNL "normally acceptable" land use/noise compatibility standard that would apply to the Shared Campus Warehouse and Laydown Facility. Therefore, none of the five projects to be developed in the near-term under the CLRDP would expose persons to train noise levels in excess of standards.

Traffic Noise

With the use and operation of all five of the near-term projects, additional motor vehicle traffic term is expected on nearby roads that provide access to and from the campus. As shown in Table 4.11-2, traffic noise along two of the road segments would increase by more than 3 dBA due to development of the five near-term projects.

The noise level along Road Segment 2 (Delaware Avenue east of Shaffer Road) would increase by 5.6 dBA to 58.7 DNL. The nearest sensitive receptors, residents of the De Anza Santa Cruz residential community, would not be exposed to this increase, however. The wooden wall, approximately five feet high, which currently stands on the north property line of the nearest mobile home residence, would attenuate the traffic noise by a minimum of 6 dBA. Thus, the resultant noise level would be very close to the existing noise level at the De Anza Santa Cruz residential community, and less than the OPR land/use compatibility standard of 60 DNL that applies to the nearby mobile home residences.

According to the noise levels estimated using the FHWA model, the noise level along Road Segment 3 (the extension of Delaware Avenue onto the project site, just west of Shaffer Road) is estimated to increase by 6.4 dBA from 50.4 DNL to 56.8 DNL. The resultant noise level for Road Segment 3 would also be less than the OPR land/use compatibility standard of 65 DNL for the 42 Apartment/Townhouse Units proposed on the south side of the road on the middle terrace development area. The increase in the noise level is overestimated by the FHWA model because a long-term measurement on the project site (approximately 400 feet due east of the Marine Wildlife Center and approximately 400 feet west of the De Anza Santa Cruz residential community) measured the existing sound level to be 52 dBA DNL, as described in the Setting above. Therefore, the impact of traffic noise generated along Road Segment 3 would be less than significant.

Operational Noise

Whether the five near-term projects expose persons to or generate noise levels in excess of noise/land use compatibility standards (Table 4.11-1) is determined by the intensity and duration of noise generated by the facilities and their relative proximity to other noise sources and sensitive receptors on or off campus.

The caretaker units on the southwest end of the property currently serve as the only residences on campus. Existing campus facilities, including the Center for Ocean Health, Research Support Building, the Younger Building, and the Seymour Marine Discovery Center, shield the caretaker units from noise generated by point sources to the north. Thus, the caretaker units would not be affected by noise associated with the operation of any of the five near-term projects under the CLRDP.

The proposed locations of the Center for Ocean Health Phase II and the Sea Otter Research and Conservation Center are not in close proximity to a sensitive receptor; therefore their operational noise, including noise from stationary equipment, would not expose sensitive receptors to noise levels in excess of standards or cause a substantial permanent increase in noise.

Operational noise generated from 42 Apartment/Townhouse Units proposed for development in the middle terrace is not expected to affect the residents of De Anza Santa Cruz residential community because they would be set back from the east property line by approximately 300 feet, given that the east side of the Marine Science Campus is designated at either Open Space or Resource Protection area. Additional attenuation would be provided by the masonry wall on the property line and from ground effects.

New mechanical equipment associated with building heating, ventilation, and air conditioning systems (HVAC) would be installed as part of the USGS Western Coastal and Marine Geology facility. HVAC systems for large buildings typically involve air handlers, filters, chillers, and fans that could generate substantial amounts of noise. Very basic units can be as loud as 100 dBA at 15 feet without noise controls. The loudest sound occurs when the compressor system turns on and off.[10] HVAC equipment noise would be predominantly from fans as opposed to large condensers for air conditioning, given that the project site does not experience extremely hot temperatures.

The 42 Apartment/Townhouse Units proposed for development approximately 80 feet east of the proposed USGS facility would experience approximate noise levels of 85 dBA if mechanical equipment is not carefully selected or does not have proper noise controls and shielding. This would exceed the normally acceptable standard of 65 dBA for multi-family residential uses. Therefore, operational noise from the USGS Western Coastal and Marine Geology facility has the potential to result in a significant noise impact on on-campus sensitive receptors. However, standard design features are available to ensure that the effect would be less than significant.

<u>Impact 4.11-2</u>: Operation of HVAC equipment that is part of the USGS Western Coastal and Marine Geology Facility, if not properly designed, could generate noise levels that exceed the normally acceptable OPR standard at the 42 Apartment/Townhouse Units proposed on the middle terrace.

[10] Bolt Beranek and Newman, Inc., “Noise Control for Building and Manufacturing Plants,” 1989.

Project-Specific Mitigation Measure 4.11-2: As part of the design of USGS Western Coastal and Marine Geology Facility, the University shall implement noise control measures in the design of the HVAC systems to reduce the resulting noise levels to 65 DNL or lower at the 42 Apartment/Townhouse units. Control measures for HVAC noise could include, but would not be limited to, the following: use of quiet HVAC models, use of sound barriers around the equipment, and/or orientation of HVAC systems away from sensitive receptors.

The proposed measures that are part of Project-Specific Mitigation Measure 4.11-2 would reduce potentially significant operational noise impacts on the 42 Apartment/Townhouse Units to a less-than-significant level.

The operation of delivery trucks and delivery equipment at the Shared Campus Warehouse and Laydown Facility on the upper terrace would result in increased sound levels. Given the nature of the equipment likely to be operated at the site (e.g., fork lifts, dollies, medium and heavy trucks), sound levels at the Shared Campus Warehouse and Laydown Facility would be approximately 66.1 dBA Leq at a distance of 50 feet.[11] The nearest existing sensitive receptors are the housing north of the Union Pacific Railroad and east of Shaffer Road, which are approximately 300 feet away. Through distance alone, the sound level generated by activity at the Shared Campus Warehouse and Laydown Facility would attenuate to 50.5 dBA, which is well below the OPR normally acceptable standard of 60 DNL for single-family residential homes. Because these residences are not yet occupied, it is assumed that the ambient noise level at their location would be similar to the existing noise level at the De Anza Santa Cruz residential community, which is 53.2 dBA. Therefore, operational noise from the Shared Campus Warehouse and Laydown Facility would have no noticeable effect at these residents. Similarly, residents at the De Anza Santa Cruz residential community, which is approximately 600 feet away, would not be effected by operational noise from the Shared Campus Warehouse and Laydown Facility. Through distance alone the sound level generated by activity at the Shared Campus Warehouse and Laydown Facility would attenuate to 44.5 dBA at the De Anza Santa Cruz residential community property line, which is well below the existing noise level of 53.2 dBA. As described in Section 3, Project Description, support housing is planned for the upper terrace development area adjacent to the Shared Campus Warehouse and Laydown Facility. Residents in this housing could be exposed to increased noise levels generated by activity at the Shared Campus Warehouse and Laydown Facility.

Impact 4.11-3: Sound levels generated by delivery activity at the Shared Campus Warehouse and Laydown Facility could potentially affect residents of future campus housing planned for the upper terrace. This could be a potentially significant impact if the residences are located within 75 feet of the Shared Campus Warehouse and Laydown Facility, where they would be exposed to sound levels above the OPR "normally acceptable" noise standard of 65 dBA for multi-family residences.

Project-Specific Mitigation Measure 4.11-3: As part of the design of the Shared Campus Warehouse and Laydown Facility, the University shall implement noise control measures to reduce the resulting noise levels to 65 DNL or lower at future campus housing planned for the upper terrace development area. Control measures

[11] Environmental Science Associates, *Noise Evaluation of Loading Dock Enclosure at the El Camino Real Costco Wholesale Warehouse in South San Francisco*, August 2003.

incorporated into the design and location of the Shared Campus Warehouse and Laydown Facility may include but not be limited to the following:

- **The University shall orient the warehouse so as to shield noise generated by activity at the Shared Campus Warehouse and Laydown Facility, from potential sites of future campus housing on the upper terrace development area.**

- **The University shall incorporate an easy turn-around for trucks such that they can avoid maneuvering in reverse and thus minimize back-up alarm noise.**

- **Once the future campus housing planned for the upper terrace becomes inhabited, the University shall limit noisy outdoor activities (such as those involving the use of heavy equipment) at the warehouse and laydown area from 10:00 PM to 6:00 AM all days of the week.**

- **The University shall construct a wall around the laydown area, consistent with CLRDP guidelines, to attenuate noise levels at future campus housing planned for the upper terrace development area. The wall shall be completed before the future campus housing planned for the upper terrace is occupied.**

The proposed measures that are part of Project-Specific Mitigation Measure 4.11-3 would reduce potentially significant operational noise impacts on future campus housing planned for the upper terrace development area to a less-than-significant level.

GROUND-BORNE VIBRATION AND GROUND-BORNE NOISE

Entire Development Program

Implementation of the CLRDP has the potential to generate or expose persons to substantial ground-borne vibration from construction activity and from train activity. These two sources of ground-borne vibration sources are analyzed separately below.

Construction Vibration

The types of construction activities that have the potential to generate or expose persons to substantial ground-borne vibration or ground-borne noise levels include the use of explosives (blasting), pile driving, rock drilling.[12] Construction projects under the CLRDP would be limited to normal construction activities that would not generate substantial levels of vibration. Piles that may be needed for foundations of some structures would be predrilled, not driven, and would therefore not generate excessive ground-borne noise or vibration levels. Paving equipment and jack hammers may generate some vibration, but the vibration would be minor in intensity and relatively brief in duration.

Train Vibration

According to a Technical Advisory Report by Caltrans (2002), freight trains within 300 feet may be potentially disruptive to sensitive operations such as residences, laboratories, or places where calibration of sensitive instruments occurs. None of the facilities proposed on the upper terrace

[12] California Department of Transportation (Caltrans), Transportation Related Earthborne Vibrations, TAV-02-01-R9601, February 2002

by the CLRDP would be sensitive to ground-borne vibration. While some technical shop space may be included at the Shared Warehouse and Laydown Facility for handling of SCUBA equipment and research instruments, the activities performed in this space would not be sensitive to ground-borne vibration. All laboratory facilities that could be sensitive to ground-borne vibration would be located on the middle and lower terraces, more than 300 feet away from the railroad tracks. Because the housing units on the upper terrace development area would be developed more than 300 feet from the railroad tracks, as depicted in Figure 3-7, residents would not be exposed to excessive ground-borne vibration levels.

Near-term Projects

Development of the five near-term projects has the potential to generate or expose persons to substantial ground-borne vibration from construction activity and from train activity. These two sources of ground-borne vibration sources are analyzed separately below.

Construction Vibration

The impact analysis of construction-related vibration for the Entire Development Program above applies to all individual developments on the project site that are part of the CLRDP, including all five near-term projects.

Train Vibration

The Sea Otter Research and Conservation Center, USGS Western Coastal and Marine Geology facility, the Center for Ocean Health Phase II facility, and the 42 Apartment/Townhouse Units would be located farther than 300 feet from the railroad tracks that run along the north side of the campus. The Shared Campus Warehouse and Laydown Facility proposed on the upper terrace is not considered an operation that would be sensitive to ground-borne vibration. Therefore, development of the five near-term projects would not expose persons to excessive ground-borne vibration levels.

PERMANENT INCREASE IN AMBIENT NOISE LEVELS

Entire Development Program

The impact analysis of train noise, traffic noise, and operational noise associated with implementation of the CLRDP that is presented in the discussion of Excess Noise Exposure above also demonstrates that the CLRDP will not result in a substantial permanent increase in ambient noise levels above levels existing without the CLRDP on and near the Marine Science Campus.

Near-term Projects

The impact analysis of train noise, traffic noise, and operational noise associated with the development of the five near-term projects that is presented in the discussion of Excess Noise Exposure above also shows that implementation of the near-term projects will not result in a substantial permanent increase in ambient noise levels above existing levels on and near the Marine Science Campus.

TEMPORARY INCREASE IN AMBIENT NOISE LEVELS

Entire Development Program

Construction activities associated with the development of new buildings and facilities on the Marine Science Campus under the CLRDP would generate noise that could expose nearby receptors to elevated noise levels. The proposed CLRDP would entail approximately 17 years of intermittent project construction, consisting of the following activities: ground clearing, earthmoving, foundation construction, erection of structures, finishing, and demolition. Construction noise would primarily result from the use of motorized construction equipment. Construction noise would be most noticeable in residential areas in proximity to project construction locations. Noise levels would vary depending on the distance from construction activity to the receptors and the type of equipment used, how it is operated, and how well it is maintained. Use of conventional construction techniques and equipment is anticipated. Standard excavation and installation equipment, such as graders, backhoes, loaders, side-boom tractors, welders, and trucks, would be used for construction of most project facilities. Specialized construction activities such as pile driving, rock drilling, or blasting are not anticipated to be necessary to implement the CLRDP. Noise levels generated by typical construction activities and commercial construction equipment are shown in Table 4.11-3 and Table 4.11-4, respectively. Sound levels generated by demolition activity performed under the CLRDP would be comparable to construction sound levels because the same types of equipment would be used.

By its nature, construction would result in temporary noise impacts that would last for the duration of each project's construction period. The level of construction noise at sensitive receptors located both on- and off-campus would depend upon the phase of construction and its relative distance from construction activity. To evaluate impacts of construction noise, the values from Table 4.11-3 are compared to the noise criterion of 80 dBA Leq during daytime or evening hours or 70 dBA Leq during nighttime hours at noise-sensitive land uses, because they represent noise levels of overall construction activities, as opposed to individual equipment.

Routine noise levels from conventional construction activities (with the normal number of equipment operating on the site) range from 78 to 89 dBA Leq at a distance of 50 feet, as shown in Table 4.11-3. Noise levels from construction activities generally decrease at a rate of 6 dBA per doubling of distance from the activity.[13] Thus, at a distance of 150 feet from construction equipment, construction noise levels would range from 68 to 79 dBA Leq. At a distance of 500 feet from construction equipment, construction noise would range from 58 to 69 dBA Leq. At a distance of 1,000 feet, construction noise could range up to 52 to 63 dBA Leq but would likely be lower due to additional attenuation from ground effects, air absorption, and shielding from various intervening structures.

Noise from project construction is predicted to be below the significance criterion of 80 dBA Leq during daytime and evening hours if construction activity occurs at distances of 150 feet or more from the closest sensitive receptor without the installation of a temporary sound wall. During nighttime hours, noise from project construction is predicted to be below the significance criterion of 70 dBA Leq if construction activity occurs at distances of 500 feet or more from the closest sensitive receptor. Noise from construction would not likely cause an exceedance of the noise impact significance criterion at residences farther than 500 feet away (on- or off-site),

[13] California Department of Transportation (Caltrans), Technical Noise Supplement, October 1998.

TABLE 4.11-3
TYPICAL CONSTRUCTION ACTIVITY NOISE LEVELS

Construction Phase	Noise Level (dBA, Leq)[a]
Ground Clearing	84
Excavation	89
Foundation Construction	78
Erection if Structures	85
Finishing	89

[a] Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

SOURCE: U.S. Environmental Protection Agency, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, 1971.

TABLE 4.11-4
TYPICAL COMMERCIAL CONSTRUCTION EQUIPMENT NOISE LEVELS

Equipment	dBA at 50 Feet[a] Without Controls	dBA at 50 Feet[a] With Controls[b]
Backhoe	85	75
Bulldozer	80	75
Graders	85	75
Front-end Loader	79	75
Dump Trucks	91	75
Concrete Pump	82	75
Flat-Bed Delivery Truck	91	75
Crane	83	75
Pumps	76	75

[a] Estimates correspond to a distance of 50 feet from the noisiest piece of equipment and 200 feet from the other equipment associated with that phase.
[b] Implementing controls may include selecting quieter procedures or machines and implementing noise-control features requiring no major redesign or extreme costs (e.g., improved mufflers, equipment redesign, use of silencers, shields, shrouds, ducts, and engine enclosures).

SOURCE: U.S. Environmental Protection Agency, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances,* December 1971.

though construction noise would be audible and would temporarily elevate the local ambient noise level to some degree.

The closest sensitive receptors to the facilities to be developed on the middle and lower terrace development areas would be the De Anza Santa Cruz residential community. As shown on Figure 3-6, the area designated as Open Space and/or Resource Protection Buffer on the middle and lower terrace development areas separates the nearest residents from the areas where facilities would be developed by at least 300 feet. Therefore, noise from the construction of these facilities would attenuate to a level below the daytime and evening significance threshold of 80 dBA Leq.

The closest sensitive receptors to the facilities to be developed on the upper terrace development area would be the residences north of the Union Pacific Railroad and East of Shaffer Road. Because these residents would be located a minimum of 300 feet from construction activity on the upper terrace development area, associated construction noise would also attenuate to a level below the daytime and evening significance threshold of 80 dBA Leq.

In addition, commute trips by construction workers and construction-related material haul trips would also increase roadside noise levels along haul routes, depending on the number of haul trips made and types of vehicles used. For instance, if construction vehicles turning from Highway 1 use Swift Street and Delaware Avenue to reach the campus, residences along Swift Street would experience elevated sound levels, which could be a potentially significant impact. Construction vehicles that use Natural Bridges Drive to approach the campus, however, would avoid this impact.

<u>Impact 4.11-4</u>: Noise generated by construction activity under the CLRDP may substantially increase noise levels at nearby sensitive receptors, resulting in temporary and localized noise impacts. This would be a potentially significant impact.

<u>General Mitigation Measure 4.11-4</u>: Prior to the initiation of construction, the University shall approve a construction noise mitigation program including but not limited to the following:

- **The University shall require that construction activities be limited to a schedule that minimizes disruption to noise-sensitive uses on the project site and in the vicinity through implementation of the following:**
  - **Construction activities during daytime and evening hours (7:00 AM to 10:00 PM) shall not occur within 150 feet of sensitive receptors, when feasible. Construction activities within 500 feet of sensitive receptors activities shall not occur during nighttime hours (10:00 PM to 7:00 AM).**
  - **Whenever possible, academic and administrative staff, as well as residents who will be subject to construction noise, shall be informed one week before the start of each construction project.**
  - **Loud construction activity as described above within 150 feet of an academic or residential use shall, to the extent feasible, be scheduled during holidays, spring break, or summer break.**

- **To reduce noise impacts from construction, the University shall require that construction contractors muffle or otherwise control noise from construction equipment through implementation of the measures below. The effectiveness of these measures is quantified in Table 4.11-4 above.**

  - **Internal combustion engines used for any purpose at the construction sites shall be equipped with a muffler of a type recommended by the manufacturer.**

  - **Equipment used for construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically-attenuating shields or shrouds, wherever feasible);**

  - **Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or electrically powered wherever feasible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used. Such mufflers can lower noise levels from the exhaust as much as 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures such as using drilling equipment rather than impact equipment shall be implemented whenever feasible.**

  - **Stationary noise sources shall be located as far from sensitive receptors as feasible. If they must be located near sensitive receptors, they shall be muffled to the extent feasible and/or, where practicable, enclosed within temporary sheds.**

- **The University shall require that a temporary wooden wall be placed around construction activity areas that are within 150 feet of sensitive receptors to provide additional noise attenuation, where feasible. The wall should impede the direct line of site between the noise sources and sensitive receptors.**

- **The University shall require that construction-related material haul trips access the campus via Natural Bridges Drive and Delaware Avenue in order to minimize noise exposure to residential land uses.**

- **The University shall identify potential noise impacts related to construction of long-term projects proposed under the CLRDP, and develop project-specific noise mitigation measures as may be necessary. The University shall take into account the location of the five campus facilities that will have been developed in the near-term as well as off-campus developments nearby. The analysis shall also take into account the sequence in which long-term projects are to be constructed and shall identify appropriate mitigation, as may be required. These future facilities may be sensitive receptors or may act as barriers to noise approaching other sensitive receptors.**

General Mitigation Measure 4.11-4 would reduce potentially significant construction noise impacts on sensitive receptors to a less than significant level.

Near-term Projects

Construction activity associated with the five projects to be developed in the near-term under the CLRDP could result in temporary and intermittent increases in ambient noise levels on and near the Marine Science Campus. Temporary impacts during construction would be significant if construction noise levels exceed the noise criterion of 80 dBA Leq during daytime or evening hours, or 70 dBA Leq during nighttime hours at noise-sensitive land uses.

Construction of the five near-term projects is anticipated to occur during continued operation of the existing facilities on the campus. The order in which the near-term projects would be developed has not yet been determined.

Activities at each of the construction sites would involve ground clearing and excavation, followed by building construction and finishing operations. Noise levels generated by typical commercial construction activities are shown in Table 4.11-3 above. Table 4.11-3 shows that routine noise levels from conventional construction activities range from 78 to 89 dBA Leq at a distance of 50 feet. Given that construction noise attenuates by a rate of 6 dBA per doubling of distance, construction noise levels would range from 68 to 79 dBA Leq at a distance of 150 feet. At a distance of 500 feet from construction equipment, construction noise would range from 58 to 69 dBA Leq. At a distance of 1,000 feet, construction noise could range up to 52 to 63 dBA Leq but would likely be lower due to additional attenuation from ground effects, air absorption, and shielding from various intervening structures.

As described under the analysis of construction noise for the entire development program, noise from project construction is predicted to be below the significance criterion of 80 dBA Leq during daytime and evening hours if construction activity occurs at distances of 150 feet or more from the closest sensitive receptor without the installation of a temporary sound wall. During nighttime hours, noise from project construction is predicted to be below the significance criterion of 70 dBA Leq if construction activity occurs at distances of 500 feet or more from the closest sensitive receptor. Noise from construction would not likely cause an exceedance of the noise impact significance criterion at residences farther than 500 feet away (on- or off-site), though construction noise would be audible and would temporarily elevate the local ambient noise level to some degree.

Shared Campus Warehouse and Laydown Facility

There are no sensitive receptors located within 150 feet of the proposed site for the Shared Campus Warehouse and Laydown Facility on the upper terrace; thus, noise generated by construction of the facility would not exceed the significance criterion of 80 dBA Leq during daytime and evening hours. Nighttime construction activity, however, could potentially exceed the 70 dBA Leq threshold because some of the residences along Shaffer Road and north of the railroad tracks would be as close as 300 feet to the construction activity. This would be a potentially significant impact.

<u>Impact 4.11-5</u>: Noise generated by nighttime construction of the Shared Campus Warehouse and Laydown Facility could potentially exceed the 70 dBA Leq threshold at nearby residents along Shaffer Road and north of the railroad tracks. This is a potentially significant impact.

> **<u>Project-Specific Mitigation Measure 4.11-5</u>: The University shall require that construction contractors limit construction activity for the Shared Campus Warehouse and Laydown Facility to the hours between 7:00 AM and 10:00 PM all days of the week.**

Project-Specific Mitigation Measure 4.11-5 would reduce potentially significant construction noise impacts associated with the development of the Shared Campus Warehouse and Laydown Facility to a less-than-significant level.

USGS Western Coastal and Marine Geology Facility

The nearest off-site sensitive receptors to the construction site for the USGS Western Coastal and Marine Geology facility would be residents of the De Anza Santa Cruz residential community, which is approximately 500 feet away. At this distance, construction noise would attenuate to levels that would range from 58 to 69 dBA Leq, depending on the type of construction activity being performed. These levels would be less than both the significance threshold of 80 dBA Leq for daytime and evening hours and 70 dBA Leq for nighttime hours. Moreover, additional noise attenuation would occur from ground effects and the small wall along the De Anza Santa Cruz residential community property line. Construction noise from the development of the USGS facility could result in an impact if the 42 Apartment/ Townhouse Units that are also proposed for the near-term are already constructed and occupied. If these housing units are developed first, residents would be located as close as 75 feet to the USGS construction site. Thus, noise from construction of the USGS facility would exceed the 80 dBA Leq daytime and evening threshold for the on-campus residents, which would be a significant impact.

<u>Impact 4.11-6</u>: Noise generated by the construction of the USGS Western Coastal and Marine Geology facility would exceed the 80 dBA Leq threshold at the 42 Apartment/ Townhouse Units that are also proposed for the near-term development on the middle terrace. This potentially significant impact would only occur if the 42 Apartment/ Townhouse Units are developed and occupied before construction of the USGS facility.

> **<u>Project-Specific Mitigation Measure 4.11-6</u>: If the 42 Apartment/Townhouse Units are developed and occupied before construction of the USGS Western Coastal and Marine Geology facility, the University shall require that construction contractors implement the following measures:**
>
> - **Contractors shall notify all residents of the 42 Apartment/Townhouse Units that will be subject to construction noise from the development of the USGS facility one week before the start of construction activity.**
> - **To the extent feasible, loud construction activity (i.e., jackhammering, concrete sawing, asphalt removal, and large-scale grading operations) within 150 feet of the 42 Apartment/Townhouse Units shall occur during daytime hours (7:00 AM to 5:00 PM).**
> - **To reduce noise impacts from construction, contractors shall muffle or otherwise control noise from construction equipment through implementation of the measures below.**

- **Internal combustion engines used for any purpose at the construction sites shall be equipped with a muffler of a type recommended by the manufacturer.**
- **Equipment used for construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically-attenuating shields or shrouds, wherever feasible);**
- **Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or electrically powered wherever feasible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used. Such mufflers can lower noise levels from the exhaust as much as 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures such as using drilling equipment rather than impact equipment shall be implemented whenever feasible.**
- **Stationary noise sources shall be located as far from sensitive receptors as feasible. If they must be located near sensitive receptors, they shall be muffled to the extent feasible and/or, where practicable, enclosed within temporary sheds.**

- **The University shall require contractors to install a temporary wooden wall around construction activity areas that are within 150 feet of inhabited residences to provide additional noise attenuation, where feasible. The wall should impede the direct line of site between the noise sources and first floor sensitive receptors.**

While Project-Specific Mitigation Measure 4.11-6 would reduce construction noise impacts, the extent of the reduction is unknown and some of the measures may not be feasible to perform in some instances. Thus, construction noise associated with the development of the USGS Western Coastal and Marine Geology facility would be a significant and unavoidable impact if the 42 Apartment/Townhouse Units proposed for the middle terrace development area are developed and occupied before construction.

42 Apartment/Townhouse Units

There are no sensitive receptors located within 300 feet of the site proposed for the 42 Apartment/Townhouse Units on the middle terrace, as shown by the developable area in Figure 3-6; thus, noise generated by construction of the facility would not exceed the significance criteria of 80 dBA Leq during daytime and evening hours and 70 dBA Leq during nighttime hours. This impact would be less than significant.

SORACC. Noise generated by activity associated with the construction of the Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) would be a less-than-significant impact. Because there are no sensitive receptors located within 150 feet of the proposed SORACC site on the middle terrace, noise generated by construction of the facility would not exceed the significance criterion of 80 dBA Leq during daytime and evening hours. Moreover, because there are no sensitive receptors within 500 feet of the proposed construction site, construction noise would not exceed the 70 dBA Leq threshold for sensitive receptors during nighttime hours.

Center for Ocean Health Phase II Facility Expansion

There are no sensitive receptors located within 150 feet of the proposed site for the Center for Ocean Health Phase II facility expansion; thus, noise generated by construction of the facility would not exceed the significance criterion of 80 dBA Leq for daytime and evening hours. Although the caretaker residences are about 300 feet from the Center for Ocean Health Phase II site, and nighttime construction would elevate noise above 70 dBA Leq at this distance, there are a number of intervening structures that would attenuate nighttime construction noise, and a significant impact would not occur.

EXPOSURE TO NOISE FROM PUBLIC AIRPORT ACTIVITY

Entire Development Program

No portions of the project site are located within an area covered by an airport land use plan. The Watsonville Municipal Airport is the nearest public use airport to the project site and is over 12 miles away. Therefore, the CLRDP would not result in exposure of people residing or working in the project area to excessive noise levels related to airport activity.

Near-term Projects

For the reasons noted above for the entire CLRDP development program, none of the near-term projects would result in significant impacts of noise from public airport activity.

EXPOSURE TO NOISE FROM PRIVATE AIRSTRIP ACTIVITY

Entire Development Program

No portions of the project site are located in the vicinity of a private airstrip. Therefore, the CLRDP would not result in exposure of people residing or working in the project area to excessive noise levels related to aircraft activity.

Near-term Projects

For the reasons noted above for the entire CLRDP development program, none of the near-term projects would result in significant impacts of noise from private airstrip activity.

Based on the CEQA criteria evaluated herein, noise generated by construction activities associated with development of the USGS Western Coastal and Marine Geology facility could result in a significant and unavoidable impact if the 42 Apartment/Townhouse Units proposed for the middle terrace development area are developed and occupied before construction. Otherwise, implementation of the CLRDP and the near-term projects with mitigation would not have significant adverse noise impacts.

CUMULATIVE IMPACTS

ENTIRE DEVELOPMENT PROGRAM

The cumulative context for the CLRDP is the development of the Marine Science Campus and the continued development of remaining undeveloped parcels located within the Santa Cruz westside study area. Santa Cruz westside study area projects included in this cumulative analysis are described in the introduction to Chapter 4. The analysis of cumulative impacts from stationary noise sources and construction noise is based on the existing and anticipated projects in the Santa Cruz westside study area (see introduction to Chapter 4). The analysis of cumulative impacts from roadside noise is based on projected future (2020) traffic volumes. Section 4.15, Transportation/Traffic, explains how these projections were derived. Cumulative impacts have been analyzed using the same significance criteria that were applied to the project impact analysis (see page 4.11-1).

None of the projects planned within the Santa Cruz westside study area are expected to result in additional train noise, or expose sensitive receptor to additional train noise. Operational sound levels associated with the operation of the CLRDP and other existing and future facilities in the area are not expected to result a cumulative increase in the sound level at any single site, given the dispersed locations of the facilities and the additive nature of sound. Similarly, construction noise levels associated with the development of future projects in the Santa Cruz westside study area are not expected to result a cumulative increase in the sound level at any single site. The one exception would be certain homes in the De Anza Santa Cruz residential community that could be exposed to concurrent construction noise from development on the campus' middle terrace (mainly the 42 Apartment Units project) and a construction project on the Swenson site at the corner of Shaffer Road and Delaware Avenue across from the mobile home park. However, there currently is no proposal to develop the Swenson site and it would be speculative to assume that the construction schedule of the 42 Apartment Units project on the campus would necessarily overlap with that of a project at this site, to result in a combined noise impact that is significant. Furthermore, as discussed earlier, construction noise from the 42 Apartment Units project would attenuate to a level below the daytime and evening significant threshold at the nearest homes in the De Anza Santa Cruz residential community.

Roadside noise levels resulting from the projected cumulative increase in traffic volumes have the potential to exceed the significance thresholds relative to the OPR noise/land use compatibility standards, which are defined in the introduction to this section. An explanation of how projected cumulative traffic volumes were derived is provided in the cumulative analysis discussion of the Transportation/Traffic (Section 4.15). Noise level estimates for these potentially affected road segments are presented in Table 4.11-2.

As shown in Table 4.11-2, traffic noise along seven of the road segments would increase by 3 dBA or more due to projected cumulative traffic (comparing the data for "Existing" and "CLRDP + 2020 Background").

The noise level along Roadway Segment 1 (Shaffer Road north of Delaware Avenue) would increase by 3.5 dBA, to 51.4 DNL. Because the resultant noise level does not exceed any of the OPR noise/land use compatibility thresholds, this increase is less than significant. This is also true for Roadway Segment 13 (Shaffer Road south of State Highway 1), which would experience an increase of 4.8 dBA to 59.6 DNL.

Traffic on Roadway Segment 2 (Delaware Avenue just east of Shaffer Road) would increase the roadside noise level by 8.9 dBA to 62.0 DNL at a distance of 50 feet. The nearest sensitive receptors, residents of the De Anza Santa Cruz residential community, would not be exposed to this increase, however. The wooden wall, approximately five feet high, that currently stands on the property line of the nearest mobile home residence would attenuate the traffic noise by a minimum of 6 dBA. Thus, the resultant noise level would be approximately 56.0 DNL at the nearest sensitive receptor, which is less than the OPR land/use compatibility standard of 60 DNL for mobile home residences (see Table 4.11-1). Moreover, this level represents an increase that is less than 3 dBA higher than the existing noise level of 53.2 dBA observed by the nearby short-term measurement.

The noise level along Roadway Segment 3 (the extension of Delaware Avenue onto the project site, just east of Shaffer Road) is estimated to increase by 9.6 dBA to 60.0 DNL; however, there are currently no sensitive receptors along this road segment that would be affected by this increase. This level would also be within the OPR noise/land use compatibility standard of 65 DNL for campus housing at the time additional campus housing is proposed for development on the upper terrace.

The noise level along Roadway Segment 5 (Delaware Avenue east of Natural Bridges Drive) would increase by 3.1 dBA to 63.6 DNL and the noise level along Roadway Segment 6 (Delaware Avenue west of Natural Bridges Drive) would increase by 5.3 dBA to 63.2 DNL. The increases at these two segments would not be significant, however, because the roadway segments are not near any noise-sensitive receptors.

The noise level along Roadway Segment 20 (Empire Grade Road north of Heller Drive) would increase by 3.0 dBA to 65.2 DNL. This noise level would attenuate to a level below the OPR noise/land use compatibility threshold of 65 DNL for support housing on the UCSC Main Campus that lies more than 100 feet from the road. The resulting noise level would also be less than the OPR noise/land use compatibility threshold of 70 DNL for the Ark Alternative School, which is located along this road segment. Thus, traffic noise along Roadway Segment 20 would result in a less than significant impact.

Based on the foregoing analysis, the CLRDP and other past and reasonably foreseeable future development in the study area would not result in a cumulatively significant noise impact.

NEAR-TERM PROJECTS

For the reasons discussed above for the CLRDP as a whole, none of the near-term projects would result in cumulatively significant noise impacts.

Based on the information presented above, the implementation of the CLRDP and its near-term projects, in conjunction with other development in the vicinity of the Marine Science Campus would not result in cumulatively significant adverse noise impacts.

4.12 POPULATION AND HOUSING

This section evaluates the potential impacts of the CLRDP and the five near-term projects on population and housing in the city of Santa Cruz and the county of Santa Cruz. Information in this section is derived primarily from the following reports: *1997 Regional Population and Employment Forecast for Monterey, San Benito, and Santa Cruz Counties: Final Report*, Association of Monterey Bay Area Governments (AMBAG), November 1997; City of Santa Cruz, *General Plan and Local Coastal Program 1990 – 2005*, adopted October 1992 and last amended October 1994; City of Santa Cruz, *Santa Cruz 2005 General Plan Final EIR*, *with Addendum*, October 27, 1992; City of Santa Cruz, *2002-2007 Housing* Element, Administrative Draft, June 2003; and County of Santa Cruz, *1994 General Plan and Local Coastal Program*, adopted May 1994.

Based on the following CEQA criteria, a project would generally be considered to have a significant adverse impact on the environment if it would:

- Induce substantial population growth or concentration of population in an area, either directly (for example, by proposing new housing and/or businesses) or indirectly (for example, through extension of roads or other infrastructure).
- Displace substantial numbers of existing housing necessitating the construction of replacement housing elsewhere.
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

SETTING

REGIONAL POPULATION AND HOUSING

The population of Santa Cruz County in 2000 was 255,602, an increase of 25,868 over 1990 levels. The city of Santa Cruz (population 54,593) accounted for 21 percent of the total county population, a share that has remained constant over the last decade. While total population in the county grew at an average annual compound rate of just over 1 percent per year during the 1990s, population growth in the county was concentrated in Watsonville, where over half of the countywide population growth occurred. Watsonville’s population growth during this period is attributable to both housing production and increases in household size (see Table 4.12-1).

In the city of Santa Cruz, by contrast, there were more units added than in Watsonville (2,140 units or about 30 percent of all units added throughout Santa Cruz County), but average household size declined, resulting in more moderate population growth trends and a population growth that was proportional to the increase in housing units. For the city of Santa Cruz, the increase in the housing stock during the 1990s represents a change from the prior decade, when only about 1,500 units were added.

The distribution of the housing stock among Santa Cruz County jurisdictions changed only slightly during the 1990s. Capitola, with about 5 percent of the countywide housing supply, saw an increase of only 27 units over the decade. By contrast, Scotts Valley, with more potential to accommodate new development, saw a 24 percent increase in housing units, although the totals remain small. The cities of Santa Cruz and Watsonville, and the unincorporated areas of the

**TABLE 4.12-1
POPULATION AND HOUSING TRENDS IN
SANTA CRUZ COUNTY JURISDICTIONS: 1990 – 2000**

Jurisdiction	1990	2000	1990 – 2000	
Total Population			***Increase or (Decrease)***	***Annual Rate of Change***
City of Santa Cruz	49,040	54,593	5,553	1.1%
Capitola	10,171	10,033	(138)	-0.1%
Scotts Valley	8,615	11,385	2,770	2.8%
Watsonville	31,099	44,265	13,166	3.6%
Unincorporated Area	130,809	135,326	4,517	0.3%
TOTAL COUNTY	**229,734**	**255,602**	**25,868**	**1.1%**
Distribution of Population	***Percent of Total***	***Percent of Total***	***Percent of Total Change***	
City of Santa Cruz	21%	21%	21%	
Capitola	4%	4%	-1%	
Scotts Valley	4%	4%	11%	
Watsonville	14%	17%	51%	
Unincorporated Area	57%	53%	17%	
TOTAL COUNTY	**100%**	**100%**	**100%**	
Household Size	***Persons per Household***			**Percent Change**
City of Santa Cruz	2.50	2.44		-2%
Capitola	2.13	2.11		-1%
Scotts Valley	2.48	2.56		3%
Watsonville	3.24	3.84		19%
Unincorporated Area	2.67	2.62		-2%
TOTAL COUNTY	**2.66**	**2.71**		**2%**
Housing Units			***Increase or (Decrease)***	**Annual Rate of Change**
City of Santa Cruz	19,364	21,504	2,140	1.1%
Capitola	5,282	5,309	27	0.1%
Scotts Valley	3,556	4,423	867	2.2%
Watsonville	9,909	11,695	1,786	1.7%
Unincorporated Area	53,767	55,942	2,175	0.4%
TOTAL COUNTY	**91,878**	**98,873**	**6,995**	**0.7%**
Distribution of Housing Units	***Percent of Total***	***Percent of Total***	***Percent of Total Change***	
City of Santa Cruz	21%	22%	31%	
Capitola	6%	5%	0%	
Scotts Valley	4%	4%	12%	
Watsonville	11%	12%	26%	
Unincorporated Area	59%	57%	31%	
TOTAL COUNTY	**100%**	**100%**	**100%**	

SOURCE: U.S. Census Bureau, *1990 Census of Population and Housing* and *Census 2000* county provided almost 90 percent of the new housing supply. The share of the total in both the city of Santa Cruz and in Watsonville increased somewhat, while the unincorporated area share declined (see Table 4.12-1).

Forecasts of population and housing growth that represent the intent of current local general plans in Santa Cruz County show continued population growth in the unincorporated areas and the cities.[1] Projections prepared by AMBAG show population growing at a somewhat slower pace than in the 1990s–at 0.8 percent per year from 2001 through 2020. While the fastest rates of growth and the largest amounts of growth are expected in the South County subarea, population and housing growth are expected in all county subareas, such that there is not much change in the distribution of countywide housing and population through the forecast period (see Table 4.12-2).[2]

AMBAG's housing unit projections assume rates of housing production in Santa Cruz County over the next two decades that are similar to what occurred during the 1990s, when almost 7,000 units were added. Projections show just over 15,000 units added countywide between 2000 and 2020.

REGIONAL EMPLOYMENT

Wage and salary employment in Santa Cruz County totaled 107,300 jobs in 2001 (see Table 4.12-3). Increased economic activity in the county resulted in a net addition of 12,400 jobs during the 1990s, an increase of 13 percent. Job losses in agriculture and manufacturing were offset by strong growth in all other sectors. The Santa Cruz County economy is diverse, with no single sector claiming more than a third of all jobs in the county. UCSC is the largest employer in the county, accounting for about 30 percent of all government employment. Data indicate that during the 1990s, growth in the "state education" category accounted for almost 40 percent of government-sector employment growth in the county and just over 10 percent of the net addition of jobs in all sectors throughout the county.[3] Other large employers include firms in technology and communications, food production and distribution, construction, health services, retail, and recreation services.[4]

There are 226 people working at the existing Marine Science Campus, including 150 UCSC faculty and staff and 76 people working at other agency facilities. The California Department of Fish and Game (CDFG) Marine Wildlife Center employs 10 people, and 6 people work in businesses located in the leased greenhouses. The National Marine Fisheries Service (NMFS) laboratory employs 60 people.

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1 AMBAG, *1997 Regional Population and Employment Forecast for Monterey, San Benito, and Santa Cruz Counties: Final Report*, November 1997. The projections are consistent with the current general plans of local jurisdictions. For Santa Cruz County jurisdictions, those plans were completed in the early 1990s and have not been substantially revised. The AMBAG projections assume enrollment growth to 15,000 students for UCSC, consistent with the 1988 LRDP. Within the planning horizon of this EIR, those enrollment projections may be revised. An alternative enrollment scenario developed for the purposes of this EIR is presented under the heading "UCSC Campus Population."

2 AMBAG's estimates for the year 2000 track closely with counts from the 2000 census for both the city of Santa Cruz and the county as a whole. The population estimates in both cases are less than one percentage point different from actual census counts.

3 State of California Employment Development Department (EDD), Labor Market Information Division, *Industry Employment and Labor Force – Annual Average 1990–2001 for Santa Cruz County*, March 2001 benchmark.

4 State of California, EDD, *Labor Market Information: Major Employers in Santa Cruz County*.

TABLE 4.12-2
PROJECTIONS OF POPULATION AND HOUSING FOR SANTA CRUZ COUNTY PLACES: 2000 AND 2020

	Total Population and Housing		Change in Population and Housing	Annual Rates of Change
County Subarea[a]	**2000**[b]	**2020**	**2001–2020**	**2001–2020**
Total Population				
City of Santa Cruz	55,013	64,386	9,373	0.79%
Capitola-Aptos-Soquel[c]	78,840	92,457	13,617	0.80%
North County[d]	53,497	61,752	8,255	0.72%
South County[e]	70,382	85,051	14,669	0.95%
TOTAL COUNTY	**257,732**	**303,646**	**45,914**	**0.82%**
Housing Units				
City of Santa Cruz	20,857	23,026	2,169	0.50%
Capitola-Aptos-Soquel[c]	32,822	38,433	5,611	0.79%
North County[d]	20,148	23,172	3,024	0.70%
South County[e]	21,359	25,666	4,307	0.92%
TOTAL COUNTY	**95,186**	**110,297**	**15,111**	**0.74%**
Percent Distribution of Housing Units			***Percent of Total Change***	
City of Santa Cruz	22%	21%	14%	
Capitola-Aptos-Soquel[c]	35%	35%	37%	
North County[d]	21%	21%	20%	
South County[e]	22%	23%	29%	
TOTAL COUNTY	100%	100%	100%	

[a] City of Santa Cruz population forecast published in *1997 Regional Population and Employment Forecast for Monterey, San Benito, and Santa Cruz Counties,* Table 2, page 4, prepared by AMBAG, November 1997. The forecasts for all other county subareas are based on unpublished land use data summarized by Census Place by AMBAG staff.
[b] These are 2000 estimates prepared by AMBAG in 1997 before the 2000 census.
[c] Generally covers the city of Capitola and surrounding county planning areas: Live Oak, Soquel, Aptos, Aptos Hills, La Selva, and Summit.
[d] Generally covers the city of Scotts Valley and the surrounding county planning areas: Bonny Doon, North Coast, San Lorenzo Valley, Carbonera, and Skyline.
[e] Generally covers the city of Watsonville and the following county planning areas: Eureka Canyon, Pajaro Valley, San Andreas, and Salsipuedes.

SOURCE: AMBAG, *1997 Regional Population and Employment Forecast for Monterey, San Benito, and Santa Cruz Counties*, November 1997

TABLE 4.12-3
SANTA CRUZ COUNTY WAGE AND SALARY EMPLOYMENT BY INDUSTRY: 1990 AND 2001

Industry Category	Number of Jobs 1990	Number of Jobs 2001	Change in Jobs 1990 - 2001	Annual Rate of Change 1990 – 2001
Farm	10,800	7,900	(2,900)	-2.8%
Construction & Mining	4,200	5,100	900	1.8%
Manufacturing	13,400	10,000	(3,400)	-2.6%
Transportation & Public Utilities	2,500	3,000	500	1.7%
Wholesale Trade	3,500	4,600	1,100	2.5%
Retail Trade	19,100	22,400	3,300	1.5%
Finance, Insurance & Real Estate	3,300	3,500	200	0.5%
Services	21,700	30,600	8,900	3.2%
Government	16,400	20,200	3,800	1.9%
TOTAL	**94,900**	**107,300**	**12,400**	**1.1%**

NOTE: Employment is reported by place of work and excludes self-employed persons, unpaid family workers, domestics, volunteers and those involved in labor-management trade disputes. Annual average industry detail may not add up to totals due to independent rounding.

SOURCE: State of California EDD, Labor Market Information Division, March 2001 benchmark

Short-term projections prepared by the State of California Employment Development Department (EDD) show continued employment growth in Santa Cruz County, bolstered by increases in services and government employment. EDD projections show increases in jobs in "state education" accounting for about 10 percent of the expected net change in non-farm employment in the county through 2006.[5]

Longer-term projections prepared by AMBAG show a continuation of these growth trends. AMBAG expects employment in Santa Cruz County to increase by 24,000 jobs from 2000 through 2020, an increase of 22 percent at an annual rate of 1 percent per year. AMBAG estimates show an increase of almost 8,000 jobs in the city of Santa Cruz, or one-third of total employment growth in the county over the 20-year projection period (see Table 4.12-4). The AMBAG projections are consistent with the current general plans of Santa Cruz County jurisdictions.

[5] State of California, EDD, *Industry Employment Projections: Santa Cruz County, 1999–2006*, March 2000 benchmark.

TABLE 4.12-4
PROJECTIONS OF EMPLOYMENT FOR SANTA CRUZ COUNTY PLACES: 2000 AND 2020

County Subarea[a]	Total Employment 2000	Total Employment 2020	Change in Employment 2001–2020	Annual Rates of Change 2001–2020
Employment by Place of Work[b]				
City of Santa Cruz	32,673	40,662	7,989	1.10%
Capitola-Aptos-Soquel[c]	29,810	36,009	6,199	0.95%
North County[d]	17,724	21,324	3,600	0.93%
South County[e]	30,934	37,222	6,288	0.93%
TOTAL COUNTY	**111,141**	**135,217**	**24,076**	**0.99%**
Percent Distribution of Employment by Place of Work			**Percent of Total Change**	
City of Santa Cruz	29%	30%	33%	
Capitola-Aptos-Soquel[c]	27%	27%	26%	
North County[d]	16%	16%	15%	
South County[e]	28%	28%	26%	
TOTAL COUNTY	**100%**	**100%**	**100%**	

[a] Employment forecasts by subarea are based on unpublished land use data summarized by Census Place by AMBAG staff.
[b] The AMBAG estimate of employment by place of work includes an estimate of self-employed workers. As a result, this number is larger than estimates and projections of wage and salary employment prepared by the State of California EDD.
[c] Generally covers the city of Capitola and surrounding county planning areas: Live Oak, Soquel, Aptos, Aptos Hills, La Selva, and Summit.
[d] Generally covers the city of Scotts Valley and the surrounding county planning areas: Bonny Doon, North Coast, San Lorenzo Valley, Carbonera, and Skyline.
[e] Generally covers the city of Watsonville and the following county planning areas: Eureka Canyon, Pajaro Valley, San Andreas, and Salsipuedes.

SOURCE: AMBAG, *1997 Regional Population and Employment Forecast for Monterey, San Benito, and Santa Cruz Counties*, November 1997

UCSC CAMPUS POPULATION[6]

Total UCSC population (students, faculty, and staff) for 2001/2002 is 16,317 people (see Table 4.12-5). About 80 percent is students and 20 percent is faculty and staff. This campus population count includes 210 students, faculty, and staff affiliated with existing UCSC facilities at the Marine Science Campus. The Marine Science Campus population of students, faculty, and staff is 1.3 percent of the total UCSC campus population.

UCSC campus enrollment in 2001/2002 totaled 12,771 students. Undergraduates were about 90 percent of total enrollment, and graduate students were about 10 percent of the total. Sixty of these students (0.5 percent) are associated with the existing facilities at the Marine Science Campus.

From the mid 1980s to the mid 1990s, enrollment at UCSC averaged around 9,500 students per year.[7] In recent years, annual enrollment levels at UCSC have increased steadily. The campus added about 3,200 more students between 1995/1996 and 2001/2002. Graduate student enrollment increased as a share of total enrollment during the 1980s, but has remained at the 10 percent level for the last 15 years.

Student enrollment projections show a continued increase (see Table 4.12-5). UCSC student enrollment is now expected to reach 15,000 by 2005/2006, continuing the annual growth of the last few years. As UC systemwide enrollment increases are anticipated over the next decade and beyond, UCSC may need to accommodate some additional enrollment increases. However, to date, UCSC does not have student growth projections for the main campus through 2020/2021, the planning horizon year for the Marine Science Campus CLRDP.[8] Therefore, for the purposes of this EIR, the historic average annual enrollment increase (enrollment growth between 1988 and 2003) of approximately 300 students per year was used as the basis for estimating growth to 2020/2021.[9] With that rate of growth, UCSC enrollment could reach approximately 19,000 students by 2020-2021.

There were 3,546 employees at UCSC during the 2001/2002 school year, not including students who are also employees (see Table 4.12-5). There were 689 faculty (about 20 percent of the total) and 2,857 staff (80 percent of the total). Of these employees, 150 (about 4 percent) were associated with the existing facilities at the Marine Science Campus.

As noted above for students, UCSC does not have faculty and staff growth projections through 2020/2021.[10] Therefore for the purposes of this EIR, it is assumed that faculty and staff employment would increase in proportion to the increase in on-campus enrollment, which was estimated above.[11] This results in a total of approximately 5,250 faculty and staff in 2020/2021.

[6] Campus population is provided in headcount units—counting each individual enrolled or employed—not in full-time equivalent (FTE) units.
[7] This reflects a 3-quarter average headcount enrollment, based on data from the UCSC Office of Planning and Budget, "Historical Profile: Headcount Enrollment by Quarter 1965-66 – 2000-01."
[8] The University is currently initiating the process of revising the UCSC LRDP. That document is expected to be completed sometime in 2004 or 2005, at which time more will be known about potential future campus growth. It should be noted, however, that campus growth beyond a 3-quarter average of 15,000 students would not occur unless and until The Regents approve an appropriate LRDP amendment and related CEQA documentation.
[9] The historic average annual enrollment increase was based on 3-quarter average enrollments between 1987-88 and 2002-03.
[10] See footnote #8 above.
[11] Projections of faculty and staff are estimated by applying the 2001/2002 ratios of faculty-to-student and staff-to-student to the projections of student enrollment. Those ratios are 1 faculty member per 18.5 students, and 1 staff member per 4.5 students.

TABLE 4.12-5
UCSC STUDENT, FACULTY, AND STAFF POPULATION

	Actual 2001/2002[a]	Projected 2005/2006[b]	Estimated 2020/2021[c]
Students	12,771	15,000	19,000
Faculty[d]	689	811	1,027
Staff[d]	2,857	3,333	4,222
TOTAL	**16,317**	**19,144**	**24,249**

NOTE: Includes main campus and Marine Science Campus. The numbers of students, faculty, and staff are measured in headcount units, as opposed to full-time-equivalent (FTE) units. Students who are also employed at UCSC are counted once, as students.

[a] From "Percent Housed On Campus" reports, UCSC Office of Planning and Budget, July 2002.
[b] Student enrollment based on projections in the 1988 Long Range Development Plan (LRDP).
[c] The campus has not established enrollment targets through 2020/2021, the planning horizon year for the Marine Science Campus CLRDP. For the purposes of this EIR, the historic average annual enrollment increase was used to estimate growth to 2020/2021.
[d] The estimates for future faculty and staff headcounts are calculated by applying the existing faculty-to-student and staff-to-student ratios to the future estimated student headcount. These ratios for 2001/2002 are 1 faculty per 18.5 students and 1 staff member per 4.5 students.

SOURCE: UCSC Environmental Assessment Group, October 2002 and August 2003.

UCSC HOUSING

In the fall of 2001, UCSC had a permanent student housing capacity of 4,739 students, measured in terms of bedspaces. This permanent capacity consisted of on-campus bedspaces in University-owned facilities (residence halls, single student apartments, family student housing, and the UCSC RV Park). To supplement this capacity, in 2000 and 2001 the University undertook temporary modifications to on-campus housing, such as converting residence hall lounges into bedrooms, and entered into 10-year leases to provide additional student housing capacity off-campus.[12] The additional capacity in that "ad hoc and other temporary space" amounted to 968 beds, or 17 percent of the total capacity available in the fall of 2001 (5,707 bedspaces). On campus, 414 beds were added in the residence halls, 189 beds were added in single student apartments, and 9 units were added at the UCSC RV Park. Off-campus housing for students includes the apartments at the University Town Center (capacity for 108) and residence hall accommodations for 248 students at the UCSC Inn (former Holiday Inn). Considering this total capacity, on-campus facilities accounted for 93 percent of the total, and off-campus facilities for

[12] This temporary space may or may not become permanent in the future (Geri Wolff, UCSC Housing Facilities Analyst personal communication, July 30, 2002).

7 percent.[13] With this increase in capacity, not all student housing was occupied in 2001/2002. Occupancy statistics show 5,332 students housed in UCSC housing on-campus and off-campus.

In the fall of 2001, the University provided 187 units of housing for faculty and staff on-campus. The inventory includes 50 apartment units, 80 units of for-sale housing, 7 provost houses, and beds for 50 staff in single student housing. Temporary additions to capacity include three off-campus apartment units in Westmont Place that are leased by the University. Counting the leased facilities, the total capacity can accommodate 190 faculty and staff, assuming one faculty or staff person per unit. In 2001/2002, all UCSC faculty and staff housing was fully occupied.

The University has land set aside on the Main Campus to provide additional on-campus housing for students, faculty, and staff. Moreover, it is expected that additional housing sites would be proposed in conjunction with any LRDP amendment.

PLACES OF RESIDENCE FOR UCSC STUDENTS, FACULTY, AND STAFF

Of the 12,771 UCSC students in 2001/2002, 5,332 (42 percent) were housed in on-campus and off-campus University facilities. Forty percent were housed on campus, and 2 percent in the recent additions to the UCSC housing inventory provided in off-campus facilities (see Table 4.12-6). This is about the same percentage of students housed on campus, as calculated for the 1985/1986 baseline analysis prepared as background to the 1988 LRDP.[14]

In 2001/2002, about 7,440 students were housed in non-UCSC housing off campus. Most were concentrated in the city of Santa Cruz. Campus data on the place of residence of students indicate that almost 70 percent of UCSC students living off campus lived in the city of Santa Cruz, not including the relatively small number living in UCSC off-campus housing. This amounts to about 5,100 students in 2001/2002. Relatively few UCSC students lived in other Santa Cruz County communities. Just over 8 percent of those living off campus lived elsewhere in Santa Cruz County and over half of those students lived in the Capitola-Aptos-Soquel area. Neighboring Santa Clara and Monterey counties housed about 12 percent and 4 percent, respectively, of students living off campus in 2001/2002. Relatively high proportions of the graduate student population lived in these areas. Overall, just over 6 percent of UCSC students living off campus lived beyond the three-county area (see Table 4.12-6).[15]

Campus housing records for 2001/2002 show 190 faculty and staff—just over 5 percent of total headcount of 3,546 faculty and staff—living in UCSC housing. All of the UCSC-provided housing for faculty and staff was fully occupied. The limited supply of on-campus housing for faculty and staff is in great demand (as evidenced by consistent 100 percent occupancy), and faculty and staff must enter the market for off-campus housing. Off campus, faculty and staff are

[13] Information on housing capacity and occupancy provided in June and July of 2002 by UCSC Environmental Assessment Group, based on the following sources: "University of California Campus Student Housing Survey, December 20, 2001"; "Single Student Housing Capacity Report", Fall 2001; "2001-2002 Residence Operations Occupancy Report"; and 2000-2001 On-Campus Housing Bedspace Statistics".

[14] Mundie & Associates, *Technical Background Report on the Subject of Growth Inducement, University of California, Santa Cruz Long Range Development Plan,* October 1987, Table 9, page 30.

[15] Undergraduates are much more likely than graduate students to live in the city of Santa Cruz. While 87 percent of undergraduates live in the city of Santa Cruz (including on the UCSC campus), only one-third (33 percent) of graduate students live in the city, including those living on campus. Compared to undergraduates and to faculty and staff, graduate students are more dispersed beyond Santa Cruz County. A high percentage of graduate students live in Santa Clara County (34 percent), 12 percent live in Monterey County, 10 percent live in San Mateo and San Francisco Counties, and 3 percent live in Marin County.

TABLE 4.12-6
UCSC POPULATION LIVING OFF CAMPUS BY PLACE OF RESIDENCE: 2001/2002

	Students[a]	Faculty & Staff[b]	Total Campus Population
Population Living On Campus 2001/2002	5,332	190	5,522
Places of Residence for Those Living Off Campus			
City of Santa Cruz[c]	5,098	2,081	7,179
Capitola-Aptos-Soquel	353	382	735
North County[d]	204	295	499
South County[e]	86	239	325
Subtotal Santa Cruz County	**5,741**	**2,997**	**8,738**
Alameda and Contra Costa Counties	44	65	109
Marin County	76	2	78
Monterey County	306	69	375
San Benito County	33	3	36
San Francisco	121	33	154
San Mateo	170	30	200
Santa Clara County	930	116	1,046
Other California	19	41	60
TOTAL	**7,440**	**3,356**	**10,797**
Percent Distribution by Place of Residence			
City of Santa Cruz[c]	**68.5%**	**62.0%**	**66.5%**
Capitola-Aptos-Soquel	4.7%	11.4%	6.8%
North County[d]	2.7%	8.8%	4.6%
South County[e]	1.2%	7.1%	3.0%
Subtotal Santa Cruz County	**77.2%**	**89.3%**	**80.9%**
Alameda and Contra Costa Counties	0.6%	1.9%	1.0%
Marin County	1.0%	0.1%	0.7%
Monterey County	4.1%	2.1%	3.5%
San Benito County	0.4%	0.1%	0.3%
San Francisco County	1.6%	1.0%	1.4%
San Mateo County	2.3%	0.9%	1.9%
Santa Clara County	12.5%	3.5%	9.7%
Other California	0.3%	1.2%	0.6%
TOTAL	**100.0%**	**100.0%**	**100.0%**

[a] Based on analysis of 1999 zip code data for places of residence of UCSC students prepared by Larry Pageler, UCSC Transportation and Parking Services.
[b] Based on analysis of 2002 Payroll Personnel System zip code data for all but the following off-campus departments: UC Extension, Educational Partnership Center, Lick Observatory (Mt. Hamilton), Accounting (University Business Park), New Teacher Center, University Relations (Swift Street), and Applications Development Support Unit. Analysis also excluded those listed as living outside California or working 0 percent time. Faculty and staff working at the Long Marine Laboratory are included in this analysis. Analysis prepared by Larry Pageler, UCSC Transportation and Parking Services.
[c] Excludes students, faculty, and staff living in UCSC off-campus housing in the city of Santa Cruz.
[d] Includes Scotts Valley and communities in the San Lorenzo Valley and the North Coast area.
[e] Includes Watsonville and surrounding communities such as La Selva Beach and Freedom.

SOURCE: UCSC and Hausrath Economics Group concentrated in the city of Santa Cruz, although not to the same extent as is the student population. According to summaries of campus payroll records, 62 percent of faculty and staff living off campus lived in the city of Santa Cruz, not including those living in UCSC leased off-campus housing.[16] Another 27 percent lived elsewhere in Santa Cruz County: 11 percent in the Capitola-Aptos-Soquel area, 9 percent in the North County area, and 7 percent in the South County area. Only about 3 percent of faculty and staff lived in Santa Clara County, and 2 percent lived in Monterey County, while 5 percent lived beyond the three-county area (see Table 4.12-6).

In terms of place of residence, UCSC faculty and staff employed at Long Marine Laboratory (LML) do not differ from their main campus colleagues. Payroll records show 63 percent living in the city of Santa Cruz, and 23 percent elsewhere in Santa Cruz County (mostly in Capitola-Aptos-Soquel and in North County), as is the case with main campus faculty and staff. Of the approximately 14 percent living outside Santa Cruz County, most live in Monterey and Santa Clara Counties. The only people currently living on the project site are the four after-hours caretakers, who live in temporary trailer facilities.

As indicated above, by far the majority of UCSC students, faculty, and staff live in the city of Santa Cruz. Of the total campus population of 16,317 in 2001/2002, about 12,700 UCSC students, faculty, or staff lived in the city of Santa Cruz, including those living in UCSC housing, both on and off campus. These people represent almost one-quarter of the city population in 2002.[17] Subtracting the students, faculty, and staff living in UCSC housing (on and off campus), there are about 7,180 living off campus in non-UCSC housing in the city of Santa Cruz (see Table 4.12-6).

HOUSING MARKET CONDITIONS

Housing market conditions in Santa Cruz County mirror those that prevailed throughout the Bay Area and Northern California over the past decade. Sales prices for new housing have more than doubled, and sales prices for existing housing have almost doubled. In 2001, Santa Cruz County average new home prices reached $561,000, and average resale prices reached $446,000.[18] Most of the price escalation has occurred since 1995. As a consequence of this steep increase in prices, Santa Cruz County ranks second to Monterey County as the least affordable housing market in the United States, according to the National Association of Home Builders' Housing Opportunity Index, which compares median sales prices to median family income.[19] In an index prepared by the University of California Office of Loan Programs that compares median sales prices for a number of other institutions and UC campuses, UCSC ranks as the third most expensive housing market after UCSF and Stanford.[20]

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16 The source of the information on place of residence is payroll records for people working at the main campus. The analysis excludes people working at off-campus units such as the Lick Observatory (Mt. Hamilton) and the Educational Partnership Center.

17 On January 1, 2002, the city of Santa Cruz population was 55,085, according to the State of California Department of Finance (DOF).

18 Real Estate Research Council of Northern California, *Northern California Real Estate Report: Second Quarter 2002*, pp 62-63.

19 National Association of Home Builders, "Housing Opportunity Index: First Quarter 2002."

20 University of California Office of Loan Programs, "2001 Housing Survey of Recently Appointed Faculty: Summary of Survey Results," June 2002, page I-4. The index provides an indication of the differential in housing costs in areas surrounding UC campuses when compared to the costs of housing nationally and in other areas of California.

Data from the 2000 census confirm the conditions of limited supply and high prices throughout Santa Cruz County. Housing vacancy rates for owner-occupied housing declined during the 1990s. Vacancy rates were less than 1 percent everywhere in the county with the exception of Capitola, where the census found a 1.5 percent vacancy rate. Median values for owner-occupied housing averaged $377,500 for the county; the highest values were in Scotts Valley ($447,900) and the city of Santa Cruz ($411,900).[21]

Forty percent of the housing stock in Santa Cruz County is rental housing, and more than half of the housing stock in the city of Santa Cruz is rental housing. As in the for-sale housing market, rental vacancy rates are very low, averaging 2.5 percent countywide and 1.4 percent for the city of Santa Cruz, according to the 2000 census. In almost 40 percent of renter-households countywide, rental costs were 35 percent or more of household income.[22]

The UCSC Community Rentals Office tracks rental statistics for off-campus housing. The data for 1995/1996 through 2000/2001 show rents increasing 9 percent per year on average. The average increase for the last year of that period (1999/2000 to 2000/2001) was 17 percent. Statistics for the four quarters through spring 2002 show a dramatic moderation of this trend; rents were essentially flat across all housing types.

Supply constraints, the desirability of the coastal and mountain locations, and local employment and population growth have contributed to the relatively high prices and rents for housing in Santa Cruz County. The northern and central county housing markets are also influenced by demand attributed to Bay Area employment growth, particularly that in Santa Clara County. The number and percentage of county residents who commute out of the county to work has increased steadily over the last three decades. In 2000, 26 percent of the county's employed population commuted to work outside Santa Cruz County; the share was 18 percent for the city of Santa Cruz.[23]

HOUSING DEVELOPMENT POTENTIAL AND EXPECTED FUTURE HOUSING MARKET CONDITIONS

The relative levels of population and employment growth and housing production in Santa Cruz County forecast by AMBAG are similar to those that prevailed in the county during the 1990s. Those forces, combined with continued demand from commuter households, point to a likely continuation of the local housing market conditions described above.

The lack of developable land and natural resource constraints (such as water supply) limit the housing supply potential in many Santa Cruz County communities.[24] Both of the cities that absorb the most housing demand from UCSC—the cities of Santa Cruz and Capitola—are approaching buildout of current residential development capacity.[25] Therefore, any substantial

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[21] U.S. Census Bureau, *Census 2000*, Summary File 1 and Summary File 3.
[22] Ibid.
[23] U.S. Census Bureau, *Census 2000*, Summary File 3.
[24] Both the City of Santa Cruz and Santa Cruz County have growth management ordinances regulating the number of residential permits that can be issued on an annual basis. Since implementation, however, those limits have not proved constraining; applications for permits have been well below allowed annual limits.
[25] The most recent housing elements for Santa Cruz County jurisdictions date from the early 1990s. They represent current local policies and are reflected in the regional projections prepared by AMBAG. In June 2003, the City of Santa Cruz published the Administrative Draft of the city's *2002-2007 Housing Element*. The City of Capitola has started an update of their housing element.

increases in housing supply potential in those communities will depend primarily on higher density redevelopment and mixed-use infill development.[26, 27]

The administrative draft *2002-2007 Housing Element* for the City of Santa Cruz identifies the development capacity of remaining residential infill sites, major transportation corridors, the Downtown Core, and opportunity sites, based on updated site analysis that remains consistent with the City's *1990-2005 General Plan*. The remaining capacity could provide 2,366 units. This amount includes an estimate of 80 units for the UCSC Marine Science Campus.[28]

The unincorporated areas of the county have the most remaining residential development potential. Of the 12,600 units of incremental development potential identified in the "1994 Santa Cruz County General Plan" (including potential residential units in commercially designated areas, but excluding potential accessory units, estimated to supply another 25 percent of total residential development capacity), about 8,800 units of development potential remain after accounting for 2000 census counts of total housing units in the unincorporated areas of the county. Using 1994 County General Plan development capacity as a guide, most of that remaining capacity (about 80 percent) is in the unincorporated central and north county areas that have historically provided UCSC-related households an alternative to closer-in housing options in the city of Santa Cruz.[29]

As part of the "Regional Housing Needs Plan" (RHNP) prepared by AMBAG and finalized in October 2002, Santa Cruz County jurisdictions accepted a total housing needs determination for the 2000–2007 period of 9,715 units. The allocations by jurisdiction are as follows: city of Santa Cruz–2,850 units (29 percent); Capitola–337 units (3 percent); Scotts Valley–804 units (4 percent); Watsonville–2,283 units (23 percent); and the unincorporated areas–3,441 units (35 percent). These allocations are intended to stimulate local plans for increased housing production, particularly production of affordable housing. The allocations are to be considered by each jurisdiction in preparing required local housing element updates. The long and contentious debate over adoption of the housing needs plan has put a spotlight on the difficult housing supply and housing market issues facing Santa Cruz County communities.[30]

The City of Santa Cruz Administrative Draft *2002-2007 Housing Element* contains an analysis indicating that, after accounting for the 836 units produced in the city from January 2000 through December 2002, the city has adequate sites to accommodate the remaining RHNP need (2,015 units).[31]

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26 *City of Santa Cruz General Plan and Local Coastal Program 1990–2005*, adopted October 1992 and last amended October 1994.
27 Patrick Dwire, Housing and Redevelopment Planner, City of Capitola, personal communication, October 8, 2002.
28 City of Santa Cruz, *2002-2007 Housing Element*, Administrative Draft, June 2003, page 4-9.
29 *County of Santa Cruz General Plan and Local Coastal Program*, adopted May 1994.
30 AMBAG, *Final Draft Regional Housing Needs Plan 2000–2007 for Monterey and Santa Cruz Counties*, reflecting AMBAG Board decisions as of July 8, 2002.
31 City of Santa Cruz, *2002-2007 Housing Element*, Administrative Draft, June 2003, page 4.-13.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP building program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new development of 529,856 square feet (sf) at the Marine Science Campus by about 2020. The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education; 70,000 sf for Outdoor Research Areas; 19,000 sf for Support Facilities; 98,100 sf for Support Housing; 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for Seawater System Expansion (see Section 3, Project Description, Table 3.2, Proposed Coastal Long Range Development Plan Building Program). Support housing would include 80 apartments and/or townhouses, 10 visitor overnight accommodations, 30 researcher housing rooms, and 2 caretaker replacement units.

Development of the CLRDP building program would introduce additional population to the Marine Science Campus. This analysis of population and housing focuses on the people working and living at the Marine Science Campus—people who would add to the local residential population and to local housing demand. The relevant categories for this analysis are people employed at the Marine Science Campus; UCSC undergraduate and graduate students studying and working at the Marine Science Campus; and the other members of the households of University faculty, researchers, staff, and students living in the apartments and townhouses providing support housing for the Marine Science Campus. Short-term, summer, day-time, and overnight visitors are not the focus in this section of the environmental analysis, although the description of the full-range of support housing mentions the support housing categories intended for occupancy by visitors and summer residents.

At full development of the CLRDP, there would be a total of 761 people employed at the Marine Science Campus (see Table 4.12-7). This population would include University faculty, researchers, and support staff, as well as people working at the affiliated marine research and education facilities at the campus. There would be an employee population of 572 associated with new development under the CLRDP building program. Existing facilities where 37 people are employed would be replaced or otherwise changed in occupancy, resulting in a net employee population change of 535 associated with full development of the CLRDP. That net change added to the existing employee population of 226 results in the total count of 761 people working at the campus at full development of the CLRDP.

Full development of the CLRDP would bring a total of 140 net new UCSC students to the Marine Science Campus. New marine research and education facilities would provide classroom space for 112 students. In addition, increased classroom use at the Seymour Marine Discovery Center and the Ocean Health facility would bring 28 more students to the campus. Counting the students associated with existing classroom space, a total of 200 students would use the Marine Science Campus at full development of the CLRDP (see Table 4.12-7).

The CLRDP building program includes support housing to provide onsite work-live options for those whose learning experience or research requires or would be enhanced by their presence on the campus during extended hours. Several types of support housing would be provided (see Table 4.12-8). Some of the support housing would provide short-term, overnight accommodations for visiting scientists, and other researcher housing would provide 24-hour immersion for coastal-dependent research by University students and researchers and (during

TABLE 4.12-7
MARINE SCIENCE CAMPUS ESTIMATED EMPLOYEE, STUDENT, AND RESIDENT POPULATION

CLRDP Program Item	Employee Population[a]	Student Population[b]	Resident Population[c]	Total Employee, Student, and Resident Population
Existing Facilities				
Seymour Marine Discovery Center	14	24	-	**38**
Ocean Health Phase I	84	36	-	**120**
Other Primary LML Buildings	43	-	-	**43**
Avian Facility	5	-	-	**5**
Greenhouses	6	-	-	**6**
Temporary Caretaker Housing	4	-	-	**4**
CDFG Marine Wildlife Center	10	-	-	**10**
NMFS Inholding	60	-	-	**60**
SUBTOTAL	**226**	**60**	**-**	**286**
CLRDP Building Program				
Marine Research and Education	553	112		**665**
Support Facilities	5			**5**
Support Housing				
Apartments and Townhouses			110	**110**
Visitor/Overnight Accommodations[d]	-			**-**
Caretaker Replacement Housing	4			**4**
Researcher Housing[d]	-	-	-	**-**
Equipment Storage and Maintenance	10			**10**
Public Access and Recreation	-			**-**
SUBTOTAL	**572**	**112**	**110**	**794**
Changed Occupancy of Existing Facilities				
Seymour Marine Discovery Center[e]	-	10	-	**10**
Ocean Health[e]	-	18	-	**18**
Original LML Buildings[f]	(27)	-	-	**(27)**
Temporary Caretaker Housing[g]	(4)	-	-	**(4)**
Greenhouses[h]	(6)	-	-	**(6)**
SUBTOTAL	**(37)**	**28**	**-**	**(9)**
TOTAL EXISTING	**226**	**60**	**-**	**286**
TOTAL NEW	**572**	**112**	**110**	**794**
TOTAL CHANGED OCCUPANCY OF EXISTING FACILITIES	**(37)**	**28**	**-**	**(9)**
TOTAL NET NEW (with changed occupancy)	**535**	**140**	**110**	**785**
TOTAL NET NEW PLUS EXISTING	**761**	**200**	**110**	**1,071**

NOTE: This table does not count the day time or overnight visitor population anticipated for the Marine Science Campus. For the purposes of this section analyzing the total population associated with the CLRDP, the estimates reflect a combination of design capacity and average daily occupancy factors, as identified in the footnotes below. Estimates that measure headcount units are most appropriate for this population and housing analysis.

**TABLE 4.12-7 (Continued)
MARINE SCIENCE CAMPUS ESTIMATED EMPLOYEE, STUDENT, AND RESIDENT POPULATION**

[a] The employee population includes people working at offices, labs, workstations, and support facilities throughout the Marine Science Campus. This includes UCSC faculty and staff (including graduate student researchers), as well as staff and scientists at other agency facilities located at the Marine Science Campus. Estimates derived from the design capacity occupancy estimates prepared by Coastplans and the UCSC Environmental Assessment Group.

[b] The student population includes students associated with classrooms at the Marine Science Campus. Classroom space is assumed to be utilized by more than one student. The estimate is based on analysis of the number of students per workstation at the UCSC Main Campus.

[c] The resident population in this column represents the household members associated with the UCSC Marine Science faculty or staff member or student counted in the employee or student population categories elsewhere in the table. The total capacity of the support housing is derived from average occupancy rates for on-campus faculty housing (2.375 persons per household). Eighty (80) units times 2.375 = 190 residents, of which 80 would be employees or students and 110 would be family members. While it is likely that some units would house more than one UCSC staff member or student, there is not enough information currently to estimate the possible “double-up” rate. Consequently, to be conservative for the purposes of this environmental analysis, each unit is assumed to house one Marine Science faculty or staff member or student, and the balance of the household members are counted as residential population.

[d] For the purposes of this population and housing impact analysis, short-term overnight visitors are not counted as residents and students, and researchers who might also live on the Marine Science Campus in researcher housing are counted in the employment or student population categories.

[e] Increased occupancy of the classrooms at the Seymour Marine Discovery Center and the Center for Ocean Health is anticipated in the future.

[f] The existing trailers that accommodate 27 workers would be replaced by Ocean Health Phase II.

[g] The temporary caretaker housing would be replaced by the same number of permanent caretakers’ units. The caretakers are counted in the employment category, not in the resident population category.

[h] The greenhouses that currently are leased to business enterprises would be demolished to accommodate new development in the middle terrace.

SOURCE: UCSC Environmental Assessment Group

summer programs) K-12 teachers and students. The UCSC student and researcher population living in the researcher support housing is counted in the estimates of Marine Science Campus employee or student population. There would be additional campus population (besides employee and student populations) associated with the 80 townhouse and apartment units providing temporary support housing to University faculty, staff, and students working and studying at the Marine Science Campus.

