UC Santa Cruz

MARINE SCIENCE CAMPUS

Coastal Long Range Development Plan

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Preface

Oceans cover 71% of the earth's surface and produce the majority of the oxygen we breathe, an important part of the protein we eat, about 25% of the oil and gas we use, and profoundly affect our weather and climate. In addition, 95% of the imported goods that enter the United States arrive by sea, including 10 million barrels of oil each day, 50% of our daily usage.

California is a coastal dependent state, yet the economic value of its marine resources is largely under-appreciated. Recreation and tourism in California is a major economic engine, producing ~$10 billion in revenues annually and supporting over 500,000 jobs. The state has six major ports with a yearly economic impact of $3.4 billion. Commercial and recreational fisheries generate an additional nearly $1 billion. A 1994 study concluded that seven ocean-dependent industries contributed more than $17 billion to the state's economy annually, equivalent to the income generated by our vast agricultural enterprise to which the state devotes substantial research funds. In contrast, the coastal oceans are vastly understudied.

In order to be healthy and productive, the oceans and the industries that depend on them need to be healthy and sustainable. It is apparent in California and elsewhere, however, that the sheer increase in numbers of people, now 33.5 million in California, as well as their activities have led to land use conflicts and also significant modifications of the coastal zone's ecological systems, seriously impacting their ability to sustain themselves.

Nearshore waters receive wastewater from domestic, industrial and agricultural drainage. Many of the state's fisheries have collapsed and former economically valuable species are now on the endangered list. Contaminated sediments have increasingly begun to restrict dredging of our major ports through which 95% of our foreign trade must pass. We see the warning signs, the closed fishing seasons, the endangered species list and the posted beaches. Yet we don't have a comprehensive picture of the magnitude of these problems and their cumulative impacts on the economic well being of California.

Because the environmental and economic sustainability of our state's coastal zone is closely tied to its health, we need to understand how the marine environment functions, and how human activity has affected this zone upon which we have grown so dependent. The conflicting scientific information and fruitless political debates that are found all too often in the environmental policy arena make it clear that we need a more effective way to integrate the efforts of researchers, public educators, and those making policy. Without such coordinated work we will be unable to understand the problems we now face, let alone solve them. We will find ourselves, not so many years from now, faced with truly insolvable environmental problems that we failed to address while they were still manageable.

Monterey Bay has attracted marine scientists for over a century, due in part to its unique oceanographic setting, its proximity to major features of oceanic circulation and the dramatic contours of its seafloor, including one of the world's largest submarine canyons. Straddling both subtropical and temperate climatic zones, Monterey Bay experiences a range of marine climates and is a region of extreme biological diversity. There are more species of marine mammals in the region than any other area in the northern hemisphere. It was these attributes as well as

concerns about offshore drilling and other potential environmental impacts that led to a sustained sixteen-year effort to have the area protected and designated as a sanctuary. In October 1992, 5,300 square miles off the central California coast was designated as the nation's newest and largest national marine sanctuary, providing protection for one-fourth of the entire California coast and also preserving the natural resources of this area for generations to come. This not only brought critical protection to this region but also focused federal and state attention on Monterey Bay, its existing marine facilities and research capabilities, and was a catalyst for new research efforts and programs in the region.

Monterey Bay has emerged over the last decade as a nationally recognized center for marine research, in large part due to the 21 marine research institutions, laboratories, government agency programs or facilities that now rim Monterey Bay and which are joined through the Monterey Bay Crescent Ocean Research Consortium. The University of California at Santa Cruz, as the only research university on the bay, has had an important responsibility and also played an important role in the emergence of the region as a recognized center for marine sciences.

We have an obligation to the people of the region and the state, as well as to the bay, the Sanctuary and the world oceans, to optimize our capabilities and our resources in order to do all we can to fully understand the oceans and anthropogenic change they are experiencing, to solve the problems we have created, and to share the knowledge we have developed with the public and those who make decisions which affect the oceans and how we use them. To do any less would be a loss of an exceptional location, capabilities and opportunities. Our challenge is to plan for optimal use of our site for marine research and education while respecting the important sensitive natural areas.