To be conservative for this purposes of this environmental analysis, it is assumed that each of these apartment or townhouse units would house one Marine Science faculty or staff member or student, in addition to associated family members. While it is likely that some of the units would house more than one faculty or staff member or student, there is not currently enough information to estimate the potential “double-up” rate. Assuming average household sizes similar to those for existing on-campus faculty housing, the total residential population associated with the 80 units would be 190 people: 80 faculty, staff, or students and 110 family members.[32] Not counting the faculty or staff residents already included under the employee population category or the students counted in the student population category, the additional family members would add 110 people to the population of the Marine Science Campus at full development of the CLRDP (see Table 4.12-7).

[32] The assumed household size is 2.375 per unit, based on average occupancy rates for on-campus faculty housing.

TABLE 4.12-8
MARINE SCIENCE CAMPUS SUPPORT HOUSING

CLRDP Program Item	Design Capacity (beds)[a]
Existing Facilities	
Temporary Caretaker Housing	4
CLRDP Building Program	
Apartments and Townhouses (80 units)[b]	190
Visitor/Overnight Accommodations[c]	10
Researcher Housing (30 rooms)[d]	60
Caretaker Replacement Housing	4
Changed Occupancy of Existing Facilities	
Temporary Caretaker Housing[e]	(4)

[a] The design capacity reflects the number of people that could be accommodated overnight in each type of facility. Some of these people are counted in the employment category in Table 4.12-7.
[b] Temporary housing for rental or short-term lease only that would be constructed and managed by UCSC for use of UCSC faculty, staff, and students working onsite or involved in University marine research programs. The support housing capacity is derived from average occupancy rates for on-campus faculty housing (2.375 persons per household). To be conservative for the purposes of this environmental analysis, each unit is assumed to house one Marine Science faculty or staff member or student.
[c] Intended to provide short-term overnight accommodations for visiting scientists and researchers.
[d] Intended to provide short-term accommodations to enrich the research and learning experience for visiting researchers, UCSC graduate and undergraduate students, and teachers and students participating in summer programs.
[e] Temporary caretaker housing currently located in the project area would be replaced by the same number of permanent caretaker housing units.

SOURCE: UCSC Environmental Assessment Group

Finally, temporary caretaker housing would be replaced by permanent housing units accommodating four people and providing 24-hour security and protection. These four people are included in the staffing count for UCSC Marine Science Campus facilities (see Table 4.12-7 and Table 4.12-8).

Full development of the CLRDP would result in increases in employee and student population and in net new housing demand (see Table 4.12-9). After accounting for the changed occupancy of existing facilities, full development of the CLRDP building program would result in an additional 535 employees and 140 UCSC students at the Marine Science Campus. Without support housing proposed as part of the CLRDP building program, potentially all of these people would add to housing demand in the local housing market.

To enhance the productivity of staff and researchers, full development of the CLRDP would provide support housing in the form of the 80 apartment or townhouse rental units and 30 rooms (of two beds each) for researchers enabling UCSC faculty, staff, or students to live on the campus temporarily during the course of their work, research, and study. The apartment and townhouse rental units would be limited to temporary rental or lease terms of a maximum of three-years.

**TABLE 4.12-9
MARINE SCIENCE CAMPUS ESTIMATED NET NEW HOUSING DEMAND**

	Employee Population	Students
Net New Population Associated with CLRDP Building Program	535	140
Population Living Temporarily in Support Housing[a]	80	60
Net New Housing Demand	**455**	**80**
Percent Housed at Marine Science Campus	15%	43%

[a] To be conservative for the purposes of this environmental analysis, assumes one Marine Science Campus employee per apartment or townhouse unit and one UCSC student per bedspace in the 30 rooms of researcher housing.

SOURCES: UCSC Environmental Assessment Group and Hausrath Economics Group

While it is likely that there would be some "doubling up" in the apartment and townhouse units, thereby increasing the capacity of that support housing to serve the short-term housing needs of the UCSC Marine Science Campus employee population, this analysis only assumes one UCSC faculty or staff member or student per unit, resulting in conservative analysis for EIR purposes. The analysis assumes one UCSC student per bedspace in the researcher housing rooms.

Using these assumptions, at full development of the CLRDP, 80 Marine Science Campus employees, representing 15 percent of the total net new employee population, would be housed in the apartment and townhouse rental units (see Table 4.12-9). At full development of the CLRDP, after accounting for those housed in Marine Science Campus support housing, a maximum of 455[33] Marine Science Campus faculty, researchers, and staff would potentially add to housing demand in the local housing market.

The 30 rooms of researcher housing with a design capacity of 60 beds would accommodate up to 60 UCSC students, representing 43 percent of the net new UCSC student population associated with full development of the CLRDP (see Table 4.12-9). At full development of the CLRDP, 80[34] UCSC students not accommodated in the Marine Science Campus support housing would potentially add to housing demand in the local housing market.

[33] This number is conservative because some of the new employees might already be living in the area and would therefore not place a demand on housing in the area.
[34] This number is conservative because some of these students might be housed on the Main Campus.

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program by about 2010. Amongst the building footprints depicted in the CLRDP prototype site plans are specific sites for these five near-term projects (see Figure 3-7). These projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area.
- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area.
- The United States Geological Survey (USGS) Western Coastal and Marine Geology facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area.
- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area.
- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area.

The near-term marine research and education projects would add 224 employees to the population of the Marine Science Campus and the shared warehouse and laydown facility would add another 10 people to the employee population (see Table 4.12-10). At the same time, the new Ocean Health Phase II facility would replace existing LML trailers that accommodate 27 employees and the affiliate operations in the leased greenhouses (employing 6 people) would cease because the greenhouses would be demolished to accommodate near-term projects for the middle terrace. Therefore, the net change in the employee population associated with the specific projects would be 201. The near-term projects would add a total of 51 additional students to the expanded Marine Science Campus: 42 in new facilities and 9 due to increased classroom use at the Ocean Health facility (see Table 4.12-10).

The near-term projects include 42 units of support housing (apartments and townhouses) that would provide temporary work-live opportunities on the Marine Science Campus for UCSC faculty, staff, and students. Assuming average household sizes similar to those for existing on-campus faculty housing, the total residential population associated with the 42 units would be 100 people: 42 faculty and staff or students and 58 family members.[35] Not counting the faculty or staff residents already included under the employee population category or the students already counted in the student population category, the additional family members would add 58 people to the population of the Marine Science Campus in the near term (see Table 4.12-10).

[35] The assumed household size is 2.375 per unit, based on average occupancy rates for on-campus faculty housing.

TABLE 4.12-10
ANTICIPATED EMPLOYEE, STUDENT, AND
RESIDENT POPULATION OF THE NEAR-TERM PROJECTS

Near-term Projects	Employee Population[a]	Students[b]	Residential Population[c]	Total Employee, Student, and Resident Population
Marine Research and Education				
Ocean Health Phase II	60	42		**102**
USGS Facility	144			**144**
SORACC	20			**20**
Equipment Storage and Maintenance				
Shared Warehouse and Laydown Facility	10	-	-	**10**
Support Housing				
42 Apartment/Townhouse Units	-	-	58	**58**
SUBTOTAL	**234**	**42**	**58**	**334**
Changed Occupancy of Existing Facilities				
Ocean Health[d]	-	9	-	**9**
Original LML Buildings[e]	(27)	-	-	**(27)**
Greenhouses[f]	(6)	-	-	**(6)**
SUBTOTAL	**(33)**	**9**	**-**	**(24)**
TOTAL NET NEW (with changed occupancy)	**201**	**51**	**58**	**310**

NOTE: This table does not count the day time or overnight visitor population anticipated for the Marine Science Campus. For the purposes of this section analyzing the total population associated with the CLRDP, the estimates reflect a combination of design capacity and average daily occupancy factors, as identified in the footnotes below. Estimates that measure headcount units are most appropriate for this population and housing analysis.

[a] The employee population includes people working at offices, labs, workstations, and support facilities throughout the Marine Science Campus. This includes UCSC faculty and staff (including graduate student researchers), as well as staff and scientists at other agency facilities located at the Marine Science Campus.
[b] The student population includes students associated with classrooms at the Marine Science Campus. Classroom space is assumed to be utilized by more than one student. The estimate is based on analysis of the number of students per workstation at the UCSC main campus.
[c] The resident population in this column represents the household members associated with the UCSC Marine Science faculty or staff member or student counted in the employee or student population categories elsewhere in the table. The total capacity of the support housing capacity is derived from average occupancy rates for on-campus faculty housing (2.375 persons per household). Forty-two (42) units times 2.375 = 100 residents, of which 42 would be employees or students and 58 would be family members. While it is likely that some units would house more than one UCSC staff member or student, there is not enough information currently to estimate the possible “double-up” rate. Consequently, to be conservative for the purposes of this environmental analysis, each unit is assumed to house one Marine Science faculty or staff member or student, and the balance of the household members are counted as residential population
[d] Increased occupancy of the classrooms at the Center for Ocean Health is anticipated in the future. For this analysis, half of the increase occupancy is assumed for the near term.
[e] The existing trailers that accommodate 27 workers would be replaced by Ocean Health Phase II.
[f] The greenhouses that currently are leased to business enterprises would be demolished to accommodate new development in the middle terrace.

SOURCE: UCSC Environmental Assessment Group

Assuming one faculty or staff member per unit, 42 of the net new employees associated with the near-term projects would find temporary housing on the Marine Science Campus. After accounting for this use of the near-term support housing, a maximum of 159 Marine Science Campus faculty, researchers, and staff and a maximum of 51 students would potentially add to housing demand in the local housing market as a result of the near-term projects.[36]

PROJECT IMPACTS AND MITIGATION MEASURES

POPULATION GROWTH

Entire Development Program

Full development of the CLRDP building program would not induce substantial population growth or result in a concentration of population. Estimates of the net new population growth for the city of Santa Cruz and Santa Cruz County that would be associated with full development of the CLRDP building program conservatively assume that all new employee positions would be filled by people new to the area. In addition, the estimates presented below for the city and the county include people who would be living on the UCSC Main Campus as well as those living in support housing on the Marine Science Campus.[37]

Marine Science Campus support housing would house 250 people (140 faculty, staff, and students and 110 other household members). Of the rest of the net new employee population, about 290 would be expected to live in the city of Santa Cruz. Of the rest of the net new student population, 65 would be expected to live in the city of Santa Cruz. Therefore, full development of the CLRDP would result in an additional 605 people living in the city of Santa Cruz in both on-campus and off-campus housing. In addition to the 250 people living on the Marine Science Campus, some of the others would be living on the Main Campus, so the number living off-campus in the City would be less.

The total of just over 600 net new people living in the city of Santa Cruz would represent one percent of the total population of about 55,000 people living in the city of Santa Cruz in 2000. The total estimated Marine Science Campus population potentially residing in the city of Santa Cruz at full development of the CLRDP building program (about 800 people, including an estimate for the existing employee and student population) would represent 1.5 percent of the total population of the City of Santa Cruz in 2000.

The net new population for the county as a whole would be 728 people, counting net new employee, student, and resident populations associated with full development of the CLRDP building program. This would represent less than one percent of total population in Santa Cruz County in 2000 (about 256,000 people). The total estimated Marine Science Campus population potentially residing throughout Santa Cruz County at full development of the CLRDP building

[36] These estimates are conservative because it is likely there would be some "doubling up" in the apartment and townhouse units, thereby increasing the capacity of that near-term support housing to serve the short-term needs of the Marine Science Campus employee population. Moreover, some of the new employees might already be living in the area and would therefore not add to housing demand, and some students might be housed on the Main Campus.

[37] The estimates are based on existing place of residence data for UCSC faculty, staff, and students. Counting those living on campus, about 64 percent of UCSC faculty and staff live in the City of Santa Cruz and 26 percent live in the rest of Santa Cruz County. For students, counting those living on campus, 82 percent of the total population lives in the city of Santa Cruz and five percent live in the rest of Santa Cruz County.

program (about 980 people, including an estimate for the existing employee and student population) would also represent less than one percent of the total population in Santa Cruz County in 2000.

Near-term Projects

The five near-term projects would not induce substantial population growth or result in a concentration of population. The five projects include projects that would add to the Marine Science Campus employee and student populations as well as support housing to house some of these people on the Marine Science Campus in addition to their family members. As would be the case for full development of the CLRDP, in total, the numbers and percentages of new population would not represent substantial population growth or a concentration of population in the city of Santa Cruz or Santa Cruz County.

DISPLACEMENT OF HOUSING OR SUBSTANTIAL NUMBERS OF PEOPLE

Entire Development Program

Full development of the CLRDP building program would not displace substantial existing housing or substantial numbers of people. Two residential trailers providing housing for caretakers are the only existing housing units on the project site. Full development of the CLRDP would replace these trailers with two caretaker residential units in 1,600 sf of building space. There would be no change in the caretaker population. Full development of the CLRDP would also remove temporary office trailers and greenhouses in which people work. A total of 33 people work in the existing facilities that would be removed. Most of those people (the 27 working in the trailers) would continue to work at the Marine Science Campus in the new facilities developed under the CLRDP building program.

Near-term Projects

There is no housing at the sites of the five near-term projects, so no housing would be displaced. The temporary office trailers and greenhouses in which 33 people work would be removed by the some of the near-term projects. As noted above, most of the people would continue to work at the Marine Science Campus in new facilities, so a substantial number of people would not be displaced by the near-term projects.

Based on CEQA criteria and the information evaluated above, implementation of the CLRDP and the near-term projects would not have a significant adverse impact on population or housing.

CUMULATIVE IMPACTS

ENTIRE DEVELOPMENT PROGRAM

The geographic area affected by the cumulative effect of the CLRDP is defined to include the County of Santa Cruz because based on observed residence patterns of UCSC employees and students, about 87 percent of the UCSC population resides in the County of Santa Cruz.

Full development of the CLRDP is expected in the year 2020, or even later. The cumulative context for the population and housing impact analysis of the CLRDP is provided, in part, by AMBAG 1997 population, housing, and employment projections for Santa Cruz County jurisdictions that describe growth expected through the year 2020 consistent with local general plans. The cumulative context for population and housing impact analysis in this EIR also considers potential increases in enrollment at USCS Main Campus in excess of that assumed in the AMBAG projections. The AMBAG projections, which were prepared in 1997, account for UCSC enrollment growth to 15,000 students as provided for in the 1988 Long Range Development Plan. As described earlier in this chapter, UC systemwide enrollment increases may result in the need for UCSC to accommodate additional enrollment beyond 15,000. Although UCSC does not, to date, have student growth projections for the Main Campus through 2020/2021, estimates were prepared for the purposes of this EIR to reflect the potential increases beyond 15,000 students.[38] Assuming historic rates of growth, UCSC enrollment could reach approximately 19,000 students by 2020/2021, or about 4,000 additional students beyond those already accounted for in AMBAG projections. Associated with this enrollment increase would be an estimated increase of about 1,105 employees, and about 1,520 dependents. AMBAG is in the process of updating its regional population projections and UCSC staff is participating in the update process to ensure that increases in campus population beyond 2005 are accounted for in the updated projections. However, the updated projections are not available at this time. Therefore the 1997 projections in conjunction with incremental growth beyond 2005 associated with the UCSC Main Campus (about 5,105 students, faculty and staff and about 1,520 dependents for a total of about 6,625 persons) represent the cumulative context for this EIR. However, not all of the incremental population associated with UCSC Main Campus not accounted for in the 1997 AMBAG projections, would not be "new" to the area as some of the employees and students would already be living in the city and other Santa Cruz County communities, and furthermore not all the new population would live in Santa Cruz County. Using the current patterns of residence of UCSC population as basis, about 87 percent of this incremental population (about 5,764 persons) would reside within the County and the rest would live in other adjacent counties.

Another factor to consider is the fact that on account of the economic downturn, in recent years the regional population at both the County and the City levels has not grown as predicted by the AMBAG 1997 projections. At the County level, although the AMBAG projections for 2000 exceeded the 2000 US Census count by about 2,100 persons, in 2003, AMBAG projections for the County exceeded the Department of Finance estimates by about 5,330 persons. Therefore it appears that at the County level, practically all of the incremental population associated with UCSC Main Campus that is not accounted for in the 1997 projections can be accommodated within the growth predicted by AMBAG that has not actually occurred, and only about 434 UCSC-related persons would be in excess of the 1997 projections. (This of course assumes that in and after 2004, the County's population begins to grow at the annual rate projected in the 1997 projections. To the extent that that does not happen, even these persons would not represent incremental population in excess of the projections.) For purposes of the analysis of cumulative impacts which follows, population levels as predicted by AMBAG in its 1997 projection series are used without adding the incremental UCSC Main Campus population in order to avoid overstatement of growth.

Therefore, based on AMBAG 1997 projections, other regional development including the growth of the UCSC Main Campus would cause the population in Santa Cruz County to grow from about 257,737 persons in 2000 to about 303,646 persons by 2020, an increase of about 12,323 persons or 4.8 percent. As discussed earlier in this section, growth at the Marine Science Campus would

[38] The University is currently initiating the process of revising the UCSC LRDP. That document is expected to be completed sometime in 2004 or 2005, at which time more will be known about potential future campus growth. It should be noted, however, that campus growth beyond a 3-quarter average of 15,000 students would not occur unless and until the Regents approve an LRDP amendment and related CEQA documentation.

add about 728 persons to the County's total population by 2020. This additional population is within the margin of error of any population predictions that forecast 15 to 20 years of growth. However even if these persons were added to the AMBAG projections for the County, the resulting total increase in population of 13,051 over a period of about 20 years would not be considered substantial. Furthermore, this growth in County population has been anticipated by the local jurisdictions since 1997.

Although a similar analysis can be conducted for the City of Santa Cruz that examines actual growth that has occurred vis a vis the AMBAG projections and determines to what extent the incremental growth at the Main Campus and the growth at the Marine Science Campus can be accommodated by existing projections, such an analysis would not be meaningful because at a local level, population growth tends to be determined by residential capacity that is available in the community. Because it is expected that housing supply within the city will likely be constrained in future years, persons associated with UCSC will tend to reside in other communities that have housing to offer. (Note that the project level analysis of CLRDP-related population assumes that about 600 persons associated with the CLRDP would reside in the City of Santa Cruz. That analysis is not in conflict with the statements above because that analysis assumes that to the extent that there is housing in the City, CLRDP-related population will reside there to be close to their workplace/school. In the event that housing is not available, some but not all of that population would be added to the City's population.)

In summary, the cumulative development, including the proposed CLRDP, would not induce substantial population growth in the County. Note that the environmental impacts of cumulative growth in the County and City populations, including the growth that would result from the implementation of the CLRDP, on traffic, public services, and utilities are addressed under cumulative impact discussions in the respective resource sections of this EIR.

NEAR-TERM PROJECTS

For reasons presented above for the CLRDP as a whole, none of the near-term projects would result in a substantial increase in the population of Santa Cruz County.

Based on CEQA criteria and the information evaluated above, implementation of the CLRDP and the five near-term projects, in conjunction with other potential population growth, would not represent significant cumulative population growth in the County of Santa Cruz. The impact would be less than significant.

4.13 PUBLIC SERVICES

This section evaluates the potential impacts of the CLRDP and the five near-term projects on public services. For information regarding parks, please see Chapter 4.14, Recreation.

Based on CEQA criteria, a project may be considered to have a significant impact on the environment if it would result in substantial adverse physical impacts or physically altered government facilities to accommodate the project (i.e., in order to maintain acceptable service ratios, response times, or other performance objectives), for any of the following public services:

- Fire protection
- Police protection
- Schools
- Other public facilities

SETTING

EXISTING CONDITIONS

Fire Protection

University of California Fire Department

The UCSC Fire Department (UCFD) is responsible for providing first response for emergencies on University-owned property. However, because of the distance between the UCSC Main Campus and the Marine Science Campus, primary and backup fire services are provided by the City of Santa Cruz Fire Department (SCFD). UCSC has adopted a Fire Protection Policy (UCSC Policy EHS0020, 1997), which ensures reasonable and consistent protection for persons and property in, on, and exposed to UCSC-administered properties in conformance with California statutes, regulations, and University policy. The University's Fire Protection Policy incorporates the following regulations, codes, and standards: Title 19, California Code of Regulations; California Building Code; California Fire Code; California Electrical Code; California Mechanical Code; California Plumbing Code; California Health and Safety Code; National Fire Codes; National Fire Protection Handbook; California Laws Relating to Fires and Fire Fighters; and International Urban-Wildland Interface Code.

The UCFD, located on the University's Main Campus on Chinquapin Road, employs a staff of 13 firefighters (including 12 firefighters, one assistant chief, and one chief).[1] Staffing levels for the UCFD are monitored under the campuswide Long Range Development Plan (LRDP) EIR Mitigation Monitoring and Reporting Program (MMRP) to ensure that significant impacts on fire department services for the Main Campus do not occur.[2] The MMRP indicated that the UCFD could fulfill its role as a first-response unit for the Main Campus by increasing staffing levels to three firefighters on duty at all times. The UCFD meets that requirement.[3] Moreover, the UCFD has added an additional three firefighters in the summer of 2003, which will provide for four firefighters on duty at all times.

1 Chuck Hernandez, UCSC Police Department, personal communication, April 30, 2003.
2 Campuswide mitigation measures provided in the UCSC Long Range Development Plan EIR (1989) do not currently apply to the project site, as the Marine Science Campus site was not covered by the 1988 LRDP.
3 UCSC Office of Planning and Construction, "2002 Annual Mitigation Monitoring Program Report," August 2002.

City and County Fire Services

The Santa Cruz Fire Department (SCFD) is responsible for providing fire protection services to all areas within the city limits, including the Marine Science Campus. The SCFD also provides fire engine-based paramedic services. The paramedic ambulance is privately owned and operated under a countywide contract. Medical emergencies are dispatched simultaneously to both fire and ambulance by a countywide 911-dispatch center.[4]

The SCFD operates three fire stations: the Downtown Station, located at 711 Center Street; the Eastside Station, located at 1103 Soquel Avenue; and the Westside Station, located at 335 Younglove Avenue near the intersection of Mission Street. The Westside Station would provide primary service for the project site. The Westside Station is staffed with a three-person engine company. In the event of a major incident, the City's two other fire stations could be called into service. The SCFD staffs one battalion chief, one deputy fire chief, one fire marshal, and 12 paid firefighters, who use three fire engines and one aerial ladder truck. There are no existing staffing, facility, or equipment deficiencies.[5]

The SCFD can generally respond to emergencies in the vicinity of the project site within two to 13 minutes, with an average response time of 7.5 minutes. If engines are not committed to a prior service call, the Westside fire station can respond to an incident on the Marine Science Campus in less than four minutes. However, at times when all fire trucks are committed, it may take the department longer to respond to emergencies. Further, additional time may be required to locate a person in need of special assistance or to take effective action on other emergencies.[6]

A 10-inch water connection to areas of the project site is located at Delaware and Shaffer Road. It currently provides fire and domestic water to the Marine Science Campus. The 10-inch main on Shaffer Road supplies Hydrant #1197 located on Shaffer Road, with 92 pounds per square inch (psi) static and 75 psi residual flow at 1,364 gallons per minute (gpm). Flow rates of existing water lines are sufficient to meet the fire flow requirements stipulated in the Uniform Fire Code. Additionally, flow rates also meet the fire flow objectives identified in the Safety Elements of the City of Santa Cruz General Plan (Policy 4.2).[7]

The California Department of Forestry (CDF) responds to all wildland fires in unincorporated areas of Santa Cruz County. During the declared fire season (June through October), CDF firefighting units typically respond to fires from the CDF headquarters near Felton. During the winter and spring, the CDF responds from the station at Big Creek, with backup provided by the Bonny Doon Fire Company. The Younger Lagoon Reserve (YLR) and the Moore Creek corridor are identified as fire hazard areas on Map S-11 of the Santa Cruz General Plan's Safety Element.

Police Protection

The University's police department (UCPD), headquartered at the south entrance to the Main Campus, is responsible for providing police protection services at both the Main Campus and proposed project site. The Santa Cruz Police Department (SCPD), located at the City Hall complex on Center Street, provides police protection services to all areas within the city limits. A mutual aid agreement between UCPD and SCPD, adopted in February 1971, stipulates that the

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4 Mark Latham, Fire Marshal, Santa Cruz Fire Department, personal communication, January 2002.
5 Ibid.
6 Mark Latham, Fire Marshal, personal communication, August, 2003.
7 The General Plan Safety Element establishes flow rate goals based on specific land uses. For commercial uses rate goals equate to 1,500 gallons of water per minute (gpm); for industrial uses, 1,500 gpm; and, for residential uses, 1,000 gpm.

UCPD will provide assistance to the SCPD when called upon. In the event of an emergency on University property, 911 calls are transferred to the UCPD. Depending on the nature of the emergency, the UCPD may request assistance from the SCPD.

Staffing levels at the UCPD are monitored under a campuswide LRDP EIR MMRP to ensure that significant impacts to police services for the Main Campus would not occur. The MMRP uses criteria based on the ratio of sworn officers to UCSC faculty, staff, and students and the number of serious crimes that occur on the campus per year to determine adequate levels of service. The UCPD has 18 uniformed officers (including one chief and one administrative sergeant), which is below the target staffing ratio contained in the LRDP MMRP.[8]

The proposed project would be required to comply with applicable provisions of the Uniform Building Code with respect to the incorporation of security features in standard building design plans.

Schools

The project site is located within the Santa Cruz City School District (SCCSD), which is technically two separate school districts (Santa Cruz City Elementary and High School Districts) governed by one board of trustees and a single administration. The SCCSD operates 10 schools that provide K–8 education and seven high schools that provide 9–12 education. The project site is located within the attendance boundaries of Natural Bridges Elementary School, Mission Hill Junior High School, and Santa Cruz High School.

Based on available enrollment and capacity data for Santa Cruz schools, there is remaining capacity in the District for approximately 1,998 students.[9] The most current enrollment projections and permanent capacities for Santa Cruz schools in the vicinity of the project site are listed in Table 4.13-1. The table shows that enrollment at schools that serve the project site is below capacity. The design capacities reflect permanent classroom space only; portable classrooms may accommodate additional students. Design capacities reflect the 1995 State Class Size Reduction Initiative, which reduced the capacities of each classroom (for grades K–3) from 29 students to 20 students.

As indicated in the table, all project-area schools are currently operating under capacity. Macro-level trends indicate a general decline in district-wide enrollment over the next 5 to 10 years, due primarily to a substantial decline in the number of local births in the late 1980s and early 1990s.[10]

8 The annual MMRP (Office of Planning and Construction, August 2002) for the existing campus-wide LRDP (which excludes this project site) contains two performance criteria to ensure that effects related to police protection services for the main campus remain less than significant. The first criterion is a mathematical ratio that addresses staffing levels; the second criterion compares the three-year average of the total number of serious crimes per UCSC enrolled student to the same three-year average measured against the UC campus system as a whole. The MMRP requires the University to meet one of the criteria to be considered in compliance with the measure. While campuswide staffing levels did not meet the first of the two criteria in the MMRP, the UCPD did fulfill the second criterion. Thus, the UCPD was considered to be in conformance with the requirements of the LRDP MMRP.

9 Robert Corley, Consultant, personal communication, February 2002.

10 Ibid.

TABLE 4.13-1
SANTA CRUZ SCHOOLS 2001–2002 CAPACITY AND ENROLLMENT

School	Capacity[a]	Enrollment 2001–2002	Remaining Capacity
Natural Bridges Elementary	446	389	57
Mission Hill Jr. High School	594	414	180
Santa Cruz High School	1,532	1,191	341

[a] Design capacities reflect permanent classroom space only.

SOURCE: Based on data obtained from the Santa Cruz City Schools and the California Public School Profiles and Reports, http://www.ed-data.k12.ca.us/dev/School.asp, 2002, as well as from personal communication with Robert Moss, Assistant Superintendent Santa Cruz City Schools, February 2002.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new development of 529,856 square feet (sf) at the Marine Science Campus by about 2020. The CLRDP entire development program would include the following uses: 254,500 sf for Marine Research and Education; 70,000 sf for Outdoor Research Areas; 19,000 sf for Support Facilities; 98,100 sf for Support Housing; 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for Seawater System Expansion (see Section 3, Project Description, Table 3-2, Proposed Coastal Long Range Development Plan Building Program).

Full development and operation of the Marine Science Campus would introduce new onsite structures and residential populations. The CLRDP's proposed support housing uses include a total of 80 apartments and/or townhouses; 10 visitor/overnight accommodations; 30 researcher housing rooms; and 2 caretaker replacement housing units. As described in Section 3, Project Description, all of the support housing on the site is intended to provide for the temporary housing needs of the Marine Science Campus (maximum 3-year occupancy), and no long-term or for-sale housing is anticipated under this program area.

Implementation of the CLRDP's entire development program would generate an additional 888 people, for a total net new average daily population of approximately 1,313 people in 2020 (see Table 3-4). The proposed near-term projects, described below, included in the CLRDP would generate an average daily population of roughly 311 people (see Table 3-5).

NEAR-TERM PROJECTS

Five near-term projects are expected to be constructed in the early phases of the CLRDP by about 2010. Amongst the building footprints depicted in the CLRDP prototype site plans are specific sites for these five near-term projects (see Figure 3-7). These projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area.
- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area.
- The United States Geological Survey (USGS) Western Coastal and Marine Geology facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area.
- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area.
- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area.

MEASURES PROPOSED AS PART OF THE PROJECT

The CLRDP does not contain or identify any policies or implementation measures that pertain to public services.

PROJECT IMPACTS AND MITIGATION MEASURES

FIRE PROTECTION

Entire Development Program

Development under the CLRDP would introduce new onsite structures and student and staff populations that would incrementally increase the need for fire protection services. As discussed under existing conditions, UCFD does not provide first-response to fire-related emergencies at the Marine Science Campus due to the station's distance from the campus. Nevertheless, the SCFD has indicated that it can provide service to the project. Thus, implementation of the CLRDP would neither cause significant impacts to SCFD's service delivery capabilities, nor would it require the construction of a new fire station which could have adverse environmental effects.[11]

The requirement that all new structures be built to all applicable building and fire code requirements, which would include, for example, the equipment of residential uses with automatic fire-sprinkler systems, serves to significantly reduce the overall demand for fire protection services. Additionally, existing water flows are adequate to meet fire-flow requirements.[12]

[11] Mark Latham, Fire Marshal, personal communication, August, 2003.
[12] Ibid. The minimum fire flow is 1,000 gpm at 20 psi residual pressure for a two-hour duration, for residential structures up to 3,600 sf. The minimum fire flow is 1,500 gpm at 20 psi residual pressure for a two-hour duration for other structures, as set forth in the Uniform Fire Code Appendix III-A.

Near-term Projects

For reasons noted above for the entire CLRDP development program, none of the near-term projects would result in significant impacts to fire protection services.

POLICE PROTECTION

Entire Development Program

Development under the CLRDP would entail the construction of new buildings and introduce student and staff populations to the project site, which would incrementally increase the need for police protection services on campus. However, based on information provided by the chief of UCSC campus police, it is highly unlikely that implementation of the CLRDP's entire development program would cause any need for new or physically altered police facilities.[13] Therefore, the CLRDP's entire development program would not cause substantial adverse environmental effects or the need for physically altered government facilities to accommodate the project, and as such, the CLRDP's effects with respect to police protection would be less than significant.

Near-term Projects

For reasons noted above for the entire CLRDP development program, none of the near-term projects would result in significant impacts to police protection services.

SCHOOLS

Entire Development Program

The CLRDP's 80 units of housing would accommodate staff and a small number of their family members, estimated to house about 190 people. Some of the staff living in these units could have children, who in turn would likely attend project-area schools such as Natural Bridges Elementary School, Mission Hill Junior High School, or Santa Cruz High School. Based on the most recent information available, the student generation factors (expressed as the average number of students per household) used by the District are as follows:

- Grades K-6: 0.292
- Grades 7-8: 0.077
- Grades 9-12: 0.085

Therefore, the entire development program would generate a total of approximately 51 school-age children: 32 in grades K-6; 9 in grades 7-8; and 10 in grades 9-12. It should be noted that although these calculations are based on the district's standard generation rates, it is likely that these rates are overstated because of the population demographics the CLRDP's support housing uses would serve (e.g., single graduate students, staff, and visiting researchers), and the brief time periods these onsite residential populations would reside on the Marine Science Campus. Therefore, the above estimates of K-12 students attributable to the project are considered to be conservative.

[13] UCSC Police Chief Mickey Aluffi, personal communication, August 2003.

Nonetheless, based on current enrollment statistics and macro-level trends in Santa Cruz, these students could be readily absorbed by the local school district, and population increases associated with the CLRDP's full development program would not result in the need to construct or alter school facilities, and the impact related to schools is considered less than significant.

Near-term Projects

The five near-term projects would include a 42-unit Apartment/Townhouse complex, which would house approximately 110 people (see Table 4.12-7, footnote c). Using the student generation rates listed above, approximately 18 of these people could be public school students: 12 in grades K-6; 3 in grades 7-8; and 4 in grades 9-12. For reasons noted above for the entire CLRDP development program, none of the near-term projects would result in significant impacts to schools.

Based on the CEQA criteria evaluated above, the CLRDP's entire development program and the near-term projects would not have a significant adverse impact on public services.

CUMULATIVE IMPACTS

The cumulative context for the CLRDP is the development of the Marine Science Campus and continuing development of remaining undeveloped parcels located within the Santa Cruz westside study area by about 2020 (see introduction to Chapter 4). The standards of significance that apply to the cumulative analysis of public service impacts are the same as those that apply to the project-level analysis.

The City of Santa Cruz General Plan/LCP indicates that a substantial area east and northeast of the project site is designated as Low Density Residential and Low Medium Density Residential. In addition, the lands east of Moore Creek and north of Highway 1 are designated Low Medium Density Residential. Lands farther east are designated Industrial (see Figure 4.9-1).

Additional development in the vicinity of the site would introduce new populations of employees and permanent residents, some of whom would live in the Santa Cruz westside study area.

The General Plan's planning horizon extends to the year 2005. Implementation of the CLRDP would generate increased residential, student, and staff populations on the project site beyond that point, through the year 2020. Additionally, development of underutilized or vacant parcels in the Santa Cruz westside study area would also contribute to (and accommodate a portion of) area and citywide population growth. Because the CLRDP's planning horizon exceeds that of the General Plan, additional population projections are included to assess CLRDP effects in a cumulative context.

According to the Association of Monterey Bay Area Governments' *Regional Population and Employment Forecast 1997*, the city's population is forecast to increase to an estimated 62,621 people by 2020, representing an approximately 15-percent increase over base-year 2000 population figures. Full development of the CLRDP would result in an additional 605 people living in the City of Santa Cruz. This total would therefore represent one percent of total population for the City of Santa Cruz in 2000 and seven percent of the population growth forecast for the city from 2001 through 2020 (see Section 4.12, Population and Housing).

The geographic areas potentially affected by cumulative citywide population growth are considered to be the service areas of the service systems described within this section. The geographic service areas are the City of Santa Cruz for fire and police protection services and the Santa Cruz City School District (SCCSD) for schools.

FIRE AND POLICE PROTECTION

Entire Development Program

Implementation of the CLRDP, in addition to present and probable future residential and industrial development in the Santa Cruz westside study area, as well as overall citywide growth, would contribute to the cumulative demand for fire and police protection services. As a part of the City of Santa Cruz General Plan update, the Fire Department will conduct an analysis that compares the department's performance against its stated goals and will assess which goals may need reevaluation. Additionally, the report will identify future station and equipment needs for achieving response time and other service goals. This analysis is not yet underway, and is not scheduled for completion before publication of this EIR.[14]

The City of Santa Cruz indicates that, at the present time, the Santa Cruz Fire Department would be able to provide fire protection services both for the entire development program as well as for development anticipated in the vicinity without the need to construct new or altered facilities.[15] In addition, the Santa Cruz Police Department indicates that, while it anticipates adding patrol officers in the future, no additional facilities or substantial alternations of existing facilities are anticipated or needed.[16] The UCSC Police Department does not anticipate a need for new or physically altered facilities in order to provide services to the project site.[17] Because fire and police protection services would be anticipated to keep pace with growth, and no need for new or altered government facilities has been identified, implementation of the CLRDP in conjunction with cumulative development would not cause an adverse cumulative effect associated with the construction of new or altered police or fire facilities.

Near-term Projects

For reasons noted above for the entire development program, none of the five near-term projects would contribute considerably to any significant cumulative impacts to fire and police protection services.

SCHOOLS

Entire Development Program

Population and housing growth associated with cumulative development within the attendance areas of the SCCSD would increase the demand for school services. As indicated under the discussion of CLRDP impacts, the CLRDP's contribution of new students to project-area schools would be relatively small and, to the extent that the balance of the project population would reside off-campus, this population would contribute funds for the development of additional school capacity through the payment of property taxes and, potentially, school development impact fees.

[14] Mark Latham, Fire Marshal, City of Santa Cruz, written communication, January 2002.
[15] Mark Latham, Fire Marshal, City of Santa Cruz, personal communication, November 20, 2003.
[16] Jeff Lock, Deputy Police Chief, City of Santa Cruz, personal communication, February 19, 2002.
[17] Ann Bertken, UCSC, personal communication citing a conversation with UCSC Police Chief Mickey Aluffi, August 27, 2003.

Moreover, districtwide enrollment is projected to decrease through at least the year 2010.[18] As shown in Table 4-13.2, all of the schools serving the project area would experience declining enrollment, thus decreasing the SCCSD's need for additional facilities. Therefore, implementation of the CLRDP in conjunction with cumulative development would not cause an adverse cumulative effect associated with the construction of new or altered school facilities.

TABLE 4.13-2
PROJECTED ENROLLMENT OF PROJECT-AREA SCHOOLS

School	2001–2002 Enrollment	2002–2003 Enrollment	2005–2006 Enrollment	2009–2010 Enrollment
Natural Bridges Elementary School	416	385	347	313
Mission Hills Junior High School	444	465	438	405
Santa Cruz High School	1,163	1,104	1,087	998

[1] Design capacities are based on existing facilities, do not include portable classrooms, and reflect the Class Size Reduction Initiative.

SOURCE: SCCSD, *Report of Enrollment Projections by Enrollment Projection Consultants*, Table 2, March 15, 2000.

Near-term Projects

For reasons noted above for the entire development program, none of the five near-term projects would contribute considerably to any significant cumulative impacts to schools.

Based on the CEQA criteria evaluated above, implementation of the CLRDP, including the five near-term projects, when combined with other development, would not result in significant adverse cumulative impacts on public services.

[18] SCCSD, *Enrollment Report*, October 2002, and *Report of Enrollment Projections by Enrollment Projection Consultants* (City of Santa Cruz, March 2000), as cited in *Shaffer Road/Pacific Shores Apartments DEIR*, City of Santa Cruz, September 2001. The year 2010 is the last year for which projected enrollment data are available (Richard Moss, personal communication, November 20, 2003).

4.14 RECREATION

This section focuses on public access as it relates to existing recreational uses on the project site and analyzes the environmental effects of recreational uses that are proposed under the CLRDP, and whether the proposed CLRDP could lead to increased use of existing recreation facilities and parks such that those facilities could experience physical deterioration. It also presents the impacts of the five near-term projects on recreational resources. Information in this section related to parks is derived from the City of Santa Cruz *General Plan and Local Coastal Program 1990–2005*.

Based on the following CEQA criteria, a project would generally be considered to have a significant adverse impact on the environment if it would:

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.
- Include recreational facilities or require the construction or expansion of recreational facilities, that might have an adverse physical effect on the environment.
- Result in substantial adverse physical impacts or physically altered government facilities to accommodate the project (i.e., in order to maintain acceptable service ratios, response times, or other performance objectives), for parks.

For additional information regarding public access and recreation, please see Section 4.1, Land Use.

SETTING

Existing recreational facilities on the project site include the Seymour Marine Discovery Center, which offers exhibits and guided tours, and publicly accessible trails and overlooks at three onsite locations. These facilities are described further below.

TRAILS AND OVERLOOKS

An ad hoc gravel and compacted earth trail is located on the terrace portion of the site that is currently used for public access to the Marine Science Campus on an occasional and informal basis (see Chapter 3, Project Description, Figure 3-4). The trail runs from the intersection of Delaware Avenue at Shaffer Road south along the site's eastern boundary to the coastal bluff, west to the Seymour Marine Discovery Center within the existing Long Marine Lab (LML) area. Public pedestrian circulation along the rest of the site's perimeter is generally accommodated along McAllister Way on the site's western portion and the Delaware Road extension to the north. Pedestrian circulation does not occur on a dedicated trail system; instead, pedestrians generally walk along the shoulders of on-site roads to access facilities on the site.

Three existing viewing platforms on the Marine Science Campus overlook Younger Lagoon Reserve (YLR) and the ocean, and are accessible from onsite trails. The existing overlooks are labeled on Figure 3-4 in the Project Description. One of the overlooks (Overlook B) is located along the blufftop at the end of McAllister Way and provides views of the Monterey Bay National Marine Sanctuary and the coast. The overlook is open during the hours that the

Seymour Visitor Center is open. Fencing exists around the overlook to prevent access to secure areas within LML, the steep bluffs, and the YLR.

The second overlook (Overlook C) is located atop an earthen berm west of the LML marine mammal research pool area. This overlook provides views into the LML marine mammal research area, to the ocean, and to the Younger Lagoon to the north. It is accessible to the public by site tours through Seymour Center and has interpretive panels on dolphin research.

The third overlook (Overlook D) is located north of the Ocean Health building. This overlook is used by docent-led tours originating at the Seymour Center and affords a view of the lower part of the YLR, and also provides an overlook for interpretation of the reserve, its inhabitants, and for the monitoring of reserve fauna, especially birds.

SEYMOUR MARINE DISCOVERY CENTER

The Seymour Marine Discovery Center is a visitor-serving recreational facility located in the lower terrace portion of the site. The center is open to the public Tuesday through Sunday and is staffed by University staff and volunteer docents. The center provides interpretive exhibits as well as guided tours of onsite research facilities, including the marine mammal pools and the overlooks to Younger Lagoon and the Pacific Ocean described above.

COASTAL ACCESS POINTS

Continuous public access is available along almost the entire coastal frontage of the city of Santa Cruz. Along this frontage, there are 15 primary coastal access points within the city. Four of these access points are west of Lighthouse Point and include staircases at Lighthouse Field, Almar Avenue, Fair Avenue and Natural Bridges. The Natural Bridges access provides general beach access approximately 800 yards east of the Marine Science Campus and serves as an entry point for the surfing break offshore Younger Beach.

YOUNGER LAGOON AND BEACH AREA

Public access to Younger Lagoon and the beach was restricted in 1981 to allow wetland research and study in a controlled setting. As a condition of that closure, the Coastal Commission (the Commission) required that UCSC submit a management plan for the LML site and annual reports of the lagoon studies in order to monitor the effects of decreased public use in the area and to provide continued justification for the closure.

The Commission was to re-examine the issue of public access to the beach and lagoon five years after the closure was approved (i.e., in 1986), however, this requirement was not fulfilled. As a result, upon reviewing UCSC's application for the Center for Ocean Health project in 1999, the Commission required the submittal of an overall management plan for the beach and the lagoon system for its review and approval.

In 2000 and 2001, respectively, the Coastal Commission approved an *Interim Access Plan for the Marine Science Campus* and a *Younger Lagoon Beach/Wetland Area Management and Access Plan*. These plans reaffirmed access controls to the YLR, designated public access trails through the terrace portion of the site and to overlook areas, and confirmed the significance of docent-led tours by the Seymour Marine Discovery Center as important public access elements. These access plans would be superseded by the public access and recreation provisions presented in the CLRDP.

PARKS

The City of Santa Cruz Parks and Recreation Department manages 21 neighborhood and community parks, four regional parks, municipal beaches, a city museum, a community center, a civic auditorium, and a municipal golf course. Through reciprocal-use agreements, the department also has access to facilities owned by the Santa Cruz City School District. Residents have access to a variety of regional and state recreational facilities located outside of the city.

According to the City of Santa Cruz General Plan, neighborhood parks are intended to serve the recreational needs of a given neighborhood, or an approximate five-block service area. The parks are usually three acres or less in area and have facilities such as children's play areas, picnic areas, athletic fields, and outdoor basketball courts. Three neighborhood parks and two school sites (Bayview and Natural Bridges Schools) serve the lower Westside area in the project vicinity.

Community parks serve recreation needs beyond those supplied by neighborhood parks. Community parks include DeLaveaga, Harvey West, and San Lorenzo Parks. These parks are usually larger than neighborhood parks and have major recreational facilities such as large picnic areas, swimming pools, ballfields, tennis courts, and recreation centers. Regional parks serve the recreational needs of a regional population and range from 150 to 500 acres in size, and may also act as regional parks, generally containing amenities not found in neighborhood and community parks. The following regional parks provide recreational opportunities in Santa Cruz's Westside in the vicinity of the project site: Wilder Ranch State Park and beaches, Henry Cowell State Park, Nisene Marks, and Big Basin.

Natural areas around the project site include Antonelli Pond, an important biotic resource, which provides an opportunity for passive recreation. The General Plan identifies Antonelli Pond as a natural area for formal and informal recreation, and maps it with other natural areas (including Pogonip, Lighthouse Field, and Neary Lagoon Wildlife Refuge) for passive recreation. The General Plan also proposes a recreational trail along the east side of Moore Creek that would extend from the UCSC Main Campus and Bay Avenue to Antonelli Pond.

Existing UCSC lands (over 2,000 acres), including undeveloped meadows and forests, are available to the campus affiliates and the public during daylight hours. The Main Campus also provides 88 acres of land for physical education and recreation facilities, including a swimming pool, ball courts, ball fields, and weight-training facilities. These facilities are available to students, faculty, staff, alumni, and associate members of the UCSC Alumni Association. Because the Marine Science Campus student population is associated with the Main Campus, students at the Marine Science Campus also have access to these facilities.

There are currently no parks on the Marine Science Campus site.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new building development of 529,856 square feet (sf) at the Marine Science Campus by about 2020. The CLRDP would include the following uses: 254,500 sf for Marine Research and Education; 70,000 sf for Outdoor Research Areas; 19,000 sf for Support Facilities; 98,100 sf for

Support Housing; 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for Seawater System Expansion (see Chapter 3, Project Description, Table 3-2, Proposed Coastal Long Range Development Plan Building Program).

With respect to recreation, the CLRDP proposes a total of 8,000 sf of paved and unpaved recreational courts, which would be developed in conjunction with the CLRDP's proposed Support Facilities uses. (This 8,000 sf is included in the 19,000 sf for Support Facilities, noted above.) Moreover, the CLRDP proposes an enhanced trail network, two new overlooks, as well as improvements to an existing onsite overlook (Overlook D).

The CLRDP includes Public Access designations for onsite trail segments and overlooks according to the type of access afforded to the public, based on the location of the trail segment or overlook with respect to its proximity to environmentally sensitive areas or Resource Protection Areas on the site. Trails are primarily classified as "Public Trails," "Controlled Access Public Areas," and "Controlled Access Trails." The Public Trails designation is intended to provide pedestrian and bicycle access to scenic areas of the campus where access restrictions are not needed for protection of public resources, public safety, or for maintaining security of sensitive University activity. The Controlled Access Public Areas designation is intended to provide pedestrian and bicycle access to scenic and coastal resource areas of the campus consistent with safety, security, and protection of sensitive coastal resources and research areas; only authorized personnel, authorized visitors, and members of the public on a supervised tour would have access to these areas (e.g., Overlooks C and D). The Controlled Access Trails designation is intended to provide pedestrian access to overlooks located in controlled access areas of campus; only authorized personnel or members of the public on a supervised tour would have access to these trail segments.

In general, public trails would be a minimum of 5 feet wide and, in most cases, would follow existing street alignments. Where feasible, trails would be separated from streets by strips of vegetation. Public trails would be constructed of decomposed granite or similar materials, and boardwalks would be used if appropriate. Figure 3-9, Coastal Access and Recreation Diagram, in the Project Description illustrates the complete scope of the planned new trail segments as well as the locations of the two proposed overlooks.

In addition to access to the proposed recreation courts, expanded trail network and overlooks, future students and faculty at the Marine Science Campus would have access to existing recreational facilities located on the University's Main Campus.

NEAR-TERM PROJECTS

Five near-term projects are expected to be constructed in the early phases of the CLRDP by about 2010 (see Figure 3-7). These projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited in the upper terrace development area.

- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area. The proposed Apartment/Townhouse units would also include development of 4,000 sf of paved/unpaved sports courts (e.g., volleyball or basketball) likely to be used by staff, students and visitors of these onsite accommodations.

- The United States Geological Survey (USGS) Western Coastal and Marine Geology facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area.

- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of outdoor yard space) would be located on the middle terrace development area.

- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area.

The enhanced public trail network would include a provision for two new overlooks (Figure 3-9). These overlooks would be constructed in the near term concurrent with the completion of any new building constructed on the lower or middle terrace of the Marine Science Campus. One overlook (Overlook A) would be constructed just north of the parking lot of the Seymour Marine Discovery Center. A public-access pathway would wrap around the outside of the parking lot and connect to a picnic area and two slightly raised viewing platforms with interpretive panels about the seasonal pond and grassland shrubs.

The second proposed overlook (Overlook E) would be located in an area near the National Marine Fisheries Services (NMFS) building and immediately adjacent to McAllister Way, just south of the existing greenhouses. Multi-level viewing windows through an alcove created in the existing fence would provide views of the upper YLR and eastern arm of the lagoon. The observation area would have a small interpretive panel and would be accessible to pedestrians walking along the public-access trail system.

In addition to the construction of Overlooks A and E described above, the CLRDP proposes improvements to the existing Overlook D. These improvements include the provision of a closed observation blind, an Americans with Disabilities Act (ADA) accessible path and associated drainage redesign. Similar to the construction of Overlooks A and E, this overlook would be improved concurrent with any new building constructed on the lower and middle terrace portion of the Marine Science Campus.

MEASURES PROPOSED AS PART OF THE PROJECT

The Public Access and Recreation Element of the CLRDP includes two guiding policies that relate to recreation at the Marine Science Campus and the management of coastal access. Policy 6.1 states that the University will "provide maximum public access to the Coastal Resources of the Marine Science Campus to the extent consistent with public safety, fragile coastal resources, implementation of the educational and research missions of the campus, and security of sensitive facilities and research activities on the sites." To this end, the CLRDP proposes the following implementation measures:

- <u>Implementation Measure 6.1.1 – Accommodation of Coastal Access Visitors</u>: The University will establish procedures consistent with Policy 6.1 that provide for admission of members of the public to the Marine Science Campus for purposes of viewing the scenic coastal vistas and overlooks and participating in educational programs and docent-led tours of the site;

- Implementation Measure 6.1.3 – Overlooks for Public Visual Access: The University will construct and maintain overlooks to provide the public with visual access of natural resources on and adjacent to the Marine Science Campus such as YLR and the ocean. The location of overlooks will be as specified in [CLRDP] Figure 5.5, and the University will be guided by the illustrations contained in Appendix C of this CLRDP as it designs the overlooks;

- Implementation Measure 6.1.4 – Docent-Led Tours and Education Programs for the Public: The University will seek to support and enhance public appreciation of coastal resource values through educational programs and docent-led tours of the site. The Seymour Center will continue as the site of educational programs on the marine environment for school groups and other members of the public. As resources are available, these programs will continue to include docent-led tours of the coastal terrace and bluff and the Younger Lagoon Reserve overlooks; and,

- Implementation Measure 6.1.5 – Educational Programs for Pre-College Students: The University is committed to increasing understanding and interest in marine science among pre-college students. To further that objective, short-term immersion marine science education programs for these students and their teachers will be implemented at the Marine Science Campus, in cooperation with other agencies and entities.

The CLRDP also includes Policy 6.2, Management of Public Access, which states: "All public access to the Marine Science Campus will be managed to ensure the security of research and marine facilities on the site, the protection of wildlife populations and other natural resources, and public safety." The following implementation measures are proposed:

- Implementation Measure 6.2.1 – Access to Resource Protection Areas: Public access to identified Resource Protection Areas will be managed to protect against disruption of habitat values. Only authorized personnel are allowed in such areas, except that public access may be gained with the University's written authorization. Authorization will be granted only on a temporary basis and only for personnel necessary for activities consistent with uses allowed by the *Land Use Plan.* The University may use any combination of devices it deems necessary to protect natural resources in *Resource Protection Areas*, including fences, walls, berms, and vegetation;

- Implementation Measure 6.2.6 – Bicycles on the Marine Science Campus: The University will allow the use of bicycles on the Marine Science Campus, except on "Controlled Access Trails";

- Implementation Measure 6.2.7 – Domestic Pets: Cats and dogs and other domestic pets will not be kept or brought temporarily onto the Marine Science Campus; and,

- Implementation Measure 6.2.8 – Public Access Signage: Signage and other media will be used to provide visitors with information about coastal resources, identify the location of public trails, and warn of dangers in the environment. Signage will also be provided to identify Controlled Access Trails, with information about supervised tours.

PROJECT IMPACTS AND MITIGATION MEASURES

Entire Development Program

Development of the CLRDP's proposed recreation facilities (recreation courts, new trail segments and improvements to existing segments, and overlooks) would result in periodic construction-related effects on the Marine Science Campus through the year 2020. Construction of the proposed onsite recreation uses could cause short-term, intermittent construction effects related to aesthetics, air quality, hydrology and noise (see Sections 4.1, Aesthetics; 4.3, Air Quality; 4.8, Hydrology; and 4.11, Noise, respectively, for discussions of potential construction-related effects). The CLRDP's recreational uses would be constructed within a larger program of proposed projects, and the University's best management practices (BMPs) for construction and specific implementation measures would ensure that construction-related activities related to the expansion of recreation facilities would not adversely affect the environment.

For example, as discussed in Section 4.5, Cultural Resources, site surveys indicate that there is no evidence of potentially significant surface or subsurface archaeological resources on the project site. Therefore, the development and expansion of onsite trail segments and overlooks would not result in adverse effects to existing cultural resources. Additionally, Implementation Measure 2.15.1, Construction Monitoring, identified in the CLRDP, would ensure that construction activities associated with implementation of the entire development program (or individual elements of the CLRDP such as its recreation uses) would not result in significant impacts to unknown archaeological resources, as defined by CEQA.

Similarly, the CLRDP's policies and implementation measures (e.g., Implementation Measure 3.6.1 discussed in Section 4.4, Biological Resources) would protect habitat and wildlife by restricting and controlling access to sensitive areas of the site, thereby ensuring that construction and operation of and improvements to the CLRDP's proposed recreation uses would not have an adverse physical effect on the environment. Moreover, the proposed recreation courts would also not result in significant traffic impacts, because these courts are intended for students, faculty, and site visitors, and would not be open to the general public.

The CLRDP's entire development program would not likely increase the use of existing neighborhood and regional parks or other recreational resources such that substantial physical deterioration of those facilities would occur or be accelerated. Implementation of the CLRDP's entire development program would generate an additional average occupancy of 888 people, for a total net new average daily population of approximately 1,313 people in 2020, some of whom may use park and recreation resources.

The CLRDP would expand and improve publicly accessible onsite recreation and educational amenities, including docent-led tours and a total of 8,000 sf of paved and unpaved sports courts for use by onsite residents. The demand generated for recreational facilities attributable to increases in onsite population at completion of the CLRDP's entire development program would be offset by the CLRDP's courts and new trail segments. Additionally, future Marine Science Campus students and faculty would have access to recreation and sports facilities on the University's Main Campus, thus the CLRDP's entire development program would not be expected to increase appreciably the use of existing neighborhood or regional parks, or require physically altered government facilities to accommodate the project. As such, impacts attributable to the CLRDP's recreation uses would be less than significant.

Near-term Projects

The proposed near-term projects included in the CLRDP would generate an average daily population of roughly 311 people. For reasons noted above for the entire CLRDP development program, none of the near-term projects would result in significant impacts on recreation.

Based on the CEQA criteria evaluated above, the CLRDP's entire development program and the near-term projects would not have a significant adverse impact on recreational resources and parks.

CUMULATIVE IMPACTS

ENTIRE DEVELOPMENT PROGRAM

The cumulative context for recreational resources includes not only the City's westside study area (see introduction to Chapter 4), but also the rest of Santa Cruz County. This is because the CLRDP would result in the concentration of new population (employees and students who would work, research, study and/or live on the Marine Science Campus) not only within the Santa Cruz westside study area but would also add new population to other communities in the County. A review of land use maps in the City of Santa Cruz General Plan/LCP indicates that a substantial part of the land east and northeast of the Marine Science Campus is designated for Low Density Residential and Low Medium Density Residential. In addition, the lands east of Moore Creek and north of Highway 1 are designated Low Medium Density Residential (see Figure 4.9-1). Additional development in the vicinity of the site would mostly introduce new populations of permanent residents, but there are some vacant and underutilized industrial parcels also present in the westside study area which when developed and occupied, would add new employees to locations near the Marine Science Campus. Therefore the proposed project in conjunction with other past and reasonably foreseeable future development would increase the study area population as well as population in other parts of the County.

The standards of significance that apply to the cumulative analysis are the same as those that apply to the project-level analysis, i.e., whether there would be increased use of recreational facilities that could lead to substantial physical deterioration, or whether there would be construction of new recreational facilities that could result in adverse environmental impacts, or whether an alteration of parks would be required to accommodate the project(s).

It would be speculative to attempt to characterize the cumulative impact of the regional population growth on existing regional recreational facilities and whether substantial physical deterioration would result from increased use. However, it would be reasonable to assume that as the regional population grows, additional recreational facilities would be needed. On-campus residential population associated with the CLRDP would not be expected to substantially contribute to the demand for new off-site recreational facilities because these persons would have access to recreational facilities on the campus and in the adjacent state parks. In fact, the trails, overlooks, and expanded educational space (such as and similar to the Seymour Discovery Center) on the Marine Science Campus would offset some of the demand for new recreational facilities in the region as these new and improved onsite facilities would not only serve the existing and future increased campus population, but also potentially increased future residential populations in the Santa Cruz westside study area and in the region as a whole. This notwithstanding, there would be a need for more recreational facilities as the regional population increases.

Under the City's planning process, planned residential uses in the City of Santa Cruz would be subject to the City's zoning ordinance and General Plan policies, which, for residential development, require new development to provide usable private open space and under certain circumstances common open space in the form of either a parkland dedication or payment of in-lieu fees. Similar processes are also used by other local jurisdictions in the area. The provision of private or common open space, or monetary contribution for parkland, in conjunction with proposed future private residential development would address future recreation needs associated with the indirect demand for recreation and park resources generated by regional population growth.

While significant environmental impacts from the development of parkland in urban areas are generally not anticipated (most parklands would be community parks and therefore infill development), the environmental review process of the City of Santa Cruz and other local jurisdictions would ensure that environmental impacts associated with the development of recreational facilities are mitigated to the maximum extent feasible. It would be speculative to assume that there would be significant and unavoidable impacts from the development of community parks in the region. In summary, the cumulative impact on recreational resources from increased on-campus population in conjunction with other population growth in the region would be less than significant.

NEAR-TERM PROJECTS

For the reasons discussed above for the CLRDP as a whole, none of the near-term projects would result in cumulatively significant impacts on recreational resources.

Based on the information presented above, the implementation of the CLRDP and its near-term projects, in conjunction with other regional development would not result in cumulatively significant adverse impacts on recreational resources.

4.15 TRANSPORTATION / TRAFFIC

This section evaluates the potential impacts of the CLRDP, including the five near-term projects, on traffic, circulation, and parking. Information in this section is derived primarily from information compiled and developed by Fehr & Peers Associates, Inc., during 2002 and 2003. Additional information contained in this section is derived from Institute of Transportation Engineers, *Trip Generation*, Sixth Edition, 1997; Transportation Research Board, *Highway Capacity Manual*, 2000; and State of California, Department of Transportation, *Guide for the Preparation of Traffic Impact Studies*, June 2001.

Based on the CEQA Standards of Significance, as provided in the *UC CEQA Handbook* (2001), the project would generally be considered to have a significant effect on the environment if it would:

- Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections);
- Exceed, either individually or cumulatively, a level of service standard 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;
- Result in inadequate parking capacity; or
- Conflict with applicable policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

Specific details regarding quantifiable impacts are presented below.

The City of Santa Cruz (http://www.ci.santa-cruz.ca.us) regulates local roadways, intersections, and bicycle and pedestrian modes of transportation within the city's jurisdiction.

Significance criteria of the City of Santa Cruz were used for this environmental assessment. According to the City of Santa Cruz, a project would result in a significant adverse impact on traffic conditions at an intersection if any of the following criteria are met:

- The peak hour level of service (LOS) at a signalized intersection degrades from an acceptable level to an unacceptable level due to the increase in traffic generated by the proposed project *and* the project increases the traffic volume by more than three percent, or
- The project increases the traffic volume by more than three percent at a signalized intersection that already operates at an unacceptable level without the project, or
- An unsignalized intersection meets the Caltrans peak hour signal warrant with the addition of project-generated traffic *and* the project increases the traffic volume by more than 3 percent.

The California Department of Transportation (Caltrans) http://www.dot.ca.gov regulates Highway (State Route) 1, which includes portions of Mission Street, and provides guidelines for the analysis of impacts to state-maintained facilities.

The City's standard for an acceptable LOS is LOS D or better. All City intersections in the study area are subject to the general City of Santa Cruz standard (LOS D). The City has previously applied an LOS E standard at key Mission Street intersections, which was developed through the original Congestion Management Program, but that program has been discontinued. Caltrans endeavors to maintain a target LOS at the transition between LOS C and D, but acknowledges that this may not always be feasible. Given the existing operations of the SR 1 (Mission Street) corridor and its location in the urbanized portion of the City, the target operating level is considered to be LOS D.

It should be noted, however, that Caltrans questioned the application of the City's standards to Mission Street-Highway 1 intersections in its comments on the Shaffer Road/Pacific Shores Apartments Draft EIR prepared for the City (2001). The City defended its standards in its responses to comments in the Final EIR. UC contacted both parties and attempted to resolve the discrepancy in approach, but did not succeed. This report therefore uses the City threshold (as has been the historic practice in University planning documents).

Neither the City of Santa Cruz nor the University have established roadway segment volume standards based on volume-to-capacity (V/C) ratios. V/C ratios can be translated into segment levels of service. This report evaluated selected roadway segments to determine whether any would operate at conditions worse than LOS D under the cumulative condition. It is assumed that if the cumulative V/C ratios at these segments yield LOS D or better, then both cumulative and project-specific V/C ratios are acceptable.

A significant adverse impact on parking conditions would occur when the demand for parking exceeds the available supply.

SETTING

REGIONAL CONTEXT

Regional access to the project site is provided by State Route (SR) 17 and SR 1. Major roadways in the vicinity of the site include Mission Street (also SR 1) and Bay Street, and local streets include Delaware Avenue, Natural Bridges Drive, and Western Drive. The key facilities serving the site are described below.

Regional Access

SR 1 is a major state highway located approximately 0.5 mile north of the site. SR 1 connects the city of Santa Cruz to the cities of Half Moon Bay and San Francisco to the north, and provides access to the city of Monterey to the south. Within the city of Santa Cruz, SR 1 is generally aligned in an east-west direction.[1] SR 1 is a four-lane freeway with grade-separated interchanges east of River Street. West of Western Drive, this roadway is a conventional, two-lane highway with at-grade intersections. Between Western Drive and River Street, SR 1 is a two- to four-lane

[1] For purposes of this EIR analysis, State Route 1 / Mission Street and streets parallel to it are considered to run east-west, and streets that intersect SR 1 / Mission (e.g., Western Drive and Bay Street) are considered to run north-south.

arterial street with signalized intersections and is also designated as Mission Street by the City (see further description below).

SR 17 is a four-lane, north-south highway connecting the Monterey Bay Area to Silicon Valley and the San Francisco Bay Area. South of SR 1, SR 17 becomes Ocean Street, an arterial street with at-grade, signalized intersections.

Local Access

Delaware Avenue is a two-lane, east-west roadway between Laguna Street and Shaffer Road that parallels SR 1 and the Monterey Bay coastline. Delaware Avenue provides primary access to the project site and is designated as an arterial roadway in the City's General Plan Circulation Element. When substantial congestion occurs on Mission Street, some traffic uses Delaware Avenue to reach points east of downtown.

Natural Bridges Drive is a two-lane, north-south arterial roadway that provides a connection between Delaware Avenue and Mission Street / SR 1.

Mission Street is an east-west arterial roadway extending between Shaffer Road and Pacific Avenue in central Santa Cruz. The section of Mission Street between Swift Street and Chestnut Street, which functions as SR 1, is a four-lane roadway with traffic signals at major intersections. Mission Street west of Swift Street, and parallel to and south of SR 1, is a two-lane roadway controlled with stop signs at street intersections. This portion of Mission Street west of Swift is called Mission Street Extension. When substantial congestion occurs on Mission Street, some traffic diverts to parallel facilities (e.g., King Street and California Street) via Walnut Avenue and Bay Street.

Bay Street is a north-south arterial roadway with two to four travel lanes and extends between High Street and West Cliff Drive. It provides access between the main campus of UCSC and Cowell Beach. Bay Street is signalized where it intersects with major cross streets.

Western Drive is a north-south collector street with two travel lanes and links the UCSC main campus to Mission Street south of SR 1.

EXISTING TRAFFIC CONDITIONS

Existing traffic conditions are described in terms of the operations of key intersections and roadway segments. The operations of the key intersections serve as the constraint points for the operations of the roadway system because these intersections control traffic by either stop signs or traffic signals. The study intersections are as follows:

1. Delaware Avenue and Shaffer Road
2. Delaware Avenue and Natural Bridges Drive
3. Delaware Avenue and Swanton Boulevard
4. Bay Street and Laguna Street
5. State Route 1 and Shaffer Road
6. Delaware Avenue and Swift Street
7. Delaware Avenue and Almar Avenue
8. State Route 1 and Western Drive

9. Mission Street and Swift Street
10. Mission Street and Almar Avenue–Younglove Avenue
11. Mission Street and Bay Street
12. Laurel Street and California Street
13. Mission Street and Laurel Street
14. Mission Street and Walnut Avenue
15. Mission Street and King/Union Street
16. Mission Street and Chestnut Street
17. State Route 1 and River Street
18. Western Drive and Meder Street
19. Western Drive and High Street
20. Bay Street and High Street
21. Bay Street and Iowa/Nobel Drive
22. Bay Street and Escalona Drive
23. Bay Street and King Street
24. Empire Grade and Heller Drive

The locations of the 24 study intersections are illustrated in Figure 4.15-1. Roadway segment evaluation is presented later in this section.

Intersection operations are described in terms of level of service (LOS), ranging from LOS A, representing good operations with low delays, to LOS F, representing oversaturated conditions with excessive delays. LOS D is considered to be the minimum acceptable level of service for signalized and unsignalized intersections in both the City and County of Santa Cruz. (Note: the Empire Grade/Heller Drive intersection is controlled by the County of Santa Cruz). This threshold is also used as the target for intersections on SR 1 that are maintained by Caltrans.

The operations of signalized intersections were calculated using procedures outlined in Chapter 16 of the 2000 update to the *Highway Capacity Manual* (HCM) published by the Transportation Research Board. Intersection LOS is based on average control delay, which includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration. Control delay does not account for delays caused by on-street parking, driveways, and other friction factors. The ranges of control delay and the corresponding LOS for signalized intersections are presented in Table 4.15-1.

Level of service calculations for stop-sign-controlled intersections were performed using the methodology for unsignalized intersections contained in Chapter 17 of the 2000 HCM. Delay for two-way stop-controlled intersections (with stop signs on the minor street approaches only) and four-way or all-way stops (where all approaches stop) is calculated differently. The level of service rating for two-way stop-controlled intersections is based on the average control delay for the longest-delayed approach controlled by a stop sign (i.e., on the minor or side street). The level of service is calculated for each movement, not for the intersection as a whole. (Including volumes on the main street would skew the weighted vehicular delay because this traffic does not stop.) For minor street approaches composed of a single lane (shared approach), the control delay is computed as the average of all movements in that lane.

SOURCE: Fehr & Peers

Figure 4.15-1

Intersection and Roadway Segment Study Locations

TABLE 4.15-1
SIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service	Average Control Delay Per Vehicle (Seconds)	Description
A	delay $\leq$ 10	Operations with very low delay occurring with favorable progression and/or short cycle length.
B	10 < delay $\leq$ 20	Operations with low delay occurring with good progression and/or short cycle lengths.
C	20 < delay $\leq$ 35	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.
D	35 < delay $\leq$ 55	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high V/C ratios. Many vehicles stop, and individual cycle failures are noticeable.
E	55 < delay $\leq$ 80	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.
F	delay > 80	Operations with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.

SOURCE: Transportation Research Board, *Highway Capacity Manual*, 2000 (Chapter 16).

At all-way stop intersections, the delay used to identify the LOS is the average of all turning movements (including through movements) on all four approaches. Thus, an overall intersection delay is presented. The ranges of control delay and the corresponding LOS for unsignalized intersections are presented in Table 4.15-2 and are different than those for signalized intersections.

Existing Intersection Volumes and Lane Configurations

The operations of the study intersections were evaluated for weekday morning (AM) and evening (PM) peak-hour traffic conditions. Peak traffic conditions generally occur on weekday mornings between 7:00 and 9:00 AM and evening periods from 4:00 to 6:00 PM. Intersection operations were evaluated for the one hour during each of these periods with the highest measured traffic volumes. This timeframe is referred to as the “peak” hour. Existing peak-hour traffic counts for the key intersections (see pages 4.15-3 and 4.15-4) were taken in May 2001 when UCSC was in session. Supplementary counts were conducted on Mission Street in May 2002 to account for new traffic patterns after the completion of construction of the Mission Street widening.

The existing lane configurations at each intersection are illustrated in Figures 4.15-2a and 4.15-2b, and the existing peak-hour volumes are shown in Figures 4.15-3a and 4.15-3b. Detailed traffic count data are contained in Appendix D.

TABLE 4.15-2
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service	Average Control Delay Per Vehicle (Seconds)	Description
A	delay ≤ 10	Little or no delay
B	10 < delay ≤ 15	Short traffic delays
C	15 < delay ≤ 25	Average traffic delays
D	25 < delay ≤ 35	Long traffic delays
E	35 < delay ≤ 50	Very long delays
F	delay > 50	Stop-and-go conditions

SOURCE: Transportation Research Board, *Highway Capacity Manual*, 2000 (Chapter 17).

Existing Levels of Service

The results of the intersection level of service calculations for existing conditions are presented in Table 4.15-3. Most of the intersections are operating at good levels of service (LOS A and B). Several of the intersections are operating at LOS C or D during at least one of the peak hours. The following two locations are operating at LOS E or F during at least one of the peak hours:

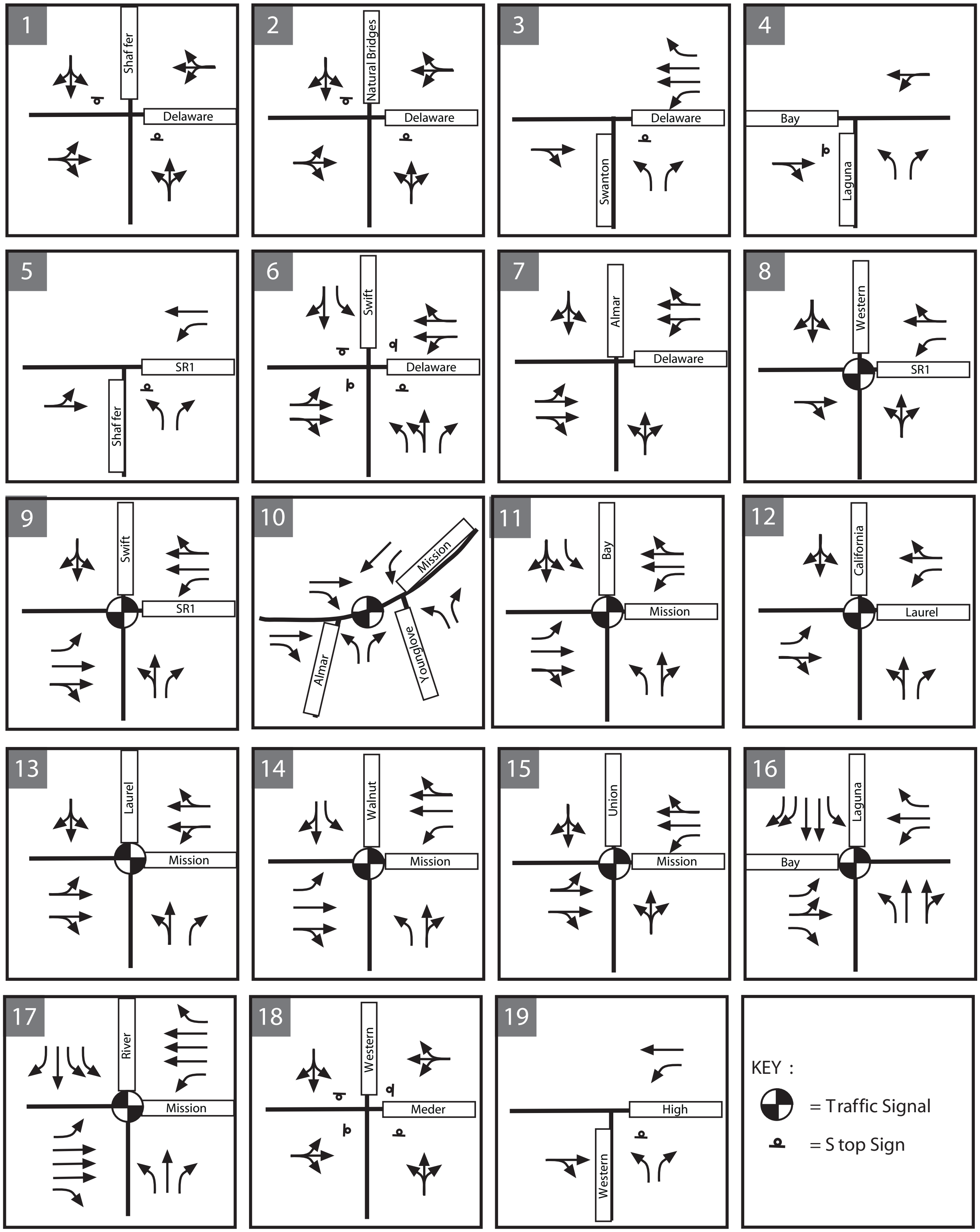
Intersection 16: SR 1–Chestnut Street / Mission Street (LOS E during the PM peak hour)

Intersection 22: Bay Street and Escalona Drive (LOS F during the PM peak hour)

A signal warrant analysis was conducted for all unsignalized intersections operating at an unacceptable level (i.e., LOS E or F). The LOS F operations at the Bay Street / Escalona Drive intersection occur for turning movements from eastbound Escalona Drive because of insufficient gaps in traffic on Bay Street. A peak-hour signal warrant analysis (using the Caltrans *Traffic Manual*) indicates that a traffic signal is not currently warranted based on peak-hour volumes. As indicated in the Caltrans *Traffic Manual*, however, installation of a traffic signal should not necessarily be based solely on the satisfaction of warrant criteria, and should also be based on other factors such as delay, congestion, driver confusion, and safety problems. The City of Santa Cruz will make the final determination regarding the need for a signal at this location.

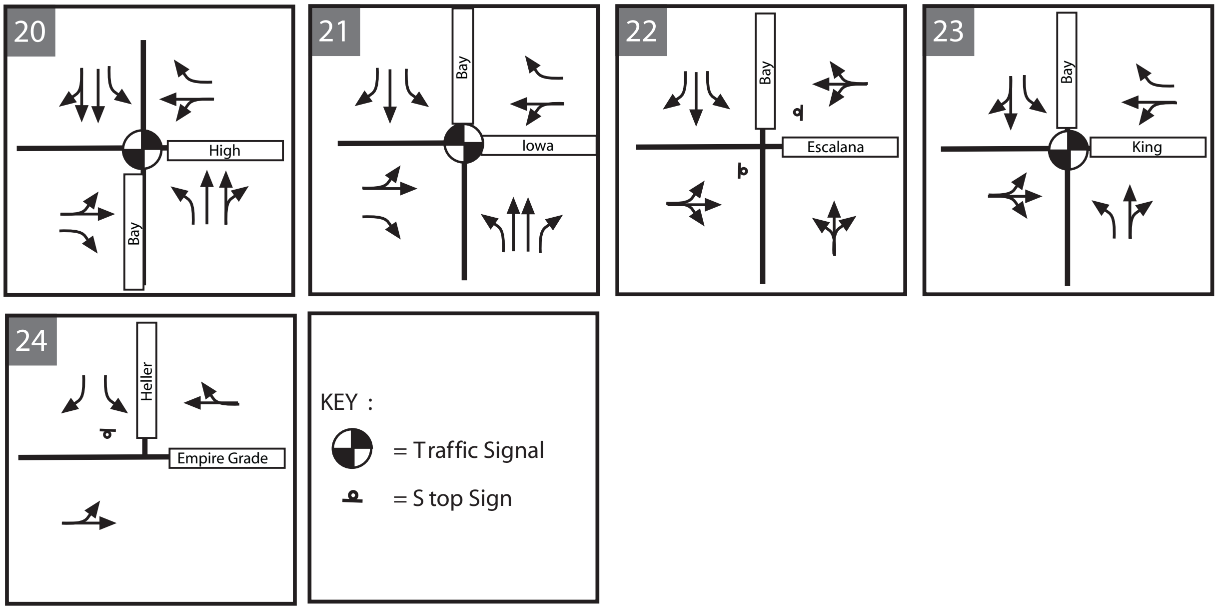
Existing Roadway Segment Capacity

Daily traffic volumes on three street segments were counted in May 2001, and volumes on a fourth segment (Delaware Avenue west of Natural Bridges Drive) were counted in January 2002. The daily volume for each location is presented in Table 4.15-4; the four segments can be seen in Figure 4.15-1. These volumes are used in the impact analysis (below) to determine if the proposed project is expected to have a significant effect on daily traffic operations.



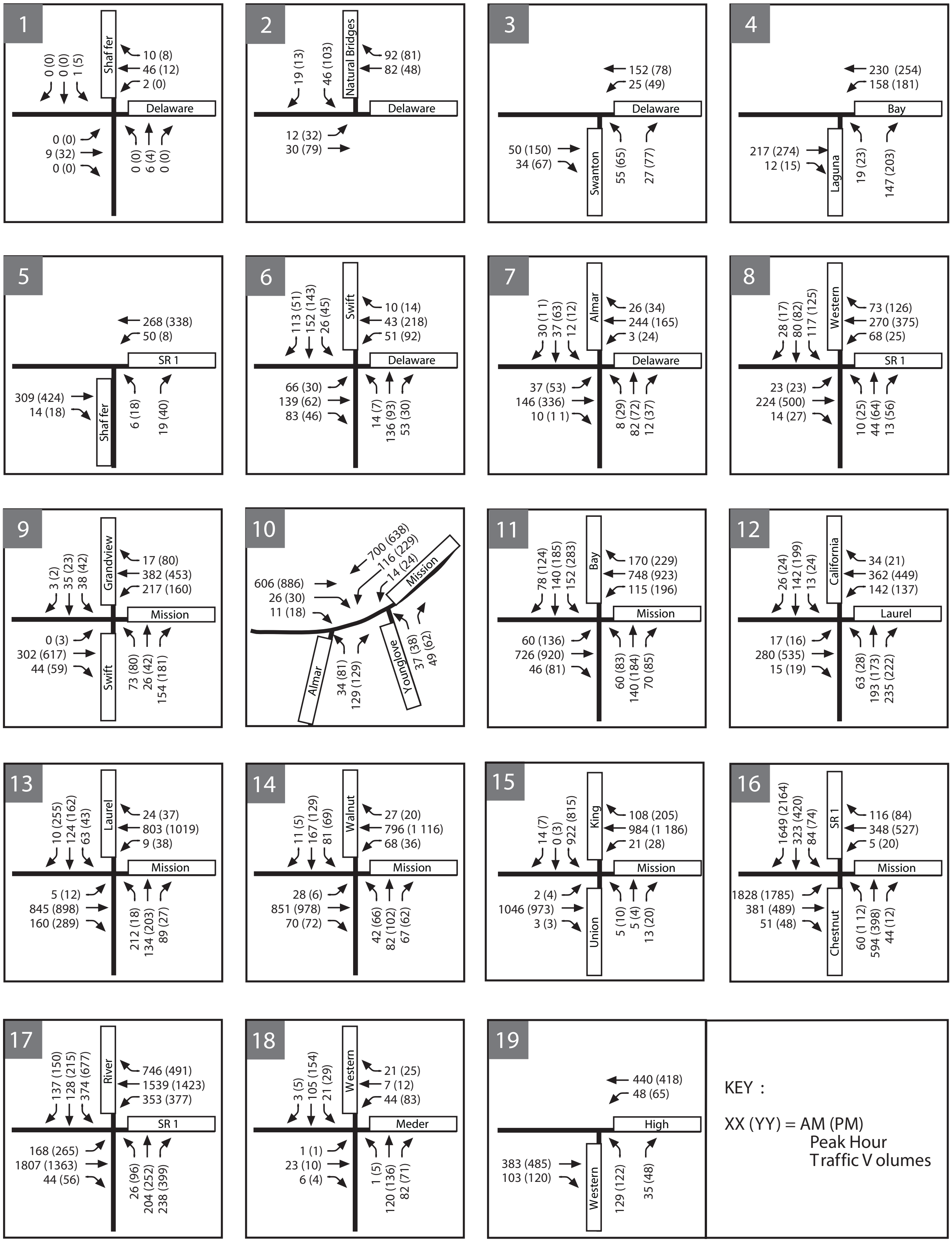
SOURCE: Fehr & Peers

Figure 4.15-2a
Lane Configurations
(Intersections 1-19)



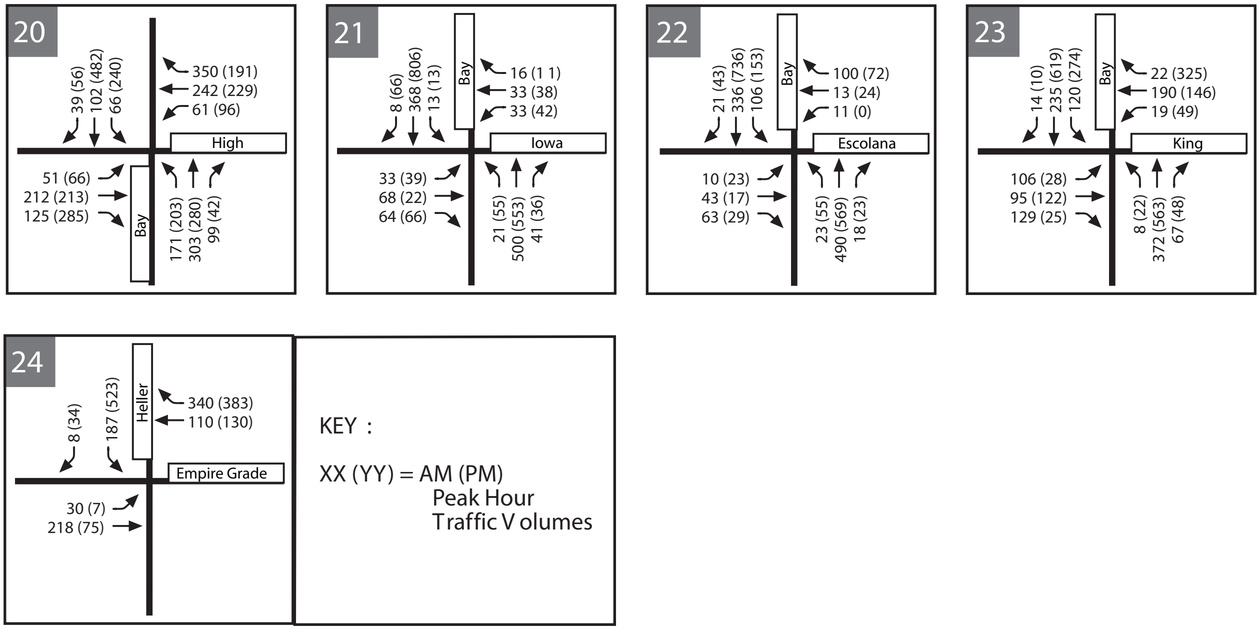
SOURCE: Fehr & Peers

Figure 4.15-2b
Lane Configurations
(Intersections 20-24)



SOURCE: Fehr & Peers

Figure 4.15-3a
Existing Volumes
(Intersections 1-19)



SOURCE: Fehr & Peers

Figure 4.15-3b
Existing Volumes
(Intersections 20-24)

TABLE 4.15-3
EXISTING INTERSECTION LEVELS OF SERVICE (LOS)

Intersection	Type of Control	Peak Hour	Delay (sec.)[a]	LOS
1. Delaware Avenue / Shaffer Road	Two-Way	AM PM	9.5 9.4	A A
2. Delaware Avenue / Natural Bridges Drive	Two-Way	AM PM	7.9 8.4	A A
3. Delaware Avenue / Swanton Boulevard	Two-Way	AM PM	9.9 10.5	A B
4. Bay Street / Laguna Street	Two-Way	AM PM	11.0 12.2	B B
5. State Route 1 / Shaffer Road	Two-Way	AM PM	11.0 12.5	B B
6. Delaware Avenue / Swift Street	All-Way	AM PM	11.0 10.9	B B
7. Delaware Avenue / Almar Avenue	All-Way	AM PM	9.3 11.4	A B
8. State Route 1 / Western Drive	Signal	AM PM	22.1 18.1	C B
9. State Route 1 / Swift Street	Signal	AM PM	21.2 20.0	C C
10. Mission Street / Almar Avenue	Signal	AM PM	21.7 24.6	C C
11. Mission Street / Bay Street	Signal	AM PM	31.8 51.1	C D
12. Laurel Street / California Street	Signal	AM PM	20.3 20.6	C C
13. Mission Street / Laurel Street	Signal	AM PM	22.1 35.3	C D
14. Mission Street / Walnut Avenue	Signal	AM PM	22.9 19.2	C B
15. Mission Street / Union Street	Signal	AM PM	24.8 24.1	C C
16. Mission Street / Chestnut Street	Signal	AM **PM**	40.0 **79.4**	D **E**
17. State Route 1 / River Street	Signal	AM PM	35.0 45.1	C D
18. Western Drive / Meder Street	All-Way	AM PM	8.1 8.7	A A
19. High Street / Western Drive	Two-Way	AM PM	25.5 30.6	D D
20. High Street / Bay Street	Signal	AM PM	18.1 22.9	B C
21. Bay Street / Iowa Drive	Signal	AM PM	12.2 10.1	B B
22. Bay Street / Escalona Drive	Two-Way	AM **PM**	21.7 **156.1**	C **F**
23. Bay Street / King Street	Signal	AM PM	19.3 22.7	B C
24. Empire Grade / Heller Drive	Two-Way	AM PM	13.4 18.4	B C

[a] Delay for signalized and all-way stop-sign-controlled intersections is expressed as the weighted average delay for the overall intersection. Delay for two-way stop-controlled intersections represents the worst-case minor street movement only. Unacceptable operations (LOS E or F) are shown in **bold** type.

SOURCE: Fehr & Peers Associates, Inc., 2003

TABLE 4.15-4
EXISTING DAILY TRAFFIC VOLUMES

Location	Average Weekday Daily Traffic Volume (vehicles)
Delaware Avenue (Shaffer Road to Natural Bridges Drive)	2,356
Delaware Avenue (Seaside Street to Surfside Avenue)	5,674
Western Drive (Western Court to Monarch Way)	4,582
Bay Street (Escalona Drive to Kenneth Street)	18,665

SOURCE: Fehr & Peers Associates, Inc., 2003

Existing Onsite Circulation and Access

Access to the project site is provided via the Delaware Avenue Extension located west of Shaffer Road. A two-lane roadway provides vehicular access, as well as access for bicyclists and pedestrians. The intersection is stop-sign-controlled and no existing operational problems were identified based on field observations.

Circulation within the site is provided via the Delaware Avenue Extension and McAllister Way. Parking lot drive aisles intersect McAllister Way at various locations. The long, straight alignment of McAllister Way could be conducive to higher travel speeds, but no excessive speeding was observed in the field. The relatively low existing trip generation of the site is adequately served by the onsite roadway system, and no hazards from a design or operational perspective were identified.

EXISTING PARKING CAPACITY

A total of 245 parking spaces are provided in paved and unpaved lots serving the existing onsite facilities. A total of 178 spaces are paved. The distribution of spaces is presented in Table 4.15-5. The 76 spaces located on the National Marine Fisheries Service (NMFS) parcel are managed by National Oceanic and Atmospheric Administration (NOAA), while the Institute of Marine Sciences (on behalf of UCSC programs and its affiliates) manages the remaining 169 spaces. At the present time, parking is not assigned, although some parking areas are equipped with gates to restrict parking as needed. In addition, short-term and delivery parking places are available informally.

Parking demand generally does not exceed supply, and parked vehicles do not intrude into the adjacent neighborhood (i.e., on Delaware Avenue and Shaffer Road). UCSC Traffic and Parking Services (TAPS) conducted an informal survey of parking occupancy at the Center for Ocean Health (COH) and the Seymour Center at the south end of the site on 14 weekdays in March and April 2003. Occupied spaces were counted at least once each day at varying times and a total of two to five counts were conducted for each weekday (i.e., Monday through Friday). The survey results indicated that the COH lot was occupied 95 percent of the time on average, while the remaining surveyed lots were occupied at no more than 69 percent of their capacity. Overall, the

TABLE 4.15-5
SUMMARY OF EXISTING PARKING SUPPLY

Location	Number of Spaces
Center for Ocean Health	33
Seymour Marine Discovery Center	72
Long Marine Lab (LML) South Area	16
LML Overflow	24
National Marine Fisheries Service (NMFS) Parcel	52
NMFS Overflow	24
Greenhouses	6
Avian Facility	7
California Department of Fish and Game (CDFG) Marine Wildlife Center	11
TOTAL	245

SOURCE: Figure 2.25 (Existing Parking), *Marine Science Campus Draft CLRDP*, July 2003

average total parking occupancy was 68 percent for the five-day period. The peak demand of 85 to 90 percent occurred on days with a conference in the library.[2]

EXISTING PEDESTRIAN AND BICYCLE FACILITIES

Pedestrian Facilities

Pedestrian facilities consist of sidewalks, trails/pathways, crosswalks, and pedestrian signals. The closest sidewalk to the project site on a public street is located on the north side of Delaware Avenue and extends for approximately 650 feet west of Natural Bridges Drive, which is approximately 1,000 feet from the entrance to the project site. Sidewalks are also located on both sides of Natural Bridges Drive and on portions of the south side of Delaware Avenue (between Swanton Boulevard and Swift Street) and on both sides of the Mission Street Extension. Another short section of sidewalk is provided on the west side of Shaffer Road next to a developed parcel north of the railroad tracks. Pedestrians must share the roadway with vehicles and bicyclists on Shaffer Road, Delaware Avenue, and the Mission Street Extension within an approximate 2,000-foot radius of the site. Because the nearest bus stop is located at the Delaware Avenue / Shaffer Street intersection immediately adjacent to the project site, pedestrians from the existing Long Marine Laboratory (LML) uses do not conflict with traffic on Delaware Avenue. Sidewalks, crosswalks, and pedestrian push buttons are provided at most of the signalized intersections in the study area. Several crosswalks are located at unsignalized intersections on the Mission Street Extension.

Pedestrian access through the site is primarily provided via the Delaware Avenue Extension and McAllister Way and the other onsite roadways/driveways, plus a few decomposed granite or compressed earth pathways and courtyards. An ad-hoc trail along the southern and eastern edge

2 Larry Pageler, TAPS, May 7, 2003 data.

of the site is used for pedestrian access. Pedestrians must share the roadway with vehicles and bicyclists between the Delaware Avenue gate and the onsite buildings, which is not considered ideal, but is not deemed a major problem given the relatively low vehicular traffic volumes and speeds.

Bicycle Facilities

Bicycle facilities are comprised of bike paths (Class I), bike lanes (Class II), and bike routes (Class III). Bike paths are paved trails that are separated from roadways. Bike lanes are striped lanes on roadways designated for bicycle use by pavement legends and signs. Bike routes are roadways that are designated for bicycle use with or without signs, but do not have a separate striped lane. Routes are typically identified to provide continuity between Class I and II facilities.

Bicycle facilities in the vicinity of the project site include Class II bike lanes on Delaware Avenue, Natural Bridges Drive, and Swift Street. A Class I multiuse/bicycle path follows the shoreline along West Cliff Drive. The “Pacific Coast Bicycle Route” follows SR 1 to Western Drive, the Mission Street Extension, Natural Bridges Drive, Delaware Avenue, Swanton Boulevard, and West Cliff Drive. In general, the Pacific Coast Route is a Class III facility except where it includes streets with bicycle lanes such as Natural Bridges Drive.

The existing and planned bicycle facilities within the project study area are depicted in Figure 4.15-4. The wide cross-section of Delaware Avenue and relatively low traffic volumes in the immediate vicinity of the project site are conducive to bicycle travel and facilitate access to the site. A majority of the streets in the city of Santa Cruz are capable of providing for safe bicycle travel. According to the Santa Cruz Bicycle Transportation Plan, many local and collector streets in the city maintain such low traffic and bicycle volumes that little more than normal maintenance activities are needed to make bicycling safe.[3] The plan also notes that a multi-use/bicycle path is proposed for the railroad right-of-way that parallels State Route 1 and Mission Street and borders the northern edge of the project site. Although there is support for this project, the design of this project has not been officially approved, right-of-way has not been acquired, and funding has not been secured for its implementation.

EXISTING TRANSIT AND SHUTTLE SERVICE

The Santa Cruz Metropolitan Transit District (SCMTD) provides bus service within Santa Cruz County with links to services in other transit districts (see Figure 4.15-5). The only existing fixed-route transit service immediately adjacent to the project site is provided by SCMTD Route 3B on Delaware Avenue. This route provides service between the De Anza Santa Cruz residential community at the Delaware Avenue/ Shaffer Road intersection and the Downtown Metro Center. The stop is immediately adjacent to the Delaware Avenue gate and requires a 0.3-mile walk to reach the first developed area of the site. Route 3B operates from 6:40 AM to 7:15 PM on 60-minute headways. According to SCMTD data, the average number of riders per bus for this route is about 13 people.[4] Numerous other routes operate in the greater study area, and many of these serve the UCSC Main Campus. The closest routes to the site (2, 3N, 20, 40, and 42) are described below.

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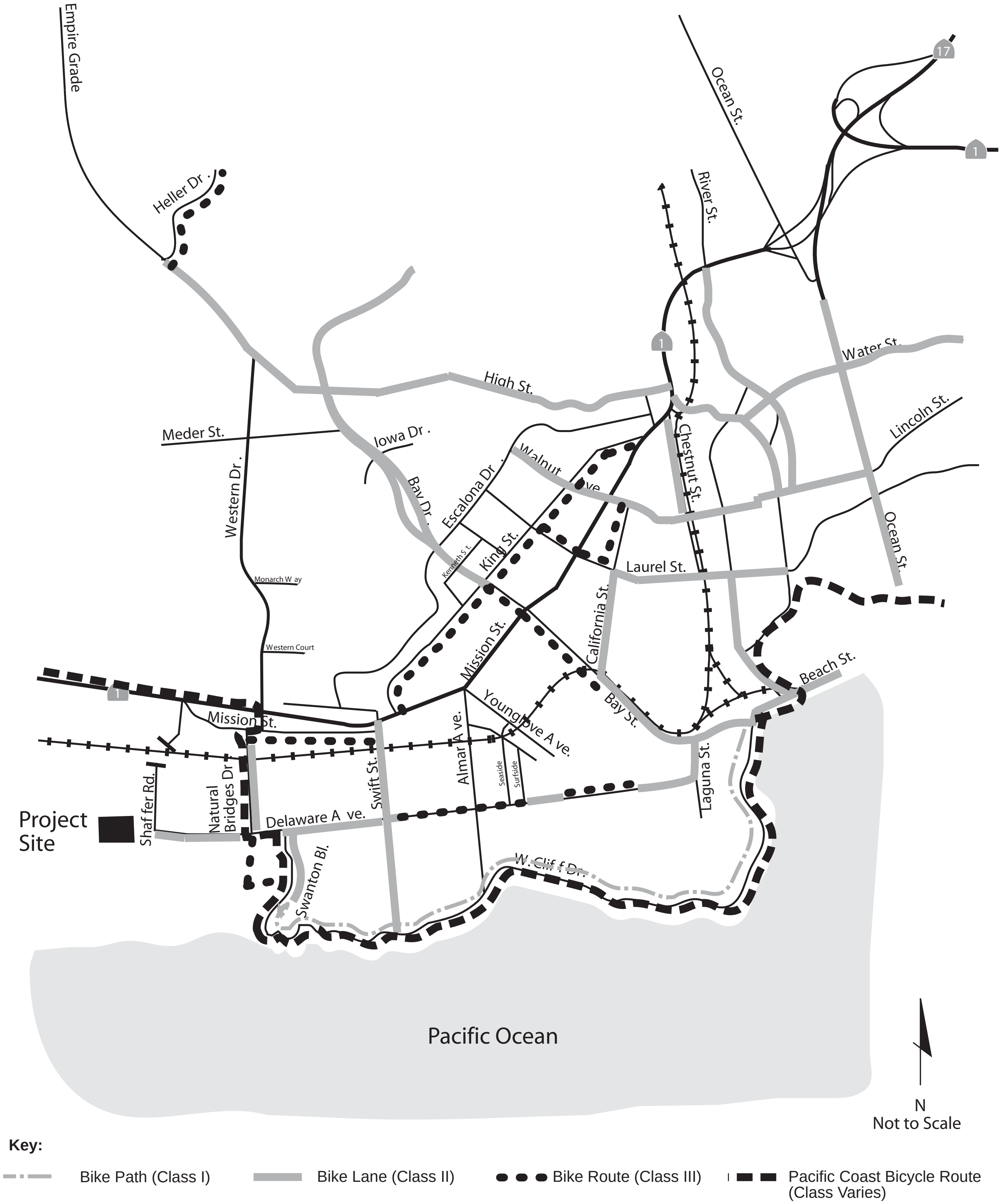
3 City of Santa Cruz, *Santa Cruz Bicycle Transportation Plan*, 2000.

4 Santa Cruz Metropolitan Transit District, “Route Summary Report: November 2001 to October 2002,” printed November 13, 2002.



SOURCE: Fehr & Peers

Figure 4.15-4
Bikeways

SOURCE: Fehr & Peers

Figure 4.15-5
Transit Facilities

Route 2 provides service between east Santa Cruz and the Downtown Metro Center. Route 2 operates along Mission Street, Western Drive, and High Street in the project study area. The weekday hours of operation are 6:15 AM to 7:30 PM, and 8:20 AM to 6:55 PM on weekends. Route 2 has 60-minute headways.

Route 3N provides transit service between Delaware Avenue / Swanton Street and the Downtown Metro Center via Mission Street and Bay Street. It operates in the evenings only, between 7:40 and 10:12 PM daily. Route 3N has 60-minute headways.

Route 20 provides transit service between UCSC and the Downtown Metro Center via Western Drive, Swift Street, and Delaware Avenue. The hours of operation are from 7:25 AM to 6:25 PM on weekdays, but only when UCSC is in session. Route 20 has 60- to 90-minute headways.

Route 40 provides transit service between the Davenport neighborhood and the Downtown Metro Center via Mission Street. The hours of operation are from 6:05 AM to 6:55 PM on weekdays and 5:45 AM to 6:55 PM on weekends. Route 40 has an average of two-hour headways.

Route 42 provides transit service between Cement Plant Road and the Downtown Metro Center via SR 1 and Empire Grade. The hours of operation are from 12:30 PM to 11:20 PM on weekdays with three trips. On weekends there are two trips, at 7:15 PM and 10:00 PM.

UCSC operates intra-campus shuttle service, as well as service between the Main Campus and the Long Marine Lab. The shuttle uses Western Drive, the Mission Street Extension, Natural Bridges Drive, and Delaware Avenue to travel between the site and the Main Campus, as shown in Figure 4.15-5. According to Traffic and Parking Services (TAPS) data, daily ridership averaged nearly five per day over the course of the Academic Year 2002-2003. Peak ridership occurred during the winter months of January and February with an average of between 10 and 13 riders per day.

EXISTING AIR TRAFFIC PATTERNS

The closest general aviation airport is located in Watsonville approximately 15 miles east of the project site. Although air traffic may occur over the project site, the local airspace is not in the primary approach path to the airport.

EXISTING EMERGENCY ACCESS

Emergency vehicle access to the site is provided by the Delaware Avenue Extension west of Shaffer Road through the main gate. An access easement is provided along the city limit line north of the extension, although the only infrastructure in this easement includes power and communication lines and no smooth driving surface. Two points of access for emergency response purposes are typically desirable in the event the primary access point is unavailable.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP building program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new building area of 377,856 square feet (sf) at the Marine Science Campus by about 2020. In addition, the proposed CLRDP would allow approximately 152,000 sf of outdoor development and approximately 550 additional parking spaces. The CLRDP building program would include the following uses: 254,500 sf for Marine Research and Education, 70,000 sf for Outdoor Research Areas, 19,000 sf for Support Facilities, 98,100 sf for Support Housing, and 107,500 sf for Equipment Storage and Maintenance.

The program includes construction of a new roadway system through the middle terrace area that would include realignment of the Delaware Avenue Extension and driveway connections to new parking areas. The existing extension would be designated for bicycle and pedestrian use only, and a new system of paths would be developed to facilitate alternative travel modes across the site.

The CLRDP identifies two types of roadway classifications: Campus Street and Controlled Service Access. The Campus Street classification is intended to accommodate access to the Marine Science Campus by motor vehicles and bicycles through the use of paved, public-use corridors with two undivided travel lanes (one in each direction) and limited on-street parking. The maximum allowable width of the corridor would be 22 feet; generally, no curbs would be provided along campus streets. The Controlled Service Access is intended to accommodate bicycle and pedestrian use, special event parking, and occasional vehicle access for habitat management activities. This designation is limited to the portion of Delaware Avenue Extension/McAllister Way between Shaffer Road and the CDFG facility and would not allow widening or other capacity improvement. A new main access roadway would be constructed from the existing entrance on an east-west alignment, which would turn north-south to reach new parking areas east of existing McAllister Way.

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the building program by about 2010, and about which more information is known. Amongst the building footprints depicted in the CLRDP prototype site plan are specific sites for these five near-term projects (see Figure 3-7). These projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited on the upper terrace development area. The building would be designed for an employee population of 10 staff members. The laydown yard would provide additional open storage space for ocean-going vessels and would not increase the campus population.

- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of yard space) would be located on the middle terrace development area adjacent to the Younger Lagoon Reserve (YLR) and just south of the existing California Department of Fish and Game (CDFG) Marine Wildlife Center. The SORACC facility would be designed for an employee population of approximately 20 staff members.

- The United States Geological Survey (USGS) Western Coastal and Marine Geology facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area. The new facility would include space for offices and laboratories and would be designed for an employee population of 144 staff members from the USGS Western Biological Resources Division, Water Resources Division, and Coastal and Marine Group.

- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area. The housing is proposed to provide onsite work/live facilities for visiting and resident Marine Science Campus scientists and students, whose learning experience or research requires, or would be enhanced by, their presence on the campus during extended hours. The support housing would consist of 42 apartment and townhouse units on the middle terrace, northeast of the NMFS facility and about 300 feet west of the De Anza Santa Cruz residential community perimeter wall. The units would accommodate approximately 100 people and are planned to be restricted to occupancy by individuals and families affiliated with the Marine Science Campus.

- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area. The Center for Ocean Health Phase II would be designed for an employee population of approximately 60 staff members and 30 students, for a net total of 90 people.

Other short-term development proposed to occur under the CLRDP by about 2010, in addition to the five near-term projects described above, would result in a net total of about 15,100 sf of new development. The short-term building program includes about 11,000 sf of support facilities on the middle terrace (i.e., a 5,000-sf seminar auditorium with up to 350 seats, 2,500 sf of meeting rooms with up to 176 seats, and a 3,500-sf dining hall with up to 105 seats); about 4,100 sf of support housing (i.e., 10 overnight visitor rooms [2,500 sf] on the middle terrace, and replacement of the two existing caretakers' units [1,600 sf] on the lower terrace); as well as 8,000 sf of both paved and unpaved recreational/sports courts on the middle terrace. This other short-term development (i.e., auditorium, meeting rooms, dining hall, overnight rooms, and replacement caretaker housing) would be designed to accommodate a total of 644 persons.

The proposed short-term development, including the five near-term projects and support facilities, would be designed to accommodate approximately 1,000 people at the Marine Science Campus, which accounts for people using the offices, labs, housing, classrooms, group space, and visitor space.

MEASURES PROPOSED AS PART OF THE PROJECT

To improve vehicular access to the site, the Shaffer Road / Delaware Avenue intersection would be improved, other improvements to Shaffer Road would be undertaken, and the existing entry road would be reclassified as Controlled Service Access. To encourage the use of alternative modes of transportation, the University would implement transportation demand management measures, including carpool and vanpool services, designed to achieve a 30-percent reduction in person-trips made by automobile.

To further encourage alternative modes of transportation, the University would manage parking for all Marine Science Campus users. In addition, the development of 550 new parking spaces would be confined to the three development areas (upper, middle, and lower terraces), and would only be developed as warranted by demand. All spaces would be regulated through the use of parking permits and time-limited parking with strict enforcement to encourage the use of alternative modes and reduce overall site vehicle trip generation. Additional parking management strategies would be implemented for special events and rescue operations.

To promote bicycle use and walking, the University would provide secure bicycle racks outside major building complexes as well as lockers and showers in a convenient, central location, and would work with the City of Santa Cruz to identify and market bike routes to the campus. An onsite system of paths is proposed to provide pedestrian and bicycle access through and around the site. More direct paths would encourage the use of bicycling and recreational walking. Crossings of onsite roadways would be adequately signed and may include raised crosswalks to increase the visibility of pedestrians and to slow vehicle traffic.

To promote the use of University and public transit, the University would work with the SCMTD to increase the frequency of transit service to the campus (as warranted by demand), would provide expanded UCSC Transportation and Parking Services (TAPS) shuttle service between the UCSC Main Campus and the Marine Science Campus, and would develop onsite transit infrastructure, such as covered transit stops.

Pertinent CLRDP Circulation and Parking Policies

Pertinent specific policies and implementation measures included in the CLRDP and considered part of the project are described, by travel mode, as follows:

Auto Circulation

<u>Policy 5.1 – Vehicular Access</u>. Roadways on the campus will provide adequate site access for regular users and visitors, while minimizing impacts on the natural environment.

Implementation Measure 5.1.1 – New Circulation System. The University will construct a new circulation system for the Marine Science Campus as shown in Figure 5.4.

Implementation Measure 5.1.2 – Improve Shaffer Road/Delaware Intersection. The Shaffer Road/Delaware intersection, at the entrance to campus, will be improved in conjunction with other road and development activities, in order to improve the functioning of this intersection and its safety.

Implementation Measure 5.1.3 – Shaffer Road Improvements. The University will cooperate with the City of Santa Cruz to evaluate extending Shaffer Road to the north across the railroad tracks to the existing access road that leads to Highway 1. The timing of this improvement will depend on analyses of traffic impacts throughout this area of Santa Cruz, including proposed residential uses across Shaffer Road from the campus and ongoing industrial development in the vicinity. Adjacent to the Marine Science Campus, Shaffer Road will be widened to be consistent with the City of Santa Cruz General Plan Circulation Diagram (adopted on October 27, 1992) and City public improvement standards.

Implementation Measure 5.1.5 – Use of Former Access Road. The existing portion of McAllister Way between Shaffer Road and the California Department of Fish and Game facility, will be abandoned as a campus street and used instead for bicycle and pedestrian access, controlled access for oversized service vehicles, controlled access for special event parking, and occasional access for habitat management activities.

Policy 5.2 – Travel Mode Split. The University will pursue a goal of having at least 30 percent of all person-trips to the Marine Science Campus made using alternatives to the single-occupant automobile.[5]

Implementation Measure 5.2.1 – Encouraging Alternatives to the Single-Occupant Vehicle. The University will enforce policies and implement measures as described in the remainder of this subsection in part as a means to encouraging alternatives to the single-occupant automobile.

Parking

Policy 5.3 – Parking for Campus Use and Coastal Access Areas. The University will provide limited parking spaces for faculty, staff, students, and visitors who have business on the Marine Science Campus. The University will also provide dedicated and dual-use parking spaces for use by visitors who have traveled to the Marine Science Campus to access the coast. Parking on the Marine Science Campus will be limited to 245 existing parking spaces, plus 550 new spaces, 10 of which will be designated for coastal access parking and 50 of which will be designated for dual use parking. For the purpose of this policy, "dual use parking" means parking spaces available for persons visiting campus facilities that have a visitor-serving component (e.g., Seymour Marine Discovery Center) as well as persons visiting the campus to access the coast.

Policy 5.4 – Development of New Parking. The University will regulate the development of new parking on the Marine Science Campus to ensure that new parking spaces are provided in an amount commensurate with demand created by new development.

Implementation Measure 5.4.1 – Creation of Parking Activity Zones. The University will maintain three parking activity zones for the Marine Science Campus. The activity zones will correspond to development areas referenced in the land use plan (i.e., Lower Terrace, Middle Terrace, and Upper Terrace).

Implementation Measure 5.4.2 – Development of New Parking. New parking will be developed as demand warrants. No new parking spaces will be developed until existing parking spaces in a given parking activity zone are 90 percent utilized (on average).

Implementation Measure 5.4.3 – Lease Agreements. The University will ensure that lease agreements entered into with tenants on the UCSC Marine Science Campus include provisions that require them to fully abide by and implement the transportation policies contained in this CLRDP.

Policy 5.5 – Parking Management. Parking on the Marine Science Campus will be managed by UCSC Transportation and Parking Services (TAPS), which will administer parking permits, operate shuttle service, disseminate commuter information, and monitor parking utilization annually. TAPS will regulate parking on the UCSC Marine Science Campus through the use of parking permits and time-limited parking.

[5] This goal is lower than the main campus trip-reduction goal since the Marine Science Campus serves a more diverse group of users including students, employees, and visitors, some of whom are more short-term users than main campus students, faculty and staff.

Implementation Measure 5.5.1 – Permits Required. Parking permits will be required for the use of each non-metered parking space on the UCSC Marine Science Campus. TAPS may regulate nighttime hours as necessary to ensure adequate parking for Marine Science Campus activities.

Implementation Measure 5.5.2 – Coastal Access Parking. Dedicated and dual-use parking for coastal access will be clustered close to coastal access points and in the case of dedicated spaces, controlled to ensure that the spaces are reserved for coastal access use.

Implementation Measure 5.5.3 – Carpools and Vanpools. Reserved parking spaces may be set aside for persons traveling to the site in registered carpools or vanpools. TAPS may institute reduced parking permit fees for carpool and vanpool users if necessary to achieve consistency with Policy 5.2.

Implementation Measure 5.5.4 – Parking Management Strategy for Special Events. The University will develop a strategy for managing parking demand for occasional special events, including rescue operations at the Marine Wildlife Center.

Implementation Measure 5.5.5 – Security Booth. The University may install an information booth at the entrance to the UCSC Marine Science Campus to ensure campus security, provide parking permits, direct visitors, and control access during special events.

Implementation Measure 5.5.6 – Parking Enforcement. The University will enforce parking regulations on the Marine Science Campus.

Pedestrian and Bicycle Facilities

<u>Policy 5.6 – Promotion of Bicycle Use and Walking</u>. The University will promote the use of bicycles and walking as a means of traveling to and from the Marine Science Campus.

Implementation Measure 5.6.1 – Bike Parking Outside Buildings. The University will provide secure bicycle racks outside major building complexes on the UCSC Marine Science Campus.

Implementation Measure 5.6.2 – Personal Lockers and Showers. The University will as feasible provide lockers and showers in conjunction with new projects in convenient locations for people who choose to bike or walk to the Marine Science Campus.

Implementation Measure 5.6.3 – Coordinated Marketing with City of Santa Cruz. The University will coordinate with the City of Santa Cruz to identify and market bike routes that bike riders can use to travel to the Marine Science Campus.

Implementation Measure 5.6.4 – Crosswalk Design. The University will design and construct pedestrian crossings with crosswalks and signage per the Federal Highway Administration's Manual of Uniform Traffic Control Devices. This includes locating crosswalks at intersections or parking area entrances and for mid-block crossings, the use of raised crosswalks, and the use of pressed asphalt pavement with integrated color to accentuate pedestrian crossings from other pavement treatments.

Transit

Policy 5.7 – Promotion of Transit Use. The University will promote the use of university and public transit as a means of traveling to and from the Marine Science Campus.

Implementation Measure 5.7.1 – Extension of SCMTD Transit Services. The University will work with SCMTD to increase the frequency of transit service to points adjacent to the UCSC Marine Science Campus as demand warrants. The University will also encourage SCMTD to extend its service onto the Marine Science Campus.

Implementation Measure 5.7.2 – Expansion of TAPS Shuttle Services. The University will provide TAPS shuttle service connecting the UCSC Marine Science Campus to the main UCSC Campus as demand warrants. Shuttles will be scheduled to correspond with classes, and class schedules will be developed in coordination with TAPS to minimize operational demands. As funding allows, shuttles may also be scheduled to accommodate University staff.

Implementation Measure 5.7.3 – Physical Infrastructure for Transit. As part of the development of the Marine Science Campus circulation system, paved areas for bus turnarounds and covered transit stops for SCMTD bus and TAPS shuttle riders will be developed at logical locations throughout the Marine Science Campus concurrent with the construction of new roadways, sidewalks and related circulation improvements.

Transportation Demand Management (TDM) Coordination

Policy 5.8 – TDM Coordination. The University will coordinate ridesharing to and from the Marine Science Campus and promote all available forms of alternative transportation to site users and visitors.

Implementation Measure 5.8.1 – Carpool and Vanpool Services. The University, through its Transportation and Parking Services (TAPS) office will provide services and programs to promote carpools and vanpools.

Implementation Measure 5.8.2 – TDM Coordination. The University will implement and provide ongoing coordination of this TDM program. TAPS will be responsible for all aspects of transportation management on the UCSC Marine Science Campus, including: parking permit issuance, organization of carpools and vanpools, and special event access planning. The University will also enforce parking regulations on the Marine Science Campus.

Implementation Measure 5.8.3 – Employee Transportation Information. The University will disseminate transportation information to visitors, staff, faculty and students at the Marine Science Campus through the UCSC web page. Printed information will also be made available at a central location on the Marine Science Campus.

PROJECT IMPACTS AND MITIGATION MEASURES

The sections that follow describe impacts from the implementation of the CLRDP. Impacts are organized in terms of impacts that would result from short-term development program and those that would result from long-term development program under the CLRDP. “Short term” is defined to include the five near-term projects that are anticipated to be completed by about 2010. Short term development also includes a small increment of additional development on the campus that may be implemented by 2010. “Long term” on the other hand refers to the total development that would occur on the Marine Science Campus under the CLRDP and therefore it encompasses both the amount of space that would be constructed between the time that the CLRDP is approved and 2010, and the space that would be constructed between 2010 and 2020. In the sections that follow, project impacts are analyzed by (1) adding project traffic (both short-term and long-term) to existing traffic volumes and determining the change in traffic conditions as a result of this additional traffic; (2) adding project traffic (both short-term and long-term) to future traffic volumes in 2010 and 2020 and determining the change in future traffic conditions as a result of the additional project-related traffic.

PROJECT IMPACTS ON EXISTING TRAFFIC CONDITIONS

Short-Term Development

Intersection Impacts

Traffic associated with short-term development program on the project site was estimated using a three-step process involving trip generation, trip distribution, and trip assignment. This process is used to estimate vehicle trips at various study intersections and roadway segment locations in order to identify potentially significant traffic impacts.

Trip Generation. The number of vehicle trips generated by uses included under the short-term development program was estimated based on a variety of sources. Given the unique nature of the existing and proposed uses, standard (published) trip generation rates would not necessarily reflect each use’s (and thus the overall project’s) trip-making characteristics. As noted in the Relevant Project Characteristics section, the short-term uses include new marine research and education and equipment storage and maintenance space for employees and students, new support facilities (including a new auditorium, meeting rooms, and dining hall), and new support housing (including new visitor and permanent housing units). Trip generation estimates for each use are described below and shown in Table 4.15-6.

Because the new uses would operate similarly to the existing uses, trip generation for new employees and students was based on existing site trip generation. A count of all vehicle, bicycle, and pedestrian trips at the main project driveway (inbound and outbound) was conducted in March 2002. Based on this count, existing trip rates per employee and student were calculated for daily, AM peak-hour, and PM peak-hour trips, as follows: 3.80 daily, 0.30 in the AM peak hour, and 0.33 in the PM peak hour. The existing project site generates a total of about 1,000 daily trips, 78 AM peak-hour trips, and 88 PM peak-hour trips.

The existing trip rates identified above were applied to the number of new employees and students expected under all elements of the short-term development program. Because the March 2002 driveway count included traffic from other existing uses (such as visitor trips to the Seymour Center and general public access trips), application of the existing rates solely to the new employee/student

TABLE 4.15-6
SHORT-TERM DEVELOPMENT TRIP GENERATION ESTIMATES

			AM Peak Hour			PM Peak Hour		
Category	**Size**	**Daily**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
New Employees and Students[a]	255 emp + stu	968	62	14	76	30	55	85
Auditorium[b]	17 visitors	22	8	2	10	2	8	10
Meeting Rooms[b]	22 visitors	20	7	2	9	2	7	9
Overnight Accommodations[c]	10 beds	20	1	5	6	4	2	6
Onsite Housing[d]	42 units	232	2	12	14	4	21	25
Increased Use of Seymour Center[e]	48 visitors	30	5	1	6	1	5	6
Increased Public Access Use[f]	20 visitors	40	4	4	8	4	4	8
Total Vehicle Trips		**1,332**	**89**	**40**	**129**	**47**	**102**	**149**

Note: Trip generation estimates are based on average daily occupancy of space anticipated to be developed by 2010. See text for a more detailed explanation of trip generation estimates. The detailed trip generation table with specific rates is presented in Appendix D.

a Trip rates for employees + students are based on driveway traffic counts of existing site uses provided by Coastplans. Daily trips (over a 24-hour period) were estimated based on 7:00 AM to 5:00 PM volumes.
b For auditorium/meeting room use, average daily attendance is based on an annual attendance projection divided by 312 days/yr. Assumptions for trip generation include:
- Average of 1.25 persons/car during peak hour, and everyone travels during the peak hour.
- Daily trip estimate includes both peak hours plus two additional trips each for preparation, tear-down, and other activities outside the peak periods.

c Overnight accommodations and dorm beds are assumed to have an average daily occupancy of 50 percent per population projections.
d Because housing is restricted to UCSC employees affiliated with the Marine Science Campus or other affiliates, rates are assumed to be 60 percent of Apartment Rate, *Trip Generation* (Institute of Transportation Engineers, Sixth Edition, 1997) to account for internal work trips and access to shuttle service.
e Increased use of Seymour Center under each scenario assumes two people per car resulting in 24 vehicle trips, of which 50 percent are assumed to occur during the peak periods. An additional six trips are added under each scenario to account for new staff trips during the day.
f Each visitor is assumed to travel alone, and 20 percent of trips are assumed to occur during each peak hour.

SOURCE: Fehr & Peers Associates, Inc., 2003, based on population projections and information from UCSC Marine Science Campus: Program, Capacity, and Occupancy Detail (Ann Bertken, UCSC, September 24, 2002).

uses may overstate the total trips generated by these uses. The estimated trip generation for the new employees and students under the short-term development program would be 968 new daily trips, 76 new AM peak-hour trips, and 85 new PM peak-hour trips.

Support facilities, including the auditorium and meeting rooms, would be occupied intermittently over the course of a year and would only be fully occupied periodically. In addition, the dining hall is expected to support the auditorium, meeting rooms, and other uses onsite and would not generate its own traffic. The technical assumptions for these uses are based on information provided by UCSC staff.[6] To estimate trip generation of the auditorium use, the annual attendance projection (5,400 people) was divided by 312 days (i.e., 26 days per month, or 6 days per week, for 12 months) to calculate an average daily attendance of 17 people. Of this total, 75 percent, or 13 people, are assumed to originate from offsite locations, and the other 25 percent would not generate external vehicle trips. The resulting attendance was then divided by 1.25, which represents the estimated average vehicle occupancy, or AVO (i.e., not all visitors to these

6 Memo to file from Ann Bertken, September 24, 2002, based on data from Gary Griggs.

uses would arrive alone in an automobile). The 10 vehicle trips were assumed to occur during each peak hour (AM and PM), and two additional daily trips were added to account for preparation, tear-down, and other activities during off-peak periods. Thus, the total average daily traffic from the auditorium is projected to be about 22 trips. A similar exercise was conducted for the meeting rooms, which are expected to serve an average daily attendance of 22 people per day, of which 50 percent would travel from offsite locations. The resulting trip generation for the meeting rooms would be about 20 daily trips, and nine trips each during the AM and PM peak hours.

It is acknowledged that a specific individual event at the auditorium or meeting rooms will generate substantially more than 22 trips per day. However, the frequency of these events is intermittent and identifying impacts based on these events would most certainly result in an overbuilding of infrastructure. Traffic and parking management for higher attendance events is addressed by TAPS' special events coordination. The potential ramifications of simultaneous events at the auditorium and meeting rooms are addressed at the end of the Transportation/Traffic section under the analysis of cumulative long-term development conditions.

The overnight/visitor accommodations (10 beds) are assumed to have an average daily occupancy of 50 percent, or five people. Although these individuals would generally be working or studying on the project site, some people would travel during the peak hours. To be conservative, each person was assumed to make 4 daily trips and 1.25 trips during the peak hour, with the peak-hour inbound/outbound directional split similar to standard apartment units. These assumptions would result in a total of about 20 daily trips, and 6 trips during each peak hour.

The 42 apartment/townhouse units would be occupied by individuals and families where at least one person would work at the Marine Science Campus or the UCSC Main Campus. Because these people would not have to drive to work or would have the option of alternative travel modes (e.g., shuttle) to travel to the main campus, overall trip generation would be less than typical for apartment and townhouse residences. To account for the LML campus affiliation requirement, trip generation for these units was assumed to be 60 percent of the trip rate published in *Trip Generation*, a standard source for these data.[7] The resulting trip generation for the housing units would be about 232 daily trips, 14 AM peak-hour trips, and 25 PM peak-hour trips.

Over the next 15 to 20 years, the number of visitors is expected to increase at the Seymour Marine Discovery Center. The number of visitors using the Marine Science Campus for public access to the coastline is also expected to increase during this period. The average number of visitors per day is estimated to increase by about 48 people under the short-term development program scenario. An AVO of 2.0 is assumed, which is considered conservative when accounting for school groups traveling in buses or carpools in minivans and SUVs. The resulting traffic volume is 24 vehicle trips, of which 50 percent are assumed to occur during the peak hours (i.e., 6 each). An additional 6 trips per day were added to account for new staff trips that occur during the day, resulting in a total of about 30 daily trips.

Public access use of the Marine Science Campus is anticipated to increase by approximately 20 visitors per day by 2010. Conservatively assuming that each visitor arrives separately would result in a total of 40 vehicle trips per day. Assuming 20 percent occur in each of the AM and PM peak hours results in the addition of 8 trips during each peak hour.

7 Institute of Transportation Engineers, *Trip Generation*, Sixth Edition, 1997.

Trip Distribution. The trip distribution pattern for the proposed project was estimated based on the existing travel patterns and locations of complementary land uses, primarily residential neighborhoods and nearby commercial services, including retail and restaurants. The major directions of approach and departure for the project are shown in Figure 4.15-6 and listed below.

30%	to/from the south/east on SR 1
30%	to/from the north on SR 17
10%	to/from the north on Empire Grade/Western
5%	to/from the north/west on SR 1
5%	to/from the east on Water Street
5%	to/from the east on Laurel Street
5%	to/from the north on Glenn Coolidge Drive
3%	to/from the east on Lincoln Street
3%	to/from the north on River Street
2%	to/from the south on West Cliff Drive
2%	to/from within the Escalona Drive/King Street area
100%	

Trip Assignment. The trips generated by the proposed project were assigned to the roadway system based on the directions of approach and departure discussed above. These volumes were added to existing volumes and the resulting volumes under Existing Plus Short-Term Development Conditions are illustrated in Figures 4.15-7a and 4.15-7b.

Intersection Levels of Service. Level of service calculations were completed based using the Existing Plus Short-Term Development volumes and the existing roadway system. The results of this analysis are presented in Table 4.15-7 and the corresponding calculation worksheets are included in Appendix D.

With the addition of the short-term development program traffic to Existing Conditions, most of the key intersections are projected to operate at acceptable levels of service. Intersections that are projected to operate at unacceptable levels (LOS E or F) are:

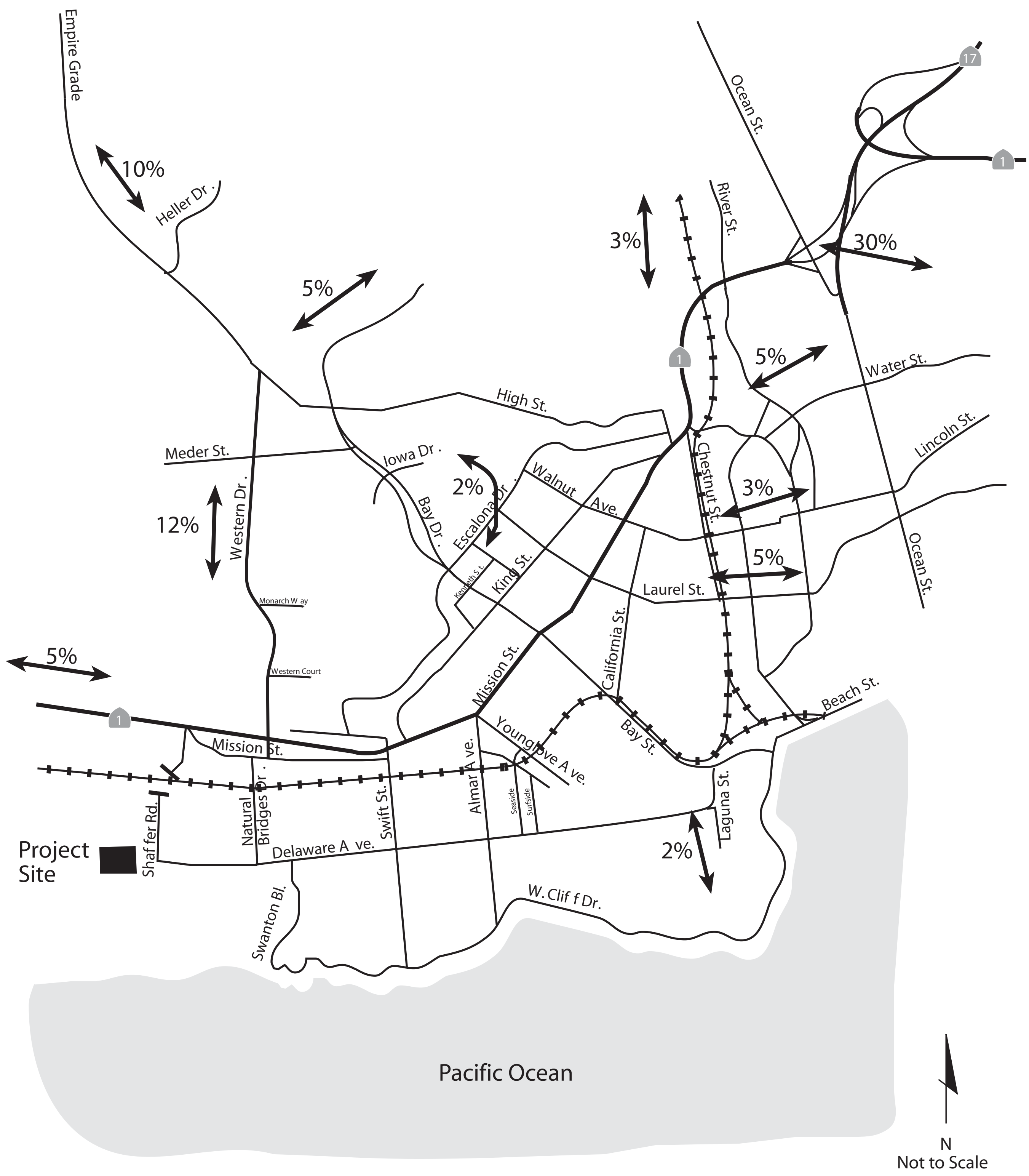
Intersection 11. Mission Street and Bay Street (LOS E during PM peak hour)

Intersection 16. Mission Street and Chestnut Street (LOS F during PM peak hour)

Intersection 22. Bay Drive and Escalona Drive (LOS F during PM peak hour)

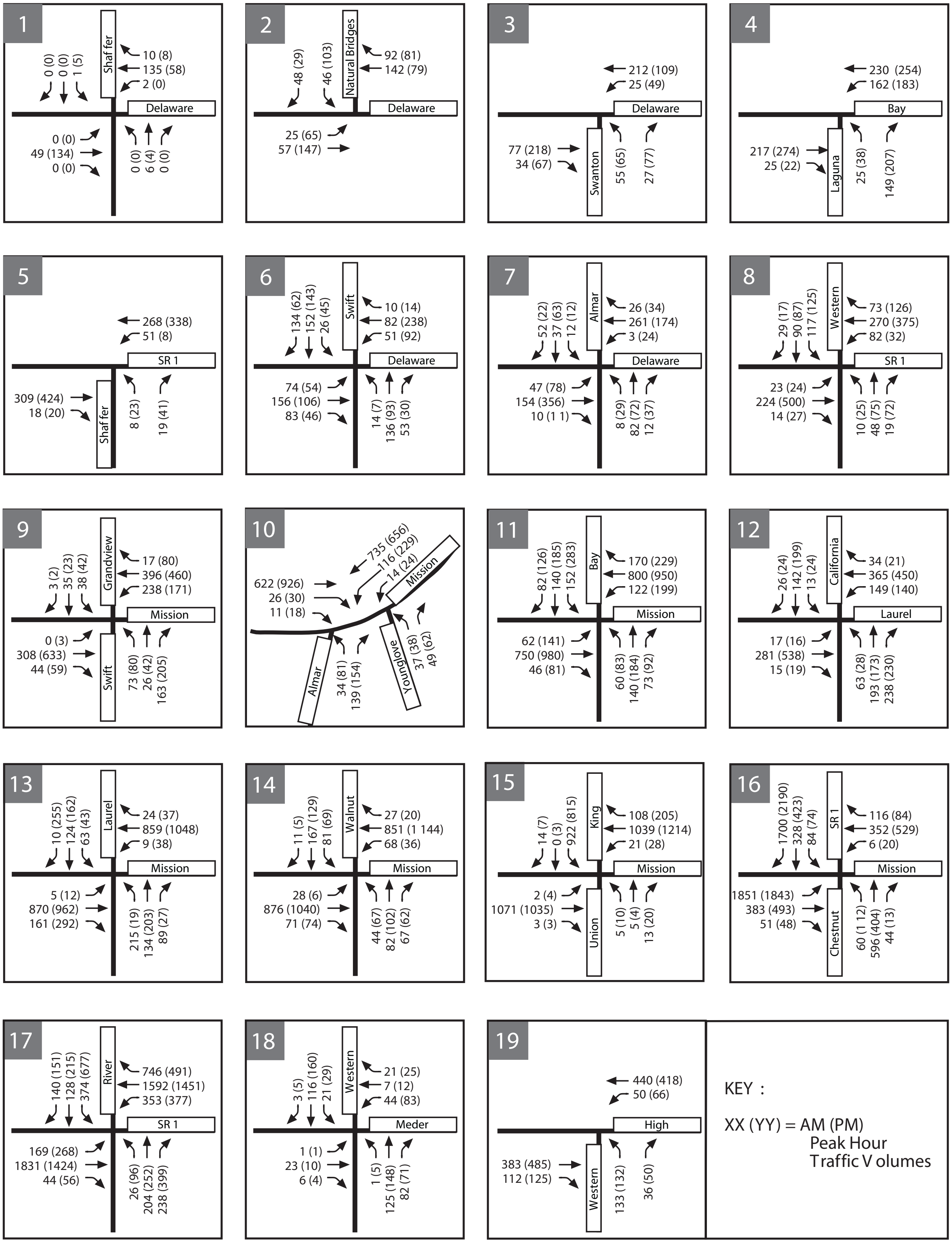
With the exception of Intersection 11 (Mission Street and Bay Street), the project would contribute between 0.2 percent and 1.6 percent of the intersection traffic volume at these intersections. At the intersection of Mission Street and Bay Street, the short-term development program is expected to contribute 3.1 percent of the total intersection volume under existing conditions.

A peak-hour signal warrant analysis conducted for Existing Plus Short-Term Development Conditions showed that a traffic signal is not warranted at the Bay Street/Escalona Drive intersection, which is currently unsignalized. The addition of project traffic would only add a negligible amount of traffic and would not trigger the need for a signal at this location. As indicated in the Caltrans *Traffic Manual*, however, installation of a traffic signal should not necessarily be based solely on the satisfaction of warrant criteria, and should also be based on other factors such as delay, congestion, driver confusion, and safety problems. The City of Santa Cruz will make the final determination regarding the need for a signal at this location.



SOURCE: Fehr & Peers

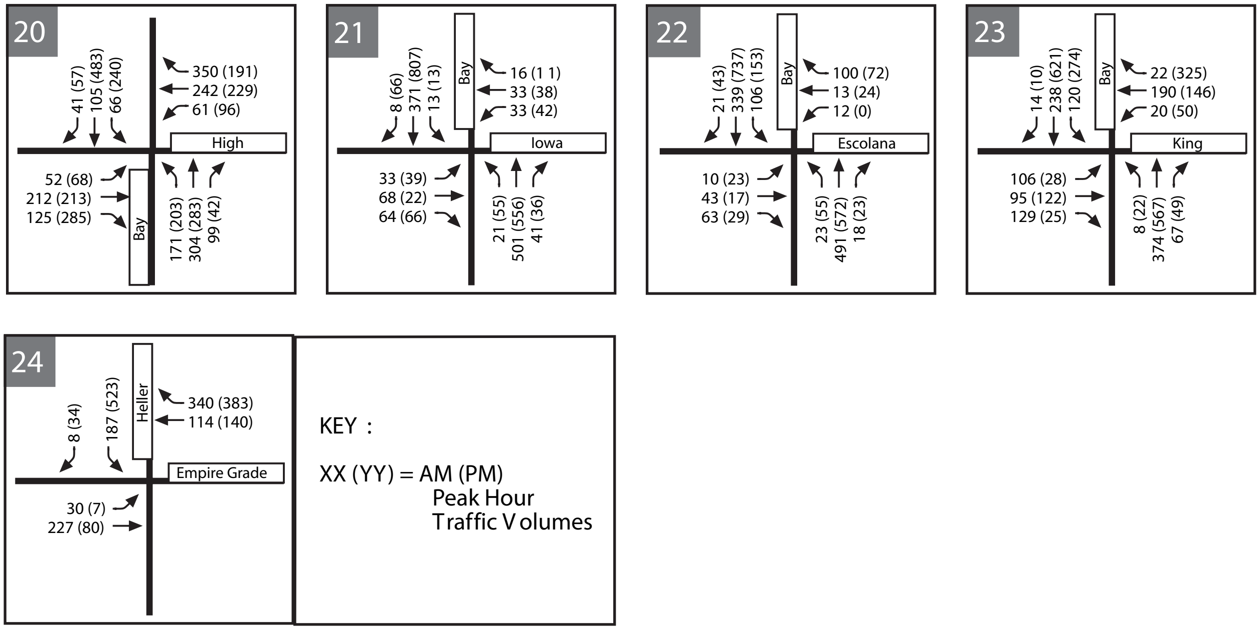
Figure 4.15-6
Trip Distribution



UCSC Marine Science Campus CLRDP Draft EIR / 200385 ■

SOURCE: Fehr & Peers

Figure 4.15-7a
Existing Plus Near-term Volumes
(Intersections 1-19)



SOURCE: Fehr & Peers

Figure 4.15-7b
Existing Plus Near-term Volumes
(Intersections 20-24)

TABLE 4.15-7
EXISTING PLUS SHORT-TERM DEVELOPMENT CONDITIONS
INTERSECTION LEVELS OF SERVICE (LOS)

Intersection	Type of Control	Peak Hour	Delay (sec.)[a]	LOS	% Inc. in Volume due to Project
1. Delaware Avenue / Shaffer Road	Two-Way	AM PM	10.3 10.3	B B	
2. Delaware Avenue / Natural Bridges Drive	Two-Way	AM PM	8.4 9.0	A A	
3. Delaware Avenue / Swanton Boulevard	Two-Way	AM PM	10.4 11.2	B B	
4. Bay Street / Laguna Street	Two-Way	AM PM	11.3 12.9	B B	
5. State Route 1 / Shaffer Road	Two-Way	AM PM	11.3 12.8	B B	
6. Delaware Avenue / Swift Street	All-Way	AM PM	12.0 11.9	B B	
7. Delaware Avenue / Almar Avenue	All-Way	AM PM	9.7 12.5	A B	
8. State Route 1 / Western Drive	Signal	AM PM	22.6 19.0	C B	
9. Mission Street / Swift Street	Signal	AM PM	21.1 20.2	C C	
10. Mission Street / Almar Avenue	Signal	AM PM	22.3 25.7	C C	
11. Mission Street / Bay Street	Signal	AM **PM**	32.1 **55.0**	C **E**	**3.1%**
12. Laurel Street / California Street	Signal	AM PM	20.4 20.7	C C	
13. Mission Street / Laurel Street	Signal	AM PM	22.0 36.1	C D	
14. Mission Street / Walnut Avenue	Signal	AM PM	22.6 19.0	C B	
15. Mission Street / Union Street	Signal	AM PM	24.9 24.2	C C	
16. Mission Street / Chestnut Street	Signal	AM **PM**	41.5 **82.7**	D **F**	**1.6%**
17. State Route 1 / River Street	Signal	AM PM	35.1 45.9	D D	
18. Western Drive / Meder Street	All-Way	AM PM	8.2 8.8	A A	
19. Western Drive / High Street	Two-Way	AM PM	26.5 33.3	D D	
20. Bay Street / High Street	Signal	AM PM	18.1 22.9	B C	
21. Bay Street / Iowa Drive	Signal	AM PM	12.2 10.1	B B	
22. Bay Street / Escalona Drive	Two-Way	AM **PM**	21.8 **158.9**	C **F**	**0.2%**
23. Bay Street / King Street	Signal	AM PM	19.3 22.8	B C	
24. Empire Grade / Heller Drive	Two-Way	AM PM	13.6 19.1	B C	

[a] Delay for signalized and all-way stop-sign-controlled intersections is expressed as the weighted average delay for the overall intersection. Delay for two-way stop-controlled intersections represents the worst-case minor street movement only. Unacceptable operations (LOS E or F) are shown in **bold** type.

SOURCE: Fehr & Peers Associates, Inc., 2003

<u>Impact 4.15-1</u>: The addition of traffic from the short-term development program to the Mission Street / Bay Street intersection would increase the existing volume by 3.1 percent (i.e., more than the 3-percent threshold) at this signalized intersection, which is projected to operate at LOS E during the PM peak hour. The 3-percent threshold would be exceeded at this intersection when the project generates 143 new PM peak hour trips. This would be a significant impact.

It is important to note that the projected delay at this intersection only slightly exceeds the acceptable threshold of 55.0 seconds per vehicle. Therefore, almost all of the proposed short-term development could be constructed and occupied before a significant intersection impact results. Table 4.15-8 below shows the number of trips generated by each of the five near-term projects and other short-term development. As shown below, all five of the projects (excluding other short-term development) would generate fewer than the 143 trips noted above and could be constructed by themselves without causing Impact 4.15-1.

TABLE 4.15-8
SHORT-TERM DEVELOPMENT VEHICLE TRIPS BY PROJECT

Near-term Development Project	Size	Daily	AM Peak Hour	PM Peak Hour
Ocean Health Phase II	96 employees/students	364	28	32
USGS Facility	130 employees/students	494	39	43
SORACC	18 employees/students	68	6	7
Shared Warehouse and Laydown Facility	9 employees	34	3	3
42 Apartment/Townhouse Units	42 units	232	14	25
Other Short-Term Development	<u>N/A</u>	<u>140</u>	<u>39</u>	<u>39</u>
Total Vehicle Trips		**1,332**	**129**	**149**

Note: See Table 4.15-6 for detailed description of trip estimates.

<u>General Mitigation Measure 4.15-1</u>: The University shall contribute its fair share (see definition of fair share below) toward the cost of improvements to the intersection of Mission and Bay Street which would include re-striping the southbound Bay Street approach (which currently includes a left-turn and shared left-turn/through/right lane) to provide a separate right-turn lane, a shared through-left lane, and a left-turn lane. With this improvement, intersection operations would improve to LOS D with 37.7 second of delay in the peak hour.

The University shall contribute its fair share towards this roadway improvement. “Fair share” is defined to mean that the University has agreed to negotiate for a contribution to the intersection improvement pursuant to procedures similar to those described in Government Code Sections 54999 et seq. for contributions to utilities. In addition, in each case a fair-share payment is agreed upon, the University will pay its fair share only if the applicable jurisdiction has established and implemented a mechanism for collecting funds from any other developers and entities contributing to traffic impacts, and the jurisdiction builds the relevant road or intersection improvement.

Any improvements to this intersection would need to be approved by Caltrans. Furthermore, the proposed improvement would not be feasible in the available right-of-way based on the lane widths required by Caltrans minimum design standards. Therefore this impact is considered significant and unavoidable.

Parking Capacity

Through CLRDP policies and implementation measures, the proposed project includes a detailed parking management program and thresholds to govern the development of new parking spaces. The onsite parking supply is proposed to be increased by 550 spaces from 245 spaces to a maximum of 795 spaces at full development under the CLRDP. New parking would be provided under short-term development conditions once the demand in a given parking activity zone exceeds an average of 90 percent of the supply.

Under the short-term development program, the onsite average daily occupancy is expected to increase from 424 persons to 769 persons. The existing average occupancy of 68 percent from the TAPS survey was applied to the total number of existing spaces (245) to estimate the number of spaces (167) currently generated by the existing population of 424 persons. Factoring the demand by the increase in population with short-term development yields an average future demand of 303 spaces (769/424 x 167 spaces). Using a current peak demand of 90 percent or 220 of 245 spaces and applying the same methodology, the peak demand with the short-term development program would require 399 spaces, and would likely result from a conference or other infrequent higher attendance event.

Parking would be controlled through the distribution of permits and time restrictions. As part of the overall TDM effort and pedestrian and bicycle enhancement, the expected reduction of single-occupant vehicle trips would also reduce the demand for parking. Accordingly, no significant impacts were identified with respect to parking.

Hazards

Site Access and Onsite Circulation. The CLRDP Circulation and Parking Diagram (Figure 5.4) was reviewed to determine the adequacy of the number of driveways and their designs. With the short-term development program, the project site main driveway opposite Delaware Avenue is estimated to serve a total of 184 AM peak-hour trips and 192 PM peak-hour trips. These volumes can be easily accommodated by the two-way driveway, site access roadway, and stop-sign-controlled Delaware Avenue / Shaffer Road intersection. As shown in Table 4.15-7, the Delaware Avenue / Shaffer Road driveway is projected to operate at LOS B during both peak hours.

The design of the new onsite roadway is an improvement over the existing layout. McAllister Way is currently a relatively long and straight roadway, which is more conducive to higher travel speeds. The proposed onsite roadway layout includes a series of tight-radius curves and T-intersections that would help to control travel speeds. The radii of any raised curbs are expected to be designed to accommodate full-size (i.e., 40-foot) transit buses so as to minimize encroachment into adjacent travel lanes.

All onsite parking areas would be located within separate paved areas except at two locations: perpendicular spaces on (1) the west side of McAllister Way immediately west of the National Oceanic and Atmospheric Administration (NOAA) Center for Marine Protected Area Science building, and (2) the west side of McAllister Way immediately north of the Ocean Health building. Although the location of such spaces is not ideal from a circulation standpoint, the low travel speeds and traffic volumes are not expected to pose a problem for pedestrians or other vehicles near these lots.

Most parking areas provide for two-way travel and allow for circulation to another lot. Only three of the lots appear to include "dead-end" aisles where vehicles would be required to turn around if no spaces were available within the lot. Given the relatively small size of these three lots, vehicles turning around would not cause substantial delays, and this design is not expected to result in any circulation problems or hazards. Thus, no significant impacts were identified.

Neighborhood Impacts. The Traffic Infusion on Residential Environments (TIRE) analysis was used to evaluate project impacts on three nearby residential street segments with front-on housing. A fourth segment (Delaware Avenue between Shaffer Road and Natural Bridges Drive) was addressed separately at the end of this section since the TIRE index is only applied to streets with front-on housing. TIRE is a numerical representation of a resident's perception of the effect of street traffic on activities such as walking, cycling, and playing and on daily tasks such as maneuvering an auto out of a residential driveway. According to TIRE, a given change in traffic volume would cause a greater impact to a residential environment on a street with a low pre-existing traffic volume than it would on a street with a higher pre-existing volume. A traffic change that would cause a TIRE index change of 0.1 or more would be noticeable to residents.

According to the TIRE index, the addition of project traffic would not be noticeable to residents on the study street segments, as shown in Table 4.15-9 (i.e., the addition of traffic to streets with front-on housing would not differ substantially from normal variations in daily traffic).

TABLE 4.15-9
SHORT-TERM DEVELOPMENT TIRE INDEX ANALYSIS

Location	Existing Average Weekday Daily Traffic Volume (vehicles)	Volume that Results in 0.1 Change in TIRE Index	Estimated Number of Daily Short-Term Project Trips	Noticeable to Residents? (Yes or No)
Delaware Avenue (Seaside Street to Surfside Avenue)	5,674	1,500	252	No
Western Drive (Western Court to Monarch Way)	4,582	1,250	159	No
Bay Street (Escalona Drive to Kenneth Street)	18,665	5,200	53	No

SOURCE: Fehr & Peers Associates, Inc., 2003

The proposed short-term development program would increase the daily traffic volume on Delaware Street between Shaffer Road and Natural Bridges Drive from 2,356 vehicles under existing conditions to approximately 3,680 vehicles. This section of roadway is rather wide and does not include any front-on housing. In addition, the projected total daily traffic volume is lower than the more than 10,000- to 12,000-vehicles-per-day physical capacity of this type of roadway (with limited driveways and adequate lane widths). The constraint point on the roadway is the stop-sign-controlled Delaware Avenue / Natural Bridges Drive intersection. As shown in Table 4.15-7, that intersection is projected to operate at LOS B or better during both peak hours, and therefore the addition of daily traffic to this segment is not expected to result in any operational problems on Delaware Avenue. No significant impacts were identified.

Safety Issues. For most residential streets, the addition of traffic does not automatically result in a degradation of safety, an increase in the likelihood of accidents, or an increase in travel speeds. In some cases, other factors such as sight distance restrictions, substandard lane widths, or other design problems could be exacerbated with an increase in traffic volume. Based on field review of each of the streets listed above, no operational or design problem was identified. In the case of a street such as Western Drive, the anticipated increase in daily traffic of 159 trips resulting from implementation of the short-term development program is within the potential daily variation in traffic volumes of up to 10 percent. The increase in total peak hour volume is estimated to be fewer than 16 trips. Accordingly, the project is not expected to cause a safety problem requiring improvements.

Emergency Access

Emergency vehicular access will continue to be provided by the Delaware Avenue Extension through the main gate. Typically a second emergency access point is desirable or needed in case some event (i.e., a car accident) blocks the primary access. Since the Delaware Avenue Extension and McAllister Way are proposed to be constructed without curbs, it would be possible for emergency vehicles to bypass an accident or other obstruction in the roadway.

With regard to evacuation needs, the very low volume of traffic at the Delaware Avenue / Shaffer Road intersection would provide ample capacity for vehicles to exit the site immediately. In addition, staff, students and visitors to the site could also leave on foot via the proposed trail system. Based on this assessment, implementation of the project is not expected to result in inadequate emergency access, and no significant impacts were identified.

Relationship to Alternative Transportation Policies, Plans, and Programs

Bicycle and Pedestrian Circulation. The evaluation of potential pedestrian and bicycle impacts was conducted based on the CLRDP Circulation and Parking Diagram and the Coastal Access and Recreation Diagram (see CLRDP Figure 5.6). Within the project site, bicyclists would share the 22-foot-wide onsite roadways, which would not include striped bike lanes. Given the anticipated relatively low traffic volumes and travel speeds, sharing the road with vehicles is not expected to result in any increased hazards for cyclists.

The CLRDP policies and implementation measures require provision of conveniently located bike lockers, onsite showers, and personal lockers to encourage bicycling as a commute alternative to driving. In addition, in concert with the City, UCSC would provide information on the most appropriate streets to use while traveling to and from the campus by bicycle.

Onsite pedestrian circulation is provided via a series of interconnected public trails that are separate from onsite roadways and provide access to all public areas of the site. Trails would be a minimum of five feet wide and would be separated from roadways by a vegetation buffer where feasible. Shared use of the trails with bicycles is not desirable unless the trail is a minimum of eight feet wide to provide additional width and reduce potential conflicts, but this issue is not considered significant if additional width is not feasible. The proposed crossings of onsite roadways are adequately addressed under the short-term development program by policies in the CLRDP.

Pedestrian facilities providing access to the site from Delaware Avenue are limited, given the approximate 900-foot gap in the sidewalk on the north side of the street. Although the street width allows for some separation between modes, pedestrians have to share the roadway with bicyclists and vehicles. Implementation of the project and the encouragement of using alternative modes could increase pedestrian activity along this corridor for commute and/or recreational purposes. However, the number of pedestrians added to this segment with implementation of the project is expected to be minimal. This impact is detailed below.

Impact 4.15-2: The addition of project-generated pedestrians to Delaware Avenue could result in an increase in hazards by increasing the potential for pedestrian conflicts with vehicles and bicyclists. This impact would occur on the 900-foot portion of the north side of Delaware Avenue when there is no sidewalk. Due to low level of pedestrian activity, the impact is considered less than significant.

> **General Mitigation Measure 4.15-2: UCSC will contribute its fair-share (see page 4.15-33 for definition of fair share) towards construction of a separate pedestrian path on the north side of Delaware Avenue from Shaffer Road to the existing sidewalk west of Natural Bridges Drive. This improvement could be as simple as installing a raised asphalt curb approximately five to six feet away from the existing curb or edge of pavement with openings to maintain existing drainage. Design and construction of this improvement to close the existing gap in pedestrian facilities in this area can and should completed by the City of Santa Cruz since Delaware Avenue is under its jurisdiction.**

The proposed mitigation measure would improve pedestrian safety on Delaware Avenue and the impact would remain less than significant.