1. INTRODUCTION

The purpose of this chapter is to introduce the Coastal Long Range Development Plan (CLRDP) for the University of California at Santa Cruz Marine Science Campus. This chapter is divided into four sections. The first section sets forth the purpose of the CLRDP. The second section discusses the preparation and use of the CLRDP. The third section summarizes the relationship of other plans to the CLRDP. Finally, the fourth section outlines the regulatory context within which the CLRDP functions.

1.1. Purpose of the CLRDP

This CLRDP is a comprehensive physical development and land use plan that governs development, land use, and resource protection at the UC Santa Cruz Marine Science Campus, including Younger Lagoon Reserve (YLR). The adoption of this plan by the University of California and subsequent certification by the California Coastal Commission results in the delegation to the University of California of the authority to authorize most on-Campus development consistent with the plan without a coastal development permit, subject to Commission oversight. This plan does not directly govern the National Oceanic and Atmospheric Administration (NOAA) Fisheries facility, a federal establishment on 2.5 acres of federal land near the center of the Marine Science Campus. The Plan also does not directly govern areas where the Coastal Commission retains direct coastal permit and other development review authority, such as on public tidelands.

A Long Range Development Plan (LRDP) identifies the physical development needed to achieve the mission and goals of the institution, and the facilities and site improvements required for those aims. The University of California prepares Long Range Development Plans periodically to guide development on the University's main campuses.

A Coastal Long Range Development Plan is provided for under the California Coastal Act of 1976. In addition to the elements normally found in a Long Range Development Plan, this document addresses issues arising from coastal proximity, resources specific to this site, and the urban edge location of the campus. Coastal Act policies relevant to these issues are reflected and incorporated throughout the CLRDP along with additional policies that also guide the University's stewardship of its lands.

An Environmental Impact Report (EIR) has been prepared for the CLRDP, in compliance with the California Environmental Quality Act (CEQA). The EIR includes a detailed discussion of the Marine Science Campus site environment, and the potential environmental impacts of implementing the planned facilities and site improvements described in this CLRDP. The EIR also presents mitigations to address these potential impacts and alternatives to the project as proposed.

The CLRDP is a general plan for the physical development of the site and is intended as a commitment to plans and policies that relate to general land use, circulation and parking, public access and recreation, stormwater and other environmental management, utilities and services, resource protection, habitat management, and transportation demand management, within the scope and timeframes set forth herein. The CLRDP is not intended, however, as a commitment to any specific building project, building construction schedule, or building funding priority. Within the parameters established by this CLRDP, individual buildings and improvements will be approved on a case-by-case basis and will be accompanied by additional environmental analysis and public review, if necessary, to comply with CEQA and/or the California Coastal Act.

The anticipated horizon year for the building program under this CLRDP is 2020. This horizon year, however, is only intended to establish a planning target to provide a finite project description for analytical buildout purposes. It neither commits the University to achieve the projected level of development by 2020 nor does the CLRDP expire at this time. Rather, this CLRDP will remain in effect indefinitely, subject to periodic update through amendments (subject again to Coastal Commission certification). The actual rate of development is subject to forecasting uncertainty and actual development may be either faster or slower than anticipated. In the event that development occurs more quickly than anticipated, an update to the CLRDP (and the EIR) may be needed before the horizon year. Conversely, in the event that campus development occurs more slowly than anticipated, either because of funding availability, changes in academic program needs, natural disasters, or other unforeseen circumstances, the horizon year for the building program under this CLRDP may extend beyond 2020.

1.2. Preparation and Use of the CLRDP

This CLRDP was prepared over a period of approximately 5 years and was initiated following the University's purchase of 57 acres adjacent to its previous smaller holdings, which included the Long Marine Lab (LML) and the adjacent Natural Reserve System (UC NRS) Younger Lagoon Reserve.

UCSC convened an advisory committee of approximately 20 persons, representing the University, the City of Santa Cruz, and California Coastal Commission staff, and initiated discussions regarding the purpose, mission, and goals for the expanded Marine Science Campus site. As an initial step, and prior to development of the CLRDP, the University hired the planning/design firm of SRG Partnership to work with the committee to develop a program of principles to guide future development of the site (Planning Principles, Marine Research and Education Center, January 28, 2000). A public open house/workshop was held at the conclusion of this process so the public could review and comment on the guiding principles. At this time a website was also developed with the principles and supporting information posted. This site has been continuously maintained and periodically updated throughout the CLRDP process.

Subsequently, UCSC retained BMS Design Group and EHDD Architecture, with other technical consultants, to continue planning and design studies and to prepare the CLRDP. Concurrently, the University commissioned extensive environmental studies to understand and document the site's existing conditions and constraints. In addition to meeting regularly with the advisory committee, two additional community meetings were held to allow the community an opportunity to review ongoing work and to comment on their concerns and ideas regarding the site.

Throughout this process, California Coastal Commission staff were consulted regarding issue identification, site constraints, and potential site development concepts. In November 2000, UCSC completed a detailed Issue Identification Report for the site, and in December 2000, the Coastal Commission held a public hearing on the report, received comments from local governments and interested persons, and adopted comments to guide further development of the CLRDP. In July 2001, UCSC completed a Preliminary Constraints Analysis for Coastal Commission staff review, which focused on site constraints linked with the resource policies of Chapter 3 of the Coastal Act. A wetland and environmentally sensitive habitat delineation and a visual analysis were also conducted with Coastal Commission staff input and review.

This CLRDP is organized into nine chapters and two appendices. Chapter 1 introduces the CLRDP by setting forth its purpose, discussing its preparation and use, explaining its relationship to other plans, and outlining the regulatory context within which it operates. Chapter 2 describes the context within which the CLRDP was developed, including the regional and local setting, existing facilities and infrastructure, and existing public access and recreational opportunities on the project site. Chapter 3 discusses site planning considerations and constraints, including the results of a multi-year effort to identify wetlands and other environmentally sensitive habitat areas on the project site. Chapter 4 describes planning objectives, provides a program overview, and discusses design principles and land use concepts used in the development of the CLRDP. Chapter 5 sets forth the policies and implementation measures of the CLRDP, including those related to: land use, resource protection, scenic and visual qualities, circulation and parking, public access and recreation, hydrology and water quality, and utilities. Chapter 6 provides design guidelines for buildings, streets, parking areas, trails, landscaping, lighting, fencing, and signage. Chapter 7 contains an illustrative campus buildout site plan and building studies that represent the University's best estimate as to how the site will be developed. Chapter 8 contains procedures that govern review and approval of future development projects on the Marine Science Campus under the CLRDP. Chapter 9 sets forth a capital improvement program for the Marine Science Campus. Finally, the two appendices provide additional detail regarding resource management and drainage for the Campus.

1.3. Relationship to Other Plans

Upon adoption by the University of California and certification by the California Coastal Commission, this CLRDP will supersede the most recent planning document for Long Marine Lab, the *UCSC Institute of Marine Sciences Long Marine Laboratory Master Plan* (Master Plan), which was adopted by The Regents of the University of California in 1993. This CLRDP will also supersede the *UCSC/Long Marine Lab Campus Interim Access Plan* (2000). Other relevant plans include the *City of Santa Cruz Local Coastal Program and General Plan* and the *County of Santa Cruz Local Coastal Program*. Each of these plans is discussed below. This CLRDP is a separate document from the Long Range Development Plan for the 2,000-acre main campus of UCSC, which is located approximately two miles to the north.

1.3.1. UCSC Institute of Marine Sciences, Long Marine Laboratory Master Plan

The California Coastal Plan of 1975 recognized the potential for development of a marine research station at this site, then called Terrace Point, and noted that further special study would establish the level of access needed and the necessary protective measures to assure that critical habitats, productive agricultural areas, urban neighborhoods, and archaeological resources were not disrupted. By 1976 the California Coastal Commission had approved Phase I of the Long

Marine Laboratory at Terrace Point, and in 1983 Phase II was approved. In 1993, The Regents of the University of California adopted the *UCSC Institute of Marine Sciences Long Marine Laboratory Master Plan*, which covered the 16 upland acres then under University ownership, as well as the 25-acre Younger Lagoon Reserve, which was incorporated into the UC Natural Reserve System. The Master Plan has guided UCSC's development of the campus to date subject to coastal development permit review by the Coastal Commission.