Transit Access. The proposed project would increase population within the Marine Science Campus and increase the number of potential transit riders. In accordance with CLRDP policies and implementation measures, UCSC would encourage the SCMTD to extend fixed-route bus service within the project site and increase service frequency as demand warrants. In addition, UCSC would provide shuttle service to the Main Campus and construct bus stops with amenities (e.g., sheltered areas) and turnouts at various locations within the site as needed to increase convenience.

Although it is difficult to accurately predict the number of users of a particular travel mode like transit, estimates of ridership can be used to determine if substantial service increases may be required. The existing ridership on Route 3B is 13 people, or boardings, per one-way bus trip, which is relatively low (i.e., substantial capacity is available). If 10 percent of the 236 total PM peak-hour vehicle trips to the site were made via SCMTD bus (a conservatively high estimate, given the current service frequency and the availability of other alternative travel modes such as bicycling, carpooling, TAPS shuttle, etc.), then there would be an additional 24 riders, which would be split between inbound and outbound movements. Given the relatively low existing ridership, the projected SCMTD bus demand could likely be served by the existing 40-seat vehicles currently serving the site via Route 3B without requiring an increase in service frequency.

The proposed bicycle and pedestrian facilities would be sufficient to link transit stops to building entrances. A turnaround would be provided to accommodate vehicles from SCMTD and UCSC TAPS, the shuttle operator. With the proposed facilities and services, transit service would be enhanced to support the CLRDP policy to reduce single-occupant vehicle trips, and no operational or safety issues are anticipated. Since the short-term development program would not conflict with applicable policies, plans and programs supporting transit and shuttle use, no significant impacts were identified.

Air Traffic Patterns

The short-term development program is not expected to affect air traffic patterns or generate a significant increase in air traffic levels. Thus, the project will not result in any significant impacts to air travel or safety, and no significant impacts were identified.

Based on the significance criteria evaluated above, the proposed short-term development program with mitigation would not have a significant adverse impact on the transportation system. If General Mitigation Measure 4.15-1 proves infeasible, however, the short-term development program would have a significant, unavoidable impact on the Mission Street / Bay Street intersection during the PM peak hour. None of the five near-term projects would individually result in a significant impact on the transportation system.

Long-Term Development

Intersection Impacts

From a traffic perspective, the individual uses proposed under the long-term development program are very similar to those proposed under the short-term development program: research and development office and laboratory space for employees and students, support housing, and increased use of the Seymour Marine Discovery Center and the public access areas. Trip generation, trip distribution, and trip assignment for the long-term development program is presented below. Traffic from the short-term development uses would be added to the trips estimated below to represent total traffic volumes under full development of the CLRDP.

Trip Generation. The existing trip rates described under the short-term development program were applied to the number of new employees and students (366) expected under long-term development. The resulting trip generation for the new employees and students under the long-term development program would be about 1,390 daily trips, 108 AM peak-hour trips, and 122 PM peak-hour trips (see Table 4.15-10).

The proposed researcher housing with 60 beds is expected to operate in a similar fashion to the overnight/visitor accommodations proposed under short-term development. The researcher housing is assumed to have an average daily occupancy of 50 percent, or 30 people, although occupancies will be higher at certain times. Although these individuals would be affiliated with (i.e., would work or be studying at) the Marine Science Campus or main campus, some would travel during the peak hours. Each person was assumed to make 4 daily trips and 1.25 trips during the peak hour, with the peak-hour inbound/outbound directional split similar to that of standard apartment units. These assumptions result in a total estimate of 120 daily trips, and 38 trips during each peak hour. It is important to note that in numerous instances, dorm occupants may be non-UCSC students that reside at the site for a week with no vehicle for transportation. Thus, the estimates for this use are considered conservative.

TABLE 4.15-10
LONG-TERM DEVELOPMENT TRIP GENERATION ESTIMATES

Category	Size	Daily	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
Short-Term Development (by 2010)								
New Employees and Students[a]	255 emp + stu	968	62	14	76	30	55	85
Auditorium[b]	17 visitors	22	8	2	10	2	8	10
Meeting Rooms[b]	22 visitors	20	7	2	9	2	7	9
Overnight Accommodations[c]	10 beds	20	1	5	6	4	2	6
Onsite Housing[d]	42 units	232	2	12	14	4	21	25
Increased Use of Seymour Center[e]	48 visitors	30	5	1	6	1	5	6
Increased Public Access Use[f]	20 visitors	40	4	4	8	4	4	8
Short-Term Development Subtotal		**1,332**	**89**	**40**	**129**	**47**	**102**	**149**
Long-Term Development (2010 to 2020)								
New Employees and Students[a]	366 emp + stu	1,390	88	20	108	43	79	122
Researcher Housing[c]	60 beds	120	6	32	38	25	13	38
Onsite Housing[d]	38 units	218	2	11	13	4	20	24
Increased Use of Seymour Center[e]	48 visitors	30	5	1	6	1	5	6
Increased Public Access Use[f]	20 visitors	40	4	4	8	4	4	8
Long-Term Development Subtotal		**1,804**	**105**	**68**	**173**	**77**	**121**	**198**
Total Development Program Trips		**3,128**	**194**	**108**	**302**	**124**	**223**	**347**

Note: Trip generation estimates are based on average daily occupancy of space anticipated to be developed by 2010 and 2020. See text for a more detailed explanation of trip generation estimates. The detailed trip generation table with specific rates is presented in Appendix D.

[a] Trip rates for employees + students are based on driveway traffic counts of existing site uses provided by Coastplans. Daily trips (over a 24-hour period) were estimated based on 7:00 AM to 5:00 PM volumes.
[b] For auditorium/meeting room use, average daily attendance is based on an annual attendance projection divided by 312 days/yr. Assumptions for trip generation include:
- Average of 1.25 persons/car during peak hour, and everyone travels during the peak hour.
- Daily trip estimate includes both peak hours plus two additional trips each for preparation, tear-down, and other activities outside the peak periods.

[c] Overnight accommodations and researcher housing are assumed to have an average daily occupancy of 50 percent per population projections.
[d] Because housing is restricted to UCSC employees affiliated with the Marine Science Campus or other affiliates, rates are assumed to be 60 percent of Apartment Rate, *Trip Generation* (Institute of Transportation Engineers, Sixth Edition, 1997) to account for internal work trips and access to shuttle service.
[e] Increased use of Seymour Center under each scenario assumes two people per car resulting in 24 vehicle trips, of which 50 percent are assumed to occur during the peak periods. An additional six trips are added under each scenario to account for new staff trips during the day.
[f] Each visitor is assumed to travel alone, and 20 percent of trips are assumed to occur during each peak hour.

SOURCE: Fehr & Peers Associates, Inc., 2003, based on population projections and information from UCSC Marine Science Campus: Program, Capacity, and Occupancy Detail (Ann Bertken, UCSC, September 24, 2002).

An additional 38 onsite support housing units are proposed with long-term development program. These units are planned to be restricted to occupancy by individuals and families affiliated with the Marine Science Campus or the Main Campus. Consistent with trip generation estimates for short-term development, the trip rates used for this housing are 60 percent of the trip rate published in *Trip Generation*. The resulting trip generation estimate for the new permanent housing units would be about 218 daily trips, 13 AM peak-hour trips, and 24 PM peak-hour trips.

An equal increase in use of the Seymour Center was assumed for the long-term development program as was assumed for the short-term development program. This would result in an additional 30 daily trips, and 6 trips during the AM and PM peak hours, respectively. Public access use is also estimated to increase by approximately 20 more visitors per day during this period. The resulting trip generation is 40 daily trips, 8 AM peak-hour trips, and 8 PM peak-hour trips.

Trip Distribution and Assignment. The trip distribution pattern used for the short-term development and illustrated in Figure 4.15-6 was also used for the long-term development program.

All of the trips generated from all uses developed with the entire program were assigned to the roadway system based on the directions of approach and departure discussed above. Traffic volumes for Existing Plus Long-Term Development Conditions with the proposed project are shown in Figures 4.15-8a and 4.15-8b.

Intersection Levels of Service. Level of service calculations were completed using the Existing Plus Short- and Long-Term Development volumes and the existing roadway system. The results of this analysis are presented in Table 4.15-11 and the corresponding calculation worksheets are included in Appendix D.

With the addition of the short- and long-term development program traffic to Existing Conditions, most of the key intersections are projected to operate at acceptable levels of service. Intersections that are projected to operate at unacceptable levels (LOS E or F) are:

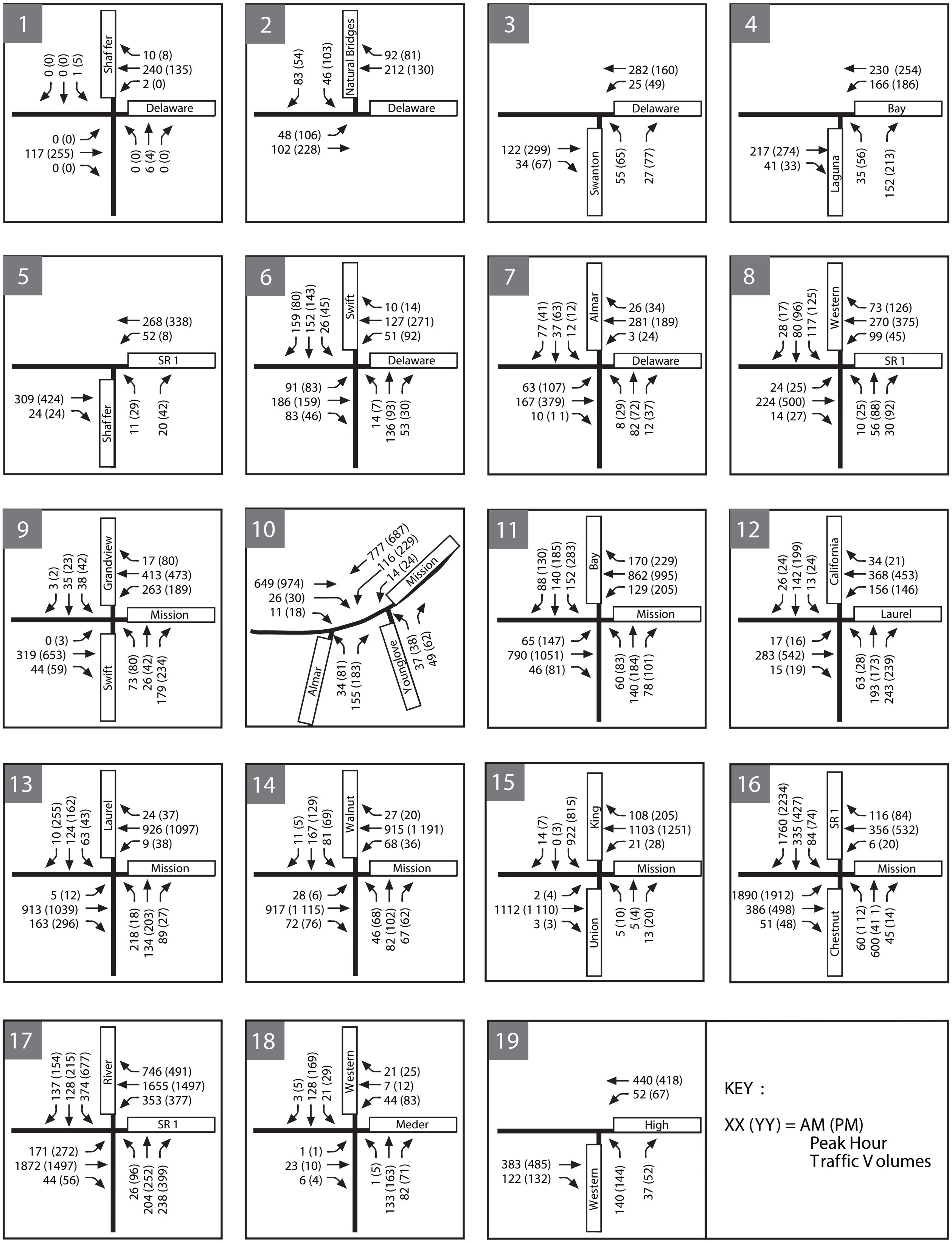
Intersection 11. Mission Street and Bay Street (LOS E during PM peak hour)

Intersection 16. Mission Street and Chestnut Street (LOS F during PM peak hour)

Intersection 19. Western Drive and High Street (LOS E during PM peak hour)

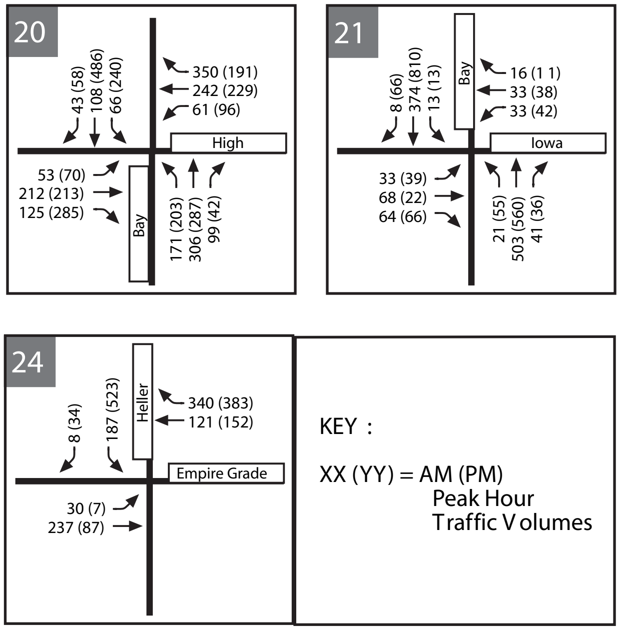
Intersection 22. Bay Drive and Escalona Drive (LOS F during PM peak hour)

The project would contribute 7.3 percent, 3.8 percent, 3.2 percent, and 0.8 percent at Intersections 11, 16, 19, and 22, respectively, assuming the entire development program was implemented under existing conditions. Similar to development of the short-term uses only, a traffic signal would not be warranted at the unsignalized Bay Street / Escalona Drive intersection under this scenario. Although the northbound approach is projected to operate at LOS E, the peak hour warrant criteria are not met at the High Street / Western Drive intersection during the PM peak hour. As such a significant impact was not identified at this location, even though the project would add slightly more than 3 percent to the total existing volume.



SOURCE: Fehr & Peers

Figure 4.15-8a
Existing Plus Entire
Development Program Volumes
(Intersections 1-19)



SOURCE: Fehr & Peers

Figure 4.15-8b
Existing Plus Entire
Development Program Volumes
(Intersections 20-24)

TABLE 4.15-11
EXISTING PLUS SHORT- AND LONG-TERM DEVELOPMENT CONDITIONS INTERSECTION LEVELS OF SERVICE (LOS)

Intersection	Type of Control	Peak Hour	Delay (sec.)[a]	LOS	% Inc. in Volume due to Project
1. Delaware Avenue / Shaffer Road	Two-Way	AM PM	11.6 11.8	B B	
2. Delaware Avenue / Natural Bridges Drive	Two-Way	AM PM	8.4 10.5	A B	
3. Delaware Avenue / Swanton Boulevard	Two-Way	AM PM	11.3 12.3	B B	
4. Bay Street / Laguna Street	Two-Way	AM PM	11.8 13.8	B B	
5. State Route 1 / Shaffer Road	Two-Way	AM PM	11.6 13.1	B B	
6. Delaware Avenue / Swift Street	All-Way	AM PM	13.8 13.8	B B	
7. Delaware Avenue / Almar Avenue	All-Way	AM PM	10.2 14.5	B B	
8. State Route 1 / Western Drive	Signal	AM PM	23.1 20.2	C C	
9. Mission Street / Swift Street	Signal	AM PM	20.9 20.5	C C	
10. Mission Street / Almar Avenue	Signal	AM PM	23.1 27.2	C C	
11. Mission Street / Bay Street	Signal	AM **PM**	32.7 **61.9**	C **E**	**7.3%**
12. Laurel Street / California Street	Signal	AM PM	20.6 21.0	C C	
13. Mission Street / Laurel Street	Signal	AM PM	21.9 37.4	C D	
14. Mission Street / Walnut Avenue	Signal	AM PM	22.3 18.6	C B	
15. Mission Street / Union Street	Signal	AM PM	24.9 24.2	C C	
16. Mission Street / Chestnut Street	Signal	AM **PM**	44.0 **88.6**	D **F**	**3.8%**
17. State Route 1 / River Street	Signal	AM PM	35.3 47.1	D D	
18. Western Drive / Meder Street	All-Way	AM PM	8.3 8.9	A A	
19. Western Drive / High Street	Two-Way	AM **PM**	28.1 **37.3**	D **E**	**3.2%**
20. Bay Street / High Street	Signal	AM PM	18.2 22.9	B C	
21. Bay Street / Iowa Drive	Signal	AM PM	12.1 10.0	B B	
22. Bay Street / Escalona Drive	Two-Way	AM **PM**	22.0 **163.5**	C **F**	**0.8%**
23. Bay Street / King Street	Signal	AM PM	19.3 22.9	B C	
24. Empire Grade / Heller Drive	Two-Way	AM PM	13.8 20.2	B C	

[a] Delay for signalized and all-way stop-sign-controlled intersections is expressed as the weighted average delay for the overall intersection. Delay for two-way stop-controlled intersections represents the worst-case minor street movement only. Unacceptable operations (LOS E or F) are shown in **bold** type.

SOURCE: Fehr & Peers Associates, Inc., 2003

Impact 4.15-3: The addition of traffic from the short- and long-term development program to the Mission Street / Bay Street intersection would increase the existing volume by 7.3 percent (i.e., more than the 3 percent threshold) at this signalized intersection, which is projected to operate at LOS E during the PM peak hour under Existing Plus Short- and Long-Term Development Conditions. The 3 percent threshold would be exceeded at this intersection when the project generates 143 new PM peak hour trips. This would be a significant impact.

> **General Mitigation Measure 4.15-3: Implement General Mitigation Measure 4.15-1.**

Re-striping of the southbound Bay Street approach would improve operations at this intersection to LOS D with 39.4 seconds of delay during the PM peak hour. As noted under General Mitigation Measure 4.15-1, this mitigation may be infeasible due to Caltrans minimum design standards and the need for additional right-of-way and roadway widening.

Impact 4.15-4: The addition of traffic from the short- and long-term development program to the Mission Street / Chestnut Street intersection would increase the existing volume by 3.8 percent (i.e., more than the 3 percent threshold) at this signalized intersection, which is projected to operate at LOS F under Existing Plus Short- and Long-Term Development Conditions. The 3 percent threshold would be exceeded at this intersection when the project generates 272 new PM peak hour trips. This would be a significant impact.

> **General Mitigation Measure 4.15-4: The University shall contribute its fair share (see page 4.15-33 for definition of fair share) toward the cost of improvements to the Mission Street/Chestnut Street intersection, which would involve the following modifications: (1) convert the southbound dual right-turn lanes on Mission Street to a single-lane "free" right-turn lane and widen of the west leg of the intersection to accommodate a new 500-foot-long, third lane for merging; or (2) install a triple southbound right-turn lane, which would also require the new merge lane. In both cases, the modifications would require major reconstruction of the intersection, and possibly right-of-way acquisition and building modification/relocation.**

The University shall contribute its fair share towards this roadway improvement (as fair-share is defined on page 4.15-33). Any improvements to these intersections would need to be approved by Caltrans. Furthermore, the proposed improvements would not be feasible in the available right-of-way. Therefore, both Impacts 4.15-3 and 4.15-4 are considered significant and unavoidable.

Parking Capacity

The CLRDP policies and implementation measures delineate a detailed parking management program and thresholds to govern the development of new parking spaces. The onsite parking supply is proposed to be increased by 550 spaces from 245 spaces under existing conditions to a maximum of 795 spaces at full development under the CLRDP. New parking would only be added when 90 percent of the supply was occupied on a regular basis.

Under the long-term development program at full development, the onsite average daily occupancy is expected to increase from 424 persons to 1,310 persons. Based on an average occupancy of 68 percent or 167 spaces under existing conditions, the estimated parking demand under long-term development conditions is 516 spaces (1,310/424 x 167 spaces). Using a current peak demand of 220 spaces and the same methodology, the peak demand with the long-term development program would be 680 spaces and would likely result from a conference or other infrequent higher attendance event. This demand could be accommodated with the proposed maximum supply of 795 spaces. However, the projected demand does not include any reduction for increased Transportation Demand Management (TDM) and other trip-reducing programs and strategies such as UCSC increased shuttle service and parking permits.

As noted under the short-term development parking evaluation, parking to accommodate the demand from this population would be controlled through the use of permits and time restrictions. As part of the overall TDM effort and pedestrian and bicycle enhancement, reduction of single-occupant vehicle trips would also reduce the demand for parking. No significant parking impacts were identified.

Hazards

Site Access and Onsite Circulation. With long-term development, the project site main driveway opposite Delaware Avenue is estimated to serve a total of 357 AM peak-hour trips and 390 PM peak-hour trips, which includes all existing and project-generated traffic. These volumes would be split between inbound and outbound movements. These volumes could be adequately served by the two-way driveway, site access roadway, and stop-sign-controlled Delaware Avenue / Shaffer Road intersection. As shown in Table 4.15-10, the Delaware Avenue / Shaffer Road driveway is projected to operate at LOS B during both peak hours.

The evaluation of onsite circulation for the short-term development program applies to long-term development as well. Since implementation of the proposed site access and onsite circulation is not expected to result in any design hazards, no significant impacts were identified.

Neighborhood Impacts

Neighborhood Impacts. The TIRE analysis was used to evaluate long-term development program impacts on three nearby street segments that include front-on housing. Table 4.15-12 summarizes the TIRE analysis for the long-term development program, which includes traffic from all of the proposed project uses.

According to the TIRE index, the addition of project traffic from all proposed uses would not be noticeable to residents on the study street segments (i.e., the addition of project traffic to streets with front-on housing would not differ substantially from normal variations in daily traffic).

As noted under the short-term development analysis, the segment of Delaware Avenue between Shaffer Road and Natural Bridges Drive was addressed based on a planning capacity rather than the TIRE index since this segment does not include any front-on housing. The proposed project would increase the daily traffic volume on this segment from 2,356 vehicles under existing conditions to approximately 5,472 vehicles with long-term development under the CLRDP. This section of roadway is rather wide and is assumed to have a physical capacity in excess of 10,000 vehicles per day. The projected total daily traffic volume of 5,472 vehicles is substantially lower than the physical capacity, and the constraint points are represented by the stop-sign-controlled intersections at Shaffer Road and Natural Bridges Drive to the east and west. Both of those locations are projected to operate at LOS A or B during both peak hours, and therefore the addition of daily traffic from long-term development to this segment is not expected to result in any operational problems on Delaware Avenue. No significant impacts were identified.

TABLE 4.15-12
LONG-TERM DEVELOPMENT TIRE INDEX ANALYSIS

Location	Existing Average Weekday Daily Traffic Volume (vehicles)	Volume that Results in 0.1 Change in TIRE Index	Estimated Number of Daily Project Trips	Noticeable to Residents? (Yes or No)
Delaware Avenue (Seaside Street to Surfside Avenue)	5,674	1,500	592	No
Western Drive (Western Court to Monarch Way)	4,582	1,250	374	No
Bay Street (Escalona Drive to Kenneth Street)	18,665	5,200	125	No

SOURCE: Fehr & Peers Associates, Inc., 2003

Safety Issues. For most residential streets, the addition of traffic does not automatically result in a degradation of safety, an increase in the likelihood of accidents, or an increase in travel speeds. In some cases, other factors such as sight distance restrictions, substandard lane widths, or other design problems could be exacerbated with an increase in traffic volume. Based on field review of each of the streets listed above, no operational or design problem was identified. In the case of a street such as Western Drive, the anticipated increase in daily traffic of 374 trips resulting from implementation of the long-term development program is within the potential daily variation in traffic volumes of up to 10 percent. The increase in total peak hour volume is estimated to be fewer than 37 trips, or an average of an additional vehicle every one to two minutes. Accordingly, the project is not expected to cause a safety problem requiring improvements.

Emergency Access

Under both the short-term and long-term development program, emergency vehicular access would continue to be provided by the Delaware Avenue Extension through the main gate. Typically a second emergency access point is desirable or needed in case some event (i.e., a car accident) blocks the primary access. Since the Delaware Avenue Extension and McAllister Way are proposed to be constructed without curbs, it would be possible for emergency vehicles to bypass an accident or other obstruction in the roadway.

With regard to evacuation needs, the very low volume of traffic at the Delaware Avenue/Shaffer Road intersection would provide ample capacity for vehicles to exit the site immediately. In addition, staff, students and visitors to the site could also leave on foot via the proposed trail system. Based on this assessment, implementation of the project is not expected to result in inadequate emergency access and no significant impacts were identified.

Relationship to Alternative Transportation Policies, Plans, and Programs

Bicycle and Pedestrian Circulation. The evaluation of pedestrian and bicycle operations described under the short-term development program applies to long-term development as well. Although the volume of onsite traffic would be higher with long-term development, bicyclists would still be able to share the roadway and use trails (with adequate width) without an increase in hazards. The onsite amenities would provide incentives for employees, students, and visitors to cycle instead of using private automobiles.

The gap in the sidewalk on the north side of Delaware Avenue could also be a problem under the long-term development program (see Impact 4.15-2 under short-term development impacts), but the onsite trail system would more than adequately serve pedestrian needs. The proposed crossings of onsite roadways are adequately addressed under the long-term development program by policies in the CLRDP.

Transit Access. Full development under the CLRDP and the implementation of more aggressive TDM measures are expected to increase the number of potential transit riders. In accordance with CLRDP policies and implementation measures, UCSC would encourage SCMTD to extend fixed-route bus service within the project site and increase service frequency as demand warrants. In addition, UCSC would provide shuttle service from the site to the main campus and construct bus stops with amenities (e.g., sheltered areas) and turnouts at various locations within the site as needed to increase convenience.

Although it is difficult to accurately predict the number of users of a particular travel mode like transit, estimates of ridership can be used to determine if substantial service increases may be required. The existing ridership on Route 3B is 13 people, or boardings, per one-way bus trip, which is relatively low since substantial capacity is available. If 10 percent of the new 346 total PM peak-hour vehicle trips to the site were made via SCMTD bus (a conservatively high estimate, given the current service frequency and the availability of other alternative travel modes such as bicycling, carpooling, TAPS shuttle, etc.), then there would be an additional 35 riders, which would be split between inbound and outbound movements. Given the relatively low existing ridership, the projected SCMTD bus demand could likely be served by the existing 40-seat vehicles currently serving the site via Route 3B without requiring an increase in service frequency. With the provision of onsite bus stops (with amenities such as shelters) and proposed trail enhancements to improve direct access to transit, no operational issues for transit service are anticipated under this scenario. Overall, the proposed project promotes the use of alternative transportation by offering shuttle service, providing secure bicycle parking, and enhancing pedestrian travel between transit stops. The proposed project does not conflict with, and in fact complements, policies, plans, and programs supporting transit use; thus, no significant impacts were identified.

Air Traffic Patterns

The long-term development program is not expected to affect air traffic patterns or generate a significant increase in air traffic levels. Thus, the project would not result in any significant impacts to air travel or safety.

With two exceptions, buildout of the long-term development program under existing conditions with mitigation would not have a significant adverse impact on the transportation system based on the CEQA criteria evaluated above. The project would result in a significant and unavoidable impact at the Mission Street / Chestnut Street intersection during the PM peak hour

(Impact 4.15-4). In addition, if General Mitigation Measure 4.15-3 proves infeasible, the project would also have a significant, unavoidable impact on the Mission Street / Bay Street intersection during the PM peak hour.

PROJECT IMPACTS ON FUTURE TRAFFIC OPERATIONS

The proposed short-term development program is expected to be completed by 2010, while full development under the CLRDP is expected to occur by 2020. Accordingly, two scenarios (2010 and 2020) were analyzed with the anticipated level of development included under each.

2010 Baseline Conditions

Background

2010 Baseline Conditions represent traffic volumes and levels of service projected to exist in 2010 without the CLRDP building program. Traffic volumes under the 2010 baseline scenario were estimated using a list of approved projects and regional growth forecasts from a traffic model. First, peak-hour traffic generated by developments that have been approved by the City (but not yet constructed) were added to existing AM and PM peak-hour traffic volumes, and then an annual growth factor of 1.2 percent (representing non-project-specific growth) for eight years (i.e., 2002 to 2010) was applied to the “existing plus approved project” volumes. The trip generation estimates for approved but not yet constructed projects are listed in Appendix D.

The annual growth factor was established by reviewing forecasts from the Association of Monterey Bay Area Governments (AMBAG) travel demand model, which is used to estimate future traffic volumes associated with projected land use changes in the Santa Cruz and Monterey County area. The entire model includes roadway network and land use in Santa Cruz, San Benito, Monterey, and portions of Santa Clara Counties. Near the project site, the model includes future growth at the UCSC Main Campus, as well in other parts of the city of Santa Cruz. The AMBAG model predicts approximately the same amount of traffic generation by the UCSC Main Campus as would be predicted using the University’s historic trip generation rate and assuming a theoretical enrollment of 15,000 students by 2010;[8] for this reason, use of volume forecasts from the AMBAG model and the resulting 1.2 percent annual growth factor is considered reasonable for the planning purposes of this 2010 analysis. An overall growth factor was applied to all intersection traffic volumes based on consultation with City of Santa Cruz Department of Public Works staff.[9]

The estimated traffic volumes at the study intersections under 2010 Baseline Conditions are shown in Figures 4.15-9a and 4.15-9b.

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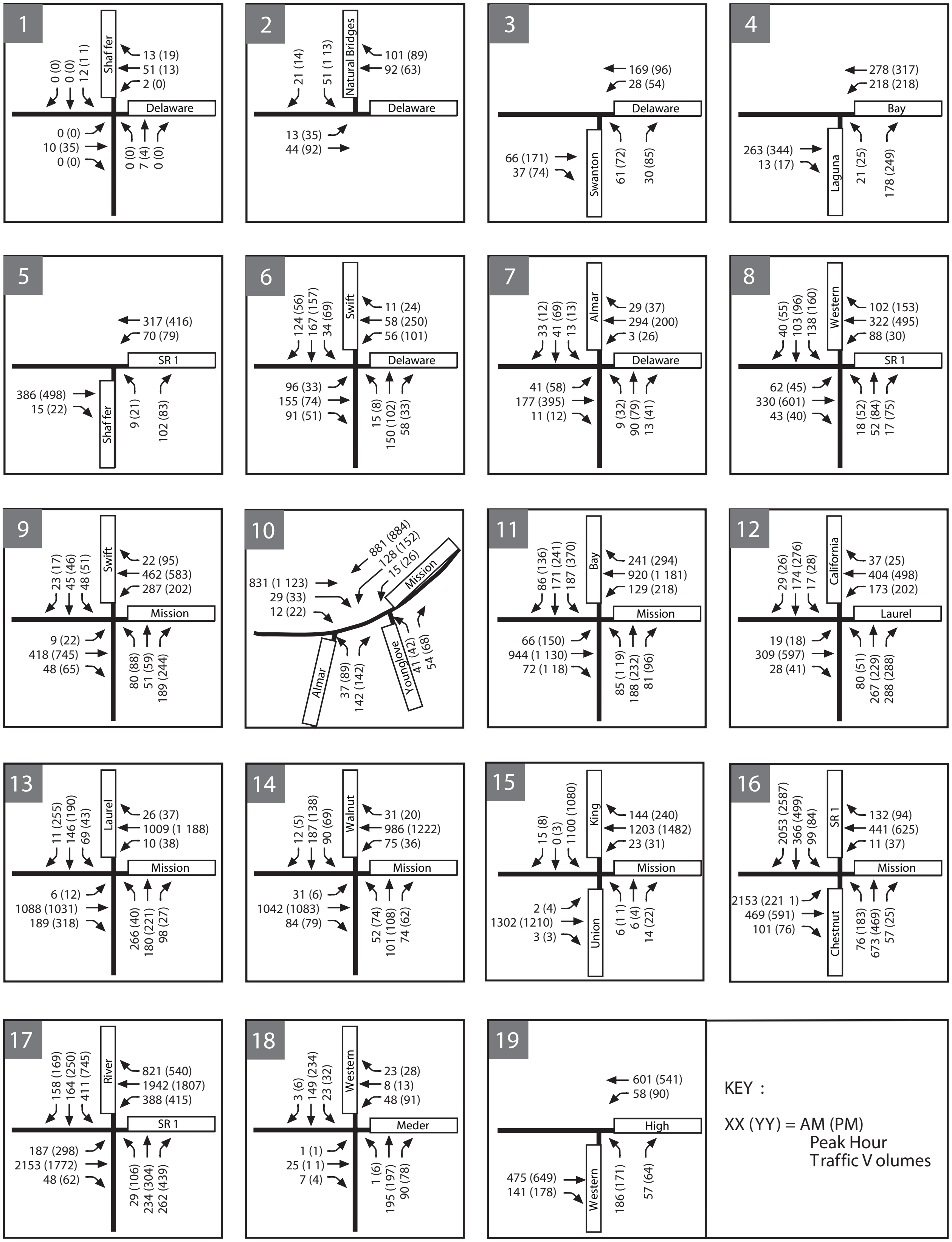
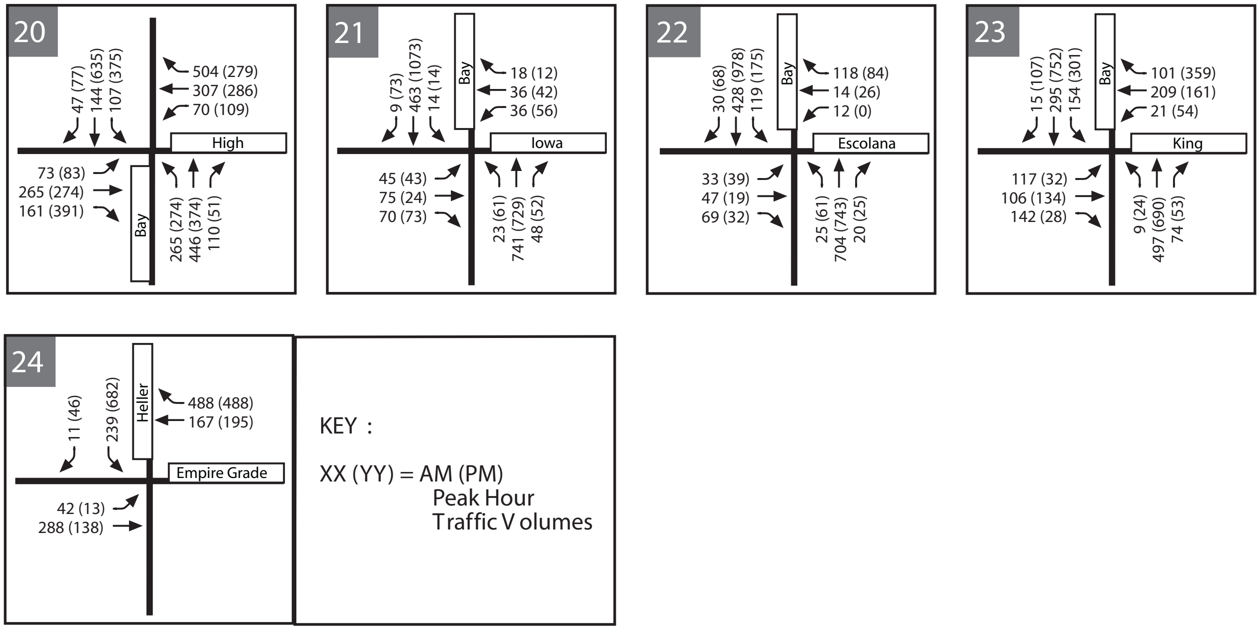
8 UCSC’s *Long Range Development Plan* projects an enrollment of 15,000 students, which is currently expected to be reached by approximately 2004-05 or 2005-06. It is currently projected that between 2005-06 and 2010-11 enrollments will increase from 15,200 to 16,900. However, during this period enrollments in excess of 15,000 FTE (14,958 headcount) students would be accommodated off campus and in expanded summer programs and therefore would not increase the population of the Main Campus above 15,000 FTE students by 2010. This approach was developed based on direction from Charlie Eadie, UCSC Campus and Community Planning, October 8, 2002.

9 Ron Marquez, Traffic Engineer, City of Santa Cruz, Department of Public Works, personal communication, October 21, 2002.



SOURCE: Fehr & Peers

Figure 4.15-9a
2010 Baseline Volumes
(Intersections 1-19)



SOURCE: Fehr & Peers

Figure 4.15-9b
2010 Baseline Volumes
(Intersections 20-24)

Intersection Levels of Service

Intersection level of service calculations were conducted to evaluate intersection operations under 2010 Baseline Conditions. The results of the LOS calculations are summarized in Table 4.15-13. The corresponding LOS calculation sheets are included in Appendix D.

Under 2010 Baseline Conditions traffic, most of the study intersections are projected to operate at acceptable levels of service. The following six locations are projected to operate at unacceptable LOS E or F during at least one of the peak hours:

Intersection 11. Mission Street and Bay Street (LOS F during PM peak hour)

Intersection 16. Mission Street and Chestnut Street (LOS F during both AM and PM peak hours)

Intersection 17. State Route 1 and River Street (LOS E during PM peak hour)

Intersection 19. Western Drive and High Street (LOS F during both AM and PM peak hours)

Intersection 22. Bay Drive and Escalona Drive (LOS F during both AM and PM peak hours)

Intersection 24. Empire Grade and Heller Drive (LOS F during PM peak hour)

Peak-hour signal warrant analyses were conducted at unsignalized intersections that are projected to operate at an unacceptable LOS of E or F, including Intersections 19, 22, and 24, to determine if a traffic signal is warranted under 2010 Baseline Conditions without the project. The results of the analysis showed that traffic signals would be warranted at the Western Drive / High Street intersection during both peak hours, and at the latter two locations during the PM peak hour. As indicated in the Caltrans *Traffic Manual*, however, installation of a traffic signal should not necessarily be based solely on the satisfaction of warrant criteria, and should also be based on other factors such as delay, congestion, driver confusion, and safety problems. The City of Santa Cruz will make the final determination regarding the need for a signal at these locations.

2010 Baseline Plus Project Conditions

Intersection Levels of Service (Short-Term Development in 2010)

Traffic volumes generated under the short-term development program were added to 2010 baseline volumes to evaluate impacts of the projects expected to be completed by that time. These volumes are presented in Figures 4.15-10a and 4.15-10b.

Intersection level of service calculations were conducted to evaluate intersection operations with the short-term development program (see Table 4.15-14). The corresponding LOS calculation sheets are included in Appendix D. Cumulative intersection impacts were identified based on the criteria used to evaluate project-level impacts (i.e., under Existing Plus Project Conditions).

With the addition of the short-term development program traffic to the 2010 Baseline Conditions, most of the key intersections are projected to operate at acceptable levels of service. Intersections that are projected to operate at unacceptable levels (LOS E or F) are:

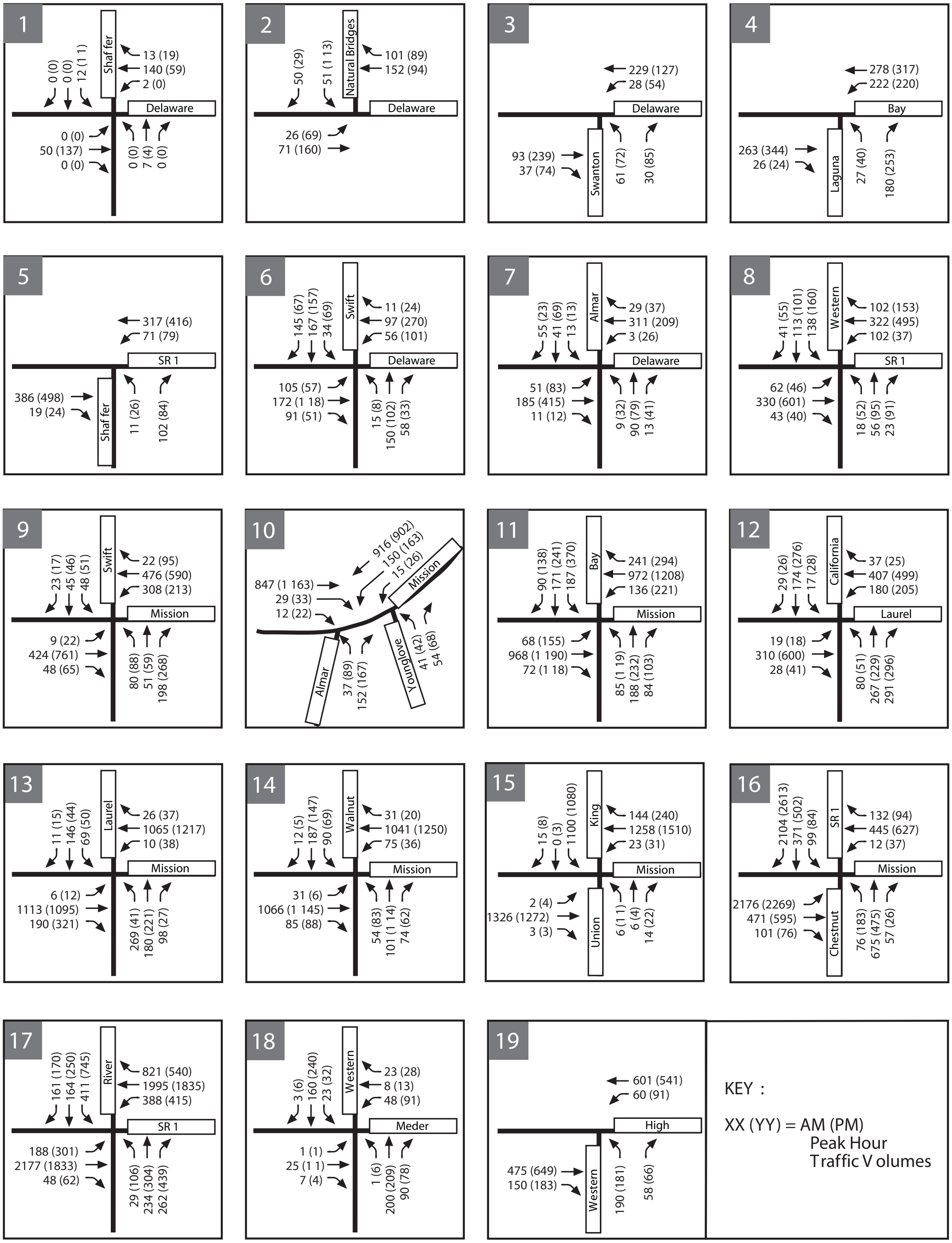
Intersection 11. Mission Street and Bay Street (LOS F during PM peak hour)

TABLE 4.15-13
2010 BASELINE
INTERSECTION LEVELS OF SERVICE (LOS)

Intersection	Type of Control	Peak Hour	Delay (sec.)[a]	LOS
1. Delaware Avenue / Shaffer Road	Two-Way	AM PM	9.5 9.5	A A
2. Delaware Avenue / Natural Bridges Drive	Two-Way	AM PM	8.1 8.6	A A
3. Delaware Avenue / Swanton Boulevard	Two-Way	AM PM	10.2 10.9	B B
4. Bay Street / Laguna Street	Two-Way	AM PM	12.1 14.2	B B
5. State Route 1 / Shaffer Road	Two-Way	AM PM	11.9 14.4	B B
6. Delaware Avenue / Swift Street	All-Way	AM PM	12.8 12.6	B B
7. Delaware Avenue / Almar Avenue	All-Way	AM PM	10.1 13.5	B B
8. State Route 1 / Western Drive	Signal	AM PM	24.0 22.5	C C
9. Mission Street / Swift Street	Signal	AM PM	23.3 22.2	C C
10. Mission Street / Almar Avenue	Signal	AM PM	21.1 24.4	C C
11. Mission Street / Bay Street	Signal	AM **PM**	37.9 **104.6**	D **F**
12. Laurel Street / California Street	Signal	AM PM	21.4 25.7	C C
13. Mission Street / Laurel Street	Signal	AM PM	24.7 41.8	C D
14. Mission Street / Walnut Avenue	Signal	AM PM	23.7 19.5	C B
15. Mission Street / Union Street	Signal	AM PM	28.3 29.3	C C
16. Mission Street / Chestnut Street	Signal	**AM** **PM**	**81.5** **162.6**	**F** **F**
17. State Route 1 / River Street	Signal	AM **PM**	45.3 **68.2**	D **E**
18. Western Drive / Meder Street	All-Way	AM PM	8.9 9.7	A A
19. Western Drive / High Street	Two-Way	**AM** **PM**	**100.8** **180.2**	**F** **F**
20. Bay Street / High Street	Signal	AM PM	20.5 27.7	C C
21. Bay Street / Iowa Drive	Signal	AM PM	11.4 9.9	B A
22. Bay Street / Escalona Drive	Two-Way	**AM** **PM**	**102.4** **> 360**	**F** **F**
23. Bay Street / King Street	Signal	AM PM	22.2 28.0	B C
24. Empire Grade / Heller Drive	Two-Way	AM **PM**	18.7 **76.6**	C **F**

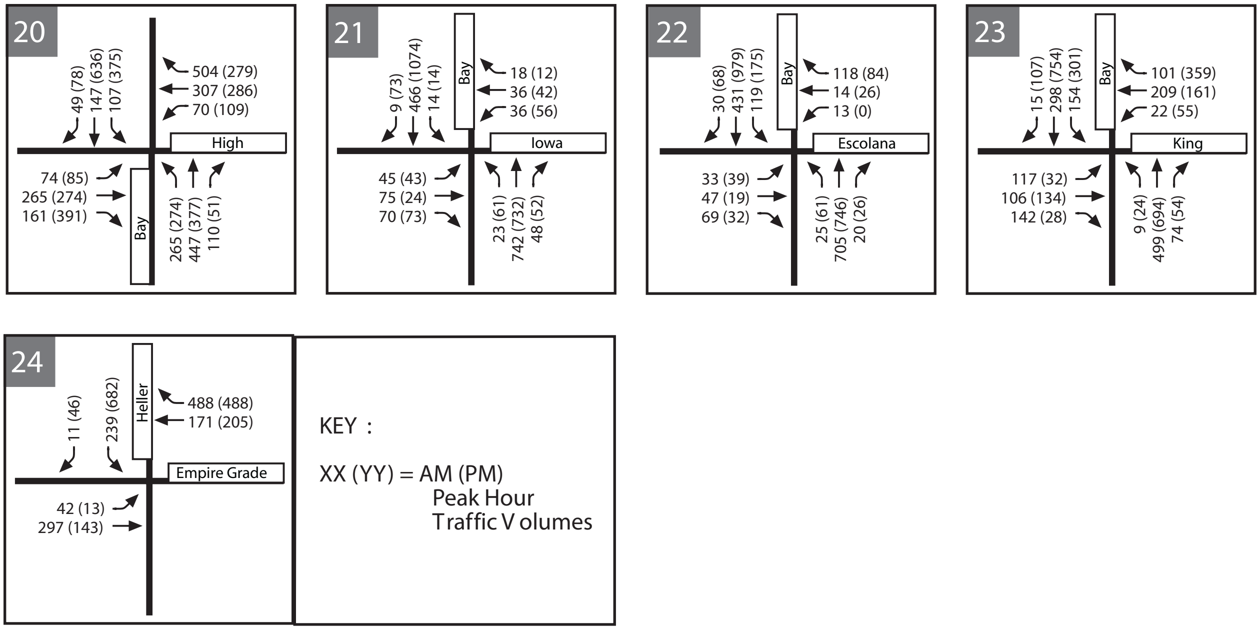
[a] Delay for signalized and all-way stop-sign-controlled intersections is expressed as the weighted average delay for the overall intersection. Delay for two-way stop-controlled intersections represents the worst-case minor street movement only. Unacceptable operations (LOS E or F) are shown in **bold** type.

SOURCE: Fehr & Peers Associates, Inc., 2003



SOURCE: Fehr & Peers

Figure 4.15-10a
2010 Plus Near-term Volumes
(Intersections 1-19)



SOURCE: Fehr & Peers

Figure 4.15-10b
2010 Plus Near-term Volumes
(Intersections 20-24)

TABLE 4.15-14
2010 BASELINE PLUS PROJECT
INTERSECTION LEVELS OF SERVICE (LOS)

Intersection	Type of Control	Peak Hour	Delay (sec.)[a]	LOS	% Inc. in Volume due to Project
1. Delaware Avenue / Shaffer Road	Two-Way	AM PM	10.4 10.4	B B	
2. Delaware Avenue / Natural Bridges Drive	Two-Way	AM PM	8.6 9.3	A A	
3. Delaware Avenue / Swanton Boulevard	Two-Way	AM PM	10.8 11.7	B B	
4. Bay Street / Laguna Street	Two-Way	AM PM	12.6 15.2	B C	
5. State Route 1 / Shaffer Road	Two-Way	AM PM	12.0 14.9	B B	
6. Delaware Avenue / Swift Street	All-Way	AM PM	14.3 14.0	B B	
7. Delaware Avenue / Almar Avenue	All-Way	AM PM	10.6 15.4	B C	
8. State Route 1 / Western Drive	Signal	AM PM	24.4 23.4	C C	
9. Mission Street / Swift Street	Signal	AM PM	23.3 22.4	C C	
10. Mission Street / Almar Avenue	Signal	AM PM	22.0 25.9	C C	
11. Mission Street / Bay Street	Signal	AM **PM**	39.0 **113.4**	D **F**	 **2.4%**
12. Laurel Street / California Street	Signal	AM PM	21.5 26.0	C C	
13. Mission Street / Laurel Street	Signal	AM PM	24.8 43.8	C D	
14. Mission Street / Walnut Avenue	Signal	AM PM	23.7 19.2	C B	
15. Mission Street / Union Street	Signal	AM PM	28.4 29.6	C C	
16. Mission Street / Chestnut Street	Signal	**AM** **PM**	**85.3** **166.5**	**F** **F**	**1.3%** **1.3%**
17. State Route 1 / River Street	Signal	AM **PM**	45.9 **70.7**	D **E**	 **1.3%**
18. Western Drive / Meder Street	All-Way	AM PM	9.0 9.9	A A	
19. Western Drive / High Street	Two-Way	**AM** **PM**	**110.0** **206.1**	**F** **F**	**1.1%** **1.1%**
20. Bay Street / High Street	Signal	AM PM	20.5 27.8	C C	
21. Bay Street / Iowa Drive	Signal	AM PM	11.4 9.9	B A	
22. Bay Street / Escalona Drive	Two-Way	**AM** **PM**	**103.9** **> 360**	**F** **F**	**0.3%** **0.2%**
23. Bay Street / King Street	Signal	AM PM	22.2 28.2	B C	
24. Empire Grade / Heller Drive	Two-Way	AM **PM**	19.2 **83.6**	C **F**	 **1.0%**

[a] Delay for signalized and all-way stop-sign-controlled intersections is expressed as the weighted average delay for the overall intersection. Delay for two-way stop-controlled intersections represents the worst-case minor street movement only. Unacceptable operations (LOS E or F) are shown in **bold** type.

SOURCE: Fehr & Peers Associates, Inc., 2003

Intersection 16. Mission Street and Chestnut Street (LOS F during both AM and PM peak hours)

Intersection 17. State Route 1 and River Street (LOS E during PM peak hour)

Intersection 19. Western Drive and High Street (LOS F during both AM and PM peak hours)

Intersection 22. Bay Street and Escalona Drive (LOS F during both AM and PM peak hours)

Intersection 24. Empire Grade and Heller Drive (LOS F during PM peak hour)

The proposed short-term development program is expected to contribute between 0.25 percent and 2 percent of the total projected 2010 traffic volumes at these intersections.

The peak-hour signal warrant analysis conducted for Short-Term Development Baseline Conditions showed that traffic signals were warranted at the last three intersections listed above, which are all currently unsignalized. The addition of project traffic would contribute toward the need for a signal at each location. As indicated in the Caltrans *Traffic Manual*, however, installation of a traffic signal should not necessarily be based solely on the satisfaction of warrant criteria, and should also be based on other factors such as delay, congestion, driver confusion, and safety problems. The City of Santa Cruz will make the final determination regarding the need for a signal at this location.

Although the project would add traffic to six intersections operating at unacceptable levels, short-term development traffic would represent less than three percent of the 2010 Baseline intersection volume at each location. Based on City of Santa Cruz's significance criteria, no significant intersection impacts would occur as a result of the short-term development program.

Roadway Capacity

A roadway segment evaluation was conducted under 2010 conditions to provide additional information on the amount of traffic expected to use key streets in the vicinity of the project site. Roadway segment evaluations are typically used to establish the number of travel lanes in each direction required to serve projected daily or peak hour traffic volumes. It is important to note that for streets in developed areas with numerous cross-streets, intersections govern the operation of the roadway system because the traffic control devices (i.e., traffic signals or stop signs) control vehicle movements, cause delay, and ultimately establish the vehicle capacity. In addition, the City of Santa Cruz has not established roadway segment volume threshold standards. Accordingly, intersection analysis was used to evaluate traffic impacts to comply with CEQA requirements, while the roadway segment evaluation was provided as a general indicator of how the projected peak hour traffic volumes relate to segment capacities using volume-to-capacity (V/C) ratios.

As part of Appendix D to the *Core West Parking Structure Traffic Study*, Higgins Associates included a list of Level of Service peak hour volume thresholds for various roadway types. These thresholds are based on information from the 1985 and 1994 *Highway Capacity Manual* assuming a 60 percent/40 percent split in directional traffic and that peak hour capacities represent 10 percent of the daily capacity. (A copy of the table is included in Appendix D.) The City of Santa Cruz has not adopted any roadway segment thresholds. Such thresholds have been used in other jurisdictions (e.g., Gilroy, Monterey County, Santa Cruz County), however.

The segment evaluation was conducted for the four roadway segments evaluated for neighborhood impacts under Existing Plus Project (both Short-Term and Long-Term Development) Conditions: Delaware Avenue (two segments), Western Drive, and Bay Street. The 2010 Baseline without and with the short-term development program was compared to the capacity for each roadway to calculate a volume-to-capacity (V/C) ratio. Bay Street was classified as a two-lane arterial, while Western Drive and Delaware Avenue were evaluated as two-lane collector streets. The results of the V/C evaluation are presented in Table 4.15-15.

TABLE 4.15-15
SHORT-TERM (2010) ROADWAY CAPACITY ANALYSIS

			2010 Baseline		2010 Baseline + Project		
Location	**Roadway Type**	**Capacity**	**Two-Way Peak-Hour Volume[a]**	**V/C**	**Two-Way Peak-Hour Volume[a]**	**V/C**	**Change[b]**
AM Peak Hour							
Delaware Avenue (Shaffer Road to Natural Bridges Drive)	2-Lane Collector	1,200	88	0.07	217	0.18	0.11
Delaware Avenue (Seaside Street to Surfside Avenue)	2-Lane Collector	1,200	529	0.44	553	0.46	0.02
Western Drive (Western Court to Monarch Way)	2-Lane Collector	1,200	497	0.41	512	0.43	0.02
Bay Street (Escalona Drive to Kenneth Street)	2-Lane Arterial	1,800	1,258	0.70	1,263	0.70	0.00
PM Peak Hour							
Delaware Avenue (Shaffer Road to Natural Bridges Drive)	2-Lane Collector	1,200	78	0.07	226	0.19	0.12
Delaware Avenue (Seaside Street to Surfside Avenue)	2-Lane Collector	1,200	702	0.59	741	0.62	0.03
Western Drive (Western Court to Monarch Way)	2-Lane Collector	1,200	593	0.49	610	0.51	0.02
Bay Street (Escalona Drive to Kenneth Street)	2-Lane Arterial	1,800	1,839	1.02	1,844	1.02	0.00

[a] Based on adjacent intersection turning movement volumes.
[b] Increase in V/C over Short-Term Baseline Conditions.

SOURCE: Roadway type designation and capacities obtained from *Core West Parking Structure Traffic Study* (Higgins Associates, February 1999). A copy of the LOS volume thresholds for each roadway type is included in Appendix D.

The results of the roadway segment evaluation show that three of the four roadway segments would operate with V/C ratios ranging between 0.07 and 0.70 (i.e., approximately LOS C or better) during both peak hours with the proposed short-term development program in place under 2010 conditions. Although the increase in traffic is relatively high on the western Delaware Avenue segment, none of the increases is considered significant because of the acceptable operations.

During the PM peak hour, the Bay Street segment is expected to operate at LOS F with a V/C ratio in excess of 1.0. This would indicate that the street may need to be widened in the future, but intersection operations should govern the need for future improvements. However, the project by 2010 is only expected to add a negligible amount of traffic to Bay Street (i.e., fewer than five peak hour trips), which is less than 1 percent of the volume at this location (see Table 4.15-5). Overall, the project is not expected to result in a substantial change in the operation of any of the study roadway segments during the peak hour with short-term development.

Neighborhood Impacts

The Traffic Infusion on Residential Environments (TIRE) analysis was used to evaluate project impacts on three nearby residential street segments with front-on housing. A fourth segment (Delaware Avenue between Shaffer Road and Natural Bridges Drive) was examined separately for operational problems since the TIRE index is typically only applied to streets with front-on housing.

According to the TIRE index, the addition of project traffic by 2010 would not be noticeable to residents on the study street segments, as shown in Table 4.15-16 (i.e., the addition of traffic to streets with front-on housing would not differ substantially from normal variations in daily traffic).

TABLE 4.15-16
SHORT-TERM DEVELOPMENT TIRE INDEX ANALYSIS

Location	Existing Average Weekday Daily Traffic Volume (vehicles)	Volume that Results in 0.1 Change in TIRE Index	Estimated Number of Daily Project Trips	Noticeable to Residents? (Yes or No)
Delaware Avenue (Seaside Street to Surfside Avenue)	5,674	1,500	252	No
Western Drive (Western Court to Monarch Way)	4,582	1,250	159	No
Bay Street (Escalona Drive to Kenneth Street)	18,665	5,200	53	No

SOURCE: Fehr & Peers Associates, Inc., 2003

The proposed short-term development program would increase the daily traffic volume on Delaware Avenue between Shaffer Road and Natural Bridges Drive from 2,356 vehicles under existing conditions to approximately 3,680 vehicles. This section of roadway is rather wide and does not include any front-on housing. In addition, the projected total daily traffic volume is lower than the more than 10,000- to 12,000-vehicles-per-day physical capacity of this type of roadway (with limited driveways and adequate lane widths). The constraint point on the roadway is the stop-sign-controlled Delaware Avenue / Natural Bridges Drive intersection. As shown in Table 4.15-14, that intersection is projected to operate at LOS B during both peak hours, and therefore the addition of daily traffic to this segment is not expected to result in any operational problems on Delaware Avenue. No significant impacts were identified.

Based on the information cited above and CEQA criteria, implementation of the short-term development program is not expected to result in any significant traffic and circulation impacts under 2010 conditions.

2020 Baseline Conditions

Background

The portion of the CLRDP building program not completed by 2010 is expected to be completed by 2020. Traffic conditions without the project at this time horizon (2020) are identified as 2020 Baseline Conditions. 2020 Baseline volumes were initially estimated using the same method used for 2010 Baseline Conditions (described above). An annual growth factor of 1.2 percent, representing non-project-specific growth, was applied for 18 years (i.e., 2002 to 2020) to existing AM and PM peak-hour traffic volumes and traffic from the City's approved projects. The trip generation estimates for approved but not yet constructed projects are presented in Appendix D.

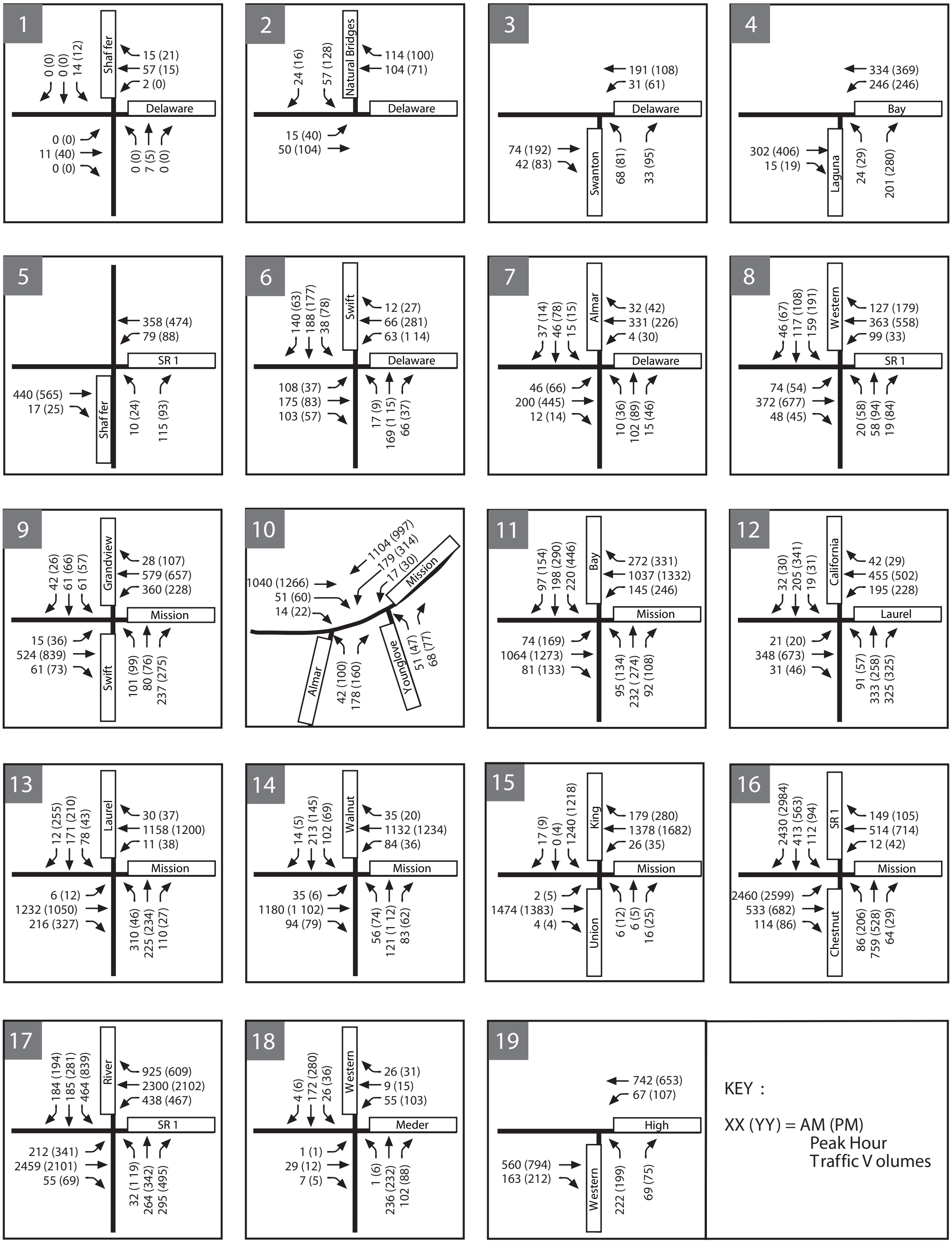
In addition to the City's approved projects, the total population estimate for the UCSC Main Campus in 2020 is expected to be 24,297, which accounts for a student enrollment of 19,000.[10] The AMBAG model only includes growth for approximately 17,000 students based on a comparison of model trips to trips estimated using the historical trip rate of 1.59 daily trips per person. As such, the resulting increase in additional campus-generated traffic was added to the growth factored volumes described above based on the daily trip rate of 1.59 and a peak hour factor of 7.8 percent in the AM peak hour and 9.2 percent in the PM peak hour. The trips from the higher Main Campus population were added directly to the growth-factored volumes.

The total estimated volumes at the study intersections in 2020 without any new development at the Marine Science Campus are shown in Figures 4.15-11a and 4.15-11b. This scenario represents 2020 Baseline Conditions.

Intersection Level of Service

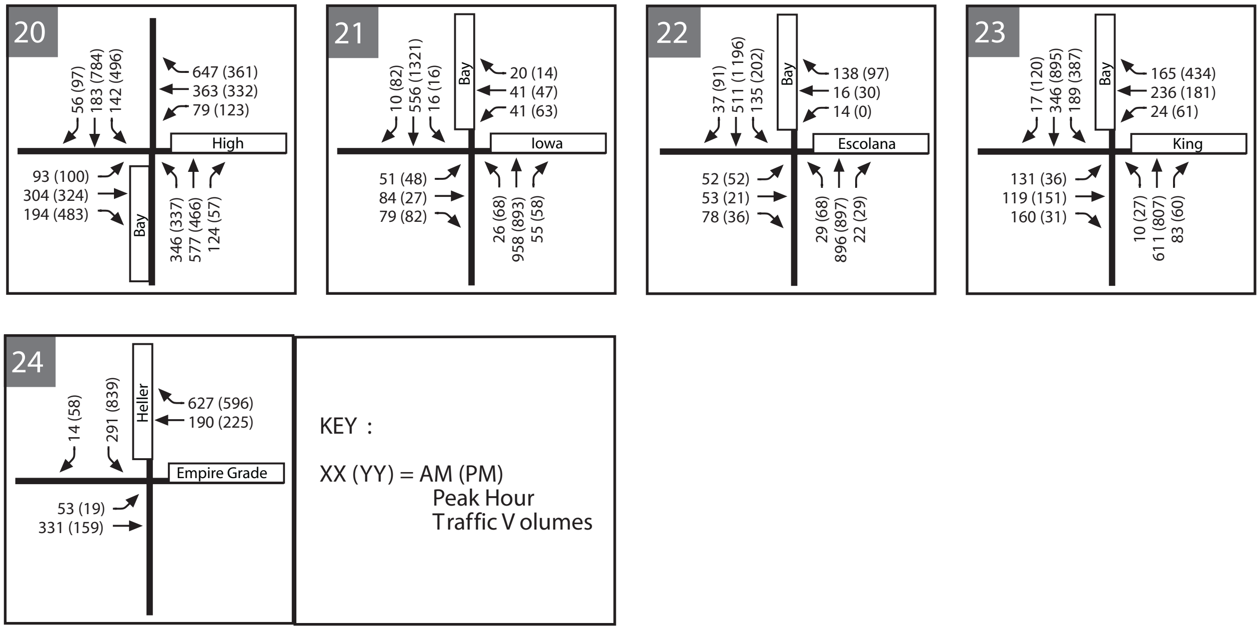
Intersection level of service calculations were conducted to evaluate intersection operations under 2020 Baseline Conditions. The results of the LOS calculations are summarized in Table 4.15-17. The corresponding LOS calculation sheets are included in Appendix D.

[10] Ann Bertken (UCSC), "Projected Campus Growth in 2020 Using Historic Average Annual Enrollment Increase," August 28, 2003.



SOURCE: Fehr & Peers

Figure 4.15-11a
2020 Baseline Volumes
(Intersections 1-19)



SOURCE: Fehr & Peers

Figure 4.15-11b
2020 Baseline Volumes
(Intersections 20-24)

TABLE 4.15-17
2020 BASELINE
INTERSECTION LEVELS OF SERVICE (LOS)

Intersection	Type of Control	Peak Hour	Delay (sec.)[a]	LOS
1. Delaware Avenue / Shaffer Road	Two-Way	AM PM	9.6 9.5	A A
2. Delaware Avenue / Natural Bridges Drive	Two-Way	AM PM	8.3 8.9	A A
3. Delaware Avenue / Swanton Boulevard	Two-Way	AM PM	10.5 11.4	B B
4. Bay Street / Laguna Street	Two-Way	AM PM	13.3 16.7	B B
5. State Route 1 / Shaffer Road	Two-Way	AM PM	12.7 16.3	B B
6. Delaware Avenue / Swift Street	All-Way	AM PM	15.5 15.1	C C
7. Delaware Avenue / Almar Avenue	All-Way	AM PM	11.0 16.9	B C
8. State Route 1 / Western Drive	Signal	AM PM	25.1 26.4	C C
9. Mission Street / Swift Street	Signal	AM PM	25.6 24.2	C C
10. Mission Street / Almar Avenue	Signal	AM PM	22.2 26.8	C C
11. Mission Street / Bay Street	Signal	AM **PM**	51.9 **168.0**	D **F**
12. Laurel Street / California Street	Signal	AM PM	23.0 31.8	C C
13. Mission Street / Laurel Street	Signal	AM PM	29.1 46.0	C D
14. Mission Street / Walnut Avenue	Signal	AM PM	26.2 19.8	C B
15. Mission Street / Union Street	Signal	AM PM	34.5 44.0	C D
16. Mission Street / Chestnut Street	Signal	**AM** **PM**	**139.4** **233.2**	**F** **F**
17. State Route 1 / River Street	Signal	**AM** **PM**	**68.4** **110.6**	**E** **F**
18. Western Drive / Meder Street	All-Way	AM PM	9.5 10.7	A B
19. Western Drive / High Street	Two-Way	**AM** **PM**	**336.5** **> 360**	**F** **F**
20. Bay Street / High Street	Signal	AM PM	25.0 46.1	C D
21. Bay Street / Iowa Drive	Signal	AM PM	11.2 10.5	B B
22. Bay Street / Escalona Drive	Two-Way	**AM** **PM**	**> 360** **> 360**	**F** **F**
23. Bay Street / King Street	Signal	AM PM	29.9 50.8	C D
24. Empire Grade / Heller Drive	Two-Way	AM **PM**	28.5 **214.5**	D **F**

[a] Delay for signalized and all-way stop-sign-controlled intersections is expressed as the weighted average delay for the overall intersection. Delay for two-way stop-controlled intersections represents the worst-case minor street movement only. Unacceptable operations (LOS E or F) are shown in **bold** type.

SOURCE: Fehr & Peers Associates, Inc., 2003

Under 2020 Baseline Conditions, most of the key intersections are projected to operate at acceptable levels of service. The following six locations (the same as under the 2010 Baseline scenario) are projected to operate at unacceptable LOS E or F during at least one of the peak hours:

Intersection 11. Mission Street and Bay Street (LOS F during PM peak hour)

Intersection 16. Chestnut Street and Mission Street (LOS F during both AM and PM peak hours)

Intersection 17. State Route 1 and River Street (LOS E during AM peak hour, and LOS F during PM peak hour)

Intersection 19. Western Drive and High Street (LOS F during both AM and PM peak hours)

Intersection 22. Bay Drive and Escalona Drive (LOS F during both AM and PM peak hours)

Intersection 24. Empire Grade and Heller Drive (LOS F during PM peak hour)

Peak-hour signal warrant analyses conducted for the 2010 Baseline scenario, described above, showed traffic signals would be warranted at three unsignalized intersections: Intersection 19–High Street / Western Drive (both peak hours), Intersection 22–Bay Street / Escalona Drive (PM peak hour), and Intersection 24–Empire Grade / Heller Drive (PM peak hour). Under the 2020 Baseline Conditions, with the addition of traffic from additional growth between 2010 and 2020, the need for traffic signals would be exacerbated at those intersections. Additionally, the AM peak-hour volumes would exceed the warrant thresholds at Intersection 22–Bay Street / Escalona Drive. As indicated in the Caltrans *Traffic Manual*, however, installation of a traffic signal should not necessarily be based solely on the satisfaction of warrant criteria, and should also be based on other factors such as delay, congestion, driver confusion, and safety problems. The City of Santa Cruz will make the final determination regarding the need for a signal at these locations.

2020 Baseline Plus Project Traffic Conditions

Intersection Levels of Service

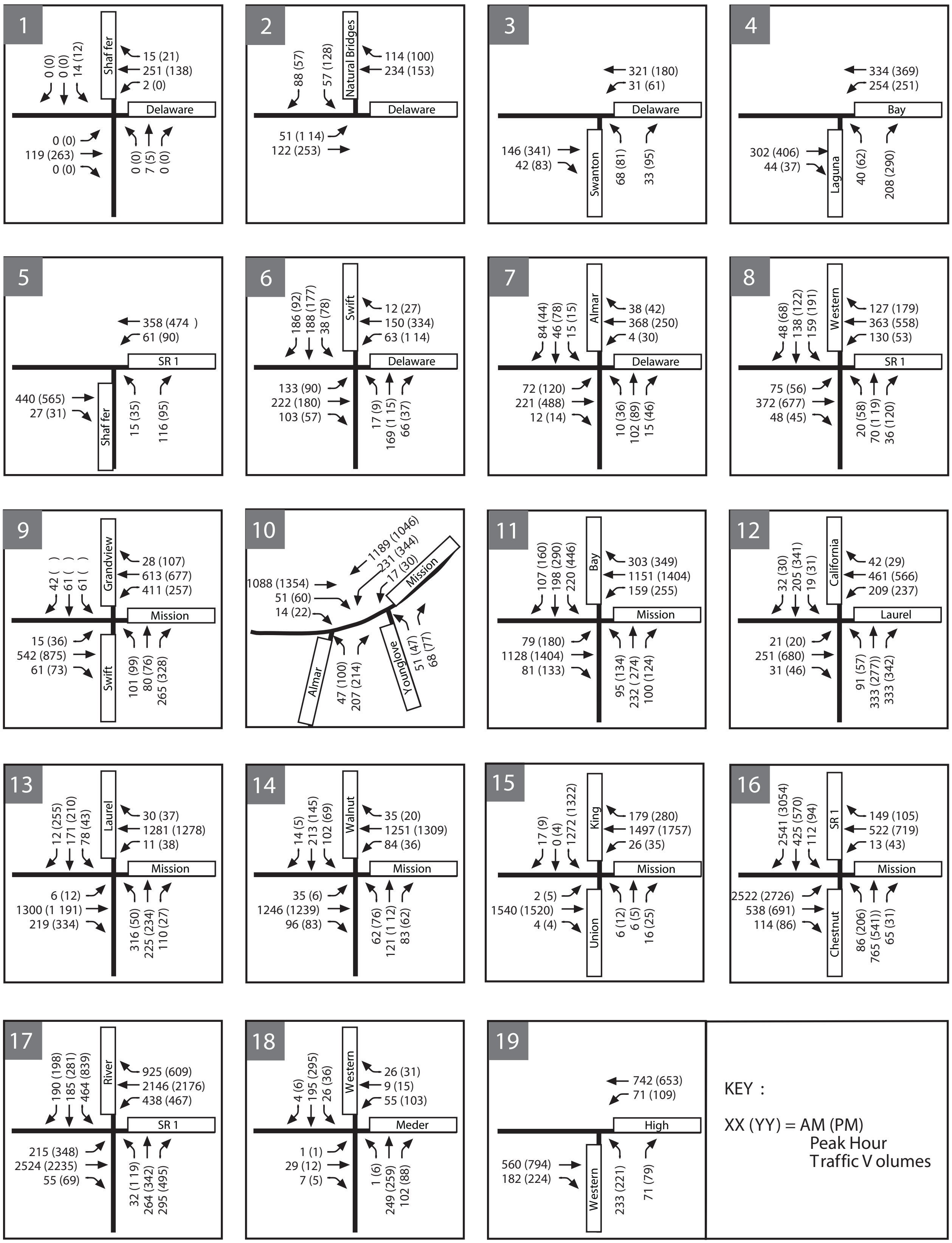
Traffic volumes generated by the entire development program (i.e., short-term and long-term) were added to 2020 baseline volumes to evaluate cumulative impacts of the entire CLRDP building program. These volumes are presented in Figures 4.15-12a and 4.15-12b.