The Master Plan envisioned facilities organized along McAllister Way, a north-south road that divided University property from privately-owned land to the east. The Plan defined YLR as a natural reserve and then defined two development areas: 1) the "Lower Terrace," where the Long Marine Laboratory structures were grouped, and 2) the "Upper Terrace," where a development area was created to accommodate USGS facilities and a leased aquaculture operation. The Plan also included some development alternatives involving use of portions of the adjacent privately owned land.

The Master Plan provided for: 1) improvements to the Seawater System and Mechanical Buildings; 2) Field Equipment Building/Corporation Yard; 3) Vertebrate Facilities Expansion; 4) Education and Visitor Center; 5) Environmental Quality/Marine Biosphere Research Buildings; 6) Caretaker and Visitor Housing; 7) U.S. Geological Survey-Branch of Pacific Marine Geology; 8) Coastal-dependent Industry/Aquaculture, and 9) Oiled Wildlife Rescue and Rehabilitation Facility. The Coastal Commission has reviewed individual projects proposed by the University under the Master Plan through case-by-case analysis of individual permit applications for consistency with the Coastal Act.

With the University's 1999 acquisition of 57 acres on the upland terrace immediately east of Long Marine Laboratory has come the need for this expanded and updated long-range plan for the campus.

1.3.2. City of Santa Cruz General Plan and Local Coastal Program

The campus site is located entirely within the Santa Cruz city limits and within the area designated "coastal zone" under the California Coastal Act. The City's Local Coastal Program (LCP) Land Use Plan, submitted for Coastal Commission certification in 1981, included a "West-Side Study Area," which was made up of the area now designated as the Marine Science Campus and the area between the Campus and Antonelli Pond to the east, including the 57-acre parcel later acquired by the University. The City's 1981 Plan proposed to terminate existing agricultural use of the land and develop it for residential, industrial, neighborhood-commercial, and coastal-dependent uses. The Commission denied certification of this plan for the West Side, while certifying the LCP for most of the rest of the City, because, among other things, agriculture was being actively carried out in the area. Since that time, the West-Side Study Area has remained an "area of deferred certification" that is not governed by the City's LCP, but rather is subject to the original permit jurisdiction of the Coastal Commission.

Although not controlling, the City of Santa Cruz General Plan includes provisions relevant to the project area. These provisions do not have controlling effect on the Marine Science Campus because, under principles of California Constitutional and statutory law, the University of California land is not subject to local land use regulation. Recognizing the interrelatedness of all land use in this area, the University has consulted with City representatives throughout development of this CLRDP and sought to make it consistent to the fullest extent feasible with

relevant portions of the City's LCP and General Plan. The City's LCP and General Plan will continue to provide guidance as the CLRDP is implemented over the years.

City General Plan Land Use Designations for the Campus Site

The General Plan designates land south of the Delaware Avenue extension, including the existing 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. The City defines "low-medium" as 10.1 to 20.0 units per acre, with allowed uses being "typical multi-family residential areas with apartments, condominiums, cooperative co-housing, townhouses and detached units."

Redevelopment Area

The project site north of Delaware Avenue extension is within a Redevelopment Area designated by the City of Santa Cruz Redevelopment Agency that generally encompasses the industrial lands at the western end of the City. While this redevelopment designation has no force or effect on the CLRDP, it may encourage continued redevelopment in the neighborhoods surrounding the CLRDP site.

Specific Plan

Policy L 2.2.4 of the City's General Plan, prepared before the University acquired the 57-acre parcel at Terrace Point, requires a specific plan for the area before it is developed. Although the University is not subject to the General Plan, the following General Plan policies were considered in preparation of the CLRDP:

- Reserve approximately 25 acres for coastal dependent uses and coastal-related use. Use intensities should not exceed 20 employees/acre for development related to unique opportunities related to the Monterey Bay Marine Sanctuary.

- Reserve 6.5 acres along the coast for coastal recreation uses.

- The specific plan shall include at least 15 acres for housing and housing-supporting uses. Housing shall be predominately of the multiple resident type, clustered for efficient use of the land, and 25% should be affordable to very-low and low-income households. The specific plan shall address housing of greatest need in the community: affordable units, rental units, small units. The concept is a neighborhood that, while not self-contained, includes services, facilities, and connections to nearby employment centers, in order to create a more pedestrian-oriented community.