Intersection level of service calculations were conducted to evaluate intersection operations under the entire development program. The results of the LOS calculations are summarized in Table 4.15-18. The corresponding LOS calculation sheets are included in Appendix D.

With the addition of traffic from the entire CLRDP building program to the 2020 Baseline Conditions, most of the key intersections are projected to operate at acceptable levels of service. Intersections that are projected to operate at unacceptable levels (LOS E or F) are:

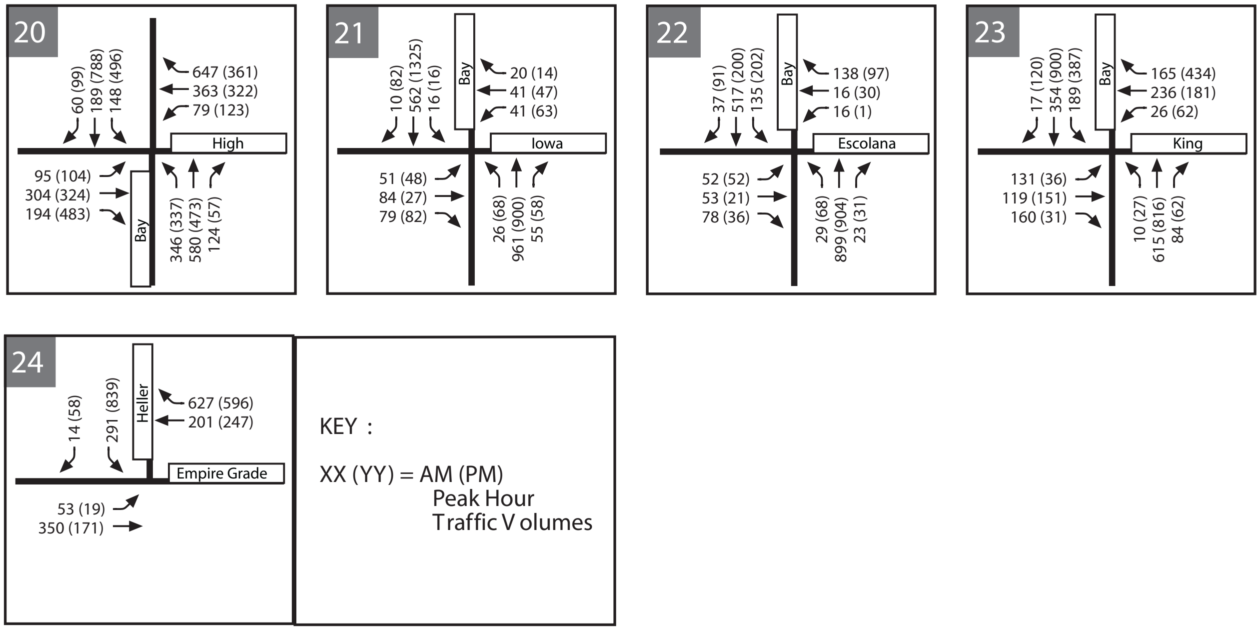
Intersection 11. Mission Street and Bay Street (LOS E during AM peak hour and LOS F during PM peak hour)

Intersection 16. Chestnut Street and Mission Street (LOS F during both AM and PM peak hours)



SOURCE: Fehr & Peers

Figure 4.15-12a
2020 Plus Entire
Development Program Volumes
(Intersections 1-19)



SOURCE: Fehr & Peers

Figure 4.15-12b
2020 Plus Entire
Development Program Volumes
(Intersections 20-24)

TABLE 4.15-18
2020 BASELINE PLUS PROJECT
INTERSECTION LEVELS OF SERVICE (LOS)

Intersection	Type of Control	Peak Hour	Delay (sec.)[a]	LOS	% Inc. in Volume due to Project
1. Delaware Avenue / Shaffer Road	Two-Way	AM PM	11.8 12.1	B B	
2. Delaware Avenue / Natural Bridges Drive	Two-Way	AM PM	10.0 12.9	A B	
3. Delaware Avenue / Swanton Boulevard	Two-Way	AM PM	12.2 13.7	B B	
4. Bay Street / Laguna Street	Two-Way	AM PM	15.1 20.9	B C	
5. State Route 1 / Shaffer Road	Two-Way	AM PM	13.1 17.7	B C	
6. Delaware Avenue / Swift Street	All-Way	AM PM	24.7 23.4	C C	
7. Delaware Avenue / Almar Avenue	All-Way	AM PM	12.6 28.8	B D	
8. State Route 1 / Western Drive	Signal	AM PM	26.3 29.5	C C	
9. Mission Street / Swift Street	Signal	AM PM	25.8 24.7	C C	
10. Mission Street / Almar Avenue	Signal	AM PM	24.6 31.4	C C	
11. Mission Street / Bay Street	Signal	**AM** **PM**	**61.0** **191.5**	**E** **F**	**5.9%** **5.0%**
12. Laurel Street / California Street	Signal	AM PM	23.4 33.0	C C	
13. Mission Street / Laurel Street	Signal	AM PM	30.0 52.5	C D	
14. Mission Street / Walnut Avenue	Signal	AM PM	26.3 19.4	C B	
15. Mission Street / Union Street	Signal	AM PM	36.5 50.8	D D	
16. Mission Street / Chestnut Street	Signal	**AM** **PM**	**151.8** **244.6**	**F** **F**	**2.7%** **2.7%**
17. State Route 1 / River Street	Signal	**AM** **PM**	**71.1** **118.8**	**E** **F**	**2.4%** **2.8%**
18. Western Drive / Meder Street	All-Way	AM PM	9.8 11.2	A B	
19. Western Drive / High Street	Two-Way	**AM** **PM**	**> 360** **> 360**	**F** **F**	**2.0%** **2.0%**
20. Bay Street / High Street	Signal	AM PM	25.2 47.3	C D	
21. Bay Street / Iowa Drive	Signal	AM PM	11.2 10.5	B B	
22. Bay Street / Escalona Drive	Two-Way	**AM** **PM**	**> 360** **> 360**	**F** **F**	**0.6%** **0.5%**
23. Bay Street / King Street	Signal	AM PM	30.2 51.8	C D	
24. Empire Grade / Heller Drive	Two-Way	AM **PM**	31.3 **242.4**	D **F**	 **1.8%**

[a] Delay for signalized and all-way stop-sign-controlled intersections is expressed as the weighted average delay for the overall intersection. Delay for two-way stop-controlled intersections represents the worst-case minor street movement only. Unacceptable operations (LOS E or F) are shown in **bold** type.

SOURCE: Fehr & Peers Associates, Inc., 2003

Intersection 17. State Route 1 and River Street (LOS E during AM peak hour and LOS F during PM peak hour)

Intersection 19. Western Drive and High Street (LOS F during both AM and PM peak hours)

Intersection 22. Bay Drive and Escalona Drive (LOS F during both AM and PM peak hours)

Intersection 24. Empire Grade and Heller Drive (LOS F during PM peak hour)

With the exception of Intersection 11 (Mission Street and Bay Street), the project would contribute between 0.5 percent and 2.8 percent of the total 2020 intersection traffic volume at these intersections. At the intersection of Mission Street and Bay Street, the entire development program is expected to contribute between 5 and nearly 6 percent of the total intersection volume in 2020. This impact is further discussed below.

The peak-hour signal warrant analysis conducted for 2020 Baseline Conditions showed that traffic signals were warranted at the last three intersections listed above which are all currently unsignalized. The addition of project traffic would contribute toward the need for a signal at these locations. As indicated in the Caltrans *Traffic Manual*, however, installation of a traffic signal should not necessarily be based solely on the satisfaction of warrant criteria, and should also be based on other factors such as delay, congestion, driver confusion, and safety problems. The City of Santa Cruz will make the final determination regarding the need for a signal at this location.

Impact 4.15-5: The entire development program under the CLRDP would cause total traffic volume to increase by between 5.0 and 5.9 percent (i.e., more than the 3-percent threshold) at the signalized Mission Street/Bay Street intersection, which is projected to operate at LOS E and F during the AM and PM peak hours, respectively, under 2020 Baseline Plus Project Conditions. This would be a significant impact.

General Mitigation Measure 4.15-5: Implement General Mitigation Measure 4.15-1.

With this improvement, intersection operations would improve to LOS D in the AM peak hour. In the PM peak hour, the intersection would continue to operate at LOS F, but the overall intersection delay would be reduced to 119 seconds, which is substantially less than the 2020 Baseline delay of 168 seconds without the project.

The University shall contribute its fair share towards this roadway improvement (as fair share is defined on page 4.15-33). As noted under General Mitigation Measure 4.15-1, any improvements to the intersection would need to be approved by Caltrans. Furthermore, the proposed improvement would not be feasible in the available right-of-way based on the lane widths required by Caltrans minimum design standards. Therefore, Impact 4.15-5 is considered significant and unavoidable.

Roadway Capacity

A roadway segment evaluation was conducted under 2020 conditions to provide additional information on the amount of traffic expected to use key streets in the vicinity of the project site. The approach to this analysis is described in more detail under 2010 Baseline Plus Project Conditions above. The segment evaluation was conducted for the four roadways evaluated for neighborhood impacts under Existing Plus Project Conditions: Delaware Avenue (two segments), Western Drive, and Bay Street.

The 2020 Baseline without and with the long-term development program was obtained directly from the adjacent intersection volumes. These volumes were compared to the capacity for each roadway to calculate a volume-to-capacity (V/C) ratio. The results of the V/C evaluation are presented in Table 4.15-19.

The results of the roadway segment evaluation show that three of the four roadway segments would operate with V/C ratios ranging between 0.08 and 0.73 (i.e., approximately LOS C or better) during both peak hours with the entire development program in place under 2020 conditions. Although the increase in traffic is relatively high on the western Delaware Avenue segment, none of the increases is considered significant because of the acceptable operations.

During the AM peak hour, the Bay Street segment is expected to operate at approximately 85 percent of capacity, while operations during the PM peak hour are expected to be LOS F with a V/C ratio in excess of 1.0. The PM peak hour results would indicate that the street may need to be widened in the future, but intersection operations should govern the need for future improvements in this corridor. Regardless, the project is only expected to add a negligible amount of traffic to Bay Street (i.e., fewer than 15 peak-hour trips), which is less than one percent of the volume at this location. Overall, the project is not expected to result in a substantial change in the operation of any of the study roadway segments during the peak hour with long-term development.

Neighborhood Impacts

The TIRE analysis was used to evaluate long-term development program impacts on three nearby street segments that include front-on housing. Similar to the short-term development analysis, the existing daily volumes were used instead of the 2020 projected daily volume to provide a more conservative analysis (i.e., there is a greater potential for impact with a lower baseline traffic volume). Table 4.15-20 summarizes the TIRE analysis for the long-term development program, which includes traffic from all of the proposed project uses.

According to the TIRE index, the addition of project traffic from all proposed uses would not be noticeable to residents on the study street segments (i.e., the addition of traffic to streets with front-on housing would not differ substantially from normal variations in daily traffic).

As noted under the short-term development analysis, the segment of Delaware Avenue between Shaffer Road and Natural Bridges Drive was addressed based on planning capacity rather than the TIRE index since this segment does not include any front-on housing. The proposed project would increase the daily traffic volume on this segment from 2,356 vehicles under existing conditions to approximately 5,472 vehicles with long-term development. This section of roadway is rather wide with a limited number of driveways and has a physical capacity in excess of 10,000 vehicles per day. The projected total daily traffic volume of 5,472 vehicles is substantially lower than the physical capacity, and the constraint points are represented by the stop-sign-controlled intersections at Shaffer Road and Natural Bridges Drive to the east and west. Both of those locations are projected to operate at LOS A or B during both peak hours, and therefore the addition of daily traffic from long-term development to this segment is not expected to result in any operational problems on Delaware Avenue. No significant impacts were identified.

TABLE 4.15-19
LONG-TERM (2020) ROADWAY CAPACITY ANALYSIS

Location	Roadway Type	Capacity	Long-Term Baseline: Two-Way Peak-Hour Volume[1]	Long-Term Baseline: V/C	Long-Term Baseline + Project: Two-Way Peak-Hour Volume[a]	Long-Term Baseline + Project: V/C	Change[b]
AM Peak Hour							
Delaware Avenue (Shaffer Road to Natural Bridges Drive)	2-Lane Collector	1,200	99	0.08	401	0.33	0.25
Delaware Avenue (Seaside Street to Surfside Avenue)	2-Lane Collector	1,200	597	0.50	655	0.55	0.05
Western Drive (Western Court to Monarch Way)	2-Lane Collector	1,200	580	0.48	617	0.51	0.03
Bay Street (Escalona Drive to Kenneth Street)	2-Lane Arterial	1,800	1,550	0.86	1,562	0.87	0.01
PM Peak Hour							
Delaware Avenue (Shaffer Road to Natural Bridges Drive)	2-Lane Collector	1,200	88	0.07	434	0.36	0.29
Delaware Avenue (Seaside Street to Surfside Avenue)	2-Lane Collector	1,200	804	0.67	871	0.73	0.06
Western Drive (Western Court to Monarch Way)	2-Lane Collector	1,200	595	0.50	735	0.61	0.11
Bay Street (Escalona Drive to Kenneth Street)	2-Lane Arterial	1,800	2,226	1.24	2,240	1.24	0.00

[a] Based on adjacent intersection turning movement volumes.
[b] Increase in V/C over Long-Term Baseline Conditions.

SOURCE: Roadway type designation and capacities obtained from *Core West Parking Structure Traffic Study* (Higgins Associates, February 1999). A copy of the LOS volume thresholds for each roadway type is included in Appendix D.

TABLE 4.15-20
LONG-TERM DEVELOPMENT TIRE INDEX ANALYSIS

Location	Existing Average Weekday Daily Traffic Volume (vehicles)	Volume that Results in 0.1 Change in TIRE Index	Estimated Number of Daily Project Trips	Noticeable to Residents? (Yes or No)
Delaware Avenue (Seaside Street to Surfside Avenue)	5,674	1,500	592	No
Western Drive (Western Court to Monarch Way)	4,582	1,250	374	No
Bay Street (Escalona Drive to Kenneth Street)	18,665	5,200	125	No

SOURCE: Fehr & Peers Associates, Inc., 2003

Shaffer Road Extension

Shaffer Road is discontinuous between Delaware Avenue and the Mission Street Extension where it is bisected by the existing railroad line. Although connecting Shaffer Road and creating a new rail crossing are not required to mitigate any project impacts, an initial assessment of this connection was requested by the City as part of this project.

Depending on the land uses developed on the east side of Shaffer Road north of Delaware Avenue and the amount of diversion from parallel streets such as Natural Bridges Drive, the segment of Shaffer Road near the project site could carry up to 2,500 vehicles per day. This volume would be the highest tolerable volume for any residents living on the west side of Shaffer Road, but would not necessitate any additional capacity beyond a typical two-lane collector street configuration. Operations at the State Route 1 / Shaffer Road intersection would still be acceptable through 2020 conditions with the proposed project and a traffic signal would not be required at that location or at the Delaware Avenue / Shaffer Road intersection. Overall, the extension of Shaffer Road would provide another option for local traffic access to State Route 1, but it is not required to improve circulation in the immediate area since all intersections are projected to operate at LOS C or better through 2020.

Simultaneous Event Analysis

The traffic analysis for both the short-term and long-term development programs was conducted using average daily attendance figures for the project auditorium and meeting rooms (i.e., the total number of annual attendees was divided by the number of days the facilities would be open). Although the number of people attending events at these facilities at one time would be considerably higher than the average daily attendance, events would typically occur on different days for each facility and would only occur intermittently throughout the year. For informational purposes, however, an analysis of the traffic impacts assuming simultaneous events at these facilities plus peak attendance at the Seymour Marine Discovery Center was conducted. This subsection describes the process of estimating traffic for this scenario and comparing the results to the projected long-term development (average-day) impacts.

During an auditorium event, the average attendance is estimated to be 225 people. Assuming that 75 percent of visitors are from offsite locations with an average vehicle occupancy (AVO) of 1.25 persons per vehicle, the number of vehicle trips would be 135 inbound and 135 outbound (270 visitor trips). An additional 40 trips is estimated to be generated by the event hosts for preparation, tear-down, and other activities. For analysis purposes, all of the 135 visitor trips plus 10 of the additional trips are assumed to occur in each peak hour (primarily inbound in the morning and outbound in the evening). Thus, the auditorium is expected to generate a total of 310 daily trips, 145 AM peak-hour trips, and 145 PM peak-hour trips on a day with a typical event. These assumptions are conservative because many events would not have start and end times that coincide directly with the peak periods.

A similar estimate of traffic generated by the meeting rooms was prepared. Based on an average vehicle occupancy of 1.25 persons per vehicle and an average attendance of 95 people, and assuming 50 percent of those people would originate offsite, the meeting rooms would generate a total of 38 vehicle trips in each direction. As with the auditorium, an additional 40 trips were included to account for preparation/tear-down activities. The resulting trip generation for a typical meeting room event would be 116 daily trips, 48 AM peak-hour trips, and 48 PM peak-hour trips.

The Seymour Marine Discovery Center periodically holds “Free Tuesday” events where admission to the facility is not charged. The estimated attendance on this day is 300 people, which is substantially higher than normal, and the resulting number of vehicles is 120 with an AVO of 2.5 persons per vehicle. Each vehicle makes two trips, and 10 percent of these trips are assumed to occur in each peak hour. The resulting additional trip generation on “Free Tuesdays” is 240 daily trips, 24 AM peak-hour trips, and 24 PM peak-hour trips. The total additional trip generation for a day when all three of these events would occur is 666 daily trips, 218 AM peak-hour trips, and 218 PM peak-hour trips.

The impact of this additional traffic was evaluated at all of the study intersections using the level of service analysis. At the already adversely affected intersection of Mission Street / Bay Street, the overall intersection delay is projected to increase from 7 to 18 seconds under the long-term development program. However, implementation of General Mitigation Measure 4.15-1 at this intersection, if feasible, would reduce the overall delay to less than the delay projected for 2020 Baseline Conditions without the project.

Also, the additional traffic would also result in an exceedance of the three-percent impact threshold at two other locations: Intersection 16 (Mission Street / Chestnut Street) and Intersection 17 (State Route 1 / River Street).

The addition of traffic from simultaneous events to traffic under the long-term development program would cause operations to degrade to LOS E at two all-way stop-sign-controlled locations (i.e., Intersection 6, Delaware Avenue / Swift Street in the AM and PM peak hours, and Intersection 7, Delaware Avenue / Almar Avenue in the PM peak hour). Although the project would add over 20 percent of the volume at each intersection during the peak hours, an evaluation of the Caltrans peak-hour warrant shows that the additional traffic from simultaneous events could be accommodated without the addition of traffic signals at either location.

During special and/or simultaneous events, locational parking shortages within the site could occur if the events are not managed. For example, all of the parking spaces in the lower terrace zone could be occupied, while a surplus is available in the middle and upper zones. While not an operational or safety problem by itself, this could result in excessive re-circulation of vehicles within the site causing congestion and driver frustration, and could degrade safety. In this case, convenient public access to the coast could be temporarily affected without addressing special event parking demand.

CLRDP Policies 5.2 and 5.5 call for the reduction of single-occupant vehicle trips to the site and the management of onsite parking, respectively. For special events, UCSC TAPS provides special coordination to manage scheduled events to maximize parking capacity and public access, provides manual traffic control and signage, and organizes transportation between remote parking areas. Implementation Measure 5.5.4 specifically calls for a strategy to manage parking during special events. Measures expected to be implemented during special events include:

- Remote or offsite parking facilities (e.g., at the Main Campus) with direct shuttle service to the site.
- Directional signage guiding event visitors to remote parking along McAllister Way.
- Special parking permits for event visitors.
- Onsite shuttles to move event attendees between remote parking areas and the event facility.

With these measures in place and the infrequency of large-scale and multiple events, the proposed project is expected to have a less than significant impact on 2020 traffic operations and the available parking supply.

CUMULATIVE IMPACTS

The cumulative context for the evaluation of traffic impacts is existing and other regional development that is projected to occur in the study area, and the proposed CLRDP. Cumulative impacts are analyzed below for cumulative growth in the short-term which is the period 2003 to 2010, and for the long term, i.e., between 2003 and 2020. As noted earlier, 2020 is the horizon year for analysis of impacts from full development under the CLRDP.

The standard of significance that applies to the cumulative impact analysis with respect to traffic operations is largely the same as that applied to the project-level analysis, that is whether the project, in conjunction with other reasonably foreseeable regional development, would cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system such that there is significant congestion at affected intersections. Congestion caused by the cumulative traffic would be considered significant if the traffic caused the level of service to decline from an acceptable LOS D to LOS E or F or further exacerbated conditions at an intersection that was already at LOS E or F. The project's contribution to this cumulative effect would be considered cumulatively considerable if the project increased the traffic volumes at these adversely affected intersections by 1 percent or more (note that this threshold is more stringent than the 3 percent threshold used for identifying significant project-level impacts which is used by the City to evaluate a project's contribution to traffic congestion).

ENTIRE DEVELOPMENT PROGRAM

The preceding sections present traffic impacts that would result from the implementation of the CLRDP both on existing traffic conditions and on conditions that would result in 2010 when the short term development program would be completed, and in 2020 when full development under the CLRDP is anticipated. Cumulative impacts under 2010 and 2020 conditions are discussed below.

<u>Impact 4.15-6</u>: The proposed CLRDP in conjunction with other regional development would cause the AM and PM peak hour traffic to increase significantly at six study intersections, which would reduce the levels of service to unacceptable levels, a significant cumulative impact. This impact would occur both in the short term (2010) and in the long term (2020). The project's contribution to this impact at five of the six affected intersections would be cumulatively considerable.

Table 4.15-21 below presents the level of service impacts from the cumulative development in the region including the proposed project in 2010 and 2020. As this table shows, as a result of the growth in traffic from cumulative development including the short-term development under the CLRDP, compared to existing conditions, the levels of service during the AM and/or PM peak hours in 2010 would decline from acceptable levels (LOS D or better) to unacceptable levels at six intersections:

- Mission Street/Bay Street
- Mission Street/Chestnut Street
- State Route 1/River Street
- High Street/Western Drive
- Bay Street/Escalona Drive
- Empire Grade/Heller Drive

This represents a significant cumulative impact. At five of the intersections where operations would be degraded to an unacceptable level, the CLRDP's contribution to the cumulative impact would be cumulatively considerable because at these intersections, the project would increase the traffic during one or both peak hours by more than 1 percent. At the Bay Street/Escalona Drive intersection that would also experience a significant cumulative impact, the project's contribution would not be cumulatively considerable because it would not cause the traffic to increase by more than 1 percent.

In 2020, traffic from full development under the CLRDP would result in a significant cumulative impact at the same six intersections listed above, where acceptable operations under existing conditions would be degraded to an unacceptable levels with cumulative development in the region including the CLRDP. The project's contribution to the cumulative impact at five of the six affected intersections would be considerable, with the project trips representing an increase of 1 percent or more. Similar to 2010 conditions, the Bay Street/Escalona Drive intersection is the exception with the project contributing less than 1 percent to the peak hour traffic volume at this location.

> **<u>General Mitigation Measure 4.15-6</u>: Implement General Mitigation Measures 4.15-1 and 4.15-4. In addition, the University shall contribute its fair share (as defined on page 4.15-33) toward the cost of improvements to the intersections at High Street/Western Drive, Empire Grade/Heller Drive, and State Route 1/River Street (SR 9). Mitigation measures include traffic signals at the High Street/Western Drive and Empire Grade/Heller Drive intersections. Potential improvements for the State Route 1/River Street (SR 9) intersection will be identified by the City of Santa Cruz.**

TABLE 4.15-21
CUMULATIVE INTERSECTION LEVELS OF SERVICE (LOS)

Intersection	Peak Hour	Existing LOS	2010 w/ Project LOS	2010 Project Contribution	2020 w/ Project LOS	2020 Project Contribution
1. Delaware Avenue / Shaffer Road	AM	A	B		B	
	PM	A	B		B	
2. Delaware Avenue / Natural Bridges	AM	A	A		A	
Drive	PM	A	A		B	
3. Delaware Avenue / Swanton Boulevard	AM	A	B		B	
	PM	B	B		B	
4. Bay Street / Laguna Street	AM	B	B		B	
	PM	B	C		C	
5. State Route 1 / Shaffer Road	AM	B	B		B	
	PM	B	B		C	
6. Delaware Avenue / Swift Street	AM	B	B		C	
	PM	B	B		C	
7. Delaware Avenue / Almar Avenue	AM	A	B		B	
	PM	B	C		D	
8. State Route 1 / Western Drive	AM	C	C		C	
	PM	B	C		C	
9. State Route 1 / Swift Street	AM	C	C		C	
	PM	C	C		C	
10. Mission Street / Almar Avenue	AM	C	C		C	
	PM	C	C		C	
11. Mission Street / Bay Street	**AM**	**C**	**D**		**E**	**5.9%**
	PM	**D**	**F**	**2.4%**	**F**	**5.0%**
12. Laurel Street / California Street	AM	C	C		C	
	PM	C	C		C	
13. Mission Street / Laurel Street	AM	C	C		C	
	PM	D	D		D	
14. Mission Street / Walnut Avenue	AM	C	C		C	
	PM	B	B		B	
15. Mission Street / Union Street	AM	C	C		D	
	PM	C	C		D	
16. Mission Street / Chestnut Street	**AM**	**D**	**F**	**1.3%**	**F**	**2.7%**
	PM	**E**	**F**	**1.3%**	**F**	**2.7%**
17. State Route 1 / River Street	**AM**	**C**	**D**		**E**	**2.4%**
	PM	**D**	**E**	**1.3%**	**F**	**2.8%**
18. Western Drive / Meder Street	AM	A	A		A	
	PM	A	A		B	
19. High Street / Western Drive	**AM**	**D**	**F**	**1.1%**	**F**	**2.0%**
	PM	**D**	**F**	**1.1%**	**F**	**2.0%**
20. High Street / Bay Street	AM	B	C		C	
	PM	C	C		D	
21. Bay Street / Iowa Drive	AM	B	B		B	
	PM	B	A		B	
22. Bay Street / Escalona Drive	**AM**	**C**	**F**	**0.3%**	**F**	**0.6%**
	PM	**F**	**F**	**0.2%**	**F**	**0.5%**
23. Bay Street / King Street	AM	B	B		C	
	PM	C	C		D	
24. Empire Grade / Heller Drive	**AM**	**B**	**C**		**D**	
	PM	**C**	**F**	**1.0%**	**F**	**1.8%**

[a] Note. Bold indicates intersections that would experience significant cumulative traffic impacts.

SOURCE: Fehr & Peers Associates, Inc., 2003

Any improvements to State-maintained intersections would need to be approved by Caltrans. Traffic signal installations would need to be approved by either the City or County depending on jurisdiction. Furthermore, the proposed improvements may not be feasible in the available right-of-way. Therefore, Impact 4.15-6 is considered significant and unavoidable.

NEAR-TERM PROJECTS

As shown in Table 4.15-8, the number of peak hour trips that would result from each of the near-term projects would be small (less than 45 trips in each case). These projects would therefore individually contribute less than 1 percent of the increase in traffic at the six intersections that would experience significant cumulative traffic impacts in 2010 and 2020. Therefore, none of the near-term projects would contribute considerably to the cumulative traffic impact.

Based on the analysis presented above, the traffic added by the development under the CLRDP in conjunction with other regional development would cause significant cumulative traffic impacts at six study area intersections. The contribution of CLRDP-related traffic to five of the six affected intersections would be cumulatively considerable. None of the near-term projects would contribute considerably to the cumulative impact.

4.16 UTILITIES, SERVICE SYSTEMS, AND ENERGY

This section evaluates the potential for the CLRDP and the five near-term projects to cause impacts to water supply systems, wastewater disposal systems, solid waste disposal systems, and energy systems. An expanded discussion of the existing and proposed onsite stormwater drainage system is included in Section 4.8, Hydrology and Water Quality.

Information in this section is derived primarily from the City of Santa Cruz *General Plan and Local Coastal Program 1990–2005*; the City of Santa Cruz *Draft Integrated Water Plan, 2003*; the California Code of Regulations, Title 24, Part 6 (California Energy Code); and historical energy consumption data provided by Bob Dunn, UCSC Physical Plant, October 2002.

Based on the following CEQA criteria, a project would generally be considered to have a significant adverse impact on the environment if it would:

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.
- Require or result in the construction of new water or water treatment facilities or the expansion of existing facilities, the construction of which could cause significant adverse effects.
- Not have sufficient water supplies available to serve the project from existing entitlements and resources, or require new or expanded entitlements.
- Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's proposed demand in addition to the provider's existing commitments.
- Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs.
- Fail to comply with applicable federal, state, and local statutes and regulations pertaining to solid waste.
- Result in the wasteful, inefficient, or unnecessary consumption of energy.

SETTING

EXISTING CONDITIONS

Water Supply

The Santa Cruz Water Department (SCWD) provides potable water to the city of Santa Cruz, UCSC, and adjoining unincorporated areas. The city's water system currently produces approximately 4,400 millions of gallons annually from four primary sources: the San Lorenzo River (48 percent), north coast streams (29 percent), Loch Lomond Reservoir (16 percent), and various wells (7 percent). Current (year 2000) citywide water demand is estimated at approximately 4.4 billion gallons per year, which is projected to increase to approximately 5.2 billion gallons per year.[1]

Because the City water system relies heavily on surface water sources, the primary water management problem facing the City's system is inadequate supply availability during low-rainfall years. The City recently completed an "Integrated Water Plan" (IWP) that provides demand forecasts and identifies potential supplemental water resources. Options under investigation include additional groundwater, maximizing use of existing sources, desalinization, and wastewater reclamation. Additionally, the City of Santa Cruz currently implements demand measures during droughts and has begun implementation of other water conservation programs, such as retrofit programs. At this time, the City is focusing primarily on desalinization options. Environmental studies are currently being conducted on the Plan and its recommendations.

Studies conducted by the City indicate that existing water supplies/production would fall short of existing and projected demands during critical and/or long-term droughts. Current and future water demand within the City's water service area exceeds the safe yield of the supply system during drought conditions. During the worst year on record the City's water production system fell 46 percent short of meeting the existing average annual demand of 4,400 million gallons per year.[2] This situation required the City to impose water rationing for the entire dry season. During the 1987–1992 drought, the lack of normal rainfall and runoff forced the City to declare a water supply emergency for five consecutive years. Water shortages during this time ranged from 10 to 24 percent of average supply and required extensive efforts by the City and its customers to curtail demand during the summer and fall months.

Water Demand

The Marine Science Campus is located within Santa Cruz city limits, and current and future water service would be provided by the SCWD. Treated water is supplied to the site though a City-owned 12-inch water main in Delaware Avenue at Shaffer Road at a static pressure of 90 pounds per square inch (psi). Onsite, a 10-inch water main distributes water to Long Marine Laboratory (LML), affiliated facilities, and the National Marine Fisheries Service (NMFS). There are currently no service restrictions.

Table 4.16-1 lists the existing uses on the project site and illustrates the water demand generated by those uses. For this EIR, existing water use is based on an annualized average of two years of water meter data provided by UCSC. As shown in the table, the existing uses on the project site generate an annual water demand of approximately 6.56 MG/YR or about 17,958 gallons per day (gpd).[3]

The IWP assesses the long-term, overall water demand in the SCWD service area and aggregates this demand by customer class and land use. For the UCSC Main Campus, the IWP estimates an average annual use of 204 million gallons of water in the year 2000. Thus, total UCSC water demand in 2000 equates to roughly 4.5 percent of the total water demand on the Santa Cruz

[1] City of Santa Cruz Water Department, *Integrated Water Plan*, March 2003.
[2] The worst year on record is considered to be the second year of a 2-year drought similar to the drought that occurred in 1976-1977. City of Santa Cruz Water Department, *Integrated Water Management Plan*, March 2003.
[3] The sums in the tables in this section have been rounded.

TABLE 4.16-1
AVERAGE EXISTING ANNUAL WATER DEMAND

Existing Use[a]	Water Use (gpy)[b]
LML Buildings[c]	4,834,922
NMSF	564,411
Greenhouses	413,270
Irrigation	409,111
CDFG	332,830
SUBTOTAL	**6,554,544 gpy (17,958 gpd)**

[a] Includes existing uses on the LML site listed in Table 3-1 unless otherwise specified here.
[b] Gallons per year.
[c] Includes Seymour Discovery Center.

SOURCES: UCSC Physical Planning and Construction; ESA 2003.

Water Department's system.[4] The IWP projects an increase in the University's water demand through the year 2010, at which time demand is estimated to level off through the IWP's planning year of 2050 at roughly 408 million gallons annually. This increase in the University's water demand reported in the IWP is relative to future growth on the Main Campus and does not include the proposed expansion of the Marine Science Campus. However, based on the campus' record of limiting growth in water demand through conservation, the estimate in the IWP at 408 million gallons in 2010 and beyond appears to be high.

Wastewater

The Santa Cruz Public Works Department provides wastewater collection services to residents of Santa Cruz and to UCSC, including the project site. Wastewater is collected in a network of sewer and trunk lines and conveyed to the wastewater treatment plant (WWTP) at Neary Lagoon, located off Bay Street.

Treated wastewater is discharged into the Monterey Bay via a 12,000-foot-long ocean outfall line. The WWTP has an existing average dry-weather flow capacity of 17 million gallons per day (mgd), and it can accommodate peak wet-weather flows of up to 81 mgd. The combined average daily flow currently measures around 10 mgd. The projected wastewater flow for the year 2020 is 12.7 mgd, and it is expected that future growth in Santa Cruz could be accommodated by the

[4] It should be noted that water demand under existing campus conservation policies has been held constant over the last 14 years (having risen only a negligible 0.2 percent), while enrollments have increased 24 percent and building square footage has increased substantially during that time. This information is cited from UCSC's "College Infill Apartments FEIR," p. 4.12-5, June 2001.

existing facility.[5] The WWTP was upgraded in 1998 with secondary treatment capacity. The City currently reclaims 200,000 gallons of wastewater at the WWTP for onsite uses.[6] Sanitary sewer service to the southern portion of the project site is provided through use of a 10,000-gallon holding tank and lift station that, in turn, pumps to a second lift station adjacent to the 2.5-acre federal inholding property. The northern portion of the site is served by gravity sewer lines that flow to the second lift station that in turn pumps into the City wastewater collection system on Shaffer Road at Delaware Avenue.

An existing sewer trunk line runs south within an easement along Shaffer Road, and then continues a short distance to the east to the Shaffer Road / Delaware pump station. From that point, an 8-inch force main connects to the trunk lines at the intersection of Delaware Avenue and Natural Bridges Drive, from which point sewage flows southerly and easterly to the WWTP. There are no known existing capacity problems related to the 8-inch forced main pipe connecting to the pumping station.[7]

Existing daily flow capacity at the Shaffer Road / Delaware Avenue sewage pump station is approximately 200 gallons per minute (gpm) / 288,000 gpd with one pump running, and 375 gpm / 540,000 gpd with two pumps running. The second pump is designed to be a standby pump, and is used when the other is taken out of service for repair, or maximum capacity is reached, tripping it to operate.

The City estimates that the dry-weather flow to the pump station is 25 gpm / 36,000 gpd, excluding flows from the Marine Science Campus and NMFS facility. Based on data provided by UCSC, the existing uses on the Marine Science Campus generate approximately 10 gpm / 14,257 gpd (or about 5.08 million gallons per year), which includes the wastewater stream from the NMFS facility. Thus, the combined sewage flows to the Shaffer Road / Delaware Avenue pump station are currently estimated to be approximately 35 gpm / 50,257 gpd, representing approximately 18 percent processing capacity of a single pump; peak wet weather flows would be higher.[8] It should be noted that the City's Public Works Department is currently preparing a Sewer System Master Plan, which will be completed prior to the City's General Plan/LCP update in 2005.[9] That plan is expected to provide updated information regarding existing flows to all city wastewater conveyance and processing facilities. Therefore, until more current information data are available, baseline flows to the pump station are considered to be 35 gpm or 50,257 gpd for purposes of this analysis.

Solid Waste

The California State Agency Integrated Waste Management Act requires state agencies and large state facilities to implement new waste diversion and reporting requirements that mirror those already in place for cities, counties, and regional agencies required by the Integrated Waste

5 Steve Wolfman, Associate Civil Engineer, City of Santa Cruz Public Works Department, personal communication, February 2002.
6 Ibid.
7 Steve Wolfman, Associate Civil Engineer, City of Santa Cruz Public Works Department, personal communication, September 2003.
8 Wastewater flow data is based on an estimate of 90 percent of metered water consumption data for the years 2001-2002, averaged and then annualized. UCSC Office of Planning and Construction, email communication, August 2003.
9 Steve Wolfman, Associate Civil Engineer, City of Santa Cruz Public Works Department, personal and written communications, September 2003.

Management Act of 1989.[10] State agencies and large state facilities are required to adopt integrated waste management plans, implement programs to reduce the amount of waste they dispose, and have their waste diversion performance periodically reviewed by the Integrated Waste Management Board. Large state facilities refer to prisons, facilities within the State Department of Transportation and other agencies, and campuses of the California Community College and State University system. The UC system is not included in these requirements, although it was encouraged to implement them.

The City of Santa Cruz owns and operates the Resource Recovery Facility (RRF), a Class III sanitary landfill located approximately three miles west of the city off Highway 1. The landfill operation is required to comply with regulations, plans, and permits of the California Integrated Waste Management Board (CIWMB) and the RWQCB. Since 1990, the landfill has been permitted to accept only non-hazardous waste. In 2001, the landfill accepted 64,213 tons of municipal solid waste annually, or an average of 176 tons of waste per day from Santa Cruz. The landfill is permitted to accept a refuse throughput of up to 400 tons per day.[11] According to the Santa Cruz Public Works Department, capacity at RRF is projected to be adequate through the year 2038,[12] primarily due to the efforts that have taken place in response to the Integrated Waste Management Act of 1989. There are no City or County plans for securing new landfill locations at this time, due to the projected lifetime of the RRF.

In 2001, the UCSC campus generated and disposed of approximately 3,179 tons of solid waste. Of the waste generated during that year, UCSC diverted a total of 870 tons of waste as a result of composting and recycling efforts. The waste recycled or diverted by UCSC amounts to 27.4 percent of the campus' total waste stream in 2001.[13] As such, the University has voluntarily achieved the 25 percent diversion milestone included in the State Agency Integrated Waste Management Act.[14] Further increases in waste generation that would be expected to accompany increases in campus enrollment and new building construction are likely to be counteracted by the decreases expected under the campuswide recycling and composting program.

Energy

The State of California regulates energy consumption in new buildings within the state under Title 24 of the California Code of Regulations, developed by the California Energy Commission (CEC). The Title 24 Building Energy Efficiency Standards apply to new construction of both residential and non-residential buildings and regulate energy consumed for heating, cooling, ventilation, water heating, and lighting. The University is required to construct its projects to comply with Title 24 requirements.

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10 The Integrated Waste Management Act, requires each city or county's source reduction and recycling element to include an implementation schedule which shows both of the following: a 25 percent diversion of all solid waste from landfill disposal or transformation by January 1, 1995, through source reduction, recycling, and composting activities, followed by a 50 percent reduction to the waste stream by January 1, 2000. As of 2001, the city of Santa Cruz's overall waste diversion rate was 48 percent (CIWMB, and California Public Resources Code, Section 41780).

11 CIWMB, "Solid Waste Information System ("SWIS") List," cited from www.ciwmb.ca.gov/swis.

12 Jim Sandoval, Santa Cruz Public Works Department, personal communication, September 2002.

13 UCSC Office of Planning and Construction, "2002 Annual Mitigation Monitoring Program Report," August 2002.

14 The campuswide recycling and waste reduction program that facilitated voluntary compliance with the State Agency Integrated Waste Management Act in 2001 is the result of a mitigation measure included in the 1988 campuswide Long Range Development Plan EIR.

The Title 24 standards were established in 1978 and are updated periodically to allow consideration and possible incorporation of new energy-efficiency technologies and methods. The CEC adopted new standards in 2001, as mandated by the California Energy Security and Reliability Act (CESRA) to reduce California's electricity demand. The amended Title 24 standards apply to the design, insulation, and to the space-cooling equipment installed in these structures. Under CESRA enacted in September 2000, the CEC will update and implement its appliance and building efficiency standards to make the "maximum feasible" reductions in unnecessary energy consumption.

The UCSC Marine Science Campus is located entirely within the Santa Cruz city limits and is adjacent to existing industrial and residential developments. PG&E provides electrical and natural gas services to the project site. Electrical power is provided through a combination of overhead and underground primary electrical lines that have recently been upgraded to 21,000 volts. In the lower terrace, the PG&E primary power system terminates at two existing pad-mounted transformers, one located west of the Seymour Marine Discovery Center and the other north of the Center for Ocean Health. Power is fed to an electrical room located in the Younger Building and distributed underground throughout the site. [15] Three transformers serve the facilities on the middle terrace, and a separate transformer serves the facilities on the upper terrace. Natural gas service to the site extends from PG&E's underground gas main in Delaware Avenue at the intersection of Shaffer Road along the same utility alignment shared by water and sewer. It presently serves the NMFS laboratory and the LML complex, and it is stubbed out for future connection to the Marine Wildlife Center.[16]

Energy is used at the campus to pump seawater and heat the dolphin pools at the LML complex and to provide power, heat, and light to the other buildings on the site. The eight principal buildings have electrical service. The UCSC electricity data measures the LML and the Ocean Health buildings as one account and provides a separate reading for the Seymour Marine Discovery Center. The Seymour Center and the LML (including the dolphin pool areas) were converted from propane to natural gas in May 2002. The Ocean Health building has always had gas service. Although three years of monthly propane delivery data are available, the data show total consumption at LML, but cannot be used to identify usage at the individual facilities. The natural gas billings provide separate readings for the Ocean Health building, the Seymour Center, the dolphin pools, and the support buildings at the LML. One year of natural gas data was provided for the Ocean Health building and six months of data was provided for the LML facilities (May 9 through November 8, 2002). The Ocean Health data indicate that the average use during this time period was 17 percent lower than the annual average, and the LML data were corrected by this factor. The caretaker housing is heated by propane.[17] The NMFS laboratory uses natural gas, and the California Department of Fish and Game (CDFG) Marine Wildlife Center uses propane. Energy consumption data for these non-University buildings were derived from the UCSC data. The Avian Facility and the greenhouses are not heated. The estimated average annual energy consumption for each building is provided in Table 4.16-2.

15 CLRDP, page II-21.
16 CLRDP, page II-22.
17 Bob Dunn, UCSC Physical Plant Manager, personal communication, October 28, 2002.

TABLE 4.16-2
APPROXIMATE AVERAGE ANNUAL ENERGY CONSUMPTION AT EXISTING BUILDINGS ON THE MARINE SCIENCE CAMPUS

		Electricity[a]		Natural Gas[b]	
Building	**Area (sf)**	**kWhrs[c]**	**Million Btu[d]**	**Therms**	**Million Btu[d]**
Seymour Marine Discovery Center	20,000	220,152	2,254	4,680	468
Ocean Health Building	23,000	144,888[e]	2,592	31,836	3,180
Other Primary LML Buildings	15,200	910,656[f,g]	8,215	37,788[h]	3,780
Avian Facility	2,160	23,772[f]	247	N/A	N/A
Greenhouses	26,844	Minimal	Minimal	N/A	N/A
Caretaker Housing[i]	1,400	4,116	157	N/A	N/A
CDFG Marine Wildlife Center	20,000	220,152[f]	2,254	N/A	N/A
NMFS Laboratory	53,400	587,796[f]	6,018	75,936[k]	7,596
Total	**162,004**	**2,111,532**	**21,737**	**150,240**	**15,024**

[a] Average of one year of monthly data from the electric service accounts for the Seymour Center and the LML (including the Center for Ocean Health).
[c] Average of one year of monthly gas data for Ocean Health Center and annualized average of six months (May through November 2002) for Discovery Center and LML, corrected for annual temperature profiles.
[d] Kilowatt hours.
[e] British thermal units (Btu). One Btu is the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit at sea level. The Title 24 conversion rate for electricity is 10,239 Btu/kWhr, which accounts for losses during generation and transmission. The conversion rate for propane is 90,000 Btu/gallon, and the rate for natural gas is 100,000 Btu/therm.
[f] Ocean Health electricity data based on DOE factors for office space, 64.5 thousand Btu/sf/year.
[g] Electric data prorated from Seymour Center, based on area.
[h] Includes 1,000-gpm seawater pump. The LML electric use derived by subtracting Ocean Health use from the 87,962 kWhr (average) metered by PG&E for both buildings. Support building use prorated from Seymour Discovery use, based on area.
[i] Includes pool heating. Lab support building heating data corrected for annual temperature profiles. Pool heating derived by subtracting Seymour Center and support building energy uses from total annual propane uses.
[j] Housing data based on Title 24 standard design for Climate Zone 3.
[k] Prorated from Center for Ocean Health heating rates, based on area.

SOURCE: Bob Dunn, UCSC Physical Plant, personal communication, October 28, 2002.

The largest existing electrical loads are the 1,000-gpm pumps that raise seawater from the surf zone to the LML complex on the lower terrace.[18] These pumps can consume approximately one-third of the 150-Kilowatt (kW) peak electrical load used by the Marine Science Campus.[19] This load is metered from the transformer at the Ocean Health building, which serves both the Center for Ocean Health and the LML complex. The annual pumping load was calculated by subtracting

[18] Two 10-inch intake lines draw seawater into a 40-foot-high caisson, which is drilled through the roof of a natural sea cave, exposed to the surf. The caisson houses the primary pumps that convey seawater through underground pipes to a filter system, then into two 36-foot-tall storage tanks. Seawater is distributed from the storage tanks to the entire developed portion of the campus.
[19] Bob Dunn, UCSC Physical Plant Manager, personal communication, October 17, 2002.

the estimated electrical use by the buildings from the metered load at the Ocean Health building. This calculation suggests that the seawater pumps typically operate at 60 percent of full capacity. The California Coastal Commission has approved an expansion of this system to 2,000 gpm to serve the UCSC and NOAA facilities. This expansion is estimated to increase the electrical load at the entire campus, including the non-University buildings to approximately 240,000 kWhr per month without any of the facilities associated with the proposed CLRDP.

Excluding the seawater pumping, the intensity of electrical energy use at the buildings on the project site is estimated at 2,612 Btu/sf, which is less than the average national rates for electrical energy intensity for education, public assembly, and office buildings. According to 1995 DOE data, the intensity of monthly energy use in buildings with these activities ranges between 2,870 and 6,450 Btu/sf, and the overall national average electricity consumption for all building types is 3,800 Btu/sf a month.[20] (DOE energy intensity data do not include transmission and generation losses, which are typically two-thirds of the energy used to produce electricity.) Except for the LML, whose electrical use includes the pumping of seawater, all the other buildings at the campus have energy consumption rates within this range.

The largest heating requirements are at the NMFS laboratory building. Because of ventilation requirements and health and safety concerns, laboratories typically use more energy per square foot than the typical office building.[21] Data for the NMFS laboratory was based on the Ocean Health building, where metered gas data are available. The Ocean Health Building has a monthly natural gas use of 11,851 Btu/sf, significantly greater than the national average of 4,250 Btu/sf and six times greater than the heating intensity (Btu/sf) at the Seymour Marine Discovery Center, which contains no laboratories and does not need to be heated at night.

The dolphin pools at the LML complex are the next largest source of energy use at the campus. The large dolphinarium is heated intermittently, depending on research needs, and the small pools are maintained at temperatures appropriate for the Atlantic dolphins. The facilities at the LML were recently converted to natural gas, with separate metering for the pools and support buildings. These data show that the dolphin pools can consume over 300 therms a day to heat ocean water to the required temperatures. Because only six months of natural gas data are available, the annual energy use for the dolphin pools was derived from the heat input during the three years of propane data. According to this analysis, over 75 percent of the natural gas-derived energy used at the LML is used to heat the dolphin pools. The support buildings and Seymour Center have relatively low heating consumption rates.

RELEVANT PROJECT CHARACTERISTICS

ENTIRE DEVELOPMENT PROGRAM

The CLRDP development program proposes construction of new facilities within three development areas (upper terrace, middle terrace, and lower terrace) and the removal of some existing development for a net new development of 377,856 square feet (sf) of building space at the Marine Science Campus by about 2020 (529,856 sf including all outdoor facilities). The CLRDP would include the following uses: 254,400 sf for Marine Research and Education; 70,000 sf for Outdoor Research Areas; 19,000 sf for Support Facilities; 98,100 sf for Support Housing; 107,500 sf for Equipment Storage and Maintenance; and 12,000 sf for Seawater System

[20] DOE Energy Information Administration, Commercial Buildings Energy Consumption Survey, January 15, 1998.
[21] Environmental Protection Agency, “Labs for the 21st Century,” July 11, 2002.

Expansion (see Chapter 3, Project Description, Table 3-2, Proposed Coastal Long Range Development Plan Building Program).

These facilities would require electrical, natural gas, communication, and water services and would generate wastewater and solid waste. Implementation of the entire development program, including the near-term projects discussed below would include the extension of utility lines immediately adjacent to the campus onto the upper, middle and lower terraces of the site to serve the planned development in those areas.

New onsite residential facilities as well as research and support facilities would require water for interior domestic and office uses (e.g., toilets, sinks, and water faucets) and for landscape irrigation. New mainline pipe sizes would be 6, 8, or 10 inches, depending on projected fire flows; pipe sizes would be determined when formal building plan sets are complete. Water, sewer, and natural gas lines would be installed underground and connected to existing municipal infrastructure at either at Shaffer Road and the Southern Pacific Railroad tracks, or at Shaffer Road and Delaware Avenue. From those connection points, water and sewer mains would extend onto the site and be located within campus roadways and easements (see Figure 3-10, Utilities Diagram in the Project Description).

No new utility pipelines would be permitted along the western boundary of the site; this "infrastructure corridor" would be reserved exclusively for telephone, data and electricity lines.

NEAR-TERM PROJECTS

Five projects are expected to be constructed in the early phases of the CLRDP by about 2010 (see Figure 3-7). These projects are further described below.

- A Shared Campus Warehouse and Laydown Facility (with about 37,500 sf of warehouse and 70,000 sf of laydown yard space) would be sited in the upper terrace development area.
- 42 Apartment/Townhouse Units with a combined building space of 43,050 sf would be constructed on the middle terrace development area.
- The United States Geological Survey (USGS) Western Coastal and Marine Geology facility would include about 78,500 sf of new office and laboratory space within two buildings on the middle terrace development area.
- The Monterey Bay Aquarium Sea Otter Research and Conservation Center (SORACC) (with about 10,000 sf of building space and 40,000 sf of outdoor yard space) would be located on the middle terrace development area.
- The Center for Ocean Health Phase II facility (18,000 sf) would consist of an addition to the existing Center for Ocean Health building and would be located on the lower terrace development area.

Anticipated water demand and waste water that would be generated by each of these projects is reported in Table 4.16-3. Average annual energy consumption is presented in Table 4.16-4.

TABLE 4.16-3
ANTICIPATED WATER DEMAND AND WASTEWATER GENERATION
ENTIRE DEVELOPMENT PROGRAM

Building Element	Size (sf)	Unit	Rate gpd[a]	Future Water Demand (gpd)	Future Wastewater generation (gpd)[b]
USGS Phase I	78,500	sf	0.1	7,850	7,065
USGS Phase II	50,000	sf	0.1	5,000	4,500
Other Marine Research Buildings	43,000	sf	0.1	4,300	3,870
NMFS Phase II	30,000	sf	0.1	3,000	2,700
Greenhouses (to be removed)	-26,844	sf	N/A	-987	-888
Future UCSC Buildings	25,000	sf	0.1	2,500	2,250
Center for Ocean Health Phase II	18,000	sf	0.1	1,800	1,620
SORACC	6,000	sf	0.1	600	540
350-Seat Seminar Auditorium	5,000	seat	5.0	1,750	1,575
Meeting Rooms	2,500	sf	0.1	250	225
Dining	3,500	100 meals	50.0	5,000	4,500
Office Trailers (to be removed)	-3,000	sf	0.1	-600	-540
80 Units Housing	82,000	sf	0.2	16,400	14,760
30 Dormitory Rooms	12,000	60 beds	60	3,600	3,240
10 Visitor/Overnight Accommodations	2,500	20 beds	130.0	2,600	2,340
Caretaker Replacement Housing	1,600	bed	100.0	1,600	1,440
Caretaker Housing (to be removed)	-1,400	bed	100.0	-1,400	-1,260
Centralized Warehouse	37,500	employee	110.0	990	891
Subtotal				**54,253**	**48,828**

[a] Rates for Marine Research and Education facilities are based on the average consumption at existing LML buildings, which generally equate to about 0.1 gpd per sf of building area.
[b] Future wastewater generation is derived by multiplying the estimated water demand by 90 percent.

SOURCES: BMS Design Group, ESA, Mesiti-Miller Engineering, UCSC Office of Planning and Construction, 2003

MEASURES PROPOSED AS PART OF THE PROJECT

As discussed in Section 4.9 of this EIR, the Land Use Element of the CLRDP states that "University development and uses of the site will be carried out in a manner consistent with the expectation that the campus will provide a stable limit to further westward urban development in this area" (Policy 2.1, Creation of a Stable Urban/Rural Boundary). To this end, the CLRDP proposes the following Implementation Measures:

- Implementation Measure 2.1.1 – Oversizing of Utility Lines Prohibited: The University will limit utilities on the campus to the size necessary to serve only the projected needs of the campus.

TABLE 4.16-4
PROJECTED AVERAGE ANNUAL ENERGY CONSUMPTION FOR ENTIRE DEVELOPMENT PROGRAM, BASED ON HISTORICAL DATA

	Electricity		Natural Gas	
CLRDP Building Element	**kWhr/ yr**	**Million Btu/yr**	**Therms/ yr**	**Million Btu/yr**
Monterey Bay Aquarium SORACC[a]	110,076	1,127	14,220	1,422
Future Marine Research	473,316	4,847	61,152	6,115
Future UCSC Buildings	70,092	718	10,572	1,057
NMSF Phase II	330,216	3,382	42,660	4,266
USGS Phase I[b]	378,796	3,879	22,064	2,206
USGS Phase II	315,036	3,226	18,348	1,835
Shared Warehouse[c]	80,592	826	8,628	863
Center for Ocean Health II[a]	220,152	2,254	28,440	2,844
Seawater pumping – 2,000 gpm[d]	3,052,608	31,253	N/A	N/A
80 Housing Units[e]	592,320	6,065	22,464	2,246
Dormitory Rooms	60,960	624	9,024	902
350-Seat Seminar Auditorium[f]	21,144	217	2,160	216
Meeting Rooms[g]	7,008	72	1,056	106
Dining Hall[h]	41,976	430	5,520	552
Visitor Accommodations[i]	12,696	130	1,884	188
Recreational Courts[j]	10,320	106	N/A	N/A
Caretaker Housing[e]	7,404	28,488	444	44
Total	**5,784,712**	**75,064**	**106,880**	**10,687**

[a] Electricity consumption prorated from the existing Seymour Marine Discovery Center data; natural gas use from the Ocean Health Building data.
[b] 1995 DOE electricity and natural gas energy intensity data for office buildings.
[c] 1995 DOE electricity and natural gas energy intensity data for warehouse buildings.
[d] Two times estimated 2002 data for 1,000-gpm pumping.
[e] Electricity use based on 2002 CEC data for average residential consumption in Santa Cruz; natural gas based on Title 24 Standard Design for Climate Zone 3.
[f] 1995 DOE electricity and natural gas energy intensity data for public assembly buildings.
[g] 1995 DOE electricity and natural gas energy intensity data for buildings with education as a primary activity.
[h] 1995 DOE electricity and natural gas energy intensity data for buildings with food service as a primary activity.
[i] 1995 DOE electricity and natural gas energy intensity data for buildings with lodging as a primary activity.
[j] 1995 DOE electricity and natural gas energy intensity data for vacant buildings.

- Implementation Measure 2.1.2 – Utility Prohibition Zone: The University will establish and maintain a one-foot utility prohibition zone at the western edge of the site wherein no new sewer or water utility lines will be allowed.

The CLRDP also includes Policy 3.1, Protection of the Marine Environment, which states: "Marine resources will be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes." The following Implementation Measure is proposed under the CLRDP:

- Implementation Measure 3.1.1 – Seawater System: The University will maintain and expand its seawater system consistent with [CLRDP] Subsection 5.2.1 to supply the Marine Science Campus with fresh seawater for research and education uses.

The CLRDP would extend telephone and data lines to the project site as needed to accommodate future program needs. Telecommunication companies would provide this service by extending their lines onto campus. The existing underground utility corridor, located on the western edge of the site, would be used to accommodate projected telephone, data service, and electrical needs. Duct banks would be installed within or adjacent to roads on campus by the service provider. To address the future expansion of telecommunication service, the CLRDP contains the following Implementation Measure that would apply to new onsite data and utility lines:

- Implementation Measure 4.2.7 – Placement of Utility Lines Underground: All utility lines serving the Marine Science Campus will be located underground.

Further, the CLRDP Policy 8.1, Provision of Public Works Facilities, states that, "New or expanded public works facilities shall be designed and limited to accommodate the needs generated by development or uses consistent with this CLRDP. Where existing or planned public works facilities can accommodate only a limited amount of new development, services to coastal dependent land use, essential public services and basic industries vital to the economic health of the region, state, or nation, public recreation, commercial recreation, and visitor-serving land uses shall not be precluded by other development." To that end, the CLRDP proposes the following Implementation Measures:

- Implementation Measure 8.1.1 – Sizing of Utilities: The University will size utilities and services to the Marine Science Campus, including water, sanitary sewer service, stormwater systems, and electrical and communication lines, consistent with and limited to accommodating the building program set forth in this CLRDP. The capacity of these utilities will be consistent with the utilities program described in Subsection 5.8.1 of this CLRDP.

- Implementation Measure 8.1.2 – Seawater System: The University will maintain and expand its seawater system to provide fresh seawater for uses consistent with this CLRDP. The capacity of the seawater system will be consistent with the building program set forth in Figure 5.1 of this CLRDP.

Policy 8.2, Protection of Biological Productivity and Quality of Coastal Waters When Providing Public Works Facilities, states, "The biological productivity and quality of coastal waters, streams, and wetlands appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained when providing public works facilities." The CLRDP proposes the following Implementation Measures:

- Implementation Measure 8.2.1 – Installation of New Utility Lines and Facilities: The University will install new underground utility lines and facilities through wetlands and riparian corridors only when there is no feasible less environmentally damaging alternative and where feasible mitigation measures have been provided to minimize adverse environmental effects.

- Implementation Measure 8.2.2 – Seawater System: The University will operate the seawater system in a manner that will protect against spillage and that will sustain the biological productivity and quality of coastal waters, streams, and wetlands.

With respect to landscaping on the site, the CLRDP contains guidelines that regulate the type and location of new planting in the upper, middle, and lower terrace areas. In terms of landscape irrigation, the intent of these guidelines is to use plant material that is drought tolerant, non-invasive, low maintenance, and fire resistant.[22]

Lastly, the CLRDP includes a set of building design guidelines that include the Leadership in Energy and Environmental Design (LEED™) Green Building Rating System. LEED™ is a voluntary national standard developed and administered by the U.S. Green Building Council for rating the environmental performance of new and existing commercial, institutional, and high-rise residential buildings. The LEED™ system provides a point system for rating the site sustainability, water conservation and efficiency, energy and atmospheric emissions, materials and resources, and indoor environmental quality of buildings. UCSC is pursuing sustainability on a system-wide basis, and design of the Marine Science Campus would be consistent with the eventual outcome of that system-wide effort.

PROJECT IMPACTS AND MITIGATION MEASURES

WATER SUPPLY

Entire Development Program

Implementation of the CLRDP's entire building program would create additional demand on the SCWD for water. Based on the estimated water usage for all program elements summarized in Table 4.16-3, the project would generate a demand for roughly 19.8 MG/YR or approximately 54,253 gpd.

As discussed in the setting section, the current annual water demand for the SCWD's service area is estimated to be 4.4 billion gallons per year, and current water supplies are less than the water demands during drought conditions. The City's IWP discusses conservation strategies to address future service shortfalls and balance future demand needs. These include conservation (e.g., implementation of 14 Best Management Practices, including fixture retrofitting and rebating, residential water surveys, etc. over the next ten years which could save up to 260 million gallons annually) and some level of service curtailment. Other strategies to address potential future water shortfalls include locating new water supplies and constructing new infrastructure. The IWP

22 CLRDP, p. VI-9.

discusses seawater desalination, reclamation/groundwater exchange, and future diversions (e.g., Santa Margarita Aquifer) as potential new sources of water.

Water demand for the CLRDP would be approximately 19.8 MG/YR, which represents 0.45 percent of current system demand for the SCWD service area, and would therefore not be considered a significant increase in water demand.[23] The CLRDP's entire building program itself would not require new or expanded water entitlements or construction of new or expanded water supply facilities, and therefore effects on water supply related to the CLRDP's entire building program would be less than significant.

Near-term Projects

The anticipated demand for water for each of the near-term projects is reported above in Table 4.16-3, and would total an estimated 0.2 percent of the water demand for the entire SCWD service area. For reasons noted above for the entire CLRDP development program, none of the near-term projects would result in significant impacts on water supply.

WASTEWATER

Entire Development Program

The CLRDP's entire building program would increase wastewater flows through the existing Natural Bridges / Delaware Avenue trunkline and pump station and to the WWTP at Neary Lagoon. Foreseeable development under the CLRDP would increase wastewater generation on the site by roughly 34 gpm / 48,828 gpd (approximately 17.8 million gallons per year). The CLRDP's contribution to the existing sewage stream at the pump station would increase overall dry weather flows to approximately 99,085 gpd, which would represent about 35 percent capacity of one pump; flows would be greater during wet weather conditions.

The CLRDP's entire building program would neither exceed the capacity of the existing WWTP nor require construction of new facilities. Therefore, the entire development program would not result in adverse effects to the environment with respect to wastewater.

With respect to the discharge of hazardous materials to the sanitary sewer system, see Section 4.7 of this EIR.

Near-term Projects

As discussed in the setting section, there are no known deficiencies in the downstream pipelines, and the condition of the Shaffer Road / Delaware Avenue sewage pump station has not been determined by the City since the operation of the NMFS facility. However, with less wastewater than the entire building program (see Table 4.16-3), for the reasons discussed above, the CLRDP's near-term projects would not result in adverse effects to the environment with respect to wastewater.

[23] Bill Kocher, Director, Santa Cruz Water Department, personal communication, November 14, 2002.

SOLID WASTE

Entire Development Program

Full development under the CLRDP would generate additional solid waste, approximately 471 tons of solid waste annually.[24] Waste would be sent to the RRF, which has adequate capacity through 2038. Because the RRF would have future capacity to serve the CLRDP's waste disposal needs, and the University has and would continue to voluntarily comply with state and local statutes pertaining to solid waste through its campuswide recycling program, implementation of the CLRDP would result in a less-than-significant impact with respect to solid waste.

Although RRF has adequate capacity to serve the CLRDP waste generation under the CLRDP and the above impact is considered to be less than significant, the following project-specific mitigation measures are included to assist the University in achieving its waste diversion targets and to reduce the overall waste it diverts to the RRF landfill. Implementation of the following measures would establish an integrated framework for recycling and waste disposal activities at the Marine Science Campus that would accommodate waste generated by new construction and campuswide population growth projected in the CLRDP.

Near-term Projects

For the reasons noted above for the entire development program, none of the near-term projects would result in significant impacts on solid waste.

ENERGY

Entire Development Program

The CLRDP entire development program would generate a demand for electricity. However, energy would not be consumed in a wasteful or inefficient manner, and effects related to energy would be less than significant.

Electrical Service

The proposed project would expand electrical service for the Marine Science Campus through the PG&E electrical grid. PG&E recently installed 21-Kilovolt (kV) service to the area and planned for additional expansion of the campus when this service was installed. As shown in Table 4.16-4, the CLRDP's full development program would increase energy use on the campus by approximately 3.8 MW/hrs, from 2.1 MW/hrs annually to 5.9 MW/hrs annually. This increase in energy demand would not be considered wasteful, inefficient, or unnecessary, and neither the increase in demand nor the expansion of electrical infrastructure onto the site would result in significant impacts.[25]

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[24] This calculation is based on an average campus generation rate of 0.0009 tons of solid waste per year per assignable square foot (asf), and is the most comprehensive rate currently available. ASF refers to the floor space in a building that is usable by a program and does not include hallways, bathrooms, or floor space used by heating, ventilating, air conditioning, and equipment. It should however be noted that the CLRDP's building program is based on gross square footages, which, when used in conjunction with the waste generation rate in this EIR, overstate waste generation impacts. This is because not all building space would be allocated to program uses (personal communication, Dave Wade, Recycling Coordinator, November 12, 2002; written communication, Ann Bertken, Campus and Community Planning, November 14, 2002).

[25] Jack McDermott, PG&E service representative, personal communication, November 14, 2002.

The installation of future energy infrastructure will be guided by policies and implementation measures included in the CLDRP. Specifically, these policies and measures require the undergrounding of utility lines (Implementation Measure 4.2.7) to reduce associated visual effects, limiting the size of the utility lines to address the energy transmission requirements solely for the needs of the MSC's entire development program (Implementation Measure 8.1.1), and protecting natural resources and environmentally sensitive areas on the site (Implementation Measure 8.2.1).

If improvements to offsite power lines were required, they could be accomplished by pulling new conductors through existing conduit or by replacing existing conduit with larger conduit. The existing underground utility corridor, which is located along the western edge of the site, would be used to deliver the power to the proposed development areas within the campus. Onsite improvements would consist of new transformers and the extension of underground services from existing and new transformers to new buildings. New meters could be required in some instances.

Natural Gas Service

Expanded natural gas service would be provided to the project site from PG&E's underground gas main in Delaware Avenue at the intersection of Shaffer Road (along the same utility alignment shared by water and sewer). No major offsite improvements are required to accommodate this demand. Onsite improvements would include the extension of underground gas service to new buildings from existing gas mains. The CLRDP would increase natural gas deliveries from approximately 150,240 therms annually to 257,120 therms annually, an annual increase of approximately 106,880 therms.

Table 4.16-4 shows the estimated average annual energy consumption of the new facilities planned for the entire development program, based on historical energy consumption rates at the campus and on national energy use factors. The table references the electricity and natural gas intensity factors that were used to calculate the energy use for each building.

All new buildings would incorporate standard energy conservation measures, as required by Title 24. The designs of new buildings would follow appropriate building design requirements, such as passive solar design, and utilize energy-efficient methods and appliances, such as solar hot water systems and low-flow showerheads.

Thus, in light of standard energy conservation measures required by Title 24, the CLRDP's entire building program would not result in the wasteful, inefficient, or unnecessary consumption of natural gas.

Near-term Projects

Table 4.16-4 reports the annual energy consumption for each of the near-term projects. For reasons noted above, none of the CLRDP near-term projects would result in significant impacts on energy resources.

Based on the CEQA criteria evaluated above, the CLRDP's development program and the near-term projects with mitigation would not have a significant adverse impact on utilities, service systems or energy.

CUMULATIVE IMPACTS

WATER SUPPLY

Entire Development Program

The geographic area potentially affected by cumulative demands on water resources due to citywide population growth is the service territory of the Santa Cruz Water Department (SCWD). The SCWD provides potable water to the City of Santa Cruz, UCSC, and adjoining unincorporated areas. The standards of significance that apply to the cumulative analysis are the same as those that apply to the project-level analysis, i.e, whether cumulative water demand could be served from existing entitlements and resources or would trigger the need for new or expanded water entitlements and/or the development of new water supply sources, the construction of which could result in significant adverse impacts on the environment.

Full development of the CLRDP, in conjunction with other development within the service area, would result in increased cumulative demand for water in a system that does not have adequate supplies. The overall cumulative impact would be considered significant if the cumulative water demand would trigger the need for new or expanded water entitlements and/or if the development of additional water resources by the City of Santa Cruz was necessary, and that the construction of these new sources were to have significant adverse impacts on the environment. As discussed earlier, the City has inadequate supply of water during low rainfall years, and the studies conducted by the City indicate that existing water supply would fall short of existing and projected demands during critical and/or long-term drought conditions. The City is in the process of examining new water supply alternatives to address the deficit which would likely worsen with the continued growth in water demand. A list of projects has been proposed but no preferred project has yet been chosen. As described in the Setting subsection above, the City is considering the development of a desalination facility and/or wastewater reclamation system. The City intends to prepare an EIR on its recently completed IWP, and would also undertake environmental review of any resulting water supply expansion projects. These EIRs have not yet been prepared, however, and in the absence of such analyses, it is conservatively assumed that one or more of these water supply projects could cause significant adverse effects on the environment. In summary, cumulative development in the service area, including the CLRDP, would require that new resources be developed to serve the projected demand for water, and the development of a new source of water could potentially result in one or more significant environmental impact. Therefore the cumulative impact associated with water supply would be significant, and the CLRDP would make a cumulatively considerable contribution to this impact.

Impact 4.16-1: The CLRDP, in conjunction with other existing development and probable future growth in the service territory of the SCWD, would result in a demand for potable water that would require development of new water supply sources, and the development of these sources could result in significant adverse impacts.

To minimize its contribution to the water supply deficit and the resultant environmental impacts from the construction of new water supply facilities, the University will implement the following mitigation measures, similar to the measures included in the UCSC 1989 LRDP EIR:

> **General Mitigation Measure 4.16-1a: All toilets, urinals, showers, and washing machines installed as part of this project shall be specified as low-flush and low-flow in order to reduce onsite water consumption. The University shall install low-flow**

toilets and urinals that are 1.6 gallon/flush or less and low-flow showers that are 2 gallons per minute (gpm) or less in new development. Further, in all new residential uses washing machines must be certified by the Consortium on Energy Efficiency (CEE) to be water- and energy-efficient (such as those with the Energy Star® label).[26]

<u>**General Mitigation Measure 4.16-1b**</u>**: If and when the City adopts policies requiring all projects (or all similar institutional or commercial projects) within the water system to offset new water demand or any other water demand reduction policies, the University will consider voluntary compliance with the policy, with appropriate credit being given to account for UCSC's previous water conservation activities (in excess of that accomplished by the similar institutional and/or commercial entities covered by the City policy).**

<u>**General Mitigation Measure 4.16-1c**</u>**: For projects proposed by non-UC entities on the campus, non-UC entities shall be required, through contracts and agreements, to implement General Mitigation Measure 4.16-1a to minimize water usage.**

<u>**General Mitigation Measure 4.16-1d**</u>**: The City can and should identify and develop new water supplies to reliably accommodate increases in water supply due to UCSC Marine Science Campus CLRDP-related growth and other background growth during normal and drought conditions.**

Although these mitigation measures will minimize the use of potable water on the Marine Science Campus and thereby minimize the project's contribution to the cumulative impacts from development of new water supply sources, it is not known whether the entire water deficit will be adequately addressed, and whether all environmental impacts associated with the SCWD water supply projects would be reduced to a less than significant level. Therefore conservatively, this EIR concludes that the impact would be significant and unavoidable.

Near-term Projects

For the reasons identified above, the five near-term projects would make a cumulatively considerable contribution to significant and unavoidable cumulative impact associated with the City of Santa Cruz's development of new water supply sources.

WASTEWATER

Entire Development Program

The geographic area potentially affected by cumulative demands for wastewater service due to citywide population growth is the service territory of the City of Santa Cruz Public Works Department. The standards of significance that apply to the cumulative analysis are the same as those that apply to the project-level analysis.

The City of Santa Cruz will collect sewer system improvement fees and construct sewer collection improvements as new development projects are proposed. Any future offsite development in the vicinity of the Marine Science Campus would be subject to such fees. The WWTP has an estimated average daily dry-weather flow capacity of approximately 17 mgd, and

[26] The CEE is a national, non-profit organization that promotes energy-efficient products and services; <u>www.cee1.org/home.html</u>.

the project's contribution to annual wastewater flow in 2020 is estimated to be 99,085 gpd (consisting of existing flows plus CLRDP flows), substantially less than the treatment capacity. Therefore, it is expected that future growth, including the growth under the CLRDP, will be accommodated by the existing wastewater treatment facility, and as such no cumulative impact associated with improvement to wastewater treatment facilities is expected.

Near-term Projects

For the reasons identified above, the five near-term projects would not make a cumulatively considerable contribution to any significant cumulative impact on the City of Santa Cruz's wastewater treatment facilities.

SOLID WASTE

Entire Development Program

The geographic area potentially affected by cumulative demand for solid waste service due to citywide population growth is the service territory of the Resource Recovery Facility (RRF) landfill owned and operated by the City of Santa Cruz. The standards of significance that apply to the cumulative analysis are the same as those that apply to the project-level analysis.

Full development of the CLRDP, population growth at the UCSC Main Campus, and the anticipated citywide population increase through 2020 would increase the overall amount of solid waste sent to the City's landfill. Project-related population living off-campus would contribute to citywide population growth and would contribute to the overall increases in solid waste sent to the RRF. The cumulative impact would not be considered significant, however, because the RRF has permitted capacity through the year 2038. Moreover, the increases in solid waste streams attributable to increases in onsite population at completion of the CLRDP building program would be offset by the campus's existing recycling program. As discussed in the Setting subsection above, the campus is voluntarily complying with the waste reduction and recycling standards of the California State Agency Integrated Waste Management Act.

The City of Santa Cruz is mandated to comply with applicable federal, state, and local statues and regulations pertaining to solid waste, in this case the Integrated Waste Management Act of 1989. This Act requires that, by 2004, at least 50 percent of the City's waste must be diverted from landfills by source reduction, recycling, and composting.

Because the RRF has permitted capacity through 2038 and the University and City of Santa Cruz are complying with existing laws and regulations pertaining to solid waste, cumulative solid waste impacts would be less than significant.

Near-term Projects

For the reasons above, the five near-term projects would not make a cumulatively considerable contribution to any significant cumulative impacts on the City of Santa Cruz's solid waste facilities or its diversion rates.

ENERGY

Entire Development Program

The geographic area potentially affected by cumulative demands on energy resources due to citywide growth is the service territory of PG&E. The standard of significance that applies to the cumulative analysis is the same as that used in the project-level analysis, i.e., result in wasteful, inefficient, or unnecessary consumption of energy.

Electricity and natural gas can be transmitted over long distances, and supply is usually made available from varying and numerous sources. Development under the CLRDP in conjunction with other regional development would result in increased consumption of electricity and natural gas. However, this increased consumption would not be considered wasteful, inefficient or unnecessary and the cumulative impact would be considered less than significant. Furthermore, development under the CLRDP would be required to comply with Title 24 requirements. In 2000, the California Energy Commission mandated additional conservation methods to achieve "maximum feasible" reductions in unnecessary energy consumption that would also apply to the proposed Marine Science Campus, specifically to heating and cooling systems. Moreover, the CLRDP includes a set of building design guidelines that include the Leadership in Energy and Environmental Design (LEED™) Green Building Rating System. The University is pursuing sustainability on a system-wide basis, and design of the Marine Science Campus would be consistent with the eventual outcome of that system-wide effort. Given that the CLRDP building program would be required to follow Title 24 requirements as well as seek LEED certification by implementing design principles based on sustainability and energy conservation, it can be concluded that the CLRDP's contribution to cumulative increases in energy/natural gas demand would not result in wasteful, inefficient, or unnecessary consumption of energy.