- Provide parks and open space for the resident and employee population according to the standards of the Parks and Recreation Element. The planning process shall take into account potential unmet parks and open space needs of the City, especially for community park facilities, playing fields, and agricultural uses.

- The specific plan shall take into account policies of the General Plan. The circulation system shall be developed in light of the overall City objective of limiting automobile trips. Environmental resources such as Antonelli Pond, Younger Lagoon, Natural Bridges Park, Moore Creek, the ocean, and agricultural land shall be buffered and/or protected. Community design objectives shall be addressed by taking into account the various viewsheds including from Highway 1, views to and along the ocean, views internal to the project and by relating development in appropriate ways to De Anza Mobile Home Park and Long Marine Lab. Urban limit policies shall be addressed by sizing utilities to serve the specific plan area and Long Marine Lab, and not include additional capacity of future development of agricultural lands beyond the city limits. Concurrency policies shall be addressed by providing facilities and services for which a demand is created by the development of the parcel. Mitigation measures shall be developed to diminish the impact on public facilities and services. Phasing of development may be considered as one way to mitigate the impact of development.

1.3.3. County of Santa Cruz Local Coastal Program

Immediately west of the project site is rural agricultural land within the County of Santa Cruz. The area is covered by the County's certified LCP, which was last comprehensively updated in 1994. This LCP contains strong policies protecting coastal resources (including coastal agriculture, views, habitat, urban-rural boundary, and public access, among others). These policies have influenced the development of the CLRDP, and are reflected in its provisions.

1.3.4. UCSC/NRS Younger Lagoon Reserve Management Plan

The Younger Lagoon Reserve has an adaptive management plan derived from the version originally prepared as part of the LML Master Plan approved by The Regents of the University of California in 1993. The plan identifies the YLR objectives and policies. However, the plan is not part of this CLRDP, and thus it does not govern any coastal development proposed there, nor can it be used to supersede the requirements of this CLRDP.

1.4. Regulatory Context

This section discusses the California Coastal Act and other state regulations that affect development of the CLRDP.

1.4.1. California Coastal Act

Through the California Coastal Act of 1976, the California Legislature has stated goals and policies that must guide development within California's coastal zone. These provisions of the California Coastal Act seek, among other things, to protect the natural and scenic resources of coastal areas; to maximize public access to the coast consistent with resource conservation; to assure orderly and balanced utilization and conservation of coastal zone resources; to encourage coordinated planning and development of beneficial uses, including educational uses, in the coastal zone; and to assure the priority of coastal-dependent and coastal-related development over other development on the coast.

For example, the California Coastal Act has been an important factor in the protection of YLR to date. Using Section 30107.5, which defines "environmentally sensitive area," and Section 30240(a), which states in part that "environmentally sensitive habitat areas shall be protected against any

significant disruption of habitat values," Younger Lagoon has been protected as an important coastal habitat.

All state public agencies are required to comply with provisions of the Coastal Act. For state universities, the goals and policies of the Act are implemented in either of two ways: by Coastal Commission review of individual project permit applications, or by development review under LRDP process established by the Act (Section 30605, Public Resources Code) and the implementing regulations (14 Cal. Code of Regulations, Chapter 8). Through development of this coastal LRDP, or CLRDP, for the Marine Science Campus, UCSC has taken the latter option.

Under the coastal LRDP process, the Coastal Act provides that the University may prepare a plan, which reflects relevant policies of the Act and provides assurance that later development projects will be carried out consistent with those policies. The plan must be developed in consultation with local government and be consistent to the fullest extent feasible with the LCPs of affected jurisdictions. The Coastal Commission reviews the proposed CLRDP for consistency with state policies contained in the Coastal Act.

Once the CLRDP is certified as consistent with the Coastal Act, the primary responsibility for approving individual projects contemplated by the plan is exercised by the University. The University must notify the Commission and interested persons of project approvals prior to the start of development. The Commission, after public hearing, may determine that the development is not consistent with the certified CLRDP and impose conditions to achieve consistency.