According to the Association of Monterey Bay Area Governments' *Regional Population and Employment Forecast 1997*, the city's population is forecast to increase to an estimated 62,621 people by 2020, presenting an approximately 15 percent increase over base-year 2000 population figures. Full development of the CLRDP would result in about 605 additional people living in the City of Santa Cruz. This total would therefore represent about one percent of total population growth for the City of Santa Cruz in 2000 and seven percent of the population growth forecast for the city from 2001 through 2020 (see Section 4.12, Population and Housing). The population growth attributable to the CLRDP building program in conjunction with overall citywide growth would increase demand for electricity and natural gas, but this increased demand would not necessarily result in the wasteful, inefficient, or unnecessary consumption of energy, and the cumulative impact would be less than significant.

Near-term Projects

For the reasons above, the five near-term projects would not make a cumulatively considerable contribution to any significant cumulative impacts on energy resources.

Cumulative impacts related to wastewater, solid waste, and energy from the growth under the CLRDP and each of the five near-term projects in conjunction with other regional growth, would be less than significant. The CLRDP, including each of the five near-term projects, would make a cumulatively considerable contribution to the significant cumulative impact associated with the development of new water supply sources.

CHAPTER 5
ALTERNATIVES

A. INTRODUCTION

The purpose of the alternatives analysis in an EIR is to describe a range of reasonable alternatives to the project, or alternatives to the location of the proposed project, that could feasibly attain most of the objectives of the project, but would avoid or substantially lessen any of the significant effects of the project, and to evaluate the comparative merits of the alternatives (CEQA Guidelines, Section 15126.6[a]).

Additionally, Section 15126.6(b) of the CEQA Guidelines requires consideration of alternatives that could reduce to a less than significant level or eliminate any significant adverse environmental effects of the proposed project, including alternatives that may be more costly or could otherwise impede to some degree the attainment of the project's objectives.

This chapter addresses five alternatives to the proposed CLRDP: (1) a Reduced Program Alternative; (2) a Modified Land Use Diagram Alternative; (3) an Increased Program Alternative; (4) a Project-by-Project Development Alternative; and (5) a No Project Alternative. These alternatives are described below, followed by a discussion of their impacts and how they would differ from those of the proposed project. Other alternatives considered but not carried forth for detailed evaluation are also discussed along with reasons as to why they were not evaluated in detail.

This chapter also presents environmental analyses of alternatives for each of the five near-term projects analyzed in the EIR.

B. PROJECT OBJECTIVES AND GOALS

The UCSC Institute of Marine Sciences and the UC Natural Reserve System, which share responsibility for managing the UCSC Marine Science Campus lands, seek to promote the health of the oceans and their coasts by conducting and supporting marine science instruction and research, and by facilitating the application of that knowledge for public education, environmental awareness and decision making. The purpose of the proposed CLRDP is to facilitate the orderly, flexible, and environmentally sensitive expansion and development of the UCSC Marine Science Campus in support of the academic, research and public services mission of the University of California. To these ends, the needs of the CLRDP development program are set forth below as objectives of planning for 20 years of growth. In addition, the proposed program is also guided by objectives of protecting natural resources on the campus site, and protecting natural resources off site, as detailed below.

The specific objectives which define the program needs of the CLRDP are as follows:

Planning for 20 Years of Growth

- Develop a world-class marine research, education, ocean health, and public service campus with the scope, diversity, and excellence in program and facilities necessary to respond to the growing need for marine science, to establish the University's leadership in the field, and to attract sustained funding.

- Develop a marine science campus with access to large volumes of fresh seawater and proximity to the ocean environment for research, education, ocean health, and public service activities.

- Develop a marine science campus sufficiently close to the main UCSC campus to enable integration with programs on the main campus and utilization of support services that do not require location close to the ocean.

- Develop an affordable campus that makes cost-effective use of the limited public funds available for research, education, and ocean health activities by expanding existing facilities on the Marine Science Campus and attracting governmental, non-profit, and private research and education affiliates that bring additional financial resources to the campus.

- Maximize the efficient use of land resources on the Marine Science Campus for coastal-dependent uses, coastal-related uses, and support facilities, consistent with identified resource constraints so as to reduce the future need for development of other coastal lands in the service of marine research and education.

- Remedy space and program deficiencies that existed in 2003 at the Marine Science Campus through the expansion and enhancement of University and affiliated facilities.

- Create a campus with opportunities for new marine research, education, and ocean health activities that: 1) can be undertaken in facilities that are adjacent to existing facilities on the Marine Science Campus, 2) complement and broaden existing research, education, and ocean health activities, 3) have access to large volumes of fresh seawater, 4) are proximate to the ocean environment for easy access to outdoor classrooms, and 5) are provided sufficient expansion area to meet anticipated demand for 20 years.

- Create a campus with opportunities for new and expanded outdoor research activities that: 1) are proximate to the ocean environment and thereby allow the keeping of marine plants and animals in an environment that approximates their natural setting, 2) can be undertaken adjacent to existing facilities on the Marine Science Campus to promote interaction and collaboration, 3) complement and broaden existing research, education, and ocean health activities, 4) have access to large volumes of fresh seawater, and 5) are provided sufficient expansion area to meet anticipated demand for 20 years.

- Create a campus that promotes round-the-clock immersion in the research environment and extends interaction and collaboration among scientists, students, and administrators beyond formal work settings by providing support housing for researchers, educators, students, caretakers, and visitors that is adjacent to coastal-dependent activities and of sufficient capacity to support approximately 20 percent of projected campus population.

- Create a campus with the functionality to provide support to scientists, students, and administrators who need meals, meeting places, and lecture halls.

- Create a campus with the functionality necessary to support a wide range of marine research and education and ocean health activities by providing equipment storage, maintenance, and outdoor laydown areas that are within easy and quick access of campus laboratories, offices, and classrooms, and of sufficient size to maintain and equip ocean vessels with scientific instrumentation.

- Provide public access and recreation opportunities on the Marine Science Campus where campus users and coastal visitors may exercise, recreate, and enjoy coastal resources.

- Provide a seawater system capable of delivering and discharging large amounts of fresh seawater for use in research, education and ocean health activities.

- Maintain and enhance natural resources at Younger Lagoon Reserve for teaching and research.

- Facilitate the development of complementary state, federal and private programs at the campus.

- Develop the Marine Science Campus in a manner that maximizes the clustering of similar or complementary uses in order to: (a) enhance opportunities for interaction and collaboration among researchers, educators, and students, (b) provide convenient access to essential research and teaching facilities, (c) provide convenient access to support facilities (e.g., food service, conference facilities, meeting rooms, etc.), and (d) support a sense of a campus community.

- Site new development to provide for convenient access to existing utility infrastructure (e.g., seawater, water, sewer, etc.) thereby reducing cost and site disturbance to the extent feasible.

<u>Protecting Natural Resources on the Site</u>

- Avoid or minimize adverse effects on the natural physical setting where it is feasible to do so, consistent with the resource protection provisions of the California Coastal Act and other environmental regulations, and consistent with achieving the growth objectives described above.

- Rely on infill and clustering of facilities to provide for efficient use of the land while minimizing development of undeveloped lands to the extent feasible.

- Protect environmentally sensitive habitat areas.

- Site development in areas with similar uses to support pedestrian travel and to minimize vehicle use for circulation within the site.

<u>Protecting Offsite Resources</u>

- Avoid or minimize adverse effects on adjacent land uses, the local community and the region where it is feasible to do so, consistent with the California Coastal Act and the growth objectives described above. Enrich the quality of life in the local and regional community by providing a facility that interprets marine research at the

University and promotes understanding of the central California coastal marine environment.

- Maximize public access to onsite coastal resources to the extent feasible and consistent with protection of fragile resources, while ensuring the security of the campus.
- Provide a mix of uses on the project site and incorporate design features that support transportation alternatives in order to minimize traffic impacts on local roadways.
- Provide on-site housing to accommodate some of the project-related housing demand in order to minimize housing impacts on the community.
- Maintain views of the ocean and the mountains from important public vantage points in order to minimize visual impacts on the community.
- Develop a site plan that is compatible with existing and planned development in the area.
- Limit infrastructure and other measures to foster establishment of a stable urban boundary at the City limit.

C. RANGE OF ALTERNATIVES

The range of alternatives addressed in the EIR must be broad enough to permit a reasoned choice by decision-makers when considering the merits of the project. Moreover, the alternatives analyzed for a project should focus on reducing or avoiding significant environmental impacts associated with the project as proposed. Implementation of the proposed CLRDP would result in significant and unavoidable impacts at the project level from increased traffic volumes at the Mission Street / Bay Street intersection and at the Mission Street / Chestnut Street intersection. It would also contribute to a significant and unavoidable cumulative impact associated with increased demand on the water supply and to a significant cumulative impact from increased traffic at six intersections. Implementation of the CLRDP would also result in significant or potentially significant but mitigable impacts with respect to air quality, cultural resources, hazardous materials, and noise (see Table 2-1).

The section below presents the alternatives that were considered for this CLRDP but not carried forth for detailed evaluation. It is followed by the section that presents alternatives that were evaluated in detail. As required by CEQA guidelines, a No Project Alternative is also analyzed. Each alternative is examined for its ability to meet project objectives and its ability to reduce environmental impacts relative to the proposed project.

D. ALTERNATIVES CONSIDERED BUT NOT CARRIED FORTH FOR DETAILED EVALUATION

This section discusses alternatives to the project that were considered, but were not analyzed further because they did not meet project objectives, or were found not to reduce project impacts, or because they would result in greater impacts than the proposed project. This section does not consider “other use” alternatives, i.e., a wetland/habitat reserve alternative or an agricultural alternative, because, as stated in the CEQA Guidelines Section 15126.6(f), alternatives should be limited to those that meet most of the project objectives. An alternative that developed uses other than educational and research facilities on the project site would not meet the objectives of the proposed project.

ALTERNATE SITE PLANS

The University presented three preliminary, conceptual alternate site plans for proposed development on the Marine Science Campus under the CLRDP to the California Coastal Commission in fall of 2000. These plans (Plans A, B and C) were prepared based on preliminary information about the site, i.e., before the wetland delineations for the CLRDP were completed. Consequently, the plans proposed development in some areas that the CLRDP would avoid in order to protect the resources on site. In addition, other site plans were suggested during scoping of the EIR that would arrange development on the campus site differently. Alternate site plans A, B and C and several other suggested site plans, were not carried forth for detailed evaluation for the reasons provided below.

- **Alternate Site Plans A and C.** Alternate Site Plan A and C are fairly similar in layout and are described together here. Under these plans, all of the proposed researcher housing would be located on the upper terrace in the northeast corner of the project site, instead of on both the upper and middle terraces as under the proposed project. Also under these plans, the new marine research and education facilities would be sited on the middle and lower terraces, with the shared warehouse and laydown facility located just southwest of the CDFG Marine Wildlife Center. Site Plan A differed from Site Plan C in that it configured the new marine research and education space in a north-south arrangement and altered the alignment of McAllister Way to lie east of the proposed development on the middle terrace. Site Plan C maintained McAllister Way largely in its current alignment. Both plans proposed the same amount of new space on the lower terrace at the same locations adjacent to the Center for Ocean Health and the existing Long Marine Laboratory building. Neither of the plans was carried forth for detailed evaluation because each plan would provide inadequate buffers between the proposed development and the wetland resources on site. In addition, both plans would place the shared warehouse and laydown facility adjacent to the Younger Lagoon Reserve (YLR). This location would be a valuable site for other uses that would benefit by the relative isolation of this site and its proximity to the coast, and would not be appropriate for a warehouse facility that potentially could be more obtrusive relative to the adjacent natural reserve.

- **Alternate Site Plan B**. This plan arranged the new facilities over a larger area on the middle and lower terraces, and placed only a small amount of the support housing on the upper terrace, with the rest on the middle terrace fairly close to the De Anza Santa Cruz residential development. It also relocated McAllister Way to the eastern portion of the site. This plan was not carried forth for detailed evaluation as it would also provide inadequate buffers between new development and site resources. Furthermore, Site Plan B would disperse the development on the middle terrace and potentially interrupt important view corridors.

- **More Clustered/Higher Density Development.** Under this alternative, development proposed for the upper terrace would be eliminated and those uses would be moved to the middle terrace and lower terrace development areas. In order to maintain the desired amount of marine research and teaching space while providing room for the shared warehouse and laydown facility and the housing moved from the upper terrace, the proposed buildings would be three stories in height, rather than one and two stories as under the proposed project. In addition, under this alternative, the buildings on the middle and lower terraces would be developed in a more dense arrangement than under the proposed CLRDP.

A more clustered and dense alternative would disturb less of the site, leave more open space, and possibly enhance some view corridors through the northeast portion of the site in comparison to the proposed project. Potentially significant but mitigable impacts of the proposed CLRDP, such as those to cultural resources, would be reduced, but significant and unavoidable impacts with respect to traffic, and water supply, would be the same as for the proposed CLRDP. Further, the more dense and taller development under this alternative would present a more conspicuous urban image on the site that could conflict with coastal planning objectives for this transition zone between urban and rural uses. Because this alternative would not reduce any significant unavoidable impacts of the proposed CLRDP and could cause other adverse visual and planning impacts, this alternative was not carried forward for detailed evaluation.

- **More Dispersed Development.** Under this alternative, building heights would be lowered and spread out over more of the project site area, resulting in a lower visual profile of the project and, therefore, a smoother aesthetic transition between urban and rural uses. This alternative, however, would disturb more of the site and would leave less uninterrupted open space than the proposed CLRDP. In addition, this alternative would increase the amount of impervious surface on the project site. Again, because this alternative would not reduce any of the significant unavoidable impacts of the proposed CLRDP and could result in some additional impacts such as disruption of view corridors and increased stormwater runoff, this alternative was not carried forward for further evaluation.

- **Parking Alternative.** This alternative includes a variety of options regarding the placement of the 550 parking spaces included in the proposed CLRDP. This amount of parking would require about four acres. One option would be to place all of the parking in a centralized location in the northwestern portion of the upper terrace, near the railroad tracks. This option, however, would likely interfere with the proposed wildlife corridor and could displace all or portions of the proposed shared warehouse, laydown yard and researcher housing units on the upper terrace. Another location for these facilities would have to be identified elsewhere on the site.

  A second parking option would be to place all of the parking underground. This would require substantial excavation, with associated construction and possible drainage impacts, would be substantially more costly than surface parking, and would not result in the reduction or avoidance of any of the significant unavoidable impacts of the CLRDP.

  A third option would be to locate all of the proposed parking off-site, such as at UCSC's Main Campus, and provide enhanced shuttle service to and from the Marine Science Campus from the off-site parking locations. This alternative would not eliminate the significant unavoidable impacts at Mission and Bay Street intersection or at Mission and Chestnut Street intersection, because it would not reduce the number of trips through these intersections, since persons en route to/from the alternative off site parking facilities to catch the shuttle would still travel through these intersections. Traffic associated with the alternative could also cause new impacts to other intersections in the vicinity of off-site parking locations. Moreover, placing all of the parking off-site would create travel time inefficiencies for the users of the Marine Science Campus, particularly for faculty and staff members and residents of the on-site housing.

Because these alternatives would not reduce any significant environmental impacts of the proposed project, and because the site arrangement under these parking alternatives would be less functional for users of the site, none of the alternative parking options was carried forth for detailed evaluation.

OFF-SITE ALTERNATIVES

The off-site alternatives that were considered include the possibility of locating the entire CLRDP building program at an alternate location or locating some components of the program at an alternate location. None of these alternatives was carried forth for detailed evaluation for reasons presented below.

- **Total Off-Site Alternative.** A total off-site alternative for the proposed project would involve locating the entire CLRDP building program at one or more off-site locations. This alternative would fail to meet the foremost objective of the proposed project, which is to develop a world-class marine science campus utilizing the momentum provided by the existing cluster of marine research facilities that are already developed on this site. Second, the expansion of the existing facilities, which is a major element of the CLRDP, is necessary to remedy space and program deficiencies at the existing Marine Science Campus. Third, the collocation of the existing Long Marine Lab, USFWS and CDFG facilities with future CLRDP facilities is essential to meet the project objective of developing a compact Marine Science Campus that promotes integration, collaboration and sharing of resources. Thus, it is important that all of the Marine Science Campus teaching and research facilities be located at a single site.

  In addition, two project objectives constrain the location of the facilities proposed under the CLRDP: the requirement to be adjacent to the ocean for access to fresh seawater; and the requirement to be near UCSC Main Campus. With respect to access to fresh seawater, the use and recirculation of seawater in existing and proposed tanks and ponds are essential elements of facility operations. The three facilities currently on the Marine Science Campus use the existing seawater collection, circulation and discharge system to hold and grow marine plants and animals for a variety of teaching, research and public education and display uses. The presence of a developed source of fresh seawater is a critical asset of the Marine Science Campus, and a major factor in attracting additional researchers to the site. The need for these marine research facilities to be close to fresh seawater sources essentially excludes more interior locations and requires the new marine research and teaching facilities as well as related support facilities to be located along the coast. While it would be possible to develop a seawater system inland, costs would be significant, and this would be a needless expense given that a functional system is already in operation at the existing site. Thus, the presence of an existing developed seawater system, as well as the synergy provided by the presence of a variety of marine research pursuits which are dependent on access to developed fresh seawater, are the critical assets that position the campus to become a world-class marine research and education facility, and location of the new development under the CLRDP at another site would be contrary to all of the key objectives of the project.

Second, researchers at the Marine Science Campus routinely collaborate with researchers and faculty at UCSC Main Campus. Faculty and affiliates associated with the Biology Department and the Ocean Science Department at both campuses share in advising of graduate students, particularly with respect to the Marine Biology submajor. Thus, because of the interdependence between the research and teaching at the Marine Science Campus and the Main Campus, it is important that the marine research program of UCSC be located within a reasonable distance of the Main Campus. There are few sites within easy access of the UCSC Main Campus that also have ready access to seawater. One alternative location that was considered was the Moss Landing Marine Laboratories (MLML). Although the coastal location of this site could fulfill the project objective of proximity to seawater and coastal resources, the site is not proximate to the UCSC Main Campus. It also does not have sufficient available space for the envisioned facilities and programs (Cole 2003).[1] While MLML enjoys a collaborative relationship with the existing Marine Science Campus facilities, its resources alone would be insufficient for some of the types of research in which UCSC is involved. Furthermore, MLML is owned by the California State University (CSU) system and is used for CSU's own marine science research, and also must address its own future program considerations for the MLML site. Finally, if the entire CLRDP program were to be located at another location, there would be operational and research inefficiencies on account of distance between the existing facilities on the Marine Science Campus and the new facilities. Similar and possibly worse environmental impacts could result from development at other sites. For all of these reasons, a full off-site alternative was not carried forth for detailed evaluation.

- **Partial Off-Site Alternative.** This alternative involves locating some (though not all) program elements of the CLRDP at locations other than the Marine Science Campus. For reasons presented above under the Total Off-Site Alternative, all of the marine research and teaching space elements of the proposed CLRDP need to be collocated and no element of marine research and teaching space can be moved off site as this would be contrary to the objectives of encouraging collaboration and providing the other benefits and efficiencies of collocation. Because the core of these marine research facilities must have ready access to seawater, an offsite location would require development of additional seawater systems and likely would necessitate use of another coastal site, both of which are contrary to project objectives and goals with respect to cost efficiencies and the avoidance of the impacts of additional off-site development.

  The University recognizes that it is desirable to reserve the Marine Science Campus areas adjacent to the coast for coastal-dependent uses and to commit other Marine Science Campus areas to uses dependent on the coastal-dependent uses. On this account, the CLRDP has been designed to focus on the necessary marine research and teaching space, and includes only minimal amounts of direct support space and support housing. Support space included in the CLRDP is limited to meeting and conference space, small dining facilities, and technical workshops, storage areas and laydown/service areas. Support space for functions such as libraries, analytical labs and physical plant maintenance functions are not included in the CLRDP: instead, the Marine Science Campus would continue to utilize the facilities and services available at the Main Campus for these purposes. Similarly, only the very minimal amount of housing necessary for the live-work function is included in the CLRDP. The CLRDP program description and project objectives explain the importance

[1] Cole 2003. Kenneth Cole, Moss Landing Marine Laboratory, personal communication with Sally Morgan, URS, December 23, 2003.

of these support facilities to the efficient and effective operation of the coastal-dependent research and educational programs. All of these land uses are dependent on and needed by the proposed coastal-dependent marine research uses at the Marine Science Campus. Meeting and dining facilities would provide places where scientists, faculty, and students can meet with their peers to discuss ideas and set agendas for future research. An auditorium suitable for lectures and presentations would enhance the conduct of meetings and workshops. A warehouse, technical shops, and laydown yard would enable outfitting of ocean-going vessels, staging for scientific fieldwork, and maintenance, repair, and development of instrumentation and equipment. The proximity of each of these support facilities to the core marine research and education space is vital to the efficient functioning and efficacy of the research and education mission of the campus, as is discussed further, below.

Although minimal amounts of support space and support housing are included in the CLRDP, and their collocation on the Marine Science Campus near marine research and teaching facilities is considered essential for the success of the program, a partial off-site alternative could involve locating some of these coastal-related program spaces off site. It has been suggested that all support housing uses could be located on UCSC's Main Campus or in nearby residential areas. However, even under the proposed project, most Marine Science Campus users would need to find housing off-campus. The "support housing" that would be provided on campus under the proposed project includes only that increment of housing considered to be integrally related to and dependent on the functions of the coastal-dependent uses. If all such support housing were located off-site, the project objectives of promoting round-the-clock immersion in the research environment by extending interaction and collaboration of scientists, students, and administrators beyond formal work settings would not be met. There would be no live-work community on site, and a primary objective of the project would not be met. As discussed in Section 4.9, Land Use and Planning, provision of support housing at research institutes is well recognized as an important component of the overall program, and the presence of a marine lab science residential community at other successful marine institutes has been found to make a major contribution to the success of those labs.

Similarly, it has been suggested that the project's proposed warehouse/laydown uses could potentially be located off-site in the nearby Natural Bridges Industrial Park. However, establishment of technical shops, storage, maintenance, and laydown/service areas at an off-site location would fail to provide functionality to support a wide range of marine research, because the facilities would not be located within convenient, quick and easy access of research facilities. This functionality is an important objective in the planning for the Marine Science Campus. An off-site location for the shared campus warehouse and laydown facility would result in increased off-site traffic, as routine functions on the Marine Science Campus would require frequent travel to and from the warehouse/laydown facility. Because of the time, labor, organizational and cost inefficiencies attendant on the need for field personnel to regularly leave the campus to access off-site work areas, the use of off-site warehouse and laydown areas would be contrary to the attainment of project objectives with respect to the functionality and efficiency of campus programs and operations.

The shared warehouse, technical shops, and laydown yard are proposed to provide USGS, NMFS and UCSC facilities for outfitting of ocean-going vessels, staging for scientific field work, and maintenance, repair, and development of instrumentation and equipment.

Proximity of technical support facilities such as these and the attendant technical staff to the end-user science staff and laboratories at the Marine Science Campus is central to the efficiency and efficacy of field marine research endeavors. Examples of regularly occurring tasks that require multiple daily trips between the research laboratories and the warehouse, shops, and laydown yard include: mobilization for research cruises at sea (i.e., preparing and packing the entire research equipment complement for deployment on a ship or boat); assembly of equipment arrays onto mooring systems for deployment in the ocean; and development of specialty instrumentation packages for submarine observation (e.g., camera sleds; sampling devices; and in-situ real time analytical instruments such as sediment grain size analyzers, chlorophyll analyzers, and acoustic devices for remote sensing of currents, biomass, and subsurface sedimentary structure). One USGS senior marine scientist who oversees the coordination between USGS technical marine facilities and USGS science staff and laboratories reinforced the importance of this adjacency, and suggested that avoiding the need to use a car to move between these venues is very important to the efficient use of staff time the frequency of important interaction, and avoidance of traffic and parking challenges.[2] Further, the Monterey Bay Aquarium Research Institute in Moss Landing, recognizing the importance of this adjacency, designed their entire facility to collocate scientists, engineers, and science laboratories with technical shops, and to collocate these facilities with outdoor service yards and ships by designing and building all of these components into one consolidated footprint.

Furthermore, a location off-site for the marine research-related warehouse and laydown uses would defeat the key purpose of the project which is to build a world class marine science campus that has all the necessary facilities in close proximity of each other. It should be noted that although there are vacant or underutilized properties in the City's westside area, which the University continues to examine as possible sites for overflow administrative or programmatic facilities, these properties would not be suitable as alternate sites for the warehouse uses for all the reasons noted above. Furthermore, any property, if purchased, would be likely to be used to consolidate the several academic and administrative functions of the UCSC Main Campus that are currently housed in leased facilities in the City's westside area. For all of these reasons the partial off-site alternative was not carried forward for detailed analysis.

E. ALTERNATIVES TO THE CLRDP EVALUATED IN DETAIL

This section presents an evaluation of five alternatives to the proposed CLRDP that were analyzed in detail; the Reduced Program Alternative, the Modified Land Use Diagram Alternative, the Increased Program Alternative, the Project-by-Project Development Alternative, and the No Project alternative. For each of these alternatives, a brief description is presented below and then each alternative is analyzed for its ability to reduce the significant impacts of the proposed CLRDP and to meet project objectives.

Table 5-1 summarizes the main differences between these alternatives and the proposed CLRDP. Employee / student population, the amount of new marine research and education space, and the amount of researcher housing associated with the CLRDP are key attributes that are responsible for major traffic, noise, and air quality impacts. These attributes also determine the amount of land area that would be developed under the proposed CLRDP, which in turn would affect

[2] Terry Bruns, USGS, personal communication with Steve Davenport UCSC, January 2004.

TABLE 5-1
CLRDP ALTERNATIVES

	New Marine Research and Education Space (sf)[a]	New On-campus Employee/ Student Population[b]	Total On-site Housing Square Footage[c]	Total Number of Apartment/Town-house Units[c]
Proposed CLRDP	254,500	535	98,100	80
Reduced Program Alternative	148,000	373	56,923	56
Modified Land Use Diagram Alternative	254,500	535	98,100	80
Increased Program Alternative	345,000	726	102,100	80
Project-by-Project Development Alternative[d]	NA	NA	NA	NA
No Project Alternative	0	0	0	0

[a] Building area for New Marine Research and Education Space for all of the alternatives were provided by UCSC.

[b] New on-campus employee / student population estimates for the CLRDP, the Reduced Program Alternative, and the Modified Land Use Alternative were provided by UCSC. For the Increased Program Alternative, populations were estimated by using the same ratio of new marine research and education space per person as under the CLRDP, which is approximately 475 sf / person.

[c] Total housing space and housing units for the CLRDP, the Increased Program Alternative and the Modified Land Use Diagram Alternative were provided by UCSC. Total housing space for the Reduced Program Alternative was estimated by using the same ratio of housing space to new marine research and education space from the CLRDP, which is approximately 2.6 sf of new marine research and education space for every one square foot of housing. The total number of units for the Reduced Program Alternative was based on an estimated 1,025 sf / unit. The additional 4,000 sf of total housing square feet under the Increased Program Alternative is due to an increase in group housing compared to the proposed CLRDP, and not from an increase in apartment / townhouse space. Therefore, the number of apartment / townhouse units would not change under the Increased Program Alternative.

[d] Square footage, population and housing units cannot be projected for the Project-by-Project Development Alternative because development would not be directed by a long term plan, but would proceed as individual projects are proposed and approved.

biological resources and hydrology. Each of the five alternatives differs from the proposed CLRDP with respect to either the size of the on-campus population and/or the nature of the development program; thus, some of these alternatives have the potential to reduce significant impacts that would be associated with the proposed project.

REDUCED PROGRAM ALTERNATIVE

DESCRIPTION

Under this alternative, the upper, middle, and lower terrace development areas would remain the same as under the CLRDP, but the amount of marine research space that would be developed on the middle and lower terrace development areas would be reduced by approximately 42 percent. The net new marine research space that would be developed under this alternative would be approximately 148,000 square feet, as compared with 254,500 square feet under the proposed CLRDP. Commensurate with the reduction in research space, the alternative would have a reduced new on-campus employee/student population of approximately 373 persons, as compared with 535 new employees and students under the proposed CLRDP. Since all of the new marine research space under the CLRDP is proposed for the lower and middle terraces, with warehouse and support housing proposed for the upper terrace, the reduction in marine research building space under this alternative would be accomplished either through a reduced density of development within the middle terrace and lower terrace development areas and/or a reduction in the footprint of development areas on the middle and lower terraces (i.e., smaller areas of development compared to the proposed CLRDP). These two options (smaller footprint or lower density) have different implications for environmental impacts, as discussed below. Development on the upper terrace would remain unchanged in size and function under this alternative. This alternative assumes that all other elements of the CLRDP, including buffers, setbacks, the Stormwater Concept Plan, and the Resource Management Plan would be implemented.

IMPACTS

Aesthetics. Neither the proposed CLRDP nor the Reduced Program Alternative would result in significant unavoidable impacts with respect to aesthetics. The Reduced Program Alternative would reduce the amount of development on the middle and lower terrace but the decrease would not be large enough to be noticeable from offsite viewpoints as compared to the development under the proposed CLRDP. If the alternative achieves the space reduction by reducing the development footprint, more open space would be left undeveloped on the middle and lower terraces under the alternative than under the proposed project.

Agricultural Resources. Similar to the proposed CLRDP, this alternative would result in a less than significant impact related to the direct conversion of the project site land to non-agricultural uses. Similar to the proposed CLRDP, the Reduced Program Alternative would include setbacks from adjacent agricultural operations and other measures to reduce potential for conflicts with agricultural operations.

Air Quality. Although the Reduced Program Alternative would result in the development of a smaller amount of building space than under the proposed CLRDP, it would still result in temporary generation of fugitive dust if several projects were under construction concurrently (Impact 4.3-1). Vehicle emissions during project operation, including TACs associated with diesel vehicles, would decrease in approximate proportion to the decrease in population (see Table 5-1) and, as under the proposed CLRDP, the impact would be less than significant.

Biological Resources. As stated above, the Reduced Program Alternative could result in smaller or less dense development within the development areas on the middle and lower terraces than under the proposed CLRDP. If development footprint were reduced, under this alternative the total amount of grasslands and other habitats affected by development of this alternative would be less than under the CLRDP. Potential impact on nesting raptors (Impact 4.4-2), and potential impact on nesting black swift (Impact 4.4-3) that are potentially associated with disturbance of nesting activities due to construction activities and noise would be similar to or less than the impacts of the proposed CLRDP. If size reduction is achieved through reduced density, grassland and habitat impacts would be similar to those of the proposed project. Because the development on the upper terrace would be the same as with the CLRDP, the less than significant impact on CRLF (Impact 4.4-1) would be the same for the alternative as for the proposed project.

Cultural Resources. Implementation of the proposed CLRDP has the potential to disturb undiscovered Native American burial sites, thus resulting in a potentially significant impact on cultural resources (Impact 4.5-1). To the extent that this alternative is achieved through reduction of development footprint, because the area that would be affected by construction of new facilities would be less than under the CLRDP, the potential for impacts to cultural resources under the alternative would be reduced relative to the proposed CLRDP. If space reduction were achieved through decreased densification without a footprint reduction, the impacts of the alternative would be similar to those of the proposed project.

Hazards and Hazardous Materials. The proposed CLRDP would result in a potentially significant hazardous materials impact associated with the handling of hazardous materials on the Marine Science Campus by non-UC entities. This impact would be reduced to a less than significant level under the proposed CLRDP by the inclusion of lease agreement conditions that would ensure that impacts from the handling and disposal of hazardous materials by non-UC entities are minimized. The Reduced Program Alternative would present the same hazard associated with the handling of hazardous materials by non-UC entities, but the reduction in square footage probably would reduce the area of non-UC labs and thus the volumes of hazardous materials likely to be present. The same lease conditions would apply to the alternative as to the CLRDP, and thus the hazard would similarly be reduced to a less than significant level.

Hydrology and Water Quality. The Reduced Program Alternative would decrease the amount of impervious surface area on the project site relative to the proposed project, to the extent that the space reduction was achieved by reduction of the footprint. The Stormwater Concept Plan that has been developed for the proposed CLRDP would ensure that potential excess runoff and water quality impacts from the project would be reduced or eliminated. Under the CLRDP, several implementation measures apply to reduction of surface flows and maintenance of peak flows at pre-project levels. The Reduced Program Alternative, like the proposed project, would include a Stormwater Concept Plan that would address handling of runoff from impervious surfaces. Therefore, like the proposed CLRDP, this alternative would not result in any significant impacts to hydrology and water quality.

Noise. The proposed CLRDP would result in noise impacts including potentially significant but mitigable temporary and periodic increases in noise during construction (during daytime and nighttime hours) of proposed facilities, potential placement of new development near sensitive resources (such as nearby residential neighborhoods), and increases in ambient noise due to operation of HVAC equipment (Impacts 4.11-1 through 4.11-6). Noise impacts under the Reduced Program Alternative would be similar but reduced in scale relative to the CLRDP, commensurate with the reduced duration and intensity of construction activity. The amount of noise-producing equipment on site also potentially would be reduced relative to the proposed project because of the reduced amount of research space development.

Recreation and Public Access. Neither the CLRDP nor the Reduced Program Alternative would result in significant impacts to recreational resources. In fact, both the proposed project and the alternative offer beneficial effects because either would provide recreational facilities and services on site. In regard to public access to coastal resources, it is assumed that Implementation Measures 6.1.1 through 6.1.5 that apply to the proposed CLRDP would also apply to the Reduced Program Alternative. These implementation measures include accommodating coastal access visitors, providing overlooks for public visual access, offering docent-led tours and education programs for the public, and offering educational programs for pre-college students. This alternative would involve a smaller on-site campus population and reduced development program compared to the CLRDP. Area potentially available for public access could be increased slightly relative to the proposed project if space reduction were accomplished by reducing the project footprint, but the ability of the program to provide recreational and community services could also be reduced.

Transportation and Traffic. The proposed CLRDP would result in significant and unavoidable traffic impacts by increasing traffic volumes at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection at the project level. It would also make a cumulatively considerable contribution to cumulative traffic impacts at these two and three other study area intersections. Development under the Reduced Program Alternative represents an approximately 42 percent reduction in size compared to the proposed CLRDP. This would substantially reduce the number of vehicle trips associated with this alternative relative to the proposed CLRDP, such that the significant project-level traffic impacts would be reduced to a less than significant level under the alternative. The Reduced Program Alternative would still make a cumulatively considerable contribution to cumulative traffic impacts.

Utilities, Service Systems, and Energy. The CLRDP as proposed would contribute to the future water supply deficit of the region, which is considered a significant unavoidable impact until sources of additional water supply are identified and developed (Impact 4.16-1). This impact would be reduced under the Reduced Program Alternative relative to the proposed project, but would remain significant and unavoidable.

Other Resources. Neither the proposed project nor the Reduced Program Alternative would result in significant impacts with respect to geology and soils, land use and planning, mineral resources, or public services. The proposed CLRDP would have less than significant project impacts on housing and population. The population and housing impacts of the Reduced Program Alternative would be less than those of the proposed CLRDP and would remain less than significant at the project level.

ABILITY TO ACCOMPLISH PROJECT OBJECTIVES

The Reduced Program Alternative would meet the University's objective of facilitating the orderly, flexible, and environmentally sensitive expansion and development of the UCSC Marine Science Campus in support of the academic, research, and public service missions of the University of California.

Although this alternative would provide a physical framework flexible enough to accommodate new research initiatives, and create a dynamic academic environment, opportunities for collaboration, research and teaching, and room for growth, it would reduce the scope of these opportunities relative to the proposed CLRDP. To the extent that the reduction in space would result in program constraints, the potential of the Campus to attract funding and the development of complementary programs could be reduced. Under this alternative, the facility would have a significantly reduced capacity to become a world-class marine research campus, in that such a status is not only the result of the quality of the science and scientists that participate, but also is the product of the breadth of the related disciplines represented, the number of science staff and supporting facilities, and the opportunities for collaboration among scientists and institutions. Further, the University would not fully realize its objective of responding to the increased current and future demand for marine research and education in California, and the part it would play in ongoing research could be diminished relative to the proposed project.

The reduced size of program space under the alternative would meet the objectives of minimizing cost and site disturbance on the Marine Science Campus, but would remedy current space and program deficiencies to a lesser degree than the proposed project. While the available land resources would be used efficiently, to the extent that program needs could not be met in the reduced space at the site there could continue to be an unmet need for marine research services and education that would eventually have to be met through additional development at this site or at other coastal sites.

Because the on-campus researcher housing element of the proposed project would be included in the Reduced Program Alternative, students, faculty and staff would still be housed under this alternative and the alternative would, therefore, fulfill the goal of providing an environment to enrich and foster interaction of on-campus faculty, researchers, and students in a live-work community. However, fewer researchers and students could be accommodated under the Reduced Program Alternative and in the reduced number of housing units and thus fewer people could share in this enriched environment.

The alternative would provide the same access to seawater as the proposed project. The alternative would provide the same proximity to the Main Campus and the services it would provide as the proposed project. The same square footage of research support facilities included in the proposed CLRDP would also be built under the alternative; thus a greater amount of warehouse and laydown area would be available relative to marine research area under this alternative than under the proposed project.

The alternative would provide the same types of teaching and research uses and the enhancement of the YLR included in the proposed project, but the reduced scale of the alternative probably would reduce the amount of research activity that likely would be focused on this area, relative to the proposed program. Similarly, the alternative would accommodate the same public access and recreation opportunities as the proposed CLRDP, but active recreational and education programs likely would be reduced in scale relative to the reduced scale of the alternative.

The Reduced Program Alternative would be consistent with the project objective of protecting natural resources on site, in that it would rely on infill and clustering of development, possibly to a greater extent than the proposed project. It would include buffers that would protect ESHAs. Like the CLRDP, the alternative would focus on site development that encourages pedestrian travel and minimizes vehicle use. The alternative would also be consistent with the project objective of protecting off site resources. Like the proposed CLRDP, the alternative would include design features that would support transportation alternatives, provide on-site housing, maintain views of the ocean, develop a site plan that is consistent with existing and planned development, and limit infrastructure to foster a stable urban boundary. To the extent that the alternative’s reduction of space would result in a commensurate reduction in public and research programs, the alternative would be somewhat less effective than the proposed CLRDP in meeting objectives with respect to public education and enriched quality of life.

MODIFIED LAND USE DIAGRAM ALTERNATIVE

DESCRIPTION

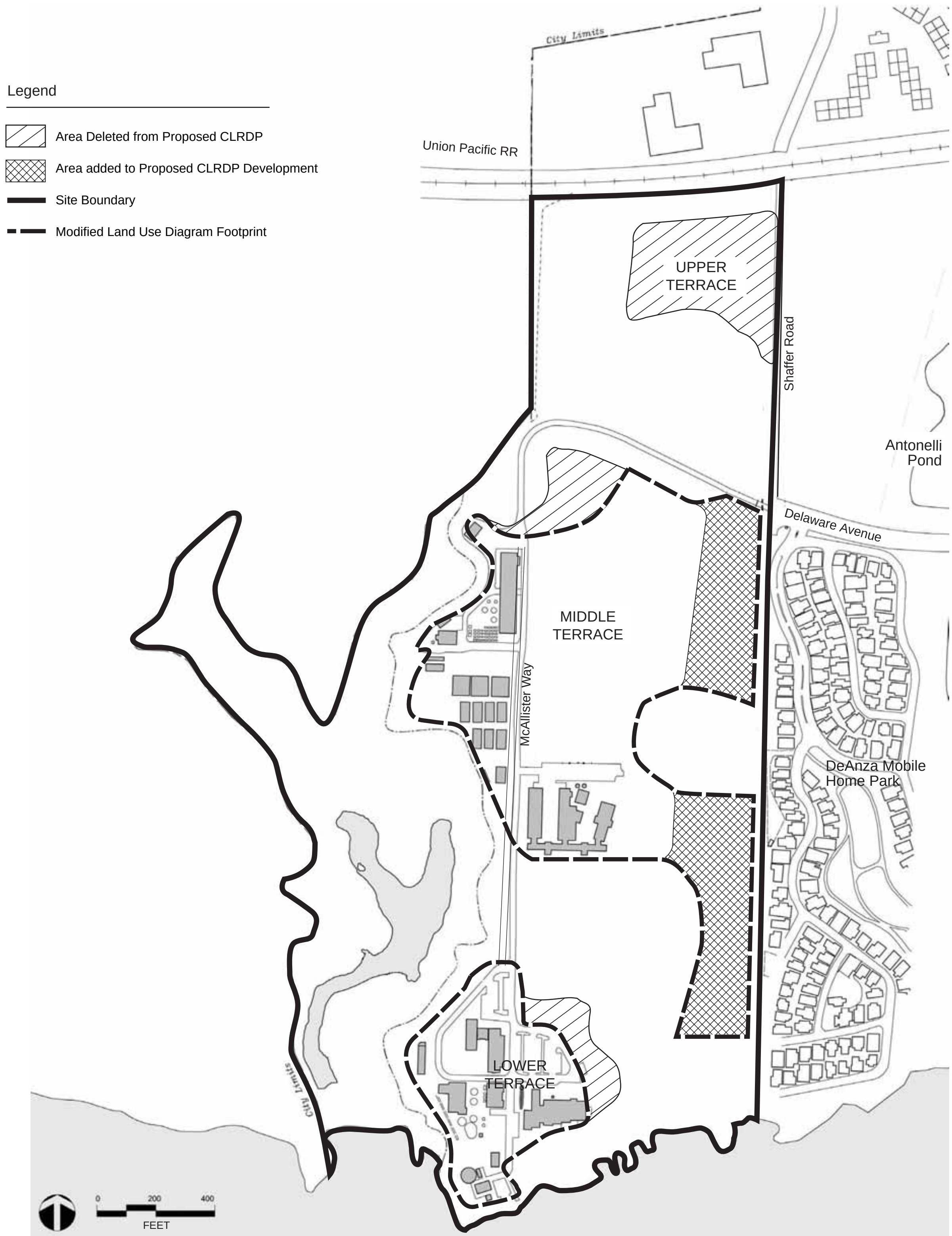
This alternative would eliminate the upper terrace development area, alter and increase the footprint of programmed development within the middle terrace development area, and decrease the development of the lower terrace relative to the proposed CLRDP site plan, as shown on Figure 5-1. The net area of development would be approximately the same as under the proposed CLRDP. Relative to the proposed project, the alternative would provide increased development buffers for wetlands and potential wildlife habitat and habitat corridors on the Marine Science Campus. The wetland, coastal and YLR buffers provided by the proposed CLRDP would be expanded, such that the margin of new development on middle and lower terrace along the YLR boundary would move back (to the east) from the YLR. To compensate for the elimination of the upper terrace development area and reduction in the western extent of the development areas on the middle and lower terraces, the Modified Land Use Diagram Alternative would expand development on the middle terrace to the east and southeast, almost to the property boundary of the De Anza Santa Cruz residential community and southward along this boundary. The effect of these changes would be the elimination of upper terrace development, a slight decrease in expansion of the lower terrace development, and an increase in the footprint of development on the middle terrace. This reconfiguration would thus accommodate approximately the same amount of development as under the proposed CLRDP, and the new development would occur almost entirely on the middle terrace. Further details about the differences between this alternative and the proposed CLRDP are presented below.

With respect to the use of the upper terrace, under the Modified Land Use Diagram Alternative the warehouse and housing uses that would be situated here under the proposed CLRDP would be moved to the middle terrace. This would eliminate the filling of a small non-ESHA wetland that would be necessary to accommodate upper terrace development under the proposed project. This alternative also would leave open space on the upper terrace undeveloped, which would widen the proposed project's wildlife movement corridor across the northern portion of the site.

The Modified Land Use Diagram Alternative would include a 150 to 250-foot-wide buffer around the seasonal pond (Wetland W5), which lies between the middle and lower terrace development areas, in areas where existing development would not preclude such a buffer. This buffer would be slightly wider than under the proposed CLRDP and thus would slightly reduce the extent of development in the southeast corner of the middle terrace and along the northeastern edge of the lower terrace.

On the southern margin of the lower terrace development area, the alternative would also provide of a 300-foot wide bluff-top setback, as compared with a 100-foot setback under the proposed CLRDP. This would reduce the extent of development along the south side of the lower terrace development area by 200 feet relative to the proposed CLRDP.

In addition, the Modified Land Use Diagram Alternative would include several elements that would affect the development of the middle terrace. One of these would be a 100-foot-wide buffer along the eastern edge of the Younger Lagoon Reserve (YLR) in areas where existing



SOURCE: Draft CLRDP

Figure 5-1
Modified Land Use Diagram Alternative

development would not preclude such a buffer. In addition, an upland habitat restoration area would be established in the remaining undeveloped portion of the middle terrace west of McAllister Way, which would provide restored upland habitat adjacent to the YLR. McAllister Way would be rerouted to the east side of the large seasonal pond (Wetland W5), to improve connectivity between the pond and the YLR. The abandoned segment of McAllister Way would be removed and restored to enhance wildlife values. Relative to development under the proposed CLRDP, these elements would reduce extent of development along the western edge of the middle terrace, and effectively would preclude new development west of McAllister Way. However, the extent of middle terrace development would be expanded to the south and west (while maintaining wetland buffers), such that the net area of middle terrace development area would be about 20 percent larger than under the proposed CLRDP.

IMPACTS

Aesthetics. The proposed CLRDP would not result in significant impacts with respect to aesthetics. Under this alternative, since upper terrace development would not take place, views of the northeast portion of the site from Shaffer Road would be preserved. However, because the proposed upper terrace development elements would be relocated to the eastern portion of the middle terrace, development adjacent to the neighboring De Anza Santa Cruz residential community would be denser than under the proposed project and views of the site from Delaware Avenue (at the northern edge of the development) and from residences along the western edge of the housing development could be affected. However, since this is not considered a scenic vista or important view corridor, and since the number of people affected would be quite small, this alternative, like the proposed CLRDP, would not result in significant aesthetics impacts related to scenic vistas. The pattern of development under this alternative would however not allow for the campus site to serve as a transition area between the densely developed areas of the City and the open agricultural fields to the west. This is because the dense development on the middle terrace under this alternative would be immediately adjacent to the De Anza Santa Cruz residential community with no intervening open space and the entire area on the campus south of Delaware Road extension would appear as a westerly extension of the densely developed city area. Under the CLRDP, development would be clustered, with the clusters of development separated by open space. This is the key characteristic of an urban to rural transitional zone, and would be maintained under the CLRDP.

Agricultural Resources. Similar to the proposed CLRDP, this alternative would result in a less than significant impact related to conversion of site land to non-agricultural uses. Like the proposed CLRDP, the Modified Site Plan Alternative would include setbacks from adjacent agricultural operations and other measures to reduce potential for conflicts with agricultural operations.

Air Quality. Although new development under this alternative would be arranged differently than under the proposed CLRDP, this alternative would result in the same amount of development and the same amount of construction activity as the proposed project. Therefore, this alternative would result in similar construction-related air-quality impacts as under the proposed CLRDP. However, because construction would extend closer to the adjacent residential development, the alternative could result in increased local impacts from fugitive dust. Vehicle emissions from project operation under the alternative would be very similar to those anticipated under the proposed CLRDP, and the impacts would be less than significant for both the proposed project and the alternative.

Biological Resources. The Modified Land Use Diagram Alternative would eliminate development on the upper terrace, and thus would not include the filling of a small non-ESHA wetland there. While it would provide wider buffers than the proposed CLRDP around several sensitive habitat areas on the middle and lower terraces, particularly around the YLR, the alternative would increase the amount of development adjacent to these buffers on the middle terrace, and this pattern of development could in particular affect Wetland W4 adjacent to the De Anza Santa Cruz residential community. The increase in the size of the development footprint on the middle terrace would be approximately equal with the size of the development area eliminated on the upper terrace. Therefore, biological resource impacts associated with the loss of coyote brush scrub grassland and non-native grassland habitat under this alternative would be similar to the less than significant impacts of the CLRDP. The less than significant impacts to nesting raptors from construction activities and nesting black swifts that would result from construction of seawater system expansion under this alternative would be the same as those under the proposed CLRDP.

Cultural Resources. Implementation of the proposed CLRDP has the potential to disturb previously undiscovered Native American burial sites, thus resulting in a potentially significant impact on cultural resources (Impact 4.5-1). Because the area that would be affected by construction of new facilities under this alternative would be similar to the CLRDP, the potential for impacts to cultural resources would be similar to the proposed project.

Hazards and Hazardous Materials. With the exception of one potentially significant but mitigable impact associated with the handling of hazardous materials on the Marine Science Campus by non-UC entities, the proposed CLRDP would not result in significant adverse hazards and hazardous materials impacts. The Modified Site Plan Alternative would present the same hazard associated with the handling of hazardous materials by non-UC entities as the CLRDP.

Hydrology and Water Quality. The Modified Land Use Alternative would result in approximately the same amount of impervious surface on the project site as the CLRDP, with no development of new impervious surfaces on the upper terrace, and more extensive development of impervious surfaces on the middle terrace. The Stormwater Concept Plan developed for the CLRDP would ensure that excess runoff and water quality impacts are reduced or eliminated, and includes implementation measures to maintain surface flows at pre-project levels. The alternative would also include a Stormwater Concept Plan. However, because most of the middle terrace area would be developed with facilities under this alternative, there would be limited space on the middle terrace to construct detention facilities and other BMPs that would manage stormwater and facilitate recharge of groundwater. Therefore, it is likely that this alternative would interfere with the full implementation of the Stormwater Concept Plan and therefore under this alternative, impacts to site hydrology and water quality could be greater than under the proposed CLRDP.

Noise. The proposed CLRDP would result in noise impacts including potentially significant but mitigable temporary and periodic increases in noise during construction of proposed facilities during daytime and nighttime hours, potential placement of new development near sensitive resources such as nearby residential neighborhoods, and increases in ambient noise due to operation of HVAC equipment (Impacts 4.11-1 through 4.11-6). Noise impacts under the Modified Land Use Diagram Alternative would be increased relative to those of the proposed CLRDP, because the area of development on the middle terrace would extend closer to existing residential areas to the east. The adjacent residential receptors could also be exposed to higher levels of operational noise due to the closer proximity of middle terrace operations.

Recreation and Public Access. Neither the proposed CLRDP nor the Modified Land Use Diagram Alternative would result in significant impacts to recreational resources. In regard to public access to coastal resources, Implementation Measures 6.1.1 through 6.1.5 that apply to the proposed CLRDP would also apply to this alternative. These implementation measures include accommodating coastal access visitors, providing overlooks for public visual access, offering docent-led tours and education programs for the public, and offering educational programs for pre-college students. Therefore, the recreational impact would be beneficial, and essentially the same for both the CLRDP and the alternative with one exception. Under this alternative, the trail along the eastern campus boundary from the Marine Science Campus entrance toward the ocean that would be enhanced under the CLRDP would not provide the same recreational experience as under the CLRDP because it would be flanked on both sides by development.

Transportation and Traffic. The CLRDP would result in significant unavoidable project-level traffic impacts by increasing traffic volumes at the Mission Street / Bay Street and Mission / Chestnut Street intersections. The Modified Land Use Diagram Alternative would result in similar traffic impacts and would, like the proposed project, contribute considerably to significant cumulative traffic impacts at these two and three other study area intersections because the site population and resultant traffic would be the same as under the CLRDP.

Utilities, Service Systems, and Energy. The CLRDP would contribute to the future water supply deficit of the region, which is considered a significant unavoidable impact until sources of additional water supply have been identified and developed (Impact 4.16-1). Since the amount of development and population would be the same for both the CLRDP and the alternative, the impact of the Modified Land Use Diagram Alternative would be essentially the same as that of the CLRDP, and would be significant and unavoidable.

Other Resources. Neither the proposed project nor the Modified Land Use Diagram Alternative would result in significant impacts with respect to geology and soils, land use and planning, mineral resources, public services, and population and housing. This alternative would not meet one of the planning policies of the CLRDP which is that the development on the Marine Science Campus will be sited and designed to sustain a logical transition from urban landscape to rural and agricultural landscape. The clustered development with intervening open areas under the CLRDP would allow the campus to maintain its rural/urban transitional character. This would not be the case under the Modified Land Use Diagram Alternative.

ABILITY TO ACCOMPLISH PROJECT OBJECTIVES

The Modified Land Use Diagram Alternative would meet almost all of the project objectives of the proposed CLRDP and to a similar degree, since it includes the same program elements and facilities on the same project site, although in a different arrangement. It would develop the same marine research facilities, provide space for new research with access to fresh seawater and proximity to the UCSC Main Campus, and would be equally attractive to outside funding. It would remedy space and program deficiencies to the same extent as would the proposed project. It would also provide opportunities for round-the-clock research immersion; provide research support functions; provide public access and recreation opportunities, and facilitate the development of complementary state and federal programs.

The alternative would site facilities in a different arrangement than under the proposed CLRDP, and thus would use land resources on the Marine Science Campus differently than the proposed project. It would increase coastal buffers and thus minimize potential coastal disturbance to a greater degree than the proposed project, but would result in a similar amount of site disturbance. The changed arrangement would not be inconsistent with the project objective of maximizing the efficient use of land resources on the Marine Science Campus for coastal-dependent, coastal-related and support uses. However, the alternative would consolidate facilities to a greater extent that the proposed project, since the development proposed for the upper terrace would be sited as in-fill or additional development on the middle terrace.

With respect to the project objectives related to protection of on-site and off-site resources, the alternative would further minimize on-site effects to biological resources by the inclusion of larger buffer areas adjacent to YLR and around on-site wetlands, and by avoiding the use of the upper terrace. Like the proposed project, the alternative would support pedestrian travel and minimize the need for vehicle use, minimize the extension of infrastructure, minimize local housing impacts, provide appropriate public coastal access, and be consistent with existing and planned development in the area and with the Coastal Act.

INCREASED PROGRAM ALTERNATIVE

DESCRIPTION

The Increased Program Alternative would include 345,000 square feet of new marine research and education space, 102,100 square feet of support housing, and 143,143 square feet of warehouse space and laydown yard. All other program space would be the same as under the CLRDP. As a result of the additional space for marine research, more group housing space, and slightly more warehouse and laydown area included in this alternative, the building program under this alternative would be about 97,640 square feet larger than the proposed CLRDP. This represents an increase of about 18 percent over the building program of the CLRDP. There would be an associated increase in population with this alternative.

This increased amount of space under the alternative could be accommodated on the Marine Science Campus by increasing the density of development through the reduction of open space and/or increased building height; or by increasing the overall footprint of development, or by a combination of these two approaches. Impacts of the alternative would vary somewhat depending on how the increased program was achieved. The same coastal and wetland buffers would apply as under the proposed CLRDP.

This alternative represents the original development program envisioned for the Marine Science Campus, which was presented at public workshops and to the CCC early in the CLRDP development process. The original development program was substantially reduced for the formulation of the proposed project, in response to the development constraints identified through subsequent studies of the site. Although a higher level of development, such as is proposed under this alternative, is unlikely to reduce the significant environmental impacts of the proposed project, CEQA permits consideration of alternatives that will provide greater project benefits, though at increased environmental costs. This alternative would provide not only greater project benefits but also greater environmental benefits by facilitating a greater amount of marine research.

IMPACTS

Aesthetics. This alternative has greater potential to result in visual quality impacts than does the CLRDP, due to taller, denser, and/or more extensive development under the alternative that likely would be more visually obtrusive. The increased density or size of development would not provide an appropriate transition between urban and rural uses and could block views of some scenic resources and intrude into some scenic vistas not affected by the CLRDP. In addition, the increased development would result in an increase of light and glare on the site because of increased project lighting and glare from autos. The site would have a more urban look than under the proposed project and would not maintain its current visual character, which is that of a rural/urban transition area.

Agricultural Resources. The proposed CLRDP would result in a less than significant impact related to the conversion of site land to non-agricultural uses. The increased level of development in proximity to agricultural fields under the Increased Program Alternative would have increased potential to result in the same indirect impacts to adjacent agricultural resources as the CLRDP. Reduction of these potential impacts to less than significant levels would require mitigation measures such as the maintenance of adequate buffers adjacent to agricultural uses.

Air Quality. Like the proposed CLRDP, the alternative would result in construction-related air quality impacts from the generation of fugitive dust during ground-disturbing construction activities (Impact 4.3-1), and potentially from combustion emissions associated with diesel engines in construction vehicles. If the increased program under this alternative is achieved by enlargement of the development footprint, the alternative could result in the generation of greater amounts of fugitive dust during construction than under the proposed project. If the increased development is achieved through use of higher buildings, fugitive dust emissions would be similar to those of the CLRDP. Irrespective of how the increase is achieved, it likely would require more extensive construction of longer duration. Vehicle emissions and TACs from project operation would increase in approximate proportion to the increase in the development program (see Table 5-1), but likely would remain less than significant.

Biological Resources. The Increased Program Alternative would result in a greater density of development on the site. If this increased development is accommodated entirely by the construction of taller buildings, the total area of wetlands, grasslands, and other habitat lost due to development of the CLRDP would be similar to that of the proposed project. Like the CLRDP, the alternative would result in less than significant impacts with respect to the CRLF (Impact 4.4-1), impacts on nesting raptors (Impact 4.4-2), and potential impact on nesting black swift (Impact 4.4-3) as the CLRDP. In the event that the increased program of this alternative were accommodated by larger building footprints, this alternative could result in greater effects on habitats and greater impacts to the above-mentioned species, although the impacts would still be less than significant for reasons noted for the proposed project.

Cultural Resources. Implementation of the proposed CLRDP has the potential to disturb previously undiscovered Native American burial sites, thus resulting in a potentially significant impact on cultural resources (Impact 4.5-1), which is reduced to a less than significant level by mitigation. The impacts of the alternative would increase relative to those of the CLRDP to the degree that the footprint area that would be affected by construction of new facilities under this alternative would be increased relative to the CLRDP. The impact would be similar to that of the CLRDP if the increase in development is achieved through increased building density and height.

Hazards and Hazardous Materials. Both the proposed project and the Increased Program Alternative have the potential to result in impacts in relation to the use of hazardous material in on-site laboratories operated by non-UC entities. Under the CLRDP, the impact would be mitigated to a less than significant level by the application of mitigation measures that would be built into any lease agreements. To the extent that more such labs were developed under the alternative, the potential impact would be increased. However, the Increased Program Alternative would not present any new hazards or hazardous materials risks not evaluated under the proposed project.

Hydrology and Water Quality. The Increased Program Alternative could increase the amount of impervious surfaces on the project site as compared to the CLRDP, depending on whether the program was achieved through increase in height or increased footprint. The Stormwater Concept Plan developed for the CLRDP would ensure that excess runoff and water quality impacts are reduced or eliminated, and includes implementation measures to maintain surface flows at pre-project levels. The alternative would also include a Stormwater Concept Plan that would address any increase in impervious surfaces. Therefore, like the CLRDP, this alternative would not result in any significant impacts to hydrology and water quality.

Noise. The proposed CLRDP would result in noise impacts including potentially significant but mitigable temporary and periodic increases in noise during construction of proposed facilities during daytime and nighttime hours, potential placement of new development near noise-sensitive resources such as nearby residential neighborhoods, and increases in ambient noise due to operation of HVAC equipment (Impacts 4.11-1 through 4.11-6). Construction noise impacts would be increased under the Increased Program Alternative relative to the CLRDP because of longer duration of construction activity. Construction noise volume would also potentially increase if high-rise structures were used to accommodate the increased research program. Operational noise impacts would be greater under the alternative because a greater number of people on site would be exposed to noise. Also, more noise would likely be experienced at off-site receptors from activities in higher structures or from development that was expanded closer to adjacent uses. Operational noise levels from increased vehicular travel on local roadways and increased on-site HVAC facilities would also increase relative to the CLRDP, but the impact likely would remain less than significant because noise controls would be built into campus designs.

Recreation and Public Access. Neither the CLRDP nor the Increased Program Alternative would result in significant impacts to recreational resources. The greater area of development under the alternative potentially would reduce the open space available for public recreation; however, the impacts of the alternative would still be less than significant, because open space buffers would be included in the design. In regard to public access to coastal resources, Implementation Measures 6.1.1 through 6.1.5 that apply to the proposed CLRDP would also apply to the Increased Program Alternative. These implementation measures include accommodating coastal access visitors, providing overlooks for public visual access, offering docent-led tours and education programs for the public, and offering educational programs for pre-college students. With the inclusion of these measures, both the CLRDP and the alternative would have beneficial effects with respect to providing public education and exposure to ocean research. These beneficial effects would be increased commensurate with the larger program developed under the alternative.

Transportation and Traffic. The CLRDP would result in significant unavoidable project-level traffic impacts by increasing traffic volumes at the Mission Street / Bay Street intersection and the Mission Street / Chestnut Street intersection and would contribute considerably to significant cumulative traffic impacts at these two and three other study area intersections. The Increased Program Alternative would result in greater project-level traffic impacts at these intersections due to the larger site population and associated vehicle traffic, and significant project-level impacts would occur at three to four additional intersections. It would also contribute more traffic to those intersections that would experience significant cumulative traffic impacts.

Utilities, Service Systems, and Energy. The CLRDP would contribute to the future water supply deficit of the region, which is considered a significant unavoidable impact until sources of additional water supply are identified and developed (Impact 4.16-1). This impact would be greater under the Increased Program Alternative, and would remain significant and unavoidable.

Other Resources. Neither the proposed project nor the Increased Program Alternative would result in significant impacts with respect to geology and soils, land use and planning, mineral resources, or public services. The population and housing impacts of the Increased Program Alternative would be greater than those of the proposed project because the population would be larger, but would remain less than significant.

ABILITY TO ACCOMPLISH PROJECT OBJECTIVES

The Increased Program Alternative would meet many of the project objectives even more effectively than would the CLRDP because it would include more research and education space, support facilities, and researcher housing, and provide more opportunities for live-work, round-the-clock research immersion; thus, the alternative would provide a true world-class facility. This alternative would also have an increased beneficial environmental effect in that it would provide increased environmental research, which would be of benefit to the public and to the ocean environment. This alternative would be more effective than the CLRDP in meeting the objectives of providing increased opportunities for marine education and increased public exposure to the results of marine research, and possibly would make a greater contribution to the protection of marine resources. The increased development of the Marine Science Campus site relative to the CLRDP would also reduce future pressure to built marine research facilities on other coastal building sites.

The alternative's increased size would provide more space for new research with access to fresh seawater, would possibly be even more attractive to outside funding, and would facilitate the development of complementary state and federal programs, possibly to a greater extent than the proposed project. The increased development on the Marine Sciences Campus would also be more effective than the proposed project in remedying space and program deficiencies, and in relieving pressure on UCSC Main Campus housing and program space.

However, the greater level of development under the Increased Program Alternative would have diminished ability to meet project objectives with respect to protection of on site and off site resources. The greater density or size of development under the alternative possibly would result in greater impacts to wildlife values than the less than significant impacts of the proposed project. While the alternative could be developed as multi-story buildings (for some facilities), thus preserving more open land for wildlife and open space, the development of higher buildings could result in significant impacts to views, and would conflict with land use planning which emphasizes preservation of the urban/rural boundary. On the other hand, as noted above, the increased size of the program could make it more effective than the proposed CLRDP in meeting objectives with respect to public education and enriched quality of life, which are important on-site and off-site resource protection goals.

PROJECT-BY-PROJECT DEVELOPMENT ALTERNATIVE

DESCRIPTION

Under the Project-by-Project Development Alternative, development on the campus would not be directed by a CLRDP or Master Plan. Instead, individual projects would be proposed by UCSC or non-UC entities and would be considered, approved and developed on a case-by-case basis. While development would be consistent with UC policies and would be subject to CCC requirements and approval, development would be directed by the objectives of each project rather than programmatic or campus-wide objectives, and would hinge on individual environmental analyses and regulatory approvals.

New development under the Project-by-Project Development Alternative likely would be planned consistent with LML Master Plan guidelines, to the extent that these remain current. However, because the LML Master Plan was not approved by the CCC, construction of additional buildings on the site under the alternative, including development on the recently acquired 54.5 acres, would in any case require consideration and approval by the CCC on a project-by-project basis. It is likely that the elements described in the proposed CLRDP would be proposed as individual projects in the future. However, development would not be guided by any overall plan, and therefore would not include the systematic consideration for resource protection included in the CLRDP.

IMPACTS

Aesthetics. Under the Project-by-Project Development Alternative, project planning likely would consider the design guidelines defined in the LML Master Plan to the extent that these remain applicable to the site, and also would be required to be consistent with CCC regulations. As such, projects likely would be limited in height and generally would maintain important view corridors. However, future individual projects could be proposed, which could exceed these limits or that might not be consistent with current guidelines. Individual development would not take into account the overall aesthetic effects of development. In the absence of overall aesthetic planning, significant visual impacts could occur.

Agricultural Resources. The alternative could result in indirect impacts to agricultural resources, including the potential that the proximity of new development would constrain the use of certain agricultural pesticides on adjacent agricultural lands, and the potential for illicit intrusions on adjacent private lands by increased public and research population. The Project-by-Project Development Alternative, without an overall master plan to guide the placement of development and buffers, potentially could be more intrusive on agricultural areas than the proposed CLRDP.

Air Quality. Under the Project-by-Project Development Alternative, the Marine Science Campus would likely grow at a slower rate than under the CLRDP, since project approvals would have to be considered one at a time. Construction-related emissions (Impact 4.3-1) would be reduced at any given time relative to the CLRDP because multiple projects likely would not be constructed simultaneously. Operational vehicle and equipment emissions would increase over time commensurate with the growth of population and related traffic and the development of space and equipment on site. It is likely that, like those of the proposed CLRDP, emissions would remain less than significant, unless much greater square footage were developed under the Project-by-Project Development Alternative, with attendant increased population growth.

Biological Resources. Under the Project-by-Project Development Alternative, the warehouse/laydown and housing development proposed for the upper terrace likely would not be constructed, at least in the near term, since this development element was designed to serve a specific complex of facilities proposed under the CLRDP. Therefore, the less than significant impacts of this development to sensitive species, a non-ESHA wetland and wildlife corridors would be eliminated, at least in the near term. However, development of unknown nature could be proposed for the upper terrace in the future. Because of the marine environmental values associated with Marine Science Campus programs, as well as CCC requirements, new development under this alternative would take into account environmental considerations such as avoidance of wetlands, other ESHAs, and special habitat areas, and would include use of environmental buffers around sensitive areas. However, these considerations would not be applied programmatically, but would have to be addressed on a case-by-case basis and there would be no systematic protection of wildlife corridors or other resources. Under the Project-by-Project Development Alternative, in the event that an expansion of the seawater system is not needed, the impact of the CLRDP with respect to nesting black swift (Impact 4.4-3), which is considered an adverse but less than significant impact, would not occur.

Cultural Resources. The Project-by-Project Development Alternative has the potential to disturb previously undiscovered Native American burial sites (Impact 4.5-1). This cultural resources impact would be potentially significant but mitigable. The extent of the potential impact relative to the CLRDP would depend on the extent of ground disturbance on campus associated with the alternative.

Hazards and Hazardous Materials. Both the proposed CLRDP and the Project-by-Project Development Alternative have the potential to result in potentially significant impacts in relation to the use of hazardous material in on-site laboratories operated by non-UC entities. The extent of the impact would be determined by the area and number of such labs developed over time. However, the impact would be mitigated to a less than significant level under both the project and the alternative by the application of controls that would be built into any lease agreements, which would apply to any development on campus. The Project-by-Project Development Alternative would not present any new hazards or hazardous materials risks not evaluated under the CLRDP.

Hydrology and Water Quality. Because development likely would occur at a slower pace under the Project-by-Project Development Alternative, the amount of impervious surface on the project site would increase more slowly than under the proposed CLRDP. However, the Stormwater Concept Plan that would be implemented as part of the CLRDP would not be implemented under the Project-by-Project Development Alternative. Future hydrology and water quality issues would be addressed and mitigated on a project-by-project basis, and the benefit from the programmatic planning of stormwater management systems would not result.

Land Use and Planning. Under the Project-by-Project Development Alternative, future land uses on the Marine Science Campus likely would be comparable to those analyzed under the LML Master Plan and the individual near-term projects analyzed for the CLRDP, and would be subject to the planning requirements of the CCC. However, development would not be guided by cohesive or programmatic planning, so land use and planning impacts could occur.

Noise. Under the Project-by-Project Development Alternative, potential noise impacts from activities related to the Marine Science Campus would be reduced because there likely would be fewer simultaneous construction projects and possibly overall development would be reduced. Potentially significant noise impacts would still result from construction activity and HVAC equipment of future development on the site. Similarly, noise impacts from increased vehicle traffic would occur under the alternative, but would be reduced relative to the less than significant impacts of the proposed CLRDP.

Recreation and Public Access. The Project-by-Project Development Alternative could result in significant impacts with respect to recreation and public access if proposed projects blocked potential coastal access routes or did not set aside adequate open space. Because the Project-by-Project Development Alternative would not necessarily include the education and public involvement programs and the improvements to trails and overlooks included in the CLRDP, the beneficial effects to recreation and public access of the proposed project could be reduced under this alternative.

Transportation and Traffic. The CLRDP would result in significant unavoidable project-level traffic impacts by increasing traffic volumes at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection. The Project-by-Project Development Alternative likely would result in fewer near-term traffic impacts at these intersections because the growth of site population would be slower. However, it is possible that buildout of the site under the Project-by-Project Development Alternative would result in significant and unavoidable traffic impacts similar to or greater than those of the proposed project. Both the CLRDP and this alternative would contribute considerably to the cumulative traffic impacts on the five study area intersections.

Utilities, Service Systems, and Energy. Both the Project-by-Project Development Alternative and the proposed CLRDP would contribute to the future water supply deficit of the region, which is considered a significant unavoidable impact until sources of additional water supply are identified (Impact 4.16-1). Although development under the Project-by-Project Development Alternative would likely occur at a slower rate than under the CLRDP, this impact would still be considered significant and unavoidable under this alternative.

Other Resources. Neither the proposed project nor the Project-by-Project Development Alternative would result in significant impacts with respect to geology and soils, mineral resources, or public services. The Project-by-Project Development Alternative would likely result in slower population growth at the site than under the proposed CLRDP: the ultimate population growth cannot be determined in the absence of a planning limit. If housing were not built on campus, under the alternative, the campus population would make a greater contribution to housing impacts in the regional communities.

ABILITY TO ACCOMPLISH PROJECT OBJECTIVES

In the absence of the CLRDP, UCSC would likely continue to develop the Marine Science Campus with new marine research and education space, but this development would be on a project-by-project basis, probably would occur at a slower pace, and ultimately might not include some of the elements proposed under the CLRDP. In the absence of an overarching plan, development could be less orderly, and some project elements likely would not be built or would be delayed. To the extent that satisfaction of project objectives relies on physical development, the ability of the campus to respond to future new or expanded initiatives and evolving program needs would also be curtailed. Under the Project-by-Project Development Alternative, full-scale individual environmental reviews would be required for each project, which would be costly both monetarily and in terms of time and effort, and thus inconsistent with CLRDP objectives with respect to cost-effective use of campus resources.

The University's objective of creating a physical framework to support world-class marine teaching, research, and public service mission of the campus would be compromised by the absence of programmatic planning. The ability of the facility to attract outside funding and to form research collaborations on-site with state and federal agencies would be compromised. There likely would be fewer opportunities and less developed space available to accommodate the anticipated research and education demand, and space and program deficiencies would be remedied at a slower rate, if at all. New on-campus housing might not be built and, in the absence of on-site housing, the Marine Science Campus would not be able to fulfill the project objectives of providing students, faculty and staff opportunities to live in this community and participate fully in campus life. In this case, it would not be possible to fulfill the University's objective to promote round-the-clock immersion in the research environment. If the seawater system were not expanded, the opportunities for seawater dependent research would also be constrained. In the absence of joint cohesive planning, it is possible that joint support facilities (such as the shared warehouse and laydown area) would not be built. In this case, new facilities would have to accommodate these functions separately, which could reduce operational efficiency and coordination among users. For these reasons, the Project-by-Project Development Alternative would not meet several of the primary project objectives.

With respect to the CLRDP's resource protection objectives, "piecemeal" planning under the Project-by-Project Development Alternative could result in less efficient use of land resources on the campus. Individual development projects could result in impacts that could be avoided through joint planning. For example, under the Project-by-Project Development Alternative, the Stormwater Concept Plan included in the proposed CLRDP might not be implemented, or could only be implemented piecemeal, rather than across the campus site. It might not be possible to support pedestrian travel, since facilities might be arranged less efficiently, and there could be fewer mixed and complementary uses on site. If housing were not built on campus, the campus population would make a greater contribution to housing impacts in the community. The existing public involvement and education programs would continue, but there would be fewer opportunities for agencies to engage in joint planning and development of expanded programs, and less enrichment of the quality of life in the local and regional community.

Under the Project-by-Project Development Alternative, it is reasonable to assume that development would be cognizant of CCC objectives. Consistent with CCC requirements, development would take sensitive habitats and species into consideration. Infrastructure would be limited to maintain urban/rural boundaries, and view corridors would be considered in project siting. However, in the absence of programmatic planning, development potentially could erode resource values, and the protection against urbanization of the area west of the campus that is provided by the CLRDP through its policies related to fortifying the rural/urban edge, including limiting the extension of utilities, would not be provided. This would be inconsistent with the resource protection objectives of the proposed CLRDP.

NO PROJECT ALTERNATIVE

DESCRIPTION

As required by CEQA Guidelines, this alternatives analysis includes consideration of the No Project Alternative. Under the No Project Alternative, the CLRDP would not be adopted. Under this alternative, no further growth would be planned for the campus. Existing facilities and programs on the campus would continue to operate, with only such population growth as the current facilities can accommodate.

IMPACTS

Aesthetics. Under the No Project Alternative, no new buildings would be developed. Campus aesthetics would be maintained as at present. No impacts are anticipated.

Agricultural Resources. Both the proposed CLRDP and the alternative could result in less than significant indirect impacts to agricultural resources, based on the potential for illicit intrusions on adjacent private lands by public and research populations. The potential for such impacts probably is less under the alternative, because there would be no development on the upper terrace, which is the area in greatest proximity to adjacent agricultural fields.

Air Quality. Under the No Project Alternative, no construction-related emissions would be anticipated. Current operational vehicle and equipment emissions would continue at the same rates, with possibly gradual increases if the existing programs are able to accommodate population growth. Impacts would be expected to be less than significant.

Biological Resources. Under the No Project Alternative, there would be no new development on the middle and lower terraces and the upper terrace would remain undeveloped. The less than significant impacts of the proposed CLRDP with respect to sensitive wildlife and habitat would not occur. On the lower terrace, the seawater system would not be expanded. This would avoid the potential impact on nesting black swift, which under the proposed CLRDP, is considered an adverse but less than significant impact.

Cultural Resources. Under the No Project Alternative, the potential to disturb previously undiscovered Native American burial sites would be reduced, because the only ground disturbance would be for necessary maintenance. The alternative thus has substantially less potential than the proposed CLRDP to result in potentially significant but mitigable impacts to cultural resources.

Hazards and Hazardous Materials. The No Project Alternative would not result in the potentially significant impacts identified for the CLRDP in relation to the use of hazardous material in on-site laboratories operated by non-UC entities. The CLRDP impact would be mitigated to a less than significant level by the application of mitigation measures that would be built into any lease agreements; these mitigation measures are already in place and would continue for existing labs. The No Project Alternative would not present any new hazards or hazardous materials risks not evaluated under the CLRDP.