1.4.2. Other Regulations

In addition to the regulations administered by the California Coastal Commission, development of the Marine Science Campus involves consultation with, and/or permits administered by the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and the Regional Water Quality Control Board. The Army Corps of Engineers has an interest in development on sites that contain wetlands under its jurisdiction. The U.S. Fish and Wildlife Service and the California Department of Fish and Game oversee development where an endangered or threatened species may be involved. Finally, the Regional Water Quality Control Board is interested in issues regarding non-point source pollution, wastewater discharge and treatment capacity, and the care and use of wetlands.

2. Context

The purpose of this chapter is to explain the context for development of the CLRDP. The chapter is divided into five sections. The first section discusses the regional and local setting. The second section summarizes pre-CLRDP facilities on the site. The third, fourth, and fifth sections describe pre-CLRDP circulation and parking, public access and recreation, and utilities, respectively.

2.1. Regional and Local Setting

This section provides a description of the Central Coast Region and the project vicinity at the time of CLRDP certification.

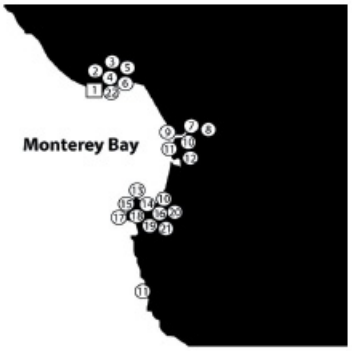
2.1.1. Central Coast Region

The UC Santa Cruz Marine Science Campus is situated on the central California coast, near the center of the Monterey Bay National Marine Sanctuary, one of the largest protected marine areas in the world. Stretching along one-fifth of the California coast, the 5,300-square-mile Monterey Bay National Marine Sanctuary extends an average of 30 miles from shore, reaching as far as 53 miles out to sea. On shore, it begins in Marin just north of San Francisco (abutting the Gulf of the Farallones National Marine Sanctuary) and follows the coastline south to Cambria. Coastal Santa Cruz lies at the heart of this protected coastline.

The Marine Science Campus 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. Younger Lagoon Reserve, a wetland-terrestrial system, including a sandy pocket beach that is part of the University of California Natural Reserve System (UC NRS), is located on the western portion of the site. Agricultural land stretches to the west and northwest of the site in the unincorporated County. The Campus coastline is characterized primarily by a low cliff that drops to a rock shelf, and partially by the larger pocket beach fronting the Younger Lagoon area. The Campus shoreline provides for views of the ocean and a dramatic placement at the transition point between Santa Cruz County's rural North Coast area and the urbanized City of Santa Cruz.

Fig. 2.1 Regional Context

Fig. 2.2 Regional Marine Sanctuaries



1 **UCSC Institute of Marine Sciences & Long Marine Lab**
2 National MarineFisheries Service Lab
3 Marine Wildlife Veterinary Care & Research Center
4 Seymour Marine Discovery Center
5 U.S. Geological Survey, Coastal and Marine Group
6 Seabird/Raptor Facility (UCSC-CDFG)
7 Moss Landing Marine Labs (CSU)
8 Elkhorn Slough National Estuarine Reserve
9 Monterey Bay Aquarium Research Institute
10 University of California- Sea Grant Extension Program
11 Marine Pollution Studies Labs
12 National Undersea Research Program
13 Hopkins Marine Station (Stanford)
14 Monterey Bay Aquarium
15 Naval Postgraduate School
16 Pacific Fisheries Environmental Group
17 Naval Research Lab, Marine Meteorology Division
18 Fleet Numerical Meteorology and Oceanography Center
19 National Weather Service
20 Monterey Bay National Marine Sanctuary Office
21 Monterey Marine Resources Lab
22 NOAA Center for Marine Protected Area Science

Fig. 2.3 Monterey Bay Marine Science Facilities

2.1.2. Project Vicinity

While the UCSC main campus lies nestled in the rolling hills northwest of downtown Santa Cruz, the Marine Science Campus is located two miles away at the coast and is physically separate from the main campus. Except for two small caretaker trailers, no housing or University food service is presently provided on site. Western Drive in Santa Cruz is the main route used to travel in between the site and the main UCSC campus.

The north edge of the Marine Science Campus site is located about one-quarter mile directly south of Highway 1, or about three-quarter miles from the highway via connecting roads. The primary access to the Marine Science Campus is provided at the western terminus of Delaware Avenue where it intersects Shaffer Road. Access from Highway 1 is from Delaware Avenue via Natural Bridges Drive and Mission Street, or via Swift Street. Existing public access to the campus is provided via the existing City street system and via the public access trail from the De Anza Mobile Home Park that intersects the Campus near the coastal bluffs.

Just northeast of the site, Highway 1 becomes Mission Street, and passes through the City of Santa Cruz. Mission Street, a major arterial, is the location of the majority of the City's west side commercial businesses, which are generally found in strip retail developments. The closest major grocery shopping and convenience retail can be found at the intersection of Mission Street and Almar Avenue, about one mile from the campus. Banking and other essential services are generally located downtown or some distance away on Mission Street. Only a few limited commercial areas lie within walking distance to the campus.

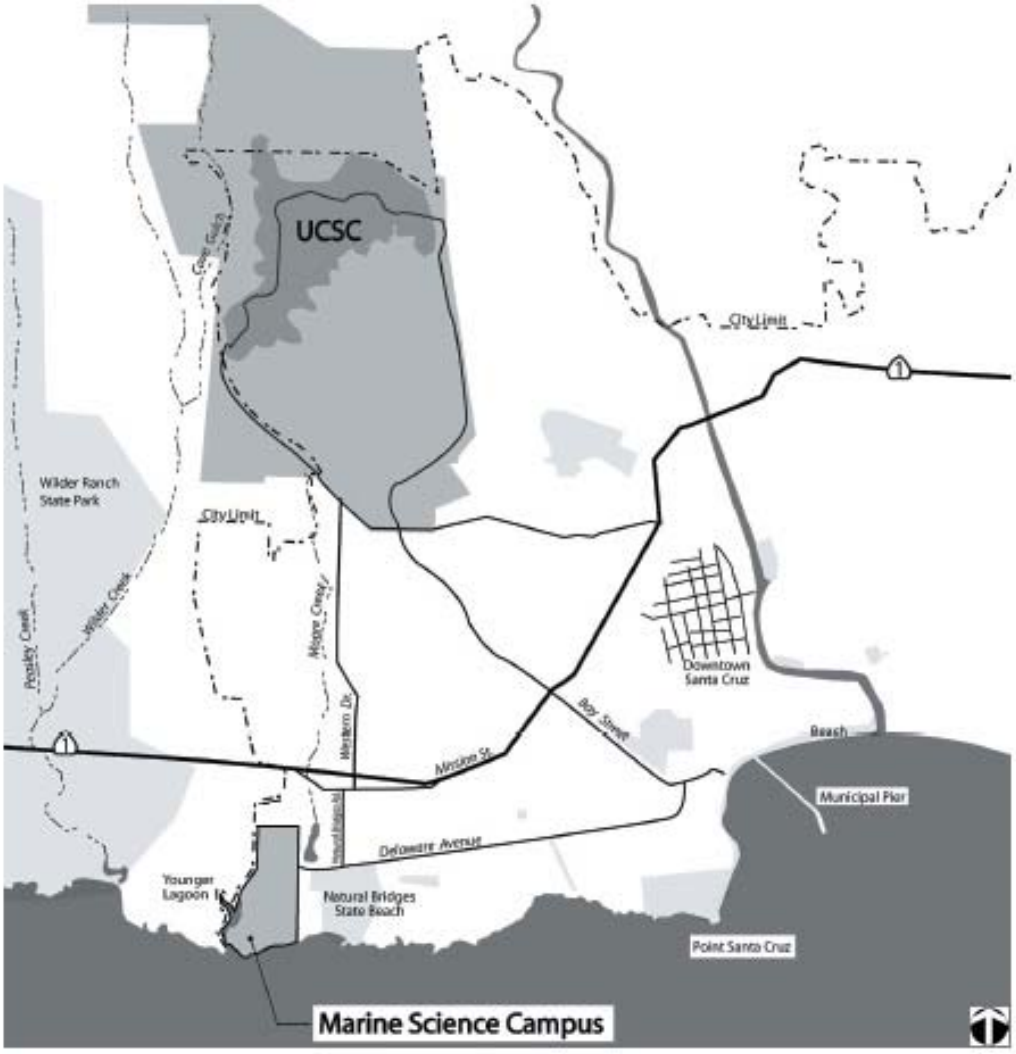