Hydrology and Water Quality. The No Project Alternative would maintain existing impervious surfaces. Surface runoff and water quality would continue to be monitored and controlled consistent with campus storm water planning, and no significant impacts are anticipated.

However, the Stormwater Concept Plan that would be implemented as part of the CLRDP would not necessarily be implemented under the No Project Alternative, and no programmatic protections would be afforded to campus hydrology and water quality.

Noise. Under the No Project Alternative, no construction activity is anticipated. The No Project Alternative would not result in any increase in operational noise either on or off site from new development.

Recreation and Public Access. Neither the CLRDP nor the No Project Alternative would result in significant impacts with respect to recreational resources. The ongoing education and public involvement programs on campus would continue, but the beneficial effects to recreation and public access that would result from program expansion and other improvements to recreational facilities under the CLRDP would not occur.

Transportation and Traffic. The proposed CLRDP would result in significant unavoidable project-level traffic impacts by increasing traffic volumes at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection. The No Project Alternative would make little or no new contribution to traffic impacts at these intersections because there would be little or no growth of site population. It would also make no contribution to the cumulative traffic impacts at these two and three other intersections.

Utilities, Service Systems, and Energy. The No Project Alternative would not produce new water demands, so it would not make new contributions to the future water supply deficit of the region, which is considered a significant unavoidable impact until sources of additional water supply are identified and developed.

Other Resources. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to geology and soils, land use and planning, mineral resources, or public services. The No Project Alternative would result in little or no population growth at the site. No impact is anticipated.

ABILITY TO ACCOMPLISH PROJECT OBJECTIVES

Under the No Project Alternative, UCSC would continue to operate the Marine Science Campus. This operation would meet some project objectives to the extent that these can be met in the absence of facility growth and expanded programs. However, many of the objectives of the CLRDP are dependent on the development of new marine research and education space, which would not be provided by the alternative.

The University's objective of creating a physical framework to support world-class marine teaching, research, and public service mission of the campus would be compromised by the absence of programmatic planning and new development. The ability of the facility to attract outside funding and to form research collaborations on-site with state and federal agencies would be compromised. The existing public involvement and education programs would continue, but there would be fewer opportunities for agencies to engage in joint planning and development of expanded programs. The ability of the campus to respond to future new or expanded initiatives and evolving program needs would also be curtailed under this alternative, because the existing facilities and program could not accommodate expansion. For these reasons, the No Project Alternative would not meet primary project objectives.

With respect to specific objectives, in the absence of on-site housing, the Marine Science Campus would not be able to fulfill the project objectives of providing students, faculty and staff opportunities to live in this community and participate fully in campus life, and it would not be possible to fulfill the University's objective to promote round-the-clock immersion in the research environment. Since the seawater system would not be expanded, the opportunities for seawater dependent research would also be constrained. Support facilities (such the shared warehouse and laydown area) likely would not be built, so these functions would have to occur off campus. None of the specific functional objectives of the project would be met.

The No Project Alternative would be consistent with the achievement of some but not all of the project objectives with respect to protection of natural resources on site and other resources off site. Since there would be no new development, existing potentially sensitive habitat areas and view corridors would be preserved. Although programs that enrich the quality of life and respect for the ocean environment would continue, their growth would be limited. In summary, the No Project Alternative would not be consistent with all of the primary objectives of the project although it would meet some of the project objectives related to the protection of resources.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

An EIR is required to identify the environmentally superior alternative—that is, the alternative having the potential for the fewest significant environmental impacts—from among the range of reasonable alternatives that are evaluated. Table 5-2 provides a summary comparison of the impacts of the alternatives with those of the proposed CLRDP. The No Project Alternative would reduce or avoid the potential environmental impacts of development under the proposed CLRDP. Because the alternative would include no new development and only slight and gradual population increases, the significant traffic impacts of the CLRDP would not occur, and the cumulative impact relative to water demand would be substantially smaller than that of the proposed project. In addition, this alternative would not result in the proposed project's impacts due to ground disturbing activities, such as those related to cultural and biological resources and increase in impervious surfaces. While the No Project Alternative would meet some project objectives with respect to preservation of resources, it would meet none of the project's primary objectives associated with program development and growth.

If the environmentally superior is the No Project Alternative, CEQA Guidelines Section 15126(d)(2) requires that the EIR shall identify another alternative as environmentally superior.

Of the remaining alternatives, the Reduced Program Alternative would be considered environmentally superior. It would reduce or avoid almost all environmental impacts of the development under the CLRDP. The increase in site population would be relatively small under this alternative and traffic impacts would be less than those under the proposed project, and in particular, the significant and unavoidable impact at the Mission Street / Bay Street and Mission Street / Chestnut Street intersections would be avoided, although the significant cumulative traffic impact would still occur. The smaller development program under this alternative would also reduce impacts associated with construction activity and ground disturbance relative to the proposed project, and would reduce the water demand impacts of the proposed project, although not to less than significant levels. These reduced impacts would be consistent with the achievement of some of the resource protection goals of the proposed project. However, because of the limited scope of development under this alternative, it would be less effective than the CLRDP in meeting many of the project objectives with respect to expansion of facilities and programs and development of a world-class marine study campus.

TABLE 5-2
COMPARISON OF ALTERNATIVES TO THE CLRDP

ALTERNATIVE	CLRDP	Reduced Program	Modified Land Use Diagram	Increased Program	Project-by-Development Project	No Project
Ability to Reduce Environmental Impacts						
Aesthetics	LS	=	+	+	+/=	-
Agricultural Resources	LS	-/=	=	+	+/=	-
Air Quality	LS	-	=	+/=	-/=	-
Biological Resources	LS	-/=	-/=	+/=	+/=	-
Cultural Resources	LS	-	=	=	-/=	-
Geology and Soils	LS	=	=	=	=	-
Hazards and Hazardous Materials	LS	-	=	=	=	-
Hydrology and Water Quality	LS	-	+/=	+/=	+/=	=/-
Land Use and Planning	LS	=	+/=	=	+/=	-
Mineral Resources	LS	=	=	=	=	=
Noise	LS	-	+	+	-	-
Population and Housing	LS	-/=	=	+/=	=	-
Public Services	LS	=	=	=	=	-
Recreation and Public Access	LS	-/=	=	+/=	+	=
Transportation/Traffic	SU	- (LS*)	=	+	=**	- (LS)
Utilities, Service Systems, and Energy	SU	=	=	+	-/=	=
Ability To Meet Project Objectives	Meets	-	=	+	-	-

* LS for project level impacts; the cumulative traffic impact would remain SU.
** Impacts could be less than those of proposed project in near term but ultimately could be equal or greater depending on ultimate extent of development.

F. ALTERNATIVES FOR NEAR-TERM PROJECTS

In addition to analyzing alternatives to the CLRDP, this chapter considers alternatives to the five near-term projects that are proposed and analyzed in this EIR. For each of the five proposed projects, the following analysis considers several alternatives for their ability to reduce significant environmental impacts of the proposed project and to meet project objectives. Alternatives considered but not carried forth for detailed evaluation are also briefly discussed and reasons are presented as to why those alternatives were not evaluated in detail.

SHARED CAMPUS WAREHOUSE AND LAYDOWN FACILITY

The proposed project is a Shared Campus Warehouse and Laydown Facility, which would provide joint-use space for four Marine Science Campus agencies (USGS, CDFG, NMFS, and UCSC) for storage, maintenance of boats and equipment, on-site outfitting of ocean-going research vessels, maintenance and repair of equipment such as large nets and bottom samplers, staging of equipment and materials for research projects, and additional open storage space for ocean-going vessels. The facility would include two 35-foot-tall buildings that would provide 37,500 sf of shared warehouse space, and 70,000 sf of shared laydown yard, and would be constructed on the upper terrace adjacent to Shaffer Road. The facility would have its own staff of about 10 persons, although marine science researchers would also work at the facility.

The objectives of the proposed project are to provide warehouse and laydown areas that:

- Are of sufficient size and adequate arrangement to be serviceable for four users on the Marine Science Campus: UCSC, CDFG, USGS and NMFS, for field research activity that requires warehousing of specialty equipment and sea-going gear, shops to develop and maintain such equipment and gear, storage of small boats and other equipment on trailers, and open space to accommodate the laydown and staging of equipment and gear prior to ocean deployment.

- Facilitate the sharing of equipment, facilities and materials and thus avoid duplication of services and expenses.

- Include outdoor space for deployment and equipment staging that can be shared by Marine Science Campus users.

- Are situated in close proximity to the marine research facilities of the users to facilitate the efficient use of time and avoidance of traffic issues for the frequent contact needed between research laboratories and service support.

The implementation of the proposed project would result in less than significant impacts with respect to biological resources, air quality and aesthetics, and potentially significant but mitigable impacts with respect to cultural resources and noise. It would contribute to the significant unavoidable cumulative impacts of the proposed CLRDP with respect to demand on the limited regional water supply, and to decreased levels of service at study area intersections, although it would not result in a project-level traffic impact.

Four project alternatives are carried forward below for detailed evaluation: the Reduced Shared Warehouse and Laydown Facility Project Alternative, the Individual Laydown Yards Alternative, the Alternate Shared Warehouse and Laydown Facility Site Alternative, and the No Project Alternative. Each of the four alternatives is considered with respect to its ability to reduce the significant environmental impacts and to meet project objectives of the proposed Shared Campus Warehouse and Laydown Facility Project.

For reasons discussed above under Partial Off-Site Alternative for the CLRDP, an off-site location for the Shared Warehouse and Laydown Facility was considered but not carried forth for detailed evaluation as a project alternative. However, the No Project Alternative for this project assumes that the effect of not developing a shared warehouse/laydown facility on the campus would be the use of off-site facilities for these functions.

REDUCED SHARED WAREHOUSE AND LAYDOWN FACILITY ALTERNATIVE

Description

The Reduced Shared Warehouse and Laydown Facility Alternative (hereinafter Reduced Project Alternative) would be constructed at the proposed location on the upper terrace, but both the warehouse and the laydown facility would be reduced in size relative to the proposed project. The warehouse space would be reduced from the proposed 37,500 to about 23,300 sf. The building height of 35 feet would be unchanged. The laydown yard would be reduced from the proposed 70,000 sf to about 33,000 sf. The facility would be jointly used by UCSC, NMFS, CDFG and USGS, but some equipment for each entity would need to be stored adjacent to the individual marine research facilities, which could entail the need to develop additional paved areas adjacent to each marine research facility, particularly on the middle terrace. Activities requiring the use of the laydown facility would need to be scheduled among the users, as there would not be enough area for simultaneous uses.

Impacts

Aesthetics. The Reduced Project Alternative would reduce the amount of proposed development on the upper terrace and leave more open space, and thus would provide a more rural visual aspect than the proposed project. Thus, the less than significant aesthetic impacts of the proposed project would be reduced by the alternative. Like the proposed project, the alternative would not obtrude on view corridors.

Agricultural Resources. Both the proposed project and the Reduced Project Alternative have the potential to constrain the agricultural use of adjacent lands, including the use of agricultural pesticides. This impact would be reduced, for both the project and the alternative, by the measures included in the CLRDP. The reduced population associated with the smaller alternative facility would reduce its contribution to the impact identified in CLRDP analysis with respect to potential for trespass and other intrusions from the campus on adjacent lands; however, this impact in any case is less than significant with the setbacks and other measures included in the CLRDP.

Air Quality. The Reduced Project Alternative would result in lesser construction-phase air quality impacts than the proposed project, because it would require a shorter construction period, and because a smaller ground area would be disturbed. The construction-phase significant dust impact would be avoided. Emissions from project-associated traffic would be reduced under the alternative.

Biological Resources. Relative to the proposed project, the Reduced Project Alternative would reduce new impervious surface area and leave more undeveloped open space on the upper terrace. The smaller facility design, however, would not avoid the filling of a small non-ESHA wetland on the upper terrace, as this is located in the area that would be developed. Wildlife and wetland buffers included in the proposed project would be maintained or increased under the alternative. With the measures included in the CLRDP, the potential impacts of both the proposed project and the alternative to sensitive species and habitats would remain less than significant.

Cultural Resources. The Reduced Project Alternative has reduced potential, relative to the proposed project, to disturb previously undiscovered Native American burial sites (Impact 4.5-1), since the area of site disturbance would be reduced under the alternative. Like the proposed project, this alternative could result in potentially significant but mitigable impacts to cultural resources.

Hazards and Hazardous Materials. The proposed project has the potential to result in impacts in relation to the use of hazardous material by non-UC entities on campus, to the extent that hazardous materials (such as solvents or other chemicals) are used at the warehouse and laydown facility by non-UC entities. This potential impact would be reduced under the alternative to the extent that uses of hazardous materials were reduced by the decreased amount of space. However, the impact would be reduced to less than significant levels under both the proposed project and the alternative by the application of mitigation measures that are included in UCSC operating and monitoring procedures, and that would be enforced at the facility as a condition of use. The Reduced Project Alternative would not present any new hazards or hazardous materials risks not evaluated under the proposed project.

Hydrology and Water Quality. The Reduced Project Alternative would reduce the amount of impervious surface on the project site relative to the proposed project. However, potential hydrologic and water quality impacts related to runoff are addressed by the Stormwater Concept Plan that would be implemented as part of the CLRDP and that would apply to both the proposed project and the alternative. Potential hydrology and water quality impacts of the alternative thus would be less than significant.

Noise. Under the Reduced Project Alternative, potential noise impacts from both construction and operation would be decreased relative to the proposed project because of the decreased duration of construction, and the decreased level of activity and traffic directly associated with a smaller facility. However, construction noise impacts would not be significant for both the proposed project and the alternative because of the distance to sensitive off-site receptors.

Population and Housing. The Reduced Project Alternative would result in a decreased contribution, relative to the proposed project, to the less than significant impact of the CLRDP with respect to population growth in the Santa Cruz area.

Recreation and Public Access. Neither the proposed project nor the Reduced Project Alternative would result in impacts to recreation and public access.

Transportation and Traffic. Compared to the proposed project, the alternative would make a smaller contribution to the significant unavoidable traffic impacts of the proposed CLRDP from increased traffic volumes at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection, and to the cumulative traffic impact at these two and four other study area intersections. At the project level, these impacts would be less than significant for both the project and the alternative, and the project's and the alternative's contribution to all of these impacts would not be cumulatively considerable.

Utilities, Service Systems, and Energy. The Reduced Project Alternative would make a smaller contribution than the proposed project to the significant unavoidable cumulative impact on the future water supply deficit of the region, which would necessitate the development of new water supply sources (Impact 4.16-1).

Other Resources. Neither the proposed project nor the alternative would result in significant impacts with respect to geology and soils. Like the proposed project, the alternative would be subject to the CLRDP. No significant land use and planning impacts are anticipated. Because the project site does not contain mineral resources, neither the proposed project nor the alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the Reduced Project Alternative would result in significant impacts with respect to public services.

Ability to Meet Project Objectives

The Reduced Project Alternative has only limited ability to meet project objectives. While the alternative would provide some room for activities that require large staging and work areas, and some warehouse space, the amount of space would be inadequate for the current and projected needs of all the users, and probably would not be functional for much joint use. The likely result of having inadequate space at this facility would be substantial competition for use of the limited available space. The four entities that would use the facility might respond to unmet needs by developing individual laydown yards and warehouse space, which would result in additional costs and operational inefficiencies associated with location and use of individual warehouse and laydown/service facilities, duplication of equipment, facilities and materials and, potentially, additional environmental impacts.

INDIVIDUAL LAYDOWN YARDS ALTERNATIVE

Description

The Individual Laydown Yards Alternative would develop warehouse space and laydown yards adjacent to individual marine research facilities and would not provide a centralized shared warehouse space and laydown yard at a single location, and the proposed warehouse and laydown project on the upper terrace would not be developed.

Under this alternative, the four agencies that would have shared in the use of the shared facilities would each build its own warehouse and laydown yard adjacent to existing or proposed facilities on the middle terrace. UCSC would require about 2,500 sf of warehouse space and a 5,000-sf laydown yard, which would be located adjacent to proposed Marine Research and Education buildings on the middle terrace. CDFG would require 5,000 sf of warehouse space and a 5,000-sf laydown yard which would be developed adjacent to its existing middle terrace facilities. NMFS facilities to be developed on the middle terrace would include an 11,500-sf warehouse and 33,000 sf laydown facility. USGS would require a warehouse of about 18,500 sf and a laydown facility of at least 44,000 sf (and up to 87,120 sf) which also likely would be located adjacent to its existing or proposed facilities on the middle terrace. Depending on available space and selected locations, some of these facilities possibly could be adjacent and could be combined, with attendant space savings. In this case, warehouse/laydown spaces might be used jointly by one or more agencies. For example, USGS and CDFG could share a single facility, possibly on the northern part of the middle terrace. UCSC and NMFS possibly could share a facility on the southern part of the middle terrace. These individual facilities would be highly accessible to the adjacent facilities and would not require transportation of materials and equipment between individual facilities and the joint facility, although staged equipment would still be moved on and off site by vehicle. Adjacency to the existing facilities possibly would reduce the need for dedicated personnel at the separate warehouse/ laydown yard, and could provide added security for equipment and facilities. Some duplication of facilities and services between the two facilities would be likely.

As described above, total development area under this alternative could be as much as 37,500 sf of warehouse space and 87,000 to 130,120 sf of laydown facility space on the middle terrace. In total, these individual developments would represent about the same amount of warehouse space as under the proposed project, but an increase of almost 50,000 sf in laydown facility space. This increased laydown space would be required because breaking up the larger single space would eliminate the efficiencies offered by shared use of access lanes, driveways and temporarily- or intermittently-used large open spaces. Each facility would maintain its own areas of these kinds under this alternative.

This alternative would increase the development footprint in the middle terrace area by at least 124,500 sf, which would require reconfiguration of parking areas and research facilities shown in the CLRDP Prototype Site Plan (see Figure 3-7), and would result in a substantial reduction in available open space in the middle terrace, including the likely elimination of the "Meadow" shown adjacent to the USGS Phase I Project site in the CLRDP Prototype Site Plan.

It is assumed that the individual warehouse/laydown facilities would be developed consistent with CLRDP design guidelines, and would take into account the wildlife and wetland buffers included in the proposed CLRDP and the individual projects.

Impacts

Aesthetics. The Individual Laydown Yards Alternative would reduce development on the upper terrace relative to the proposed project, and thus would reduce the proposed project's less than significant impact with respect to views from off-site locations. The alternative concomitantly would reduce open space and include much denser development on the middle terrace, which could result in somewhat diminished views as a result of an increasingly urban visual aspect. Buildings under both the proposed project and the alternative would be constructed in keeping with CLRDP design guidelines and CCC policies, and thus would be limited in height and would maintain important view corridors. The impact would be less than significant.

Agricultural Resources. On account of the measures included in the CLRDP, neither the proposed project nor the alternative would result in indirect impacts to agricultural resources, including the potential that the proximity of new and expanded development would constrain the use of certain agricultural pesticides on adjacent agricultural lands, and the potential for illicit intrusions on adjacent private lands by increased public and research population. Neither the proposed project nor the alternative would result in a significant direct impact on agricultural resources.

Air Quality. The alternative would result in the development of greater square footage and larger areas of ground disturbance relative to the proposed project, and thus would increase construction-related emissions, including vehicle emissions and fugitive dust (Impact 4.3-1). This increase in emissions relative to the proposed project would be a significant impact of the alternative. Operational equipment emissions would also be increased to the extent that additional uses were associated with the larger area of laydown facilities.

Biological Resources. The proposed project would result in filling of a small non-ESHA wetland on the upper terrace and in impacts to wildlife movement and habitat, which would be less than significant due to the measures included in the CLRDP. As no warehouse facility would be developed on the upper terrace, the proposed project's less than significant impacts on the upper terrace would be avoided. The development of two or more larger individual facilities on the middle terrace would result in a substantial increase in the development of impervious surfaces on the middle terrace and possibly more use of heavy equipment in areas closer to the YLR, with potential noise impacts to wildlife in this area. However, much of this development likely would affect the previously graded areas on the middle terrace, which have relatively low wildlife habitat value. Further, under both the proposed project and the alternative, wetland, wildlife and habitat impacts would be reduced to less than significant levels through measures included in the CLRDP including buffers around sensitive areas and management of stormwater runoff. Overall, the level of impacts would be approximately the same for the alternative as for the proposed project.

Cultural Resources. The alternative has a higher potential than the proposed project to disturb previously undiscovered Native American burial sites (Impact 4.5-1), since the overall area of ground disturbance would be increased by the alternative. Like the proposed project, this alternative could result in potentially significant but mitigable impacts to cultural resources.

Hazards and Hazardous Materials. The proposed project has the potential to result in impacts in relation to the use of hazardous material by non-UC entities on campus to the extent that hazardous materials (such as solvents or other chemicals) would be used by non-UC entities working at the warehouse and laydown facility. This potential impact would be increased under the alternative to the extent that uses of hazardous materials were increased by the increased amount of space. However, the impact would be reduced to less than significant levels under both the proposed project and the alternative by the application of mitigation measures that are included in UCSC operating and monitoring procedures, and that would be enforced at the facility as a condition of use or condition of the ground lease. The alternative would not present any new hazards or hazardous materials risks not evaluated under the proposed project.

Hydrology and Water Quality. The alternative would eliminate the proposed project's development of impervious surfaces on the upper terrace, but would substantially increase the impervious surface area on the middle terrace. However, the Stormwater Concept Plan, which would be implemented as part of the CLRDP and would also apply to both the project and the alternative, would address and mitigate runoff issues. The alternative therefore would not result in significant impacts to hydrology and water quality.

Noise. More space would be developed under the alternative, and it thus would result in increased scale and duration of construction activity. The two individual projects could be constructed simultaneously, which could also increase short-term noise. Operational noise impacts also might be greater relative to the proposed project, to the extent that multiple noise-producing operations were conducted simultaneously. The increased proximity to existing facilities and the YLR of outdoor work areas where heavy equipment would be present might also increase the level of noise impacts. However, CLRDP noise restrictions and buffers would apply to both the proposed project and the alternative and would reduce potential construction and operational noise impacts to less than significant levels.

Population and Housing. Because more staff could be required to operate multiple yards at discrete separate locations, the alternative could make a slightly larger contribution than the proposed project to the less than significant impact of the CLRDP with respect to population growth in the Santa Cruz area. This impact also would be less than significant at the project level.

Recreation and Public Access. The alternative would reduce the amount of open space on the middle terrace, without the concomitant benefit of other middle terrace development of increasing public access and interpretation activities. However, public access would be maintained under the alternative, and neither the proposed project nor the alternative would result in significant impacts with respect to recreational resources.

Transportation and Traffic. The proposed project and the alternative would contribute about equally to the significant unavoidable traffic impacts of the proposed CLRDP at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection, and to the cumulative traffic impact at these two and four other intersections. At the project level, these impacts would be less than significant for both the project and the alternative, and the project's and the alternative's contribution to all of these impacts would not be cumulatively considerable.

Utilities, Service Systems, and Energy. Compared to the proposed project, the alternative would make a slightly greater contribution to the significant unavoidable cumulative impact on the future water supply deficit of the region, which would necessitate the development of new water supply sources (Impact 4.16-1).

Other Resources. Neither the proposed project nor the alternative would result in significant impacts with respect to geology and soils. Since the alternative, like the proposed project, would be developed consistent with the CLRDP, the land use impacts are anticipated to be less than significant. Because the project site does not contain mineral resources, neither the proposed project nor the alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

This alternative would place maintenance and laydown yards closer to the facilities that would make the most use of them, and would therefore further promote project objectives relating to providing equipment storage, maintenance, and laydown areas that are within quick and easy access of campus laboratories, classrooms, and offices. It would also be more satisfactory than the proposed project in providing an optimal amount of laydown space, which was scaled down under the proposed project to meet CLRDP objectives with respect to open space and natural resources. The alternative would not meet the project objective of providing facilities that can be shared and avoiding duplication of equipment, tools and services.

ALTERNATE SHARED WAREHOUSE AND LAYDOWN FACILITY SITE ALTERNATIVE

Description

Under the Alternate Shared Warehouse and Laydown Facility Site Alternative (hereinafter Alternate Site Alternative), the 37,500 square feet of warehouse space and the 70,000 square-foot laydown yard would not be developed on the upper terrace, but would instead be located at the middle terrace site proposed in the CLRDP for development of the SORACC. This would preclude the use of the site for the SORACC, for which another site would have to be identified. The Alternate Site Alternative would occupy a substantially larger footprint in the western portion of the middle terrace than would the SORACC and its associated outdoor research area, such that some parking areas and research facilities shown in the CLRDP Prototype Site Plan (Figure 3-7) would have to be reconfigured. Open space in the middle terrace would be reduced. It is assumed that the facilities would be developed under the alternative consistent with the CLRDP. Therefore, the wildlife and wetland habitat buffers such are included in the proposed project and building heights would also be maintained for the alternative.

Impacts

Aesthetics. The alternative would result in a reduction of open space on the western part of the middle terrace. The upper terrace would remain as undeveloped open space in the near term. The Marine Science Campus would continue to present a less developed visual aspect for viewers from roads to the north of the site. A warehouse and laydown facility at the alternate site could project a somewhat more industrial visual impression of this area of the campus, but the facility would not be markedly different in appearance than surrounding facilities and the impact would be anticipated to be less than significant. Buildings would be constructed in keeping with the design guidelines defined in the CLRDP. It is anticipated that the aesthetic impacts of the proposed project and the alternative would be similar and that either would be less than significant.

Agricultural Resources. Neither the proposed project not the alternative would result in significant direct and indirect impacts to agricultural resources, including the potential that the proximity of new development would constrain the use of certain agricultural pesticides on adjacent agricultural lands, and the potential for illicit intrusions on adjacent private lands by increased public and research population. At this site, the alternative would require the removal of greenhouses, some of which are in agricultural use. However this would not be a significant impact of this alternative because of the small size of conversion.

Air Quality. The proposed project and the alternative would have identical impacts upon air quality as the result of construction and operational emissions. The impact associated with construction dust would be significant and would require mitigation.

Biological Resources. Under this alternative, the proximity of the warehouse and laydown yard to the YLR could increase the potential for biological impacts in relation to the potential to cause "startle" noise effects, glare, and related disturbances that could affect wildlife and habitat values of the YLR. All development in this area would be set back from the lagoon by an undeveloped buffer, which would reduce light and glare impacts but it is likely that the shared warehouse project at this site would not be able to comply with CLRDP requirement of keeping noise at or below 60 decibels at the site boundary with YLR.

Because the relocation of the warehouse and laydown facilities would result in less construction in the upper terrace development area, this alternative would increase open space and would not reduce upland habitat area there. This would eliminate the impacts of the proposed project in that area, which, however, are less than significant in any case due to measures included in the CLRDP.

Cultural Resources. The proposed project and the alternative would have the same potential to disturb previously undiscovered Native American burial sites (Impact 4.5-1) as the result of ground disturbance, since both would affect the same amount of ground area. Like the proposed project, this alternative could result in potentially significant but mitigable impacts to cultural resources.

Hazards and Hazardous Materials. The proposed project and the alternative have the same potential to result in impacts in relation to the use of hazardous material by non-UC entities on campus, to the extent that hazardous materials (such as solvents or other chemicals) are used at the warehouse and laydown facility by non-UC entities. However, the impact would be reduced to less than significant levels under both the proposed project and the alternative by the application of mitigation measures that are included in UCSC operating and monitoring procedures, and that would be enforced at the facility as a condition of use. The Alternate Site Alternative would not present any new hazards or hazardous materials risks not evaluated under the proposed project.

Hydrology and Water Quality. The proposed project and the alternative each would result in development of the same amount of new impervious surface; the proposed project on the upper terrace, and the alternative on the middle terrace. The Stormwater Concept Plan that would be implemented as part of the CLRDP would apply to both the proposed project and the alternative and would reduce potential impacts to hydrology and water quality to less than significant levels. This alternative would therefore not result in significant impacts to hydrology and water quality.

Noise. Both the alternative and the proposed project would entail short-term construction noise and subsequent operational noise. The elimination of the use of the proposed upper terrace site would avoid the proposed project's less than significant construction noise impacts on off-site receptors. However, the use of the alternate site for the warehouse and laydown facility possibly would result in increased construction and operational noise impacts to closely adjacent facilities on the middle terrace, a potentially significant impact. Thus the noise impacts of the alternative would be greater.

Population and Housing. The alternative and the proposed project would make the same contribution to the less than significant impact of the CLRDP with respect to population growth in the Santa Cruz area.

Recreation and Public Access. Neither the proposed project nor the alternative would result in significant impacts with respect to recreational resources.

Transportation and Traffic. The proposed project and the alternative would make the same contribution to the significant unavoidable traffic impacts of the proposed CLRDP at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection, and to the cumulative traffic impact at these two and four other study area intersections. At the project level, these impacts would be less than significant for both the project and the alternative, and the project's and the alternative's contribution to all of these impacts would not be cumulatively considerable.

Utilities, Service Systems, and Energy. Both the alternative and the proposed project would make the same contribution to the significant unavoidable cumulative impact on the future water supply deficit of the region, which would necessitate the development of new water supply sources (Impact 4.16-1).

Other Resources. Neither the proposed project nor the alternative would result in significant impacts with respect to geology and soils. Because the campus site does not contain mineral resources, neither the proposed project nor the alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the alternative would result in significant impacts with respect to land use and public services.

Ability to Accomplish Project Objectives

The Alternative Site Alternative would place the shared warehouse and laydown yard closer to all the facilities that would make the most use of them, and would therefore be more effective than the proposed project in promoting project objectives relating to providing equipment storage, maintenance, and laydown areas that are within quick and easy access of campus laboratories, classrooms, and offices. The alternative would provide the same amount of outdoor work space as the proposed project, and would be of sufficient size and adequate arrangement to be serviceable to anticipated users. The alternative would meet the objective of providing joint work spaces that would reduce duplication of tools and materials to the same degree as the proposed project.

NO PROJECT ALTERNATIVE

Description

Under the No Project Alternative, no shared warehouse and laydown facility would be developed on the Marine Science Campus and the upper terrace site would remain undeveloped in the near term. Nonetheless, there would continue to be a need for a shared warehouse/laydown facility, since its functions are considered essential to the implementation of the program envisioned for the Marine Science Campus. These include routine research support activities, such as outfitting of ocean-going research vessels, staging for scientific fieldwork, and maintenance, repair, and development of instrumentation and equipment. Facilities currently operating on campus use parking areas or other areas adjacent to their buildings or off-site areas on an ad hoc basis, as feasible, to conduct these activities.

Commensurate with an increase in marine research space on the campus, such as is envisioned under the CLRDP, there would be an increased need for warehouse and laydown space. As warehouse and laydown space requirements are anticipated to grow hand-in-hand with increased development on campus, it would be difficult to meet this increased need without the designation of space specifically for these purposes. In the absence of a shared warehouse and laydown facility on the Marine Science Campus such as would be developed under the proposed project, the entities that require these facilities would have to provide individual facilities on campus (as described above under Individual Facilities Alternative) or would lease already-developed facilities in the City that could be adapted to these uses. Since the development of individual facilities is already considered as a separate alternative, above, the No Project Alternative evaluated below therefore is defined as the use of existing space at undetermined off-site locations for warehouse and laydown facility functions.

Impacts

Aesthetics. Under the No Project Alternative, no shared warehouse and laydown yard would be developed on the upper terrace. The less than significant impacts of the project with respect to changes in visual aspect there would not occur. Because the required facilities would occupy already developed space at off-site locations, there would be no visual impacts at those sites that would be associated with the development of new facilities.

Agricultural Resources. The No Project Alternative would avoid the less than significant direct and indirect impacts of the project to agricultural resources, including the potential that the proximity of new development would constrain the use of certain agricultural pesticides on adjacent agricultural lands, and the potential for illicit intrusions on adjacent private lands by the increased public and research population. Because the required facilities would occupy already developed space at off-site locations, there would be no agricultural resource impacts at those sites that would be associated with the development of new facilities.

Air Quality. Under the No Project Alternative, the significant impact associated with project construction dust emissions would not occur. Operational air emissions would likely be greater than those of the proposed project, because frequent vehicle travel to access warehouse and laydown space at the offsite locations would be necessary.

Biological Resources. Under the No Project Alternative, the warehouse/laydown and proposed on the upper terrace would not be constructed. This would eliminate the less than significant impacts of the proposed project with respect to wildlife corridors, a non-ESHA wetland, and sensitive species. Because the required facilities would occupy already developed space at off-site locations, there would be no biological resource impacts at those sites that would be associated with the development of new facilities.

Cultural Resources. The No Project Alternative would avoid the potentially significant but mitigable cultural resources impact of the proposed project in relation to the potential to disturb previously undiscovered Native American burial sites. Because the required facilities would occupy already developed space at off-site locations, there would be no cultural resource impacts at those sites that would be associated with the development of new facilities.

Hazards and Hazardous Materials. To the extent that non-UC entities moved their warehouse and laydown operations off site into leased space, the No Project Alternative would eliminate the proposed project's potentially significant but mitigable impact in relation to the use of hazardous materials on campus by non-UC entities.

Hydrology and Water Quality. Under the No Project Alternative, impervious surfaces that would have been developed on the upper terrace would remain in open space, at least in the near term. Because the required facilities would occupy already developed space at off-site locations, there would be no impact at those sites that would be associated with increased runoff from the development of new facilities.

Noise. Under the No Project Alternative, potentially significant noise impacts from project construction would be eliminated. The operations that would have been conducted at the proposed facility would be conducted off site. In the absence of a specific location where the proposed facility might be located, operations noise impacts at that location cannot be characterized. However, the dispersed, periodic and generally low level noise from these operations would not be expected to result in significant noise impacts. Traffic noise levels associated with this alternative would be greater because a large number of daily trips would be added to the City roadways between the Marine Science Campus and the off-site leased facility, as researchers travel to and from the campus to this facility.

Population and Housing. The No Project Alternative would not eliminate the proposed project's small contribution to the less than impact of the proposed CLRDP with respect to population growth in the Santa Cruz area because a similar number of employees would be necessary to operate the facility at the off-site location.

Recreation and Public Access. Neither the proposed project nor the alternative would result in significant impacts with respect to recreational resources.

Transportation and Traffic. The No Project Alternative would not eliminate the small contribution of the proposed project to the significant unavoidable cumulative traffic impacts of the proposed CLRDP that would result from increased traffic volumes at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection, and to the cumulative traffic impact at these two and four other intersections. because new employees would be needed to operate the facility at the off-site location. At the project level, these impacts would be less than significant for both the project and the alternative, and the project's and the No Project Alternative's contribution to all of these impacts would not be cumulatively considerable. However, compared to the proposed project, more traffic would be added to the City streets under this alternative between the Marine Science Campus and the off-site leased facility, as researchers traveled to and from the campus to this facility.

Utilities, Service Systems, and Energy. The No Project Alternative would not eliminate the contribution of the proposed project to the future water supply deficit of the region, which is considered a significant unavoidable impact of the CLRDP and of the proposed project (Impact 4.16-1), because the same water demand would be produced at the off-site location. This impact would still be considered significant and unavoidable under the No Project Alternative.

Other Resources. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to geology and soils. Neither the proposed project nor the No Project Alternative would result in significant land use and planning impacts. Because the project site does not contain mineral resources, neither the proposed project nor the No Project Alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

The No Shared Warehouse and Laydown Facility Project Alternative would not meet any of the project objectives. While the alternative would provide the warehouse facilities and the outdoor space for deployment and staging needed by several Marine Science Campus users, the off-site location(s) would not provide the proximity to user facilities that is a critical objective of the project. The shared warehouse, technical shops, and laydown yard are proposed to provide USGS, NMFS, CDFG and UCSC facilities for outfitting of ocean-going vessels, staging for scientific field work, and maintenance, repair, and development of instrumentation and equipment. Proximity of technical support facilities such as these and the attendant technical staff to the end-user science staff and laboratories at the Marine Science Campus is central to the efficiency and efficacy of field marine research endeavors. Examples of regularly occurring tasks that require multiple daily trips between the research laboratories and the warehouse, shops, and laydown yard include: mobilization for research cruises at sea (i.e., preparing and packing the entire research equipment complement for deployment on a ship or boat); assembly of equipment arrays onto mooring systems for deployment in the ocean; and development of specialty instrumentation packages for submarine observation (e.g., camera sleds; sampling devices; and in-situ real time analytical instruments such as sediment grain size analyzers, chlorophyll analyzers, and acoustic devices for remote sensing of currents, biomass, and subsurface sedimentary structure). As discussed earlier, one USGS senior marine scientist who oversees the coordination between USGS technical marine facilities and USGS science staff and laboratories reinforced the importance of this adjacency, and suggested that avoiding the need to use a car to move between these venues is very important to the efficient use of staff time the frequency of important interaction, and avoidance of traffic and parking challenges. Further, the Monterey Bay Aquarium Research Institute in Moss Landing, recognizing the importance of this adjacency, designed their entire facility to collocate scientists, engineers, and science laboratories with technical shops, and to collocate these facilities with outdoor service yards and ships by designing and building all of these components into one consolidated footprint.

Development of sufficient space and of facilities that can be shared by Marine Science Campus users are also objectives of the Shared Warehouse and Laydown Facility project. Depending on available space off campus, it might not be possible to develop a shared facility of sufficient size and adequate arrangement at an off-site location. In this case, each entity would have to locate and secure off-campus space and would not enjoy the benefits of facility proximity, such as sharing of tools and equipment. It should be noted that although there are vacant or underutilized properties in the City's westside area, which the University continues to examine as possible sites for overflow administrative or programmatic facilities, these properties would not be suitable as alternate sites for the warehouse uses for all the reasons noted above. Furthermore, any property, if purchased, would be likely to be used to consolidate the several academic and administrative functions of the UCSC Main Campus that are currently housed in leased facilities in the City's westside area, rather than for warehouse and laydown uses. In this case, it could be difficult to designate adequate space for the joint warehouse and laydown operations.

For similar reasons, the No Project Alternative would also not meet objectives of the CLRDP. A location off-site for the marine research-related warehouse and laydown uses would defeat the key purpose of the CLRDP, which is to build a world class marine science campus that has all the necessary facilities in close proximity of each other. Proximity of technical support facilities such as these and the attendant technical staff to the end-user science staff and laboratories at the Marine Science Campus is central to the efficiency and efficacy of field marine research endeavors. Avoiding the need to use a car to move between these venues is very important to the efficient use of staff time, increasing the frequency of important interaction, and avoidance of traffic and parking challenges. Under the alternative, routine functions on the Marine Science Campus would require frequent travel to and from the warehouse/ laydown facility. Because of the time, labor, organizational and cost inefficiencies attendant on the need for field personnel to regularly leave the campus to access off-site work areas, the use of off-site warehouse and laydown areas would be contrary to the attainment of project objectives with respect to the functionality and efficiency of campus programs and operations. Because the support facilities would not be located within convenient, quick and easy access of research facilities, this alternative would fail to provide functionality to support a wide range of marine research, a key objective in the planning for the Marine Science Campus.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Table 5-3 presents a comparison of the proposed project with other alternatives. The No Project Alternative would avoid all of the impacts associated with the construction of new facilities because no new facilities would be built on site and the required functions would be housed in leased facilities off site. The No Project Alternative would still result in a contribution to the significant unavoidable impacts of the proposed project with respect to regional water supply and traffic. Project-level traffic and traffic-related air and noise impacts could potentially be greater under the alternative because an off-site facility would require additional daily trips off campus. The No Project Alternative is therefore marginally the environmentally superior alternative. However, this alternative would not meet any of the project objectives. In this circumstance, CEQA provides for identification of another environmentally superior alternative.

The proposed project is considered the environmentally superior alternative. While implementation of the proposed project would contribute to the significant unavoidable impacts of the CLRDP with respect to regional water supply and traffic, its contributions would be small. Furthermore, these impacts would occur under all the alternatives. The potential environmental impacts of the proposed project with respect to biological and cultural resources, and use of hazardous materials by non-UC entities, are less than significant either before or after mitigation, and would largely be shared with other project alternatives. Further, other alternatives would displace or constrain future development of other proposed Marine Science Campus facilities, or would be less functional than the proposed project.

42 APARTMENT/TOWNHOUSE UNITS

The 42 Apartment/Townhouse Units development would consist of 42 residential units in two clusters of buildings with adjacent parking on the middle terrace east of McAllister Way, approximately 300 feet west of the De Anza Santa Cruz residential community. The building development would total 43,050 sf and would be 25 feet in height. These units would house temporary and resident scientists and students of the Marine Science Campus, and would be anticipated to have primarily short-term occupancy (from a few weeks to up to 3 years).

The objectives of the proposed project are:

- To accommodate a live-work community for researchers at the site.
- To provide short-term housing at the site for visiting scholars and post-doctoral researchers.
- To provide housing for researchers that is controlled and managed by the campus to ensure availability as needed.

The proposed project would result in less than significant impacts with respect to aesthetics, agricultural and biological resources and transportation, and potentially significant but mitigable impacts in relation to the potential to disturb previously undiscovered human remains. It would contribute considerably to the proposed CLRDP’s significant unavoidable cumulative impact with respect to increased demand on the region’s limited water supply. It also would contribute to the CLRDP's impact with respect to decreased level of service at two intersections, and to the cumulative impact at six intersections, although the impact would not be significant at the project level, and the project’s contribution to the cumulative impact would not be cumulatively considerable.

TABLE 5-3
COMPARISON OF IMPACTS FOR SHARED CAMPUS WAREHOUSE AND LAYDOWN FACILITY PROJECT AND ALTERNATIVES

	Proposed Shared Campus Warehouse and Laydown Facility	Reduced Project	Individual Laydown Yards	Alternate Site	No Project
Ability to Reduce Environmental Impacts					
Aesthetics	LS	-	=	+/=	-
Agricultural Resources	LS	-	=	+/=	-
Air Quality	LS	-	+	=	+/=
Biological Resources	LS	-	=/+	+/=	-
Cultural Resources	LS	-	+	=	-
Hazards and Hazardous Materials	LS	-	+	=	-
Hydrology and Water Quality	LS	-	+	=	-
Noise	LS	-	+	=	-
Population and Housing	LS	-	+/=	=	=
Recreation and Public Access	LS	=	=	=	=
Transportation/Traffic	LS	-	=	=	+
Utilities, Service Systems, and Energy	SU	-	+/=	=	=
Other Resources[a]	LS	=	=	=	=
Ability to Meet Project Objectives	Meets	-	-	-	Does not meet

[a] Geology and soils, land use and planning, mineral resources and public services. These resources are considered together because there would be negligible or no project impacts in these areas.

SU Significant and Unavoidable
LS Less than Significant
\+ Greater impact than that of the proposed project.
= Same (or similar) impact as that of the proposed project.
\- Lesser impact than that of the proposed project.
+/= Approximately the same impact as or potentially greater impact than that of the proposed project.
-/= Approximately the same impact as or potentially lesser impact than that of the proposed project

Three alternatives to the project were carried forward for analysis: The Reduced Project Alternative, the Alternate On-Site Location Alternative, and the No Project Alternative. Each of the three alternatives was examined with respect to its ability to meet project objectives and to reduce the significant environmental impacts of the project. For reasons explained under the Partial Off-Site Alternative for the CLRDP, an off-site alternative for the proposed housing was not carried forth for detailed evaluation.

REDUCED PROJECT ALTERNATIVE

Description

The Reduced Project Alternative would provide Marine Science Campus Housing only for essential staff and to a limited number of visitors. Under this alternative, 21 housing units would be built at same middle terrace location as the proposed project, in a single building structure totaling about 22,000 sf. The 25' two story building height of the proposed project would be maintained. Housing for most staff, for most visiting and short-term research scientists, and for students, would have to be found elsewhere on the Main Campus or in Santa Cruz or other communities.

Impacts

Aesthetics. Under the Reduced Project Alternative, only one building structure would be built. Building mass on the eastern half of the middle terrace would be reduced relative to the proposed project. The alternative thus would have reduced less than significant aesthetic impacts relative to the proposed project. However, since view corridors were taken into account in the design of the proposed project such that the visual impact was less than significant, the reduced project would also not result in significant aesthetic impacts.

Agricultural Resources. Both the proposed project and the alternative would result in less than significant direct and indirect impacts to agricultural resources, including the potential that the proximity of new development would constrain the use of certain agricultural pesticides on adjacent agricultural lands, and the potential for illicit intrusions on adjacent private lands be increased public and research population. The alternative would introduce a smaller resident population to the site and thus would make a smaller contribution to the impact. Buffers and other measures included in the CLRDP would apply equally to the proposed project and the alternative.

Air Quality. The Reduced Project Alternative would reduce the less than significant impact of the proposed project with respect to construction-related emissions (Impact 4.3-1), because of the smaller scale and likely shorter duration of construction. The impact associated with operational vehicle emissions would be greater relative to the proposed project because persons who would not be housed on campus would drive to the site from off-site locations.

Biological Resources. Under the Reduced Project Alternative, the new development on the middle terrace associated with the proposed project would be reduced by about half. The alternative thus would reduce the less than significant impacts of the proposed project on sensitive species and habitat by about half. The smaller scale of the alternative would also permit a footprint that would be more removed from middle terrace wetland areas; however, these are protected under the proposed project by the buffers included in the CLRDP.

Cultural Resources. The potential for the Reduced Project Alternative to disturb previously undiscovered Native American burial sites (Impact 4.5-1), a potentially significant but mitigable impact of the proposed project, would be reduced because of the reduced area of ground disturbance.

Hazards and Hazardous Materials. Neither the proposed project nor the Reduced Project Alternative would result in impacts with respect to hazards or hazardous materials risks.

Hydrology and Water Quality. Because development would be reduced by about half relative to the proposed project, the Reduced Project Alternative would create only about half of the area of impervious surfaces, and would have reduced potential for water quality and hydrology impacts. The Stormwater Concept Plan that would be implemented as part of the CLRDP would apply to both the proposed project and the alternative to ensure that water quality and hydrology impacts did not occur.

Noise. The Reduced Project Alternative would further reduce the less than significant construction noise impact of the proposed project on the adjacent De Anza Santa Cruz residential community, because the smaller scale of the project would result in a shorter duration of construction. The noise impact from vehicles would be proportionally greater relative to the proposed project because persons not housed on campus would travel to and from the campus on a daily basis.

Population and Housing. Neither the proposed project nor the alternative would contribute to the CLRDP's less than significant impacts with respect to population growth in the Santa Cruz area, since both the project and the alternative would provide housing for campus population. However, the Reduced Project Alternative would house only about half the population that would be housed under the proposed project. Since, the alternative would provide housing for a smaller portion of the CLRDP population, the number of persons in the CLRDP population who would seek housing in the City of Santa Cruz or in other nearby communities would be increased relative to the proposed project. Thus, the alternative would increase the contribution made by the CLRDP to the less than significant impact with respect to population and housing.

Recreation and Public Access. Neither the proposed project nor the Reduced Project Alternative would result in significant impacts with respect to recreational resources or public access.

Transportation and Traffic. The proposed project would contribute to the significant unavoidable traffic impacts of the CLRDP by increasing traffic volumes at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection, and to the cumulative traffic impact at these two and four other intersections. The alternative would make an increased contribution to the impact relative to the proposed project because a larger portion of the CLRDP population would not be housed on campus and would commute to campus, and traffic traveling to and from the campus would likely pass through these intersections. However, the population associated with the proposed project is relatively small, such that neither the proposed project nor the reduced alternative would result in significant traffic impacts at the project level, and the contribution to cumulative traffic impacts would not be cumulatively considerable.

Utilities, Service Systems, and Energy. The contribution of the Reduced Project Alternative to the future water supply deficit of the region, which is considered a significant unavoidable impact of the CLRDP and of the proposed project (Impact 4.16-1), would be similar or only slightly reduced compared to that of the proposed project because those persons not housed on the Marine Science Campus would likely live in housing in other parts of the City or in other nearby communities and would still contribute to the water demand.

Other Resources. Neither the proposed project nor the Reduced Project Alternative would result in significant impacts with respect to geology and soils. Neither the proposed project nor the alternative would result in land use or planning impacts. Because the campus site does not contain mineral resources, neither the proposed project nor the Reduced Project Alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the Reduced Project Alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

The Reduced Project Alternative would provide only about 50 percent of the housing included in the proposed project, and would have commensurately reduced ability to meet the project objective of establishing a live-work community for the Marine Science Campus. While the units could function for a live-work community, participation would necessarily be limited. The Reduced Project Alternative would meet the objectives of providing and managing availability of short term housing for visiting researchers and other scholars, but the limited amount of housing would constrain its allocation and availability to potential occupants. This limited amount of housing would provide little flexibility in management since the demand would exceed the supply. The alternative therefore meets project objectives only in a limited way.

ALTERNATE ON-SITE LOCATION ALTERNATIVE

Description

Under the Alternate On-Site Location Alternative, the proposed 42 units of housing would be developed on the upper terrace, immediately south and east of the proposed shared warehouse and laydown yard facility. The housing would be developed in a similar configuration to the proposed project, with the same square footage and height, and the same population. In order to also accommodate additional future housing in this area, which is included on the CLRDP Prototype Site Plan (Figure 3-7) and would be developed as a separate future project, it would be necessary to rearrange the structures and laydown yard included in the proposed warehouse and laydown yard facility, and change the footprint of that project.

Impacts

Aesthetics. Under the Alternate On-Site Location Alternative, all of the proposed housing would be developed on the upper terrace in proximity to the proposed shared warehouse and laydown yard. Although development in this area thus would be more dense than under the proposed project, no view corridors would be blocked. Because the housing would not be built on the middle terrace, campus development on the middle terrace would be more distant from the adjacent De Anza Santa Cruz residential community, which could be a beneficial aesthetic effect for residents there. Overall, the level of aesthetic impacts would be similar for both the proposed project and the alternative.

Agricultural Resources. Neither the proposed project nor the alternative would result in direct and indirect impacts to agricultural resources, including the potential that the proximity of new development would constrain the use of certain agricultural pesticides on adjacent agricultural lands, and the potential for illicit intrusions on adjacent private lands be increased public and research population. The alternative would place the housing on the upper terrace in closer proximity to the adjacent agricultural lands, but would still maintain the CLRDP-proposed agricultural setback, so the impact would be less than significant.

Air Quality. Construction-related emissions including dust (Impact 4.3-1) produced by the alternative would be similar to the proposed project because the same ground area would be disturbed and the construction would be of the same scale and duration. Operational vehicle and equipment emissions also would be the same for both the proposed project and the alternative, and would be less than significant.

Biological Resources. Under the alternative, housing proposed for the middle terrace would instead be situated on the upper terrace. However because the housing would be constructing by adjusting the area and arrangement of the shared warehouse and laydown yard and without developing any additional upper terrace land, the impacts of this alternative on the upper terrace biological resources would not be significant.

Cultural Resources. The proposed project and the alternative would disturb the same amount of ground area and thus would have the same potential to disturb previously undiscovered Native American burial sites (Impact 4.5-1) a potentially significant but mitigable impact to cultural resources.

Hazards and Hazardous Materials. Neither the proposed project nor the alternative would result in impacts with respect to hazards or hazardous materials risks.

Hydrology and Water Quality. The alternative and the proposed project both would result in development of the same amount of new impervious surfaces, although at different locations. The Stormwater Concept Plan that would be implemented as part of the CLRDP would apply to both the proposed project and the alternative. This alternative would therefore not result in significant impacts to hydrology and water quality.

Noise. The Alternate On-Site Location Alternative would avoid the less than significant construction noise impact of the proposed project on the De Anza Santa Cruz residential community, because the alternative site would be more distant from the development. Potentially significant construction noise impacts to the proposed housing under this alternative could result if the proposed shared warehouse and laydown yard facility were built subsequent to the occupancy of the housing development.

Population and Housing. This alternative would result in the same contribution as the proposed project to the less than significant impact of the CLRDP with respect to population growth in the Santa Cruz area.

Recreation and Public Access. Neither the proposed project not the alternative would result in significant impacts with respect to recreational resources or public access.

Transportation and Traffic. The proposed project and the alternative would make the same contribution to significant unavoidable traffic impacts of the CLRDP at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection. It would make the same contribution as the proposed project to the cumulative traffic impacts at these two and four other intersections affected by the CLRDP and other regional development, but the contribution of the alternative, like that of the proposed project, would not be cumulatively considerable. Neither would result in significant traffic impacts at the project level.

Utilities, Service Systems, and Energy. Both the alternative and the proposed project would make the same contribution to the significant unavoidable cumulative impact on the future water supply deficit of the region, which would necessitate the development of new water supply sources (Impact 4.16-1).

Other Resources. Neither the proposed project nor the alternative would result in significant impacts with respect to geology and soils. Neither the proposed project nor the alternative would result in significant land use and planning impacts. Because the campus site does not contain mineral resources, neither the proposed project nor the alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

The alternative has the same ability as the proposed project to accomplish all of the project objectives, including accommodating a live-work community at the site, and providing short-term housing that can be controlled and managed by the campus to ensure availability as needed for visiting scholars and post-doctoral researchers. The alternative site, because it is slightly more distant from the middle and lower terrace research area, possibly would be a less effective site for a live-work community.

NO PROJECT ALTERNATIVE

Description

Under the No Project Alternative, the proposed 42 apartments and townhouses would not be constructed and the proposed housing site would remain undeveloped. In the near term, no housing would be provided at the Marine Science Campus.

Impacts

Aesthetics. No significant aesthetic impacts were identified for the proposed project. The No Project Alternative would leave more undeveloped open space on the middle terrace and increase the distance of development from the adjacent mobile home park, which would eliminate the less than significant aesthetic impact of the proposed project.

Agricultural Resources. Neither the proposed project nor the No Project Alternative would result in significant impacts to agricultural resources.

Air Quality. The alternative would eliminate the less than significant impacts of the project from construction combustion emissions and fugitive dust. However, because those who would have been housed on campus under the proposed project would have to live off campus and likely would commute by motor vehicle under the alternative, the No Project Alternative could make a larger contribution than the proposed project to air quality impacts.

Biological Resources. The proposed project would result in less than significant impacts to potential wildlife habitat on the middle terrace. These impacts of the proposed project would be eliminated by the No Project Alternative.

Cultural Resources. Under the No Project Alternative, the potential of the proposed project to disturb previously undiscovered Native American burial sites, a potentially significant but mitigable impact of the proposed project, would be eliminated

Hazards and Hazardous Materials. Neither the proposed project nor the No Project Alternative would result in impacts with respect to hazards or the use of hazardous materials.

Hydrology and Water Quality. The proposed project would result in the development of new impervious surface on the middle terrace, a less than significant impact of the proposed project. This development would not occur under the No Project Alternative.

Noise. Construction noise would not occur under the No Project Alternative. Traffic noise on and off site potentially could be increased under the No Project Alternative because those who could not be housed on campus would commute by motor vehicle.

Population and Housing. The No Project Alternative would not eliminate the contribution of the proposed project to the less than significant impact of the CLRDP with respect to population growth in the Santa Cruz area, as those persons who would have been housed on campus likely would seek housing elsewhere in the City or in other nearby communities.

Recreation and Public Access. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to recreational resources and public access.

Transportation and Traffic. Under the No Project Alternative, users/employees of the Marine Science Campus who would have otherwise been housed on campus in the Apartment/Townhouse units under the CLRDP, would have to commute to the campus. Thus, the alternative potentially could result in a greater contribution than the proposed project to the significant unavoidable traffic impacts of the CLRDP from the increase in traffic volumes at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection, and to the significant cumulative traffic impacts at these two and four other study area intersections.

Utilities, Service Systems, and Energy. The No Project Alternative would not eliminate but may reduce the contribution of the proposed project to the future water supply deficit of the region, which is considered a significant unavoidable impact of the CLRDP and of the proposed project. Those persons who are not housed on campus would live elsewhere in the City or in other nearby communities and would use potable water at those locations.

Other Resources. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to geology and soils. Neither the proposed project nor the No Project Alternative would result in significant land use and planning impacts. Because the campus site does not contain mineral resources, neither the proposed project nor the No Project Alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

The No Project Alternative would not meet any of the objectives of the proposed project because it would not provide any university-controlled housing or any housing on the Marine Science Campus. The No Project Alternative would not provide any facilities that could accommodate a live-work community for researchers at the site.

In addition, this alternative would be less satisfactory than the proposed project in meeting the CLRDP objectives associated with creating a campus that provides round-the-clock immersion in the research environment and extending interaction and collaboration among scientists, students, and administrators.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Table 5-4 presents a summary comparison of the proposed project and the alternatives discussed above for their ability to reduce project impacts and the ability to meet project objectives. None of the potentially significant environmental impacts associated with the proposed apartment and townhouse development would occur under the No Project Alternative. The No Project Alternative would make a similar contribution as the proposed project to the significant cumulative impact of the proposed CLRDP on regional water supply, since those not housed on campus would still be housed in the region and would still place a demand on the system. Because some users/employees of the Marine Science Campus, who would have otherwise been housed on campus in the Apartment/Townhouse units under the CLRDP, would be required to commute to the campus, traffic impacts, and associated air quality and possibly traffic noise impacts, would be greater than under the proposed project. Therefore, the No Project Alternative is not environmentally superior.

Similar to the No Project Alternative, the Reduced Project Alternative would result in more traffic and traffic-related air quality and noise impacts and would not fully meet the objectives of the proposed project. Although the Alternate On-Site Location Alternative would meet most of the project objectives, it would increase the density of development on the upper terrace and potentially could result in more light and noise that could affect the wildlife habitat values in that area. Therefore, the proposed project is considered the environmentally superior alternative.

SEA OTTER RESEARCH AND CONSERVATION CENTER

Under the proposed project, the Sea Otter Research and Conservation Center (SORACC) would include 10,000 square feet of building area contained in two buildings and 40,000 square feet of outdoor research area. The outdoor research area would be used for mammal pools. The project would be situated on the western edge of the middle terrace development area, in an area that is currently occupied by greenhouses and temporary trailers. The CDFG Marine Wildlife Center is immediately to the north of the SORACC site. The development would include a minimum setback of approximately 50 feet from the western property line adjoining the YLR and the structures would at least 250 feet from the Younger Ranch boundary.

The objectives of the SORACC Project are to:

- Provide increased opportunities for collaboration between the Monterey Bay Aquarium (MBA) research program and existing programs on site for sea otter and other marine mammal research and conservation, including UCSC, CDFG and NMFS programs.

- Provide space to accommodate the existing MBA program’s space needs, and collaborative research projects among agencies, and allow for anticipated growth in UCSC's and MBA's marine mammal research programs.

- Provide secure animal holding areas away from human disturbance and activity on and off site, and with access to an adequate source of fresh seawater.

TABLE 5-4
COMPARISON OF IMPACTS FOR
42 APARTMENT/TOWNHOUSE UNITS PROJECT AND ALTERNATIVES

	Proposed 42 Apartment/ Townhouse Units Project	Reduced Project	Alternate Location On Site	No Project
Ability to Reduce Environmental Impacts				
Aesthetics	LS	-	-	-
Agricultural Resources	LS	-	=	-
Air Quality	LS	+/=	=	+
Biological Resources	LS	-	+	-
Cultural Resources	LS	-	=	-
Hydrology and Water Quality	LS	-	=	-
Noise	LS	-/=	+/=	-/=
Population and Housing	LS	+	=	+
Recreation and Public Access	LS	=	=	=
Transportation/Traffic	LS	+	=	+
Utilities, Service Systems, and Energy	SU	-	=	-
Other Resources[a]	LS	=	=	=
Ability to Meet Project Objectives	Meets	-	-/=	Does not meet

[a] Geology and soils, hazards and hazardous materials, land use and planning, mineral resources and public services. These resources are considered together because there would be negligible or no project impacts in these areas.

SU Significant and Unavoidable
LS Less than Significant
\+ Greater impact than that of the proposed project.
= Same (or similar) impact as that of the proposed project.
\- Lesser impact than that of the proposed project.
+/= Approximately the same impact as or potentially greater impact than that of the proposed project.
-/= Approximately the same impact as or potentially lesser impact than that of the proposed project

- Locate facilities, in proximity to CDFG Marine Wildlife Center, so as to facilitate joint use of existing CDFG facilities, including joint freezer space for storage of specimens, a surgery suite and additional work space.

The only significant environmental impacts identified for the proposed SORACC Project are its contributions to the CLRDP's impact with respect to the cumulative regional water supply deficit. It would also contribute to the significant project-level traffic impacts of the proposed CLRDP, although the SORACC Project traffic on its own would not result in a significant impact at the project level. All other impacts of the proposed SORACC Project would be less than significant.

Four alternatives to this project are carried forward for analysis: the Reduced SORACC Project Alternative, the Alternate Location Alternative, the Larger SORACC Project Alternative, and the No Project Alternative. Each of these alternatives is considered with respect to its ability to reduce the significant environmental impacts and to meet project objectives of the proposed SORACC Project.

An alternative that would construct the proposed project at an off-site location was not considered in this analysis because it would not meet any of the objectives of the proposed project which are to enhance research through collaboration with existing research programs at the Marine Science Campus, and to achieve efficiencies through the joint use of the facilities, especially those of CDFG. Furthermore, the proposed project is seawater dependent and the Marine Science Campus has an existing developed seawater system.

REDUCED SORACC PROJECT ALTERNATIVE

Description

Under this alternative, the SORACC would be constructed with 6,000 to 7,000 sf of building space and approximately 15,000 to 20,000 sf of outside space, to accommodate only the existing research program of the Monterey Bay Aquarium. Under this alternative, the amount of growth space for the sea otter programs of UCSC, MBA, and other entities would be reduced or eliminated relative to the proposed project.

Similar to the proposed project, the building height and its design under this alternative would comply with relevant CLRDP policies, implementation programs, and design guidelines. The alternative would be built at the same site as the proposed SORACC as shown in the CLRDP prototype site plan (see Figure 3-7), but with a smaller footprint for both indoor and outdoor work space. Both work spaces likely would be configured similar to the proposed project. The same buffer area adjacent to the YLR as for the proposed project would be maintained, consistent with CLRDP design guidelines.

Impacts

Aesthetics. Under the Reduced SORACC Project Alternative, facilities constructed on the SORACC site would cover less area and there would be more open space on the site. The facilities would be similar in appearance to the proposed project, but potentially would present a less substantial appearance to off-site viewers. The reduced facilities potentially could be set back further from the YLR, since there would be additional room on site. Aesthetic impacts thus would be reduced relative to the proposed project. However, given the distance of the site from most potential viewers and existing development at and around the site, the visual impact would in any case be less than significant.

Agricultural Resources. Neither the proposed project nor the alternative would result in direct or indirect impacts to agricultural resources, since the SORACC site is separated from adjacent agricultural lands by the YLR. Similar to the proposed project, the removal of greenhouses that house the organic seed propagation business would be necessary. Similar to the proposed project, the alternative would develop urban uses on lands that are not considered a significant agricultural resource.

Air Quality. Since the alternative would involve less square footage of construction than the proposed project, the duration of construction would be shorter and thus construction-associated emissions would be reduced relative to the proposed project. The potential for fugitive dust emissions from ground disturbance during construction would also be reduced, since the area of ground disturbance would be smaller. Operational emissions associated with traffic and operating equipment would be somewhat lower than for the proposed project because of the smaller size of the program under the alternative. Air quality impacts of the alternative, like those of the proposed project, would be less than significant.

Biological Resources. The alternative would have essentially the same potential for impacts to sensitive habitats, species and wetlands as the proposed project, since both would occupy the same site, although the reduced development space under the alternative could represent a reduction in the potential impact. The impacts would in any case be less than significant under both the proposed project and the alternative because the site is already disturbed and developed with structures, and valuable habitat is not present. The alternative would have reduced beneficial effects, relative to the alternative, with respect to increased understanding, education about and protection of biological resources and ocean health.

Cultural Resources. The alternative would disturb less area within the site and thus could have a reduced potential for impacts to previously undiscovered Native American burial sites (Impact 4.5-1) compared to the proposed project. The potentially significant impact would be reduced to a less than significant level by mitigation that would be included in both the proposed project and the alternative under the CLRDP.

Hazards and Hazardous Materials. Both the proposed project and the Reduced SORACC Project Alternative have the potential to result in potentially significant impacts in relation to the use of hazardous material in on-site laboratories operated by non-UC entities. To the extent that fewer such labs were developed under the alternative, the potential impact would be reduced. However, the impact would be mitigated to a less than significant level under both the project and the alternative by the application of mitigation measures that would be built into any lease agreements under the CLRDP. The Reduced SORACC Project Alternative would not present any new hazards or hazardous materials risks not evaluated under the proposed project.

Hydrology and Water Quality. The alternative would include reduced development space at the same site as the proposed project, and thus would include less impermeable surface than the proposed project. Because the Stormwater Concept Plan that would be implemented as part of the proposed project under the CLRDP would also be implemented under the alternative, any future hydrology and water quality issues would be mitigated to less than significant levels for both the proposed project and the alternative.

Noise. Potential noise impacts from construction of the alternative would be reduced relative to the proposed project because the duration and possibly the intensity of construction would be decreased for the smaller size of development. Because the construction site is relatively distant from the nearest sensitive receptors, the impact in any case would be less than significant. Similarly, noise from HVAC equipment and operational traffic would be reduced, under the alternative, as the result of the smaller program associated with the alternative, but would in any case be less than significant because of the distance from sensitive receptors.

Population and Housing. Because less space would be developed and the associated population potentially would be smaller, the alternative would be expected to result in less population growth relative to the proposed project, and thus would make a smaller contribution to the less than significant population and housing impact of the proposed CLRDP. The impact is not significant at the project level under either the proposed project or under the alternative.

Recreation and Public Access. Neither the proposed project nor the Reduced SORACC Project Alternative would result in significant impacts with respect to recreation and public access. Both would include education and public involvement programs, which would have beneficial effects with respect to recreation and public access to ocean research. Presuming that the alternative included public programs that are reduced commensurate with the reduced area of the project, the alternative would have slightly reduced beneficial effects relative to the proposed project in this regard.

Transportation and Traffic. The proposed project would make a contribution to significant unavoidable traffic impacts of the CLRDP at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection. The contribution of the alternative to these impacts would be smaller than that of the proposed project, because there would be a smaller population increase associated with the reduced size of the program. It would also make a smaller contribution compared to the proposed project to the cumulative traffic impacts at six intersections significantly affected by the CLRDP in conjunction with other regional development. The contribution of the alternative, like that of the proposed project, would not be cumulatively considerable. Neither would result in significant traffic impacts at the project level.

Utilities, Service Systems, and Energy. Both the alternative and the proposed project would contribute to the significant unavoidable cumulative impact on the future water supply deficit of the region, which would necessitate the development of new water supply sources (Impact 4.16-1). The development under the alternative would be less than under the proposed project, and thus the contribution of the alternative to the cumulative impact would be less. However, the impact would remain significant and unavoidable.

Other Resources. Neither the proposed project nor the Reduced SORACC Project Alternative would result in significant impacts with respect to geology and soils. No land use and planning impacts were identified for either the proposed project or the alternative. Because the campus site does not contain mineral resources, neither the proposed project nor the Reduced SORACC Project Alternative would result in impacts with respect to mineral resources. Neither the proposed project nor the alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

A Reduced SORACC Alternative Project would satisfy some project objectives, though to a lesser degree than the proposed SORACC Project. Marine research space designed to respond to the growing need for marine science would be provided, and would be available for Monterey Bay Aquarium research program. However, the area of the project as proposed already is smaller than requested by MBA, and a further reduced area would not be sufficient to accommodate future growth. The alternative would meet the objective of providing a secure and secluded animal holding area, but the smaller area of this facility would not be sufficient to accommodate joint research programs. The alternative would not provide space for joint use by the CDFG, although its location adjacent to CDFG would allow the Monterey Bay Aquarium research program to use CDFG facilities.

ALTERNATE SORACC SITE ALTERNATIVE

Description

The proposed SORACC Project consists of a 10,000 sf building and 40,000 sf of outdoor animal holding ponds and associated outdoor workspace on the west side of McAllister Way, near the western edge of the middle terrace, with the ponds on a relatively isolated promontory above the YLR. The Alternate SORACC Site Alternative would situate the proposed 10,000 sf SORACC building and the associated 40,000 sf of outdoor research area on the middle terrace on the east side of McAllister Way across from CDFG Marine Wildlife Center. The facility's animal holding ponds would be situated on the inland side of the building to accommodate other adjacent development. The alternative facility would displace other future Marine Research and Education facilities programmed under the proposed CLRDP.

Impacts

Aesthetics. Under the Alternate SORACC Site Alternative, the SORACC facility would be moved back from the western edge of the terrace adjacent to the YLR. The facilities on the alternative site would be consistent with CLRDP design guidelines and would not block any views. The aesthetic impact would be similar to or less than the less than significant impact of the proposed project.

Agricultural Resources. Both the proposed and the alternative SORACC site are separated from adjacent agricultural lands by the YLR. Besides, there is existing development between the Younger Ranch and the alternative site, so similar to the proposed project, the alternative would be unlikely to constrain agricultural uses, including the use of pesticides. The population associated with the operation of the project is less than 20, and this population is unlikely to pose much potential for illicit intrusions on adjacent private lands as a result of increased public and research population. This alternative would not require the removal of the greenhouses, which in any case are not a significant agricultural resource. Both the SORACC Project and the alternative would result in less than significant impacts on agricultural resources.

Air Quality. The same less than significant air quality impacts would be associated with construction and operations of both the alternative and the proposed project, because both include the same amount of building space and the same population.

Biological Resources. The alternative site would set the SORACC facility further back from the edge of the YLR. However, the proposed project includes a buffer and no impacts to the reserve would be anticipated from either the proposed project or the alternative. At the alternative site, the project would involve removal of relatively undisturbed grassland habitat whereas at the proposed site, the habitat is highly disturbed and of limited value. Therefore the potential for biological resource impacts would be somewhat greater at this site than the proposed site.

Cultural Resources. The proposed project and the alternative include the same amount of ground disturbance and thus have the same potential to disturb previously undiscovered Native American burial sites (Impact 4.5-1). Like the proposed SORACC Project, this alternative could thus result in potentially significant but mitigable impacts to cultural resources.

Hazards and Hazardous Materials. The proposed project and the alternative have the same potential to result in potentially significant impacts in relation to the use of hazardous material in on-site laboratories operated by non-UC entities, because the facility development would be the same in each case. The impact would be mitigated to a less than significant level under both the project and the alternative by the application of mitigation measures that would be built into any lease agreements under the CLRDP. The alternative would not present any new hazards or hazardous materials risks not evaluated under the proposed project.

Hydrology and Water Quality. The proposed project and the alternative would each include the same amount of impervious surface development. Both would be designed and managed consistent with the CLRDP Stormwater Concept Plan, which would mitigate any potential hydrology and water quality impacts to less than significant levels. The impacts of this alternative would therefore be similar to those that would result from the proposed project.

Noise. Potential noise impacts from construction and operation would be the same for the alternative and the proposed project, since both would include the same level of development. These impacts would be less than significant. Under the alternative, the SORACC facilities themselves, particularly the holding ponds with their sensitive sea mammal populations, potentially would be exposed to more noise from the construction and operation of other Marine Science Campus facilities, because the ponds would be less isolated from adjacent facilities and human activity. Thus, the construction of other facilities in the vicinity of the alternative site could result in noise impacts on the SORACC facility.

Population and Housing. The proposed project and the alternative would have the same population and each would make the same contribution to the CLRDP's less than significant impact with respect to population growth in the Santa Cruz area.

Recreation and Public Access. Neither the proposed project nor the alternative would result in significant impacts with respect to recreational resources. Both would include the same education and public involvement programs, and thus each would have the same beneficial effects to recreation and public access.

Transportation and Traffic. The proposed project would make a contribution to significant unavoidable traffic impacts of the CLRDP at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection. The contribution of the alternative to these impacts would be same as that of the proposed project. It would make a similar contribution as the proposed project to the cumulative traffic impacts at the same two and four other intersections affected by the CLRDP and other regional development. The contribution of the alternative, like that of the proposed project, would not be cumulatively considerable. Neither would result in significant traffic impacts at the project level.

Utilities, Service Systems, and Energy. Both the alternative and the proposed project would make the same contribution to the significant unavoidable cumulative impact on the future water supply deficit of the region, which would necessitate the development of new water supply sources (Impact 4.16-1).

Other Resources. Neither the proposed project nor the alternative would result in significant impacts with respect to geology and soils. Land uses on the Marine Science Campus would be identical under the alternative and the proposed project. Like the proposed project, the alternative would not result in significant land use and planning impacts. Because the campus site does not contain mineral resources, neither the proposed project nor the alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

The Alternative SORACC Site Alternative would have the same ability as the proposed project to provide increased integration between the Monterey Bay Aquarium research program and existing campus programs, and space for program needs and growth. The alternative site, like the proposed project site, would also provide sufficient proximity to CDFG facilities to make joint use of facilities feasible. However the facilities would not be immediately adjacent and would have a road between them, which would reduce the efficiency of moving, especially animals, between the two facilities, and would therefore would not meet the objective of functional proximity to CDFG to the same degree as the proposed project. However, while they would have the same access to fresh seawater, animal holding ponds at the alternative site would be substantially less isolated and less secure from human activity and disturbance than at the proposed site. Thus, the alternative site would not meet this objective to the same degree as the proposed project.

LARGER SORACC PROJECT ALTERNATIVE

Description

The Larger SORACC Project Alternative would include an expanded indoor space of 21,000 square feet of building area and a reduced 35,000 sf of outdoor research area, as compared with the 10,000 square feet of building area and 40,000 sf of outdoor research area included in the proposed project. The research program and associated population would be increased commensurate with the increased square footage of development: thus a population of about 40 persons would be associated with the alternative, as compared with a population of 20 for the proposed project. The increased building area would provide increased space for administrative offices and sea otter critical-care research and support uses consistent with the needs of the Monterey Bay Aquarium, which has expressed an interest in developing a facility at this scale. As under the proposed project, the building height and its design would comply with relevant policies, implementation programs, and design guidelines of the proposed CLRDP.

The Larger Project Alternative would be built within approximately the same overall footprint of the proposed SORACC as shown in the CLRDP prototype site plan (see Figure 3-7), but with a smaller footprint for the outdoor space than the proposed project. The increased amount of indoor space could not all be accommodated on one floor within this footprint, and likely would be at least two stories tall. The same buffer area adjacent to the YLR as for the proposed project would be maintained, consistent with CLRDP design guidelines.

Impacts

Aesthetics. Under the Larger SORACC Project Alternative, a larger main building would be built in the space proposed for SORACC. The building would have to be higher than under the proposed project in order to accommodate the increased square footage of development. This potentially would make the development more obtrusive to off-site viewers, with a potentially greater aesthetic impact than the proposed project. However, on account of the existing development around the site and the distance of the site from potential off-site viewers, the visual impact would be less than significant. The higher building under this alternative would potentially produce increased light and glare in the vicinity of sensitive wildlife holding areas, which is a potentially significant impact.

Agricultural Resources. Neither the proposed project nor the alternative would result in direct or indirect impacts to agricultural resources.

Air Quality. Since the alternative would involve more square footage of construction than the proposed project, the duration of construction would be longer and thus construction-associated emissions would be higher. However, the potential for fugitive dust emissions from ground disturbance during construction would be about the same as for the proposed project, because the footprint area would be approximately the same for the alternative as for the proposed project. Operational emissions associated with traffic and operating equipment would be somewhat higher than for the proposed project because of the larger size of the program under the alternative. It is likely that air quality impacts would nonetheless remain insignificant.

Biological Resources. The alternative would have essentially the same potential for impacts to sensitive habitats and species as the proposed project, since both would occupy the same footprint. The impacts would be less than significant under both the proposed project and the alternative. The alternative would have increased beneficial effects, relative to the proposed project, with respect to increased research, public education and protection of biological resources and ocean health.

Cultural Resources. The alternative would have essentially the same potential for impacts to previously undiscovered Native American burial sites (Impact 4.5-1) as the proposed project, since both would occupy the same site. The potentially significant impact would be reduced to a less than significant level by mitigation that would be included in both the proposed project and the alternative.

Hazards and Hazardous Materials. Both the proposed project and the Larger SORACC Project Alternative have the potential to result in impacts in relation to the use of hazardous material in on-site laboratories operated by non-UC entities. To the extent that more such labs were developed under the alternative, the potential impact would be increased. However, the impact would be mitigated to a less than significant level under both the project and the alternative by the application of mitigation measures that would be built into any lease agreements. The Larger SORACC Project Alternative would not present any new hazards or hazardous materials risks not evaluated under the proposed project.

Hydrology and Water Quality. The proposed project and the alternative have essentially the same footprint with respect to increased impermeable surface. Because the Stormwater Concept Plan that would be implemented as part of the proposed project would also be implemented under the alternative, any future hydrology and water quality issues would be mitigated to less than significant levels.

Noise. Potential noise impacts from construction of the alternative would be increased relative to the proposed project because the duration of construction would be increased for the larger development. However, because the construction site is quite removed from the nearest sensitive receptors, the impact still would be less than significant. Similarly, noise from HVAC equipment and operational traffic would be slightly greater as a result of the larger program associated with the alternative, but still would be expected to be less than significant because of the distance from sensitive receptors.

Population and Housing. Because more space would be developed and the associated program population would be larger, the alternative would be expected to result in greater population growth relative to the proposed project, and thus would make a larger contribution to the less than significant regional population and housing impact of the proposed CLRDP. The population impact would also be less than significant at the project level.

Recreation and Public Access. Neither the proposed project nor the Larger SORACC Project Alternative would result in significant impacts with respect to recreation and public access. Further, both would include education and public involvement programs, which would have beneficial effects with respect to recreation and public access to ocean research. Presuming that the alternative included public programs expanded commensurate with the increased area of the project, the alternative would have slightly increased beneficial effects relative to the proposed project in this regard.

Transportation and Traffic. The proposed project would contribute to the significant unavoidable traffic impacts of the proposed CLRDP by increasing traffic volumes at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection. The contribution of the alternative to these impacts would be larger than that of the proposed project because of the increased program size and associated population. The alternative would also contribute more than the proposed project to the cumulative traffic impacts at these two and four other study area intersections, however, its contribution to the cumulative impact would not be cumulatively considerable. The project-level impacts would remain less than significant.

Utilities, Service Systems, and Energy. Both the alternative and the proposed project would contribute to the significant unavoidable cumulative impact on the future water supply deficit of the region, which would necessitate the development of new water supply sources (Impact 4.16-1). The development under the alternative would be greater than under the proposed project, and thus the contribution of the alternative to the cumulative impact would be greater.

Other Resources. Neither the proposed project nor the alternative would result in significant impacts with respect to geology and soils. Land uses on the Marine Science Campus would be essentially the same under the alternative and the proposed project. Like the proposed project, the alternative would not result in significant land use and planning impacts. Because the campus site does not contain mineral resources, neither the proposed project nor the alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

A Larger SORACC Alternative Project would satisfy project objectives to the same or higher degree relative to the proposed SORACC Project, particularly in terms of providing marine research and education space designed to respond to the growing need for marine science. It would equally meet the objective of providing a secure and secluded animal holding area, although the holding area would be reduced by about 12 percent under the alternative, relative to the proposed project. The alternative would provide increased indoor research space for growth and for joint use with the CDFG relative to the proposed project.

NO SORACC PROJECT ALTERNATIVE

Description

Under the No SORACC Project Alternative, the proposed SORACC would not be built and the SORACC site would remain in its current state.

Impacts

Aesthetics. The proposed project would be consistent with CLRDP design guidelines and would avoid blocking view corridors and thus would not result in visual impacts. The No Project Alternative, similarly, would not result in visual impacts.

Agricultural Resources. The proposed project would be separated from nearby agricultural lands by the YLR, as well as by the 250 foot-wide buffer along the shoreline. Thus, neither the proposed project nor the No Project Alternative would result in direct or indirect agricultural impacts.

Air Quality. Under the No Project Alternative, the SORACC facility would not be constructed and there would be no emissions associated with construction vehicles, fugitive dust or operations of this facility. This alternative, thus, would avoid the less than significant air quality impacts of the proposed project.

Biological Resources. Under the No Project Alternative, the SORACC facility would not be constructed. While this would avoid the less than significant impacts of the proposed project upon sensitive species and habitat, it would also eliminate the proposed project’s beneficial effects with respect to research and education on marine biological resources.

Cultural Resources. Under the No Project Alternative, the proposed project’s potential to disturb previously undiscovered Native American burial sites, a less than significant impact of the proposed project, would be eliminated.

Hazards and Hazardous Materials. The No Action Alternative would eliminate the impact of the proposed project in relation to the use of hazardous material in on-site laboratories operated by non-UC entities. Since no additional labs would be developed under the alternative, the potential impact from new development would be eliminated.

Hydrology and Water Quality. The proposed project would introduce new impervious surfaces on the project site, while the No Project Alternative would leave these areas under greenhouses or as open space. Therefore there would be no change in site runoff under the No Project Alternative.

Noise. Under the No Project Alternative, potential noise impacts from activities related to the development of the SORACC Project would be eliminated. However, since the proposed SORACC site is relatively distant from the closest sensitive receptors, the potential impact in any case would be less than significant.

Population and Housing. The No Project Alternative would eliminate the proposed project's contribution to the CLRDP's less than significant impact with respect to population growth in the Santa Cruz area.

Recreation and Public Access. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to recreation or public access. Because the No Project Alternative would not include the education and public involvement programs included in the proposed project, the beneficial effects to recreation and public access of the proposed project could be eliminated under the No Project Alternative.

Transportation and Traffic. The proposed project would contribute to significant unavoidable traffic impacts of the proposed CLRDP by increasing traffic volumes at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection, although it would not result in significant impacts at the project level. It would also contribute, although not considerably, to the cumulative traffic impacts at the same two and four other intersections. The No Project Alternative would eliminate the traffic contribution of the proposed project.

Utilities, Service Systems, and Energy. The No Action Alternative would eliminate the impact of the proposed project that would result from its contribution to future water supply deficit of the region, which is considered a significant unavoidable impact of the CLRDP.

Other Resources. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to geology and soils. Neither the proposed project nor the No Project Alternative would result in significant land use and planning impacts. Because the campus site does not contain mineral resources, neither the proposed project nor the No Project Alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

The No SORACC Project Alternative would not meet any of the objectives of the proposed project. Although the alternative would not preclude the use of the site in the future, it would not provide the space and facilities needed to meet project objectives. Without a new facility there would be only limited opportunities at the Marine Science Campus to provide for integration between campus programs and Monterey Bay Aquarium research activities. No new space would be added for growth of the sea otter program, nor would additional secure animal holding areas be provided. Finally, joint facilities for research with CDFG would be limited to existing facilities.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Table 5-5 presents a summary comparison of the proposed project and the alternatives discussed above for their ability to reduce project impacts and the ability to meet project objectives. Because the No Project Alternative would make no contribution to the significant unavoidable regional water supply impacts of the proposed CLRDP or to the significant unavoidable traffic impacts of the CLRDP, the No Project Alternative is the environmentally superior alternative. However, this alternative would not meet any of the project objectives. In this circumstance, CEQA requires the identification of another environmentally superior alternative.

TABLE 5-5
COMPARISON OF IMPACTS FOR SORACC PROJECT AND ALTERNATIVES

	Proposed SORACC	Reduced Project	Alternate Location	Larger Project	No Project
Ability to Reduce Environmental Impacts					
Aesthetics	LS	-	-	+	-
Agricultural Resources	LS	=	=	=	-
Air Quality	LS	-	=	+	-
Biological Resources	LS	=	+	=	-
Cultural Resources	LS	=	=	=	-
Hazards and Hazardous Materials	LS	-	=	+	-
Hydrology and Water Quality	LS	-	=	=	-
Noise	LS	-	=	+	-
Population and Housing	LS	-	=	+	-
Recreation and Public Access[a]	LS	=	=	=	=
Transportation/Traffic	LS	-	=	+	-
Utilities, Service Systems, and Energy	SU	-	=	+	-
Other Resources[b]	LS	=	=	=	=
Ability to Meet Project Objectives	Meets	-	-	+	Does not meet

[a] Analysis does not take into account to potential beneficial effects of proposed project and alternatives with respect to increased public education and interpretation.
[b] Geology and soils, land use and planning, mineral resources and public services. These resources are considered together because impacts were negligible or did not occur in these areas.

SU Significant and Unavoidable
LS Less than Significant
\+ Greater impact than that of the proposed project.
= Same (or similar) impact as that of the proposed project.
\- Lesser impact than that of the proposed project.
+/= Approximately the same impact as or potentially greater impact than that of the proposed project.
-/= Approximately the same impact as or potentially lesser impact than that of the proposed project

The proposed project would meet all project objectives and would not result in any significant project-level impacts. While it would contribute to significant regional project level and cumulative impacts of the CLRDP with respect to water supply and traffic, these impacts are shared with all of the other build alternatives of the project. While the Reduced SORACC Project Alternative would make a reduced contribution to the cumulative and project impacts of the CLRDP, it also has a reduced ability to meet project objectives and reduced beneficial effect with respect to environmental research for ocean health and public education. In the balance, the proposed SORACC Project, therefore, is environmentally superior.

UNITED STATES GEOLOGICAL SURVEY WESTERN COASTAL AND MARINE GEOLOGY FACILITY

The proposed United States Geological Survey Western Coastal and Marine Geology Facility (USGS Phase I) Project would consist of development of about 78,500 sf of new office and laboratory space in two new one- to two-story buildings on the middle terrace development area of the Marine Science Campus, east of McAllister Way.

The objectives of the USGS Phase I Project are to:

- Collocate the USGS Western Coastal and Marine Geology Team and the Western Ecological Research Center with other Marine Science Campus users, to foster research and interpretive collaboration.
- Secure an adequate source of fresh seawater, including developed infrastructure, for USGS research.
- Share facilities such as warehouse, shops, and laydown yard; small boat maintenance, repair and storage facilities; scientific diving support facilities; conference and meeting spaces; dining facilities; and specialty equipment and laboratories such as genetics labs and sediment analysis labs with other researchers with similar interests, to reduce costs and redundancy of facilities for all.
- Maintain employment adjacencies and working relationships between UCSC graduates and USGS science staff for efficient and effective use of trained researchers.
- Maintain research employment and training relationships between UC graduate students, undergraduate students and USGS science staff to provide fresh intellectual resources to USGS and research experience and employment to UC graduate and undergraduate students occupying a common campus.

The proposed USGS Phase I Project would result in potentially significant but mitigable impacts with respect to cultural resources and hazardous materials, and would contribute to significant unavoidable cumulative impacts of the CLRDP with respect to traffic. It would also contribute to significant unavoidable impacts to regional water supply both cumulatively and at the project level.

Four alternatives to this project are carried forward: the Reduced USGS Project Alternative, the Larger USGS Project Alternative, the Modified Site Plan Alternative, and the No USGS Project Alternative. Each of these alternatives is considered with respect to its ability to meet project objectives and to reduce the significant environmental impacts of the proposed USGS Phase I Project.

An alternative that constructs the proposed project at an off-site location was not considered in this analysis because it would not meet any of the objectives of the proposed project which are to foster research through collaboration with existing research programs at the Marine Science Campus, maintain employment relationships between UC graduates and USGS staff, and to achieve efficiencies through the joint use of the facilities. Furthermore, USGS is highly desirous of collocating all of its Western Coastal and Marine Geology Program from Menlo Park to the Santa Cruz area because the Monterey Bay has become a national center for marine science, and provides unprecedented opportunities for collaborative research. Collocating with UCSC is a goal of USGS because of the benefits to both organizations of strengthening programmatic relationships, including collaborative research opportunities, shared facilities, laboratories, ship time and staff, involvement of graduate and undergraduate students as researchers in USGS projects, and joint participation in seminars, workshops, formal classes and other educational opportunities. These USGS goals are fully consistent with CLRDP objectives and those of the proposed project.

USGS conducted a feasibility study for locating a new facility, which considered a number of off-campus sites (Winsler and Kelly 2002).[3] This study notes,

> "In the late 1990's, NOAA conducted a search for suitable locations for a facility it planned on constructing with NMFS. NOAA's conclusion was that there was no other location [aside from the Marine Science Campus] that offered sufficient land area, the collaborative interaction of a marine research community and specifically, the opportunity to work closely with highly regarded university faculty, researchers and graduate students in the marine sciences…and the infrastructure support and seawater access afforded by the Long Marine Lab site" (Winsler and Kelly 2002:26).

USGS's consultant independently considered a number of off-campus sites in the vicinity in January 2002. The Live Oak Business Park offered adequate space for USGS needs, but would require extensive tenant improvements and, located 1.8 miles from the ocean, did not have access to fresh seawater. The University of California does not have building space or a building site (other than the potential site on the Marine Science Campus) that would be available for USGS purposes. The Santa Cruz area is very constrained geographically, with few development sites available for any urban use in the City of Santa Cruz. Cal State and University of California properties at the former Fort Ord potentially could be available to USGS; however, these also lack the necessary proximity to seawater and to other researchers. There are no buildings of adequate size, but about 25 acres of undeveloped land with suitable proximity to other researchers and to seawater are present in the Moss Landing area. However, the land is in private holdings and is not available. Further, environmental constraints and entitlement considerations are significant development issues in this area.

Ultimately, USGS concluded that there was only one facility in the vicinity (the Texas Instrument Building) that merited further consideration. This building was large enough to accommodate USGS project needs and was considered close enough to the Marine Science Campus to foster the desired collaborative atmosphere. However, the site had the major disadvantage that its use would require that seawater be pumped from the intake facility at the Marine Science Campus, with no assurance that the University would be willing or able to undertake the expansion of the existing seawater pumping and distribution system to an offsite location. In addition, extensive renovation of the building would be required to accommodate uses such as lab space.

While about 13,000 sf of the proposed USGS development consists of support /administrative functions that are not seawater-dependent, and potentially could be located off site, this could result in diminished efficiency for research activities at the facility. Depending on the specific facilities that were placed off site, researchers could be required to travel off site to carry out data entry, track projects, confer with support staff, or review materials. Division in the work site

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[3] Draft Feasibility Study for United States Geological Survey (USGS) Facilities Plan, Western Coastal and Marine Geology Program, Santa Cruz, CA. Prepared by Winsler and Kelly for General Services Administration, PBS, Portfolio Management Division. February 4, 2002.

could increase the difficulties of tracking research, maintaining direct oversight of field activities, and conducting necessary observations. For these reasons, the location of the small amount of support/administrative space at an off site location would not be appropriate, and is not evaluated any further.

REDUCED USGS PROJECT ALTERNATIVE

Description

The Reduced USGS Project Alternative would develop a facility of about 58,000 square feet on the proposed site. This facility would house only laboratory and non-laboratory research facilities. The USGS administrative, shop and support space included in the proposed project would not be developed at the Marine Science Campus, but would be housed either at leased facilities in the Santa Cruz area, or at facilities at the USGS compound in Menlo Park. Population of the facility would be reduced by about 25 percent, to about 116 persons. It is assumed that development under the alternative would comply with relevant CLRDP design guidelines, would include the same habitat buffers as the proposed project, and would comply with the CLRDP's Stormwater Concept Plan.

Impacts

Aesthetics. The Reduced USGS Project Alternative would provide less dense development on the middle terrace as compared with the proposed project, which could further reduce the less than significant aesthetic impact of the proposed project. Like the proposed project, the alternative would not obtrude on view corridors or be inconsistent with CLRDP design guidelines.

Agricultural Resources. The site for both the alternative and the proposed project is separated from adjacent farmlands by the YLR, the proposed SORACC site and existing CDFG facilities. Because the site is set back on the Marine Science Campus, development of the USGS facility would not have the potential to constrain the agricultural use of adjacent lands, including the use of agricultural pesticides. The reduced population associated with the smaller alternative facility would reduce its contribution to the impact identified in CLRDP analysis with respect to potential for trespass and other intrusions from the campus on adjacent lands; however, this impact in any case is less than significant with the setbacks and other measures included in the CLRDP.

Air Quality. The Reduced USGS Project Alternative would make a smaller contribution than the proposed project to air quality impacts that would result from construction vehicle emissions and fugitive dust, because it would require a shorter construction period, and because a smaller ground area would be disturbed. Emissions from project-associated traffic also would be reduced under the alternative, since population would be reduced by 25 percent. The air quality impact would be less than significant under both the project and the alternative.

Biological Resources. Relative to the proposed project, the Reduced USGS Project Alternative would reduce new impervious surface area and leave more undeveloped open space in the middle terrace. Wildlife and wetland buffers included in the proposed project would be maintained under the alternative, and the potential impact to sensitive species and habitats would remain less than significant.

Cultural Resources. The Reduced USGS Project Alternative would have reduced potential, relative to the proposed project, to disturb previously undiscovered Native American burial sites (Impact 4.5-1), to the extent that the overall area of site disturbance would be reduced under the alternative. Like the proposed project, this alternative could result in potentially significant but mitigable impacts to cultural resources.

Hazards and Hazardous Materials. Both the proposed project and the Reduced USGS Project Alternative would result in a potentially significant impact in relation to the use of hazardous material in on-site laboratories operated by non-UC entities. While is it possible that a smaller facility would have fewer such labs, the reduction in size of the alternative would be achieved primarily by elimination of administrative and support space: thus, the lab areas probably would be essentially the same as under the proposed project. The impact in any case would be mitigated to a less than significant level under both the project and the alternative, by the application of mitigation measures that would be built into any lease agreements under the CLRDP. The Reduced USGS Project Alternative would not present any new hazards or hazardous materials risks not evaluated under the proposed project.

Hydrology and Water Quality. The Reduced USGS Project Alternative would result in a decrease in the amount of impervious surface on the project site relative to the proposed project. This would reduce potential hydrologic and water quality impacts related to runoff. However, these issues are addressed for both the proposed project and the alternative by the Stormwater Concept Plan that would be implemented as part of the CLRDP and that would apply to all alternatives. Potential hydrology and water quality impacts of the alternative thus would be less than significant after mitigation.

Noise. Under the Reduced USGS Project Alternative, potential noise impacts from both construction and operation would be decreased relative to the proposed project because of the decreased scale and duration of construction, and the decreased level of activity associated with a smaller facility, possibly including the operation of fewer pieces of HVAC equipment. Noise impacts would be less than significant for either the proposed project or the alternative because of the distance from sensitive off-site receptors, and because of the application of noise controls included in the CLRDP.

Population and Housing. The Reduced USGS Project Alternative would result in a decreased contribution, relative to the proposed project, to the less than significant impacts of the CLRDP with respect to population growth in the Santa Cruz area.

Recreation and Public Access. The Reduced USGS Project Alternative would include education and public involvement programs (as described in the proposed CLRDP) with beneficial recreation and public access effects. These possibly would be reduced in scale under the alternative because the reduced program would include only minimal administrative and support services on site.

Transportation and Traffic. The alternative would make a smaller contribution than the proposed project to the significant unavoidable traffic impacts of the proposed CLRDP at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection, and to the cumulative impact at the same two intersections and four other study area intersections that would be affected by traffic from the development under the CLRDP and other regional development. The contributions of both the project and the alternative to the cumulative impacts would not be cumulatively considerable. At the project level, traffic impacts would be less than significant for both the project and the alternative.

Utilities, Service Systems, and Energy. Both the alternative and the proposed project would contribute to a significant unavoidable cumulative impact on the future water supply deficit of the region, which would necessitate the development of new water supply sources (Impact 4.16-1). The contribution of the alternative to this impact would be less than the contribution of the proposed project.

Other Resources. Neither the proposed project nor the alternative would result in significant impacts with respect to geology and soils. Like the proposed project, the alternative would be subject to the CLRDP. No significant land use and planning impacts are anticipated. Because the campus site does not contain mineral resources, neither the proposed project nor the alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the Reduced USGS Project Alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

The Reduced USGS Project Alternative would meet some of the project objectives for the proposed USGS Phase I Project. It would provide USGS with access to an adequate supply of fresh seawater. It would also provide research facilities in proximity to CDFG facilities that could be shared by both teams, and would collocate the USGS Ecological Research Center with other Marine Science Campus users, to foster research and interpretive collaboration. It also would contribute to the maintenance of employment relationships between USGS and UCSC. However, to the extent that these objectives are dependent on facility space and administrative and support services, the alternative would reduce the degree to which the project objectives would be met.

USGS MODIFIED SITE PLAN ALTERNATIVE

Description

The USGS Modified Site Plan Alternative would provide a USGS Phase I facility with the same 78,500 square feet of development as under the proposed project, but the facility would be developed with a smaller footprint than the proposed project, as a single three-story building. The height of this building ideally would be less than the CLRDP guideline of 36-feet maximum, but laboratory functions might require a greater height to accommodate the necessary floor plan within the smaller footprint, and thus a taller building might be needed. A portion of the proposed site would remain as open space in the middle terrace development area.

Impacts

Aesthetics. The additional height of the USGS would make the facility visually prominent, which could increase the less than significant aesthetic impact of the project. Provided that the USGS Modified Site Plan Alternative remained consistent with CLRDP design guidelines (i.e., maximum height of 36 feet), the aesthetic impact of this alternative would remain less than significant. If the function of the facility required greater height for a three-story building, the building could result in a significant visual impact.

Agricultural Resources. The proposed project and the alternative would result in similar less than significant direct and indirect impacts to agricultural resources, including the potential for illicit intrusions on adjacent private lands by the increased public and research population.

Air Quality. Construction-related emissions (Impact 4.3-1) from the proposed project and the alternative would likely be similar. Fugitive dust emissions could be reduced under the alternative because a smaller ground area would be disturbed. Operational vehicle and equipment emissions would be the same for the alternative as for the proposed project, since both would have the same area of development and the same population.

Biological Resources. The less than significant impacts of the proposed project with respect to sensitive species and habitat would be reduced by the alternative because more open space would be maintained. Like the proposed project, the alternative would include wildlife, habitat and wetland buffers.

Cultural Resources. The alternative has reduced potential relative to the proposed project to disturb previously undiscovered Native American burial sites (Impact 4.5-1), since the overall area of site disturbance would be reduced. Like the proposed project, the alternative could result in potentially significant but mitigable impacts to cultural resources.

Hazards and Hazardous Materials. The alternative and the proposed project have the same potential to result in potentially significant impacts in relation to the use of hazardous material in on-site laboratories operated by non-UC entities, since the same amount of such lab space is included in both. The impact would be mitigated to a less than significant level under both the project and the alternative by the application of controls that would be built into any lease agreements. The alternative would not present any new hazards or hazardous materials risks not evaluated under the proposed project.

Hydrology and Water Quality. Because the alternative would be built on a smaller footprint, the amount of impervious surface on the project site would be decreased relative to the proposed project, which could further reduce the less than significant impact of the proposed project. The Stormwater Concept Plan that would be implemented as part of the CLRDP would apply to both the project and the alternative. This alternative would therefore not result in significant impacts to hydrology or water quality.

Noise. The alternative and the proposed project would result in similar levels of construction noise and operational noise in relation to traffic and the operation of HVAC equipment. With noise mitigations included in the CLRDP, and considering the distance of the project site from most sensitive receptors, the impact would be less than significant.

Population and Housing. The proposed project and the alternative would make the same contribution to the CLRDP-identified less than significant impact with respect to population growth in the Santa Cruz area.

Recreation and Public Access. Neither the proposed project nor the alternative would result in significant impacts with respect to recreational resources. The alternative would provide increased open space on site as compared with the larger footprint of the proposed project. The alternative and the proposed project would result in the same beneficial effects to recreation and public access through the provision of public education and interpretation.

Transportation and Traffic. The proposed project and the alternative would make the same contribution to significant unavoidable traffic impacts that would result from development under the CLRDP at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection, and to cumulative impacts at these two and four other study area intersections. The contributions of both the project and this alternative, however, would not be cumulatively considerable. Neither the proposed project nor the alternative would result in project level impacts.

Utilities, Service Systems, and Energy. Both the alternative and the proposed project would make the same contribution to the significant unavoidable cumulative impact on the future water supply deficit of the region, which would necessitate the development of new water supply sources (Impact 4.16-1).

Other Resources. Neither the proposed project nor the alternative would result in significant impacts with respect to geology and soils. Providing that the alternative building can be developed within the CLRDP height guidelines, it would not conflict with any land use plan or the planning requirements of the CLDRP. However, if the smaller footprint and facility function required greater height, this would conflict with planning guidelines, which could result in a significant land use and planning impact. Because the campus site does not contain mineral resources, neither the proposed project nor the alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the Modified Site Plan Alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

This alternative would meet all of the project objectives for the USGS facility to the same extent as the proposed project. The reconfiguration of building space would not affect the operation of the program or any of its components, and thus would not affect the ability of the alternative to meet either project or CLRDP objectives.

LARGER USGS PROJECT ALTERNATIVE

Description

The USGS originally envisioned a larger program of development for the Marine Science Campus. Only one phase of this proposal is included in the proposed project. The Larger USGS Project Alternative would develop the entire program as originally proposed. The alternative would consist of approximately 203,473 sf of development. The facility would include 98,000 sf of research building area, 18,353 sf of warehouse space, and an 87,120-sf laydown yard. The project population would increase commensurate with the 25 percent increase in interior building space, with a small incremental population increase related to the operation of outdoor spaces: population under this alternative is thus estimated at about 175. While it is recognized that a larger alternative is unlikely to reduce the environmental effects of a project, this alternative is considered for its potential to result in similar effects while potentially meeting project objectives to a greater degree than the proposed project.

The USGS warehouse and laydown yard associated with the alternative would be used exclusively by USGS. If this alternative were selected, USGS would not use the separately proposed Shared Warehouse and Laydown Yard Facility on the upper terrace. The shared facility in that case either would be built on a reduced scale for use by the other entities on campus, or its functions would be absorbed by additional separate warehouse and laydown yard facilities operated by the participating agencies.

Under the Larger USGS Project Alternative, the USGS development footprint in the middle terrace area would be increased by more than 100,000 sf relative to the proposed project. The main facility would consist of a single building, 34 feet in height. Development under the alternative would comply with relevant CLRDP design guidelines to the extent possible, and would comply with the CLRDP's Stormwater Concept Plan. It would not displace other marine research facilities, but would result in a denser pattern of development on the middle terrace than under the CLRDP. In order to accommodate the additional developed space, there would be a substantial reduction in available open space in the middle terrace, including the likely elimination of the “meadow” shown in the CLRDP Prototype Site Plan (see Figure 3-7).

Impacts

Aesthetics. The Larger USGS Project Alternative would substantially reduce the area of the middle terrace that would be maintained as open space under the proposed project. The visual character would be one of denser development than the proposed project, but because of the surrounding open space, still would not present an urban appearance. The alternative development would comply with CLRDP design guidelines with respect to building height, massing, and lighting. The same open space buffers would be retained around wetlands and along the coastal margin as under the proposed project, and no view corridors would be blocked. The aesthetic impacts of the alternative thus would be less than significant.

Agricultural Resources. The site for both the alternative and the proposed project is separated from adjacent farmlands by the YLR area, the proposed SORACC site and existing CDFG facilities. Because the site is set back on the Marine Science Campus, development of the larger USGS facility would not have the potential to constrain the agricultural use of adjacent lands, including the use of pesticides. The increased population associated with the larger facility would increase its contribution to the indirect impact identified in CLRDP analysis with respect to potential for trespass and other intrusions from the campus on adjacent lands; however, this impact is less than significant with the setbacks and other measures included in the CLRDP.

Air Quality. Because a longer period of construction would be involved and a larger ground area would be disturbed, the Larger USGS Project Alternative would result in greater dust emissions than the proposed project, and the air quality impact would be significant. Emissions from project-associated traffic would also be greater under the alternative because a larger population would be associated with the larger facility.

Biological Resources. The Larger USGS Project Alternative would substantially increase the impervious surface area in the middle terrace. The meadow that would be preserved under the proposed project likely would be eliminated by the alternative: this potentially could reduce habitat. On the upper terrace, because the area of the shared warehouse/laydown facility would be reduced, there would be less impervious surface relative to the proposed project and potentially greater preservation of wildlife corridors and foraging habitat. The biological impacts of the alternative would be less than significant because the proposed project's wildlife and wetland buffers on both the middle and upper terraces would be maintained under the alternative.

Cultural Resources. The Larger USGS Project Alternative has increased potential, relative to the proposed project, to disturb previously undiscovered Native American burial sites

(Impact 4.5-1), to the extent that the overall area of site disturbance would be increased under the alternative. Like the proposed project, this alternative could result in potentially significant but mitigable impacts to cultural resources.

Hazards and Hazardous Materials. Both the proposed project and the Larger USGS Project Alternative have the potential to result in potentially significant impacts in relation to the use of hazardous material in on-site laboratories operated by non-UC entities. To the extent that the larger facility included a larger number or increased area of such labs, the potential impact would be increased. However, the impact would be mitigated to a less than significant level under both the project and the alternative by the application of mitigation measures that would be built into any lease agreements. The Larger USGS Project Alternative would not present any new hazards or hazardous materials risks not evaluated under the proposed project.

Hydrology and Water Quality. The Larger USGS Project Alternative would result in an increase in the amount of impervious surface on the middle terrace, relative to the proposed project, and a likely decrease in impervious surface on the upper terrace. The increased development on the middle terrace would result in potential hydrologic and water quality impacts in relation to increased runoff. However, these issues are addressed by the Stormwater Concept Plan that would be implemented as part of the CLRDP and that would apply to both the proposed project and the alternative. This alternative would therefore not result in significant impacts to hydrology or water quality.

Noise. Under the Larger USGS Project Alternative, potential noise impacts from both construction and operation would be increased relative to the proposed project because of the increased scale and duration of construction, and the increased level of activity associated with a larger facility, possibly including the operation of more HVAC equipment.

Population and Housing. The Larger USGS Project Alternative would result in an increased contribution, relative to the proposed project, to the less than significant impact of the CLRDP with respect to population growth in the Santa Cruz area.

Recreation and Public Access. The Larger USGS Project Alternative likely would eliminate the meadow area adjacent to the proposed project site, which is included in the CLRDP, and therefore result in a reduction in recreational open space. However, substantial recreation space and public access would be maintained on the campus, so this impact would be less than significant. The alternative would include education and public involvement programs (as described in the proposed CLRDP) with beneficial recreation and public access effects, and these possibly would be increased in scale commensurate with the larger program scale under the alternative.

Transportation and Traffic. The alternative would make a larger contribution than the proposed project to the significant unavoidable traffic impacts of the proposed CLRDP by increasing traffic volumes at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection. At the project level, these impacts would remain less than significant. It would also contribute substantially to the cumulative traffic impacts at the same two and four other study area intersections that would experience significant cumulative traffic impacts.

Utilities, Service Systems, and Energy. This alternative would make a larger contribution than the proposed project to the significant unavoidable cumulative impact on the future water supply deficit of the region, which would necessitate the development of new water supply sources (Impact 4.16-1).

Other Resources. Neither the proposed project nor the alternative would result in significant impacts with respect to geology and soils. Like the proposed project, the alternative would be subject to the CLRDP. No significant land use and planning impacts are anticipated. Because the campus site does not contain mineral resources, neither the proposed project nor the alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the Larger USGS Project Alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

This alternative would meet all of the project objectives for the proposed USGS Phase I Project. To the extent that these objectives are dependent on facility space, the alternative would increase the potential for the project to meet objectives with respect to collaboration with other site users, sharing of facilities, and providing employment opportunities.

NO PROJECT ALTERNATIVE

Description

Under the No Project Alternative, the USGS Phase I facility would not be constructed and the site would remain undeveloped.

Impacts

Aesthetics. Under the No Project Alternative, no USGS facility would be constructed on the Marine Science Campus. In the near term, the proposed site would be left as open space. The project's less than significant visual impact would not occur,

Agricultural Resources. The proposed project would result in less than significant direct and indirect impacts to agricultural resources, including the potential that the proximity of new development would constrain the use of certain agricultural pesticides on adjacent agricultural lands, and the potential for illicit intrusions on adjacent private lands by increased public and research population. No agricultural resources impacts would result from the No Project Alternative.

Air Quality. Under the No Project Alternative, the USGS facility would not be constructed. This would eliminate the less than significant impacts that would result from construction vehicle emissions and fugitive dust associated with project construction, and vehicle emissions associated with project traffic.

Biological Resources. Under the No Project Alternative, the USGS facility proposed for the middle terrace would not be constructed. This would eliminate the less than significant impacts of the proposed project with respect to sensitive species and habitat.

Cultural Resources. Under the No Project Alternative, the project's potential to disturb previously undiscovered Native American burial sites would be eliminated.

Hazards and Hazardous Materials. The No Project Alternative would avoid the potential of the proposed project to result in the impact in relation to the use of hazardous material in on-site laboratories operated by non-UC entities. However, the impact would in any case be mitigated to a less than significant level under both the project and the alternative by the application of mitigation measures that would be built into lease agreements under the CLRDP.

Hydrology and Water Quality. Under the proposed project, the impervious surface areas on the middle terrace associated with the proposed project would not be developed and there would be no changes to site hydrology. Thus the alternative would have reduced impacts relative to the proposed project.

Noise. Under the No Project Alternative, the potentially significant noise impacts associated with construction and operation of the USGS facility would be eliminated.

Population and Housing. The No Project Alternative would eliminate the contribution of the proposed project to the less than significant impact of the CLRDP with respect to population growth in the Santa Cruz area.

Recreation and Public Access. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to recreational resources. However, under the No Project Alternative, the proposed project's beneficial effects with respect to education and public involvement programs would also not occur.

Transportation and Traffic. The No Project Alternative would eliminate the contribution of the proposed project to the significant unavoidable traffic impacts of the CLRDP at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection. Neither the proposed project nor the No Project Alternative would result in significant traffic impacts at the project level. The No Project would not contribute to the significant cumulative traffic impacts at the six study area intersections affected by CLRDP and other regional development.

Utilities, Service Systems, and Energy. The No Project Alternative would not contribute to the future water supply deficit of the region, which is considered a significant unavoidable impact of the CLRDP and of the proposed project until sources of additional water supply are identified and utilized.

Other Resources. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to geology and soils. Under the No Project Alternative, the USGS site would remain as open space, at least in the near term. The No Project Alternative would not result in significant land use and planning impacts. Because the campus site does not contain mineral resources, neither the proposed project nor the No Project Alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

The No Project Alternative would not meet any of the project objectives. The No Project Alternative would not provide the USGS with necessary space for its marine research. Without a USGS facility on the Marine Science Campus, the USGS would not be assured of an adequate supply of seawater for marine research, would not be afforded opportunities for research collaboration with others on campus, would not have access to joint facilities with CDFG, and would have reduced opportunities for employment relationships with UCSC.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Table 5-6 presents a summary comparison of the proposed project and the alternatives discussed above for their ability to reduce project impacts and the ability to meet project objectives. The only significant unavoidable environmental impacts identified for the proposed USGS Phase I Project is its contributions to the cumulative regional water supply deficit, which is a significant impact both at the project level and cumulatively with the proposed CLRDP, and its cumulatively considerable contribution to cumulative traffic impacts at six study intersections. All other impacts of the proposed USGS Project would be mitigable to less than significant levels.

Because the No Project Alternative would make no contribution to the significant water supply impacts of the proposed CLRDP or to the significant unavoidable traffic impacts of the CLRDP, the No Project Alternative is the environmentally superior alternative. However, this alternative would not meet any of the project objectives. In this circumstance, CEQA requires the identification of another environmentally superior alternative.

The proposed project would meet all project objectives and would not result in any significant project-level impacts. While it would contribute to significant regional cumulative impacts of the CLRDP with respect to traffic and water supply, these impacts are shared with all of the other action alternatives of the project. While the Reduced Project Alternative makes a reduced contribution to the cumulative and project impacts of the CLRDP, it also has a reduced ability to meet project objectives and reduced beneficial effect with respect to environmental research for ocean health and public education. In the balance, the proposed USGS Phase I Project, therefore, is environmentally superior.

CENTER FOR OCEAN HEALTH PHASE II

The Center for Ocean Health Phase II (COH) Project would include the expansion of the existing COH facility on the Marine Science Campus by approximately 18,000 square feet. The expanded areas would accommodate office and laboratory space, administrative support space, and meeting and teaching rooms. The expanded area would be housed in a single wing attached to the existing COH buildings, which would be approximately 34 feet tall and would comply with CLRDP design guidelines. The proposed project would also include the construction of two new public-access overlooks, and improvements of an existing overlook on the lower terrace. The COH Phase II Project would be located on the lower terrace north of the existing Younger building and adjacent to the existing COH facilities.

The objectives of the COH Phase II Project are to:

- Provide sufficient space to remedy current space deficiencies, accommodate current programs and allow for anticipated and desired growth.
- Develop in sufficient proximity to existing facilities to take advantage of shared functions.
- Develop immediate adjacency or connection to the existing COH building to take advantage of central building facilities such as restrooms, administrative support space, and mechanical building systems so as to avoid duplication.
- Enhance public observation and participation opportunities.

TABLE 5-6
COMPARISON OF IMPACTS FOR USGS PHASE I PROJECT AND ALTERNATIVES

	Proposed USGS Phase I	Reduced Project	Modified Site Plan	Larger Project	No Project
Ability to Reduce Environmental Impacts					
Aesthetics	LS	-	+[a]	+	-
Agricultural Resources	LS	-	=	+	-
Air Quality	LS	-	=	+(S)	-
Biological Resources	LS	-	-	+	-
Cultural Resources	LS	-	-	+	-
Hazards and Hazardous Materials	LS	-	=	+	-
Hydrology and Water Quality	LS	-	-	+	-
Noise	LS	-	=	+	-
Population and Housing	LS	-	=	+	-
Recreation and Public Access[b]	LS	=	=	=	-
Transportation/Traffic	LS	-	=	+(S)	-
Utilities, Service Systems, and Energy	SU	-	=	+	-
Other Resources[c]	LS	=	=	=	=
Ability to Meet Project Objectives	Meets	-	=	+	Does not meet

a Impact could become SU if function of facility required building taller than 36' to accommodate space in smaller footprint.
b Analysis does not take into account to potential beneficial effects of proposed project and alternatives with respect to increased public education and interpretation.
c Geology and soils, land use and planning, mineral resources and public services. These resources are considered together because there would be negligible or no project impacts in these areas.

SU Significant and Unavoidable
LS Less than Significant
\+ Greater impact than that of the proposed project.
= Same (or similar) impact as that of the proposed project.
\- Lesser impact than that of the proposed project.
+/= Approximately the same impact as or potentially greater impact than that of the proposed project.
-/= Approximately the same impact as or potentially lesser impact than that of the proposed project
Shaded blocks represent change in the significance of an impact relative to proposed project.

The proposed project would result in a significant unavoidable impact at the project level only with respect to its contribution to the regional water supply deficit. The project also would contribute to the significant unavoidable impact of the CLRDP with respect to traffic volumes at two intersections, and to the cumulative traffic impacts at six study intersections; however, the traffic impact would not be significant at the COH project level, and the contribution of the project to cumulative traffic impacts would not be cumulatively considerable.

Two alternatives to this project are carried forward: the Alternate COH Phase II Site Alternative, and the No COH Phase II Project Alternative. Each of the two alternatives is considered with respect to its capacity to meet project objectives and to reduce the significant environmental impacts of the proposed COH Phase II Project.

A Reduced COH Phase II Alternative, was considered but not carried forward because any reduction in program space would introduce a high level of inefficiency in the future operation of the program and would not meet the critical project objective of remedying current space deficiencies. Similarly, an alternative that would construct the proposed project at an off-site location was considered but not carried forth for detailed evaluation because it would introduce inefficiencies in the operation of the research program.

CENTER FOR OCEAN HEALTH PHASE II ALTERNATE SITE ALTERNATIVE

Description

This alternative would involve locating the proposed COH expansion on a site to the east of the existing COH facility, across McAllister Way from the proposed site and more distant from the YLR. The size of the facility, the program that it would house and the associated population would be the same as under the proposed project.

Impacts

Aesthetics. Under the Alternate Site Alternative, the COH Phase II development would be moved further from the YLR, which could reduce the less than significant aesthetic impact of the project. However, the existing berm effectively screens much of the facility on the lower terrace from the ocean and the shore, in any case. The proposed project and the alternative would both provide the same beneficial aesthetic effect through the development and improvement of public overlooks.

Agricultural Resources. Both the proposed and the alternative project sites are located at the southern end of the Marine Science Campus, and are quite removed from agricultural uses on adjoining properties. For this reason, there is no potential for development of this facility to result in constraints on agricultural practices (such as use of pesticides). The proposed project and the alternative carry a similar slight potential for impacts to adjacent properties as the result of illicit access or agricultural damages by the project population, but the isolation of this facility from adjacent agricultural uses makes the potential for impact slight. The use of setbacks and other measures included in the CLRDP reduces the potential impact to a less than significant level for both the proposed project and the alternative.

Air Quality. The proposed project and the alternative have the same potential to result in less than significant construction-related emissions (Impact 4.3-1). Operational vehicle and equipment emissions also would be less than significant for both.

Biological Resources. Similar to the proposed site, at the alternate site, there is no existing habitat that is of value because the site is currently a parking lot.

Cultural Resources. The proposed project and the alternative have similar potential to disturb previously undiscovered Native American burial sites (Impact 4.5-1). Like the proposed project, this alternative could result in potentially significant but mitigable impacts to cultural resources.

Hazards and Hazardous Materials. Neither the proposed project nor the alternative would present any new hazards or hazardous materials risks not evaluated under the CLRDP.

Hydrology and Water Quality. The proposed project and the alternative would develop the same amount of impervious surface on the lower terrace, and thus both would carry the same potential for hydrological and water quality impacts. However, the Stormwater Concept Plan that would be implemented as part of the CLRDP would be applied to both the proposed project and the alternative, which would reduce hydrology and water quality impacts to less than significant levels. Neither the proposed project not the alternative would therefore result in significant impacts to hydrology and water quality.

Noise. The proposed project and the alternative would result in similar less than significant noise impacts. Noise would be produced by construction activity and from HVAC equipment used during project operation, but noise would be below threshold levels. At the alternate site, the noise sources would be more distant from the YLR but closer to the De Anza Santa Cruz residential community. However, the noise impacts would be less than significant because of intervening distance. Similarly, increased operational vehicle traffic would produce increased noise on site under both the project and the alternative, but the amount of traffic would be small and the impact would be less than significant.

Population and Housing. The alternative and the proposed project would make the same contribution to population growth in the Santa Cruz area, which is a less than significant impact of the CLRDP.

Recreation and Public Access. Neither the proposed project nor the alternative would result in significant impacts with respect to recreational resources. Both would have the same beneficial effects to recreation and public access as through provision of education and public involvement programs and improvements to overlooks.

Transportation and Traffic. The proposed project and the alternative would make the same contribution to the significant unavoidable traffic impacts of the CLRDP at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection, and to the significant cumulative impacts at these two and four other study area intersections. The contribution of the alternative, like that of the proposed project to the cumulative impact would not be cumulatively considerable. The traffic impacts would be less than significant at the project level for both the proposed project and the alternative.

Utilities, Service Systems, and Energy. Both the alternative and the proposed project would make the same contribution to the significant unavoidable cumulative impact on the future water supply deficit of the region, which would necessitate the development of new water supply sources (Impact 4.16-1).

Other Resources. Neither the proposed project nor the alternative would result in significant impacts with respect to geology and soils. The alternative would move the COH Phase II facility east of McAllister Way, which potentially would displace Marine Research and Education facilities programmed under the CLRDP. However, it probably would be possible to accommodate any displaced facility elsewhere on the site. Neither the proposed project nor the alternative would result in significant land use and planning impacts. Because neither the proposed nor the alternate site contains mineral resources, neither the proposed project nor the alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

Because a facility on the alternate site would be slightly more distant from the Phase I facility, the alternative might be slightly less efficient than the proposed project in facility functions and otherwise providing the advantages of facility adjacency. The Alternative Site COH Phase II Alternative would provide the same amount of program space for current and future needs as the proposed project, and equally would enhance public observation and participation opportunities.

NO PROJECT ALTERNATIVE

Description

Under the No Project Alternative, the COH Phase II Project would not be constructed, COH Phase I would continue to operate within the limits of space and program deficiencies, and the Phase II site would remain undeveloped, at least in the near term. The existing overlook would not be upgraded, and two new overlooks would not be built.

Impacts

Aesthetics. The No Project Alternative would not develop the proposed overlooks, or a second building adjacent to the existing COH. The Phase II building development adjacent to the existing building would not substantially change the existing appearance of the site, and would result in a less than significant visual impact. The No Project Alternative would not provide the beneficial aesthetic effect that would result from the development of additional public viewpoints.

Agricultural Resources. The less than significant direct and indirect impacts of the proposed project on agricultural resources would be avoided by the No Project Alternative.

Air Quality. The proposed project has the potential to result in less than significant construction-related emissions and operational vehicle and equipment emissions. These would be eliminated by the No Project Alternative.

Biological Resources. The proposed project would not result in impacts to biological resources because the site is disturbed and the habitat is of limited value. Similarly, there would be no impacts to biological resources under the No Project Alternative.

Cultural Resources. Under the No Project Alternative, the proposed project's potential to disturb previously undiscovered Native American burial sites would be eliminated.

Hazards and Hazardous Materials. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to hazards and hazardous materials.

Hydrology and Water Quality. Under the No Project Alternative, the less than significant impact associated with the development of new impervious surfaces on the lower terrace under the proposed project would be eliminated. The Stormwater Concept Plan that would be implemented as part of the CLRDP would in any case reduce the potential hydrologic impacts to a less than significant level.

Noise. Under the No Project Alternative, the project's less than significant noise impacts from construction activity and from traffic and HVAC equipment related to project operation would be eliminated.

Population and Housing. The No Project Alternative would eliminate the proposed project's contribution to the less than significant impact of the CLRDP with respect to population growth in the Santa Cruz area.

Recreation and Public Access. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to recreational resources. Because, under the No Project Alternative, the proposed overlooks would not be developed, the alternative would not provide the beneficial effects to recreation and public access of the education and public involvement programs included in the proposed project.

Transportation and Traffic. The traffic impacts of the proposed project would be less than significant. However, the No Project alternative would eliminate the contribution of the proposed project to the significant unavoidable traffic impacts of full development under the CLRDP at the Mission Street / Chestnut Street intersection and the Mission Street / Bay Street intersection, and at the four other study area intersections that would be affected by cumulative traffic.

Utilities, Service Systems, and Energy. The No Project Alternative would eliminate the contribution of the proposed project to the future water supply deficit of the region, which is considered a significant unavoidable impact of the CLRDP and of the proposed project.

Other Resources. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to geology and soils. Neither the proposed project nor the alternative would result in significant land use and planning impacts. Because the project site does not contain mineral resources, neither the proposed project nor the No Project Alternative would result in significant impacts with respect to mineral resources. Neither the proposed project nor the No Project Alternative would result in significant impacts with respect to public services.

Ability to Accomplish Project Objectives

This alternative would meet none of the project objectives associated with the COH Phase II Project. It would not provide the space needed to remedy existing space and program deficiencies, provide the space needed for growth and future demand, or allow for sharing of functions between adjacent users. It would also not provide the public education and involvement benefits of the proposed project. Further, the No Project Alternative would diminish the ability of the CLRDP to meet its program growth objectives.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Table 5-7 presents a summary comparison of the proposed project and the alternatives discussed above for their ability to reduce project impacts and the ability to meet project objectives. Because the No Project Alternative would make no contribution to the significant unavoidable regional water supply impacts of the proposed CLRDP, to the significant unavoidable traffic impacts of the CLRDP, or to the mitigable impacts of the project with respect to cultural resources, the No Project Alternative is the environmentally superior alternative. However, this alternative would not meet any of the project objectives. In this circumstance, CEQA requires the identification of another environmentally superior alternative.

The proposed project would meet all project objectives and would not result in any significant project-level impacts. While it would contribute to the significant unavoidable regional cumulative impact of the CLRDP with respect to water supply, and to traffic impacts of the CLRDP, these impacts are shared with the other action alternative of the project. While the Alternate Site Alternative would have impacts that are comparable to the proposed project, it has a somewhat reduced ability to meet the project objective of providing adjacency of facilities. In the balance, the proposed COH Phase II Project, therefore, is the environmentally superior alternative.

TABLE 5-7
COMPARISON OF IMPACTS FOR CENTER FOR OCEAN HEALTH PROJECT AND ALTERNATIVES

	Proposed Center for Ocean Health	Alternative COH Phase II Location	No Project
Ability to Reduce Environmental Impacts			
Aesthetics	LS	=	-
Agricultural Resources	LS	=	-
Air Quality	LS	=	-
Biological Resources	LS	=	=
Cultural Resources	LS	=	-
Hazards and Hazardous Materials	LS	=	-
Hydrology and Water Quality	LS	=	-
Noise	LS	=	-
Population and Housing	LS	=	-
Recreation and Public Access[a]	LS	=	=
Transportation/Traffic	LS	=	-
Utilities, Service Systems, and Energy	SU	=	-
Other Resources[b]	LS	=	=
Ability to Meet Project Objectives	Meets	=	Does not meet

[a] Analysis does not take into account to potential beneficial effects of proposed project and alternatives with respect to increased public education and interpretation.
[b] Geology and soils, land use and planning, mineral resources and public services. These resources are considered together because there would be negligible or no impacts in these areas.

SU Significant and Unavoidable
LS Less than Significant
\+ Greater impact than that of the proposed project.
= Same (or similar) impact as that of the proposed project.
\- Lesser impact than that of the proposed project.
+/= Approximately the same impact as or potentially greater impact than that of the proposed project.
-/= Approximately the same impact as or potentially lesser impact than that of the proposed project

CHAPTER 6

OTHER CEQA CONSIDERATIONS

This section summarizes the findings of this EIR with respect to the irreversible effects and growth-inducing impacts of the proposed project.

A. SIGNIFICANT IRREVERSIBLE EFFECTS

CEQA Guidelines indicate that impacts associated with a proposed project may be considered to be significant and irreversible for the following reasons:

- Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible, since a large commitment of such resources makes their removal thereafter unlikely;
- Primary impacts and, particularly, secondary impacts (such as highway improvement that provides access to a previously inaccessible area) generally commit future generations to similar uses; and,
- Irreversible damage can result from environmental accidents associated with the project.

The dedication of mostly undeveloped lands to development under the proposed project would constitute an irreversible use of these lands, as it is unlikely that they would be returned to their natural state in the future. Furthermore, the proposed project would irretrievably commit materials to the construction and maintenance of the new facility. In addition, the construction and operation of the proposed project would result in the use of energy, including fossil fuels. See Section 4.16, Utilities, Service Systems, and Energy for a more detailed discussion of the project's anticipated natural gas and electricity demand.

The project would not result in the development of access roads to areas that were previously inaccessible. The project is not expected to result in any activities likely to result in accidents that could lead to irreversible environmental damage (see Section 4.7, Hazards and Hazardous Materials for a more detailed discussion).

B. GROWTH INDUCEMENT

Projects are typically considered growth-inducing if they foster economic or population growth. Typical growth-inducing activities might be the extension of urban services or transportation infrastructure to previously un-served or under-served areas, or the removal of major barriers to development.

The proposed project includes several elements designed to reinforce a stable urban boundary at the City of Santa Cruz city limit. The land use plan clusters complementary uses, retaining undeveloped open lands, habitat areas, and buffers adjacent to neighboring agricultural uses. The proposed project would provide infrastructure to serve the needs of the projected campus population. Policies in the land use element limit the size of utility lines onsite to serve only the projected needs of the campus and establish a utility prohibition zone where new sewer or water utility lines would not be allowed. Circulation improvements would be limited and parking would be regulated though use of parking permits and time-limited parking.

Marine Science Campus development would not result in substantial population or employment growth or a concentration of population or employment. The analysis described in the Population, Housing section adopts a conservative approach, assuming all enrollment and employment increases associated with the proposed project would represent in-migration of students and workers. The numbers are not large, however, in the context of either the Santa Cruz urban area or the UCSC campus. Moreover, the proposed project would provide housing on-site that would only be available to UCSC Marine Science faculty and staff, thereby reducing housing demand in the City of Santa Cruz and surrounding communities that would otherwise be associated with the proposed project. The net remaining housing demand associated with students and other Marine Science Campus employment would not represent a substantial addition to the need for local housing production.

Some secondary employment would be expected to be induced in local retail and other service sectors. The amount would not be large and would be within the growth parameters outlined in current local general plans. In light of the downturn in high technology sectors that supported growth in economic activity and jobs in the County in the 1980s and 1990s, the economic stimulus of institutional investment such as that represented by the proposed project could be interpreted as a beneficial economic impact.

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- Planning Department

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CHAPTER 10

GLOSSARY AND ABBREVIATIONS

A. GLOSSARY

ADVERSE:	A term used to describe unfavorable, harmful or detrimental changes in environmental conditions. (ESA)
AESTIVATE:	To spend the summer usually at one place. (www.m-w.com)
ALTERNATIVES:	Other feasible projects that meet of substantially meet the stated objectives of the project being reviewed. (Fulton, 1999)
AMPHIBIAN:	Any of a class of cold-blooded vertebrates (as frogs, toads, or salamanders) intermediate in many characters between fishes and reptiles and having gilled aquatic larvae and air-breathing adults. (www.m-w.com)
ANAEROBIC:	Living, active, occurring, or existing in the absence of free oxygen. (www.m-w.com)
ANTHROPOGENIC:	Of, relating to, or resulting from the influence of human beings on nature. (www.m-w.com)
AQUACULTURE:	The cultivation of the natural produce of water. (www.m-w.com)
AQUIFER:	A natural underground formation which is saturated with water, and from which water can be withdrawn. (UCSC)
ARBORESCENT:	Resembling a tree in properties, growth, structure, or appearance. (www.m-w.com)
ASSESSMENT:	Determination of the nature, amount, importance or value of a change in an environmental condition. (UCSC)
AVIAN:	Of, relating to, or derived from birds. (www.m-w.com)
AVIFAUNA:	The birds or the kinds of birds of a region, period, or environment. (www.m-w.com)

BASIN:	A synclinal structure, roughly circular in its outcrop pattern, in which beds dip gently toward the center from all directions. (Glossary of Geologic Terms)
BENTHIC:	The lower region of a body of water including the bottom. (Water Environment Federation)
BERM:	A raised path or mound of earth. (Fulton, 1999)
BEST MANAGEMENT PRACTICES (BMPs):	Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from non-point sources. (US EPA)
BIOTA:	The animal and plant life of a given region. (US EPA)
BOLLARD:	A post of metal or wood on a wharf around which to fasten mooring lines. (www.m-w.com)
BREAKWATER:	A protective wall built offshore and usually parallel to the shore (Illustrated Glossary of Geologic Terms)
BUILDOUT:	A condition in which all development allowed by an adopted plan has been completed. (UCSC)
BULK:	The height, mass, density, and location of buildings on a piece of land. (Fulton, 1999)
CANDIDATE SPECIES:	Species that the California Department of Fish and Game has formally noticed as being under review for addition to either the list of endangered species or the list of threatened species.
COASTANOAN:	From the Spanish “costenos,” or coast dwellers; native American inhabitants of San Francisco and Monterey Bays (same as Ohlone). (UCSC)
COMMUNITY:	In ecology, an assemblage of populations of different species within a specified location in space and time. Sometimes, a particular subgrouping may be specified, such as the fish community in a lake or the soil arthropod community in a forest. (US EPA)
CONDUCTIVITY:	A measure of the ability of a solution to carry an electrical current. (US EPA)

CUMULATIVE IMPACT: Two or more environmental effects which, when considered together, area considerable or which compound or increase other environmental impacts. (CEQA Deskbook)

DECIBEL (dB): A unit for expressing the relative intensity (loudness) of sounds. The decibel is the logarithm of the ratio of the intensity of a given sound to the faintest sound discernable by the human ear. (UCSC)

DENSITY: A measure of how heavy a specific volume of a solid, liquid, or gas is in comparison to water. depending on the chemical. (US EPA)

DIKE: A bank usually of earth constructed to control or confine water. (www.m-w.com)

DRAINAGE BASIN: An area drained by a main river and its tributaries. (Water Environment Federation)

ECOSYSTEM: The interacting system of a biological community and its non-living environmental surroundings. (US EPA)

EFFLUENT: Wastewater--treated or untreated--that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters. (US EPA)

ENDANGERED SPECIES: Under the California Endangered Species Act, a species of plant, fish, or wildlife, which is “in serious danger of becoming extinct throughout all, or a significant portion of its range” and is limited to species or subspecies native to California. Under the Federal Endangered Species Act, an endangered species is defined as “any species that is in danger of becoming extinct throughout all or a significant portion of its range.”

ENDEMISM: Species restricted to this area alone.

ENVIRONMENT: The physical conditions which exist within an area which will be affected by a proposed project. The conditions include land, air, water, minerals, flora, fauna, noise, and objects of historical or aesthetic significance. (CEQA Deskbook)

ENVIRONMENTALLY SENSITIVE HABITAT AREAS (ESHAs): Any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments. (Public Resource Code Section 30107.5)

EPHEMERAL: Lasting a very short time. (www.m-w.com)

EROSION: Process by which material is removed from the earth's surface (including: weathering, dissolution, abrasion, and transportation). (UCSC)

ESTUARY: An estuary is a partially enclosed body of water formed where freshwater from rivers and streams flows into the ocean, mixing with the salty sea water. (US EPA)

EVAPORATION: The act or process of converting or changing into a vapor with the application of heat. (Water Environment Federation)

EVAPOTRANSPIRATION: The loss of water from the soil both by evaporation and by transpiration from the plants growing in the soil. (US EPA)

EYRIES: The nest of a bird on a cliff or a mountaintop. (www.m-w.com)

FAUNA: Animal life. (www.m-w.com)

FEASIBLE: capable of successfully being accomplished by reasonably available means. (UCSC)

FLOODPLAIN AREAS: Defined as the lowland and relatively flat areas adjoining inland and coastal waters subject to a 1 percent or greater chance of flooding in any given year (also termed the 100-year floodplain).

FLORA: Plant or bacterial life. (www.m-w.com)

FOSSILIFEROUS: Containing fossils. (www.m-w.com)

GLARE: A light source, either eflected or direct, which is annoying or distracting. (UCSC)

GRADING: Alteration of existing slope and/or shape of the ground surface. (UCSC)

GROIN: A wall built out from the shore. (Illustrated Glossary of Geologic Terms)

GROUNDWATER: Water beneath the surface of the earth. (UCSC)

GULLY: A trench worn in the earth by running water. (Water Environment Federation)

HAZARDOUS MATERIAL:	Any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment.
HYDROPHYTE:	Plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. (Cowardin et al. 1979)
IMPACT REPORT:	A public document prepared under the California Environmental Quality Act used by a governmental agency to analyze the significant environmental effects of a proposed project, to identify alternatives, and to disclose possible ways to reduce or avoid possible environmental damage. (UCSC)
IMPAIRED WATERS:	Those waters that do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology.
IMPERVIOUS SURFACES / AREAS:	Ground surface which cannot be penetrated by water. Includes paved and compacted surfaces, as well as those covered by buildings. (UCSC)
INDIGENOUS:	Having originated in and being produced, growing, living, or occurring naturally in a particular region or environment. (www.m-w.com)
INFILTRATION:	With reference to water and wastewater conveyance lines, infiltration is the introduction of underground water, such as groundwater, into wastewater collection systems. Infiltration results in increased wastewater flow levels. (UCSC)
INFILTRATION:	With reference to water and wastewater conveyance lines, infiltration is the introduction of underground water, such as groundwater, into wastewater collection systems. Infiltration results in increased wastewater flow levels.
INFLOW:	With reference to water and wastewater conveyance lines, inflow is surface water, such as rainfall runoff, which enters a wastewater collection system. Inflow results in increased wastewater flow levels. (UCSC)
KILOWATT:	A measure of the rate of electrical flow. (UCSC)
KILOWATT-HOUR:	A measure of a quantity of electrical consumption. (UCSC)

LAGOON:	A shallow pond where sunlight, bacterial action, and oxygen work to purify wastewater; also used for storage of wastewater or spent nuclear fuel rods. (US EPA)
LESS THAN SIGNIFICANT:	An environmental condition change that does not exceed a stated CEQA standard of significance. (UCSC)
LEVEE:	An embankment for preventing flooding. (www.m-w.com)
LEVEL OF SERVICE (LOS):	A measure of the mobility characteristics of an intersection, as determined by vehicle delay, which is estimated by a volume-to-capacity ratio. (UCSC)
LITTORAL ZONE:	Strip of land along the shoreline between the high and low water levels. (US EPA)
LOCAL COASTAL PLAN:	A plan for coastal development required by the state Coastal Commission before land use permitting power in the coastal zone is returned to local governments. (Fulton, 1999)
LONG-RANGE VIEWS:	Views of distances from more than one mile from the site.
MARICULTURE:	The cultivation of marine organisms in their natural environment. (www.m-w.com)
MATERIAL SAFETY DATA SHEETS (MSDSs):	Forms provided by hazardous materials manufacturers that identify the hazardous constituents in the material and explain proper safety precautions.
MEDIUM-RANGE VIEWS:	Views of distances ranging from one-half mile to one mile from the site.
MITIGATION MEASURE:	Action taken to reduce or eliminate environmental impacts. (UCSC)
MONOCULTURE:	A crop or a population of a single kind of organism grown on land in monoculture. (www.m-w.com)
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES):	A system under the federal Clean Water Act that requires a permit for the discharge of pollutants to surface waters of the United States. In California, NPDES permits are obtained from the Regional Water Quality Control Board. (CA Dept. of Toxic Substances Control)

NAVIGABLE WATERS: Traditionally, waters sufficiently deep and wide for navigation by all, or specified vessels; such waters in the United States come under federal jurisdiction and are protected by certain provisions of the Clean Water Act. (US EPA)

NOISE: Annoying, harmful or unwanted sound. (UCSC)

NON-POINT SOURCE POLLUTION: Sources of pollution which are difficult to define and which usually ocer broad areas of land, such as the carrying of fertilizers from agricultureal land by runoff or the carrying of smog from one area to another. (Fulton, 1999)

OHLONE: A Miwok word meaning "people of the west", referring to the native American inhabitants of the San Francisco Bay area and the Monterey Bay area (same as Coastanoan). (UCSC)

ONCOGENIC: Relating to tumor formation (www.m-w.com)

OVERLAND FLOW: A land application technique that cleanses waste water by allowing it to flow over a sloped surface. As the water flows over the surface, contaminants are absorbed and the water is collected at the bottom of the slope for reuse. (US EPA)

PARTICULATE: Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog, found in air or emissions. (US EPA)

PEAK HOUR: In reference to public services infrastructure or transportation systems, the hour in which the greatest use occurs. (UCSC)

PERCOLATION: Downward movement of groundwater through soil and bedrock. (UCSC)

PERMEABLE: Passable; allowing fluid to penetrate or pass through it. (Water Environment Federation)

PHYSIOGNOMY: The facial features held to show qualities of mind or character by their configuration or expression. (www.m-w.com)

POINT-SOURCE POLLUTION: Pollution that can be traced to a single point source, such as a pipe or culvert. (Water Environment Federation)

PRECIPITATION: Removal of particles from airborne emissions as in rain. (US EPA)

RAPTOR: Bird of prey, such as a hawk, eagle, or owl.

RARE:	A condition in which a species or subspecies, although not presently threatened with extinction, exists in such small numbers throughout its range that it may be endangered if its environment is degraded or reduced in size. (UCSC)
RECOMBINANT DNA:	Genetically engineered DNA prepared in vitro by cutting up DNA molecules and splicing together specific DNA fragments usually from more than one species of organism. (www.m-w.com)
RECYCLING:	A variety of processes by which reusable materials in the solid or hazardous waste streams are separated for reuse. (UCSC)
REVETMENT:	A facing to sustain an embankment. (www.m-w.com)
RICHTER MAGNITUDE:	A logarithmic scale ranging from one to ten, used to express the total energy of an earthquake. An increase of one unit represents a 60-fold increase in energy. (UCSC)
RIPARIAN HABITAT:	Areas adjacent to rivers and streams with a differing density, diversity, and productivity of plant and animal species relative to nearby uplands. (US EPA)
ROOKERY:	A breeding ground or haunt especially of gregarious birds or mammals. (www.m-w.com)
RUDERAL:	Heavily disturbed areas in wastelands near human habitation that support primarily annual non-native plant species.
RUN-OFF:	That part of precipitation, snow melt, or irrigation water that runs off the land into streams or other surface-water. It can carry pollutants from the air and land into receiving waters. (US EPA)
SALINITY:	The percentage of salt in water. (US EPA)
SCENIC CORRIDOR:	The land adjacent to and visible from the highway, using a motorist's line of vision.
SEAWALL:	A wall at the shore and parallel to it for protection against wave erosion. (http://www.ge-at.iastate.edu/courses/Geol_100/glossary.html#G)
SEDIMENTATION:	Process by which material suspended in water is deposited in a body of water. (UCSC)

SEICHE:	An oscillation of the surface of a landlocked body of water that varies in period from a few minutes to several hours. (www.m-w.com)
SHORT-RANGE VIEWS:	Views of distances from less than one-half mile from the site.
SILT:	Soil composed of particles finer than fine sand and coarser than clay. (UCSC)
SITE PLANNING:	The physical layout of physical building and landscape design. (Fulton, 1999)
SPILL LIGHT:	Light that falls on off-site receptors causing additional unwanted illumination.
SURFACE WATER:	Water running in streams or rivers. (UCSC)
SWALE:	A depression in the landscape. (UCSC)
TAKE:	Harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct.
TAXA:	One of the hierarchical categories into which organisms are classified. (Water Environment Federation)
THREATENED SPECIES:	A species that "is likely to become endangered in the foreseeable future.
TOTAL MAXIMUM DAILY LOADS (TMDL):	Sets discharge limits for nonpoint-source pollutants.
TRANSPORTATION DEMAND MANAGEMENT:	Programs designed to reduce demands of transportation systems by influencing how and when commute trips occur. (UCSC)
TRIBUTARY:	A stream or river that flows into a larger river or lake. (Water Environment Federation)
TSUNAMI:	Great sea wave produced by submarine earth movement or volcanic eruption. (www.m-w.com)
VIEWSHED:	The area which can be seen from a specified location. (UCSC)
VOLUME-TO-CAPACITY RATIO:	In reference to transportation, ratio of peak hour use to capacity. (UCSC)

WATER TABLE:	The level of groundwater. (US EPA)
WETLAND:	An area that is saturated by surface or ground water with vegetation adapted for life under those soil conditions, as swamps, bogs, fens, marshes, and estuaries. (US EPA)
WILDLIFE CORRIDOR:	A natural corridor, such as an undeveloped ravine, that is frequently used by wildlife to travel from one area to another. (UCSC)

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B. ABBREVIATIONS

the ACT:	California Coastal Act
$\mu g/m^3$:	micrograms per cubic meter
aam:	Annual arithmetic mean
AAQS:	Ambient Air Quality Standards
AB:	Assembly Bill
ABAG:	Association of Bay Area Governments
AC:	Animal Care
AMBAG:	Association of Monterey Bay Area Governments
APHIS:	United States Department of Agriculture, Animal and Plant Health Inspection Service
AQMPs:	Air Quality Management Plans
ARB:	Air Resource Board
ARCS:	Archaeological Reconnaissance Ocean Genetics
AVO:	Average Vehicle Occupancy
BMP:	Best Management Practice
Btu:	British thermal units
CAA:	Clean Air Act
CAFE:	Corporate Average Fuel Efficiency
Cal-EPA:	California Environmental Protection Agency
Cal/OSHA:	California Division of Occupational Safety and Health
CalARP:	California Accidental Release Prevention Program
Caltrans:	California Department of Transportation
CARB:	California Air Resources Board
CARC:	Chancellor’s Animal Research Committee
CCAA:	California Clean Air Act
CCR:	California Code of Regulations
CDC:	Centers for Disease Control and Prevention
CDF:	California Department of Forestry
CDFG:	California Department of Fish and Game
CEC:	California Energy Commission
CEQA:	California Environmental Quality Act
CERCLIS:	Comprehensive Environmental Response, Compensation, and Liability Information System

CESA:	California Endangered Species Act
CFR:	Code of Federal Regulations
CGS:	California Geological Survey
CHP:	California Highway Patrol
CHW:	Catholic Healthcare West
CLRDP:	Coastal Long Range Development Plan
CMMPR:	California's Management Measures for Polluted Runoff
CMP:	Congestion Management Plan
CNDDB:	California Natural Diversity Data Base
CNPS:	California Native Plant Society
CO:	Carbon monoxide
Corps:	United States Army Corps of Engineers
CPUC:	California Public Utilities Commission
CRHP:	California Register of Historic Places
CRLF:	California red-legged frog
CUPA:	Certified Unified Program Agency
CVC:	California Vehicle Code
CWA:	Clean Water Act
CZARA:	Zone Act Reauthorization Amendments
CZMA:	Coastal Zone Management Act
dB(A):	A-weighted sound level
dB:	Decibel
DEIR:	Draft Environmental Impact Report
DFG:	Department of Fish and Game
DHS:	Department of Health Services
DNA:	Deoxyribonucleic Acid
DNL:	Day Night Average Sound Level
DOT:	United States Department of Transportation
DTSC:	Department of Toxic Substances Control
DWR:	Department of Water Resources
EA:	Exclusive Agriculture
EDD:	Employment Development Department
EDR:	Environmental Data Resources
EH&S:	UCSC Environmental Health and Safety Department

EHS:	Santa Cruz County Environmental Health Services Division
EIR:	Environmental Impact Report
EPA:	Environmental Protection Agency
EPA-PRGs:	EPA-Preliminary Remediation Goals
ERNS:	Emergency Response Notification System
ESA:	Environmental Science Associates
ESHAs:	Environmentally Sensitive Habitat Areas
Fed/OSHA:	Federal Occupational Safety and Health Administration
FEIR:	Final Environmental Impact Report
FEMA:	Federal Emergency Management Agency
FERC:	Federal Energy Regulatory Commission
FESA:	Federal Endangered Species Act
FHWA:	Federal Highway Administration
FP:	Flood Plain
FTE:	Full-time Equivalent
GPD:	gallons per day
GPM:	gallons per minute
GSF:	Gross Square Feet
HBG:	Huffman-Broadway Group
HCM:	Highway Capacity Manual
HCP:	Habitat Conservation Plan
HWCL:	Hazardous Waste Control Law
IACUC:	Institutional Animal Care and Use Committee
ICBO:	International Conference of Building Officials
IG:	General Industrial
IIPP:	Injury Illness and Prevention Plan
ILAR:	Institute of Laboratory Animal Resources
IMS:	Institute for Marine Sciences
ITE:	Institute of Transportation Engineers
IWMB:	Integrated Waste Management Board
KW:	Kilowatt
KWHr:	Kilowatt-hours
LCC:	Land Capability Classifications
LCP:	Local Coastal Program

LE:	Land Evaluation
L_{eq}:	Equivalent Noise Level
L_{max}:	Maximum Noise Level
LESA:	Land Evaluation and Site Assessment
LLRW:	Low-level radioactive waste
LML:	Long Marine Laboratory
LOS:	Level of Service
LRDP:	Long Range Development Plan
LU:	Land use
LUST:	Leaking Underground Storage Tank
M:	Richter Magnitude
MBUAPCD:	Monterey Bay Unified Air Pollution Control District
MFD:	Multiple-Family Dwelling Units (Rentals)
mgd:	million gallons per day
MMRP:	Mitigation Monitoring and Reporting Program
MOP:	Mortgage Origination Program
MPO:	Metropolitan Planning Organization
MSDSs:	Material Safety Data Sheets
msl:	Mean sea level
Mw:	Maximum Moment Magnitude Earthquake
MW:	Megawatts
NCCP:	Natural Communities Conservation Plan
NES:	National Energy Strategy
NIH:	National Institute of Health
NMFL:	National Marine Fisheries Laboratory
NMFS:	National Marine Fisheries Service
NO_2:	Nitrogen dioxide
NO_x:	Nitrogen oxide
NOAA:	National Oceanic and Atmospheric Administration
NPDES:	National Pollution Discharge Elimination System
NRC:	Nuclear Regulatory Commission
NRCS:	Natural Resources Conservation Service
NRHP:	National Register of Historic Places
NRS:	National Reserve System

O_3:	Ozone
OES:	Office of Emergency Services
OPR:	Office of Planning and Research
OSHA:	Occupational Safety and Health Act
PCBs:	Polychlorinated Biphenyls
PG&E:	Pacific Gas and Electricity Company
PM_{10}:	Particulates
ppm:	parts per million
PRC:	Public Resources Code
PSI:	Per square inch
QFs:	Qualifying facilities
RCRA:	Resource Conservation and Recovery Act of 1976
RCRIS:	Resource Conservation and Recovery (Act) Information System
RCRIS-LQG:	Resource Conservation and Recovery (Act) Information System Large Quantity Generator
RCRIS-SQG:	Resource Conservation and Recovery (Act) Information System Small Quantity Generator
RHB:	Radiologic Health Branch
RMP:	Resource Management Plan
RQ:	Reportable quantity
RRF:	Resource Recovery Facility
RSBC:	Radiation Safety and Bio-Safety Committee
RWQCB:	Regional Water Quality Control Board
SA:	Site Assessment
SARA:	Amendments and Reauthorization Act
SB:	Senate Bill
SCCSD:	Santa Cruz City School District
SCE:	Southern California Edison
SCFD:	Santa Cruz Fire Department
SCMTD:	Santa Cruz Metropolitan Transit District
SCPD:	Santa Cruz Police Department
SCUBA:	Self Contained Underwater Breathing Appartus
SCWD:	Santa Cruz Water Department
sf:	Square feet
SFD:	Single-Family Dwelling Units

SIP:	State Implementation Plan
SO_2:	Sulfur dioxide
SO_x:	Sulphuric oxide
SORACC:	Sea Otter Research and Conservation Center
SR:	State Route
SSA:	Streambed Alteration Agreement
SWRCB:	State Water Resources Control Board
TAC:	Toxic Air Contaminant
TAPS:	Transportation and Parking Services
TDM:	Transportation Demand Management
TIRE:	Traffic Infusion on Residential Environments
TMDL:	Total maximum daily loads
TSS:	Total suspended solids
U.S. EPA:	United States Environmental Protection Agency
UBC:	Uniform Building Code
UC:	University of California
UCFD:	University of California, Santa Cruz Fire Department
UCPD:	University of California, Santa Cruz Police Department
UCSC:	University of California, Santa Cruz
USC:	United States Code
USDA:	United States Department of Agriculture
USFWS:	United States Fish and Wildlife Service
USGS:	United States Geological Survey
USPS:	United States Postal Service
UST:	Underground Storage Tank
WHR:	Wildlife Habitat Relationships
WMUDS:	Waste Management Unit Discharge System
WWTP:	Wastewater treatment plant
YLR:	Younger Lagoon Reserve
ZOI:	Zone of Influence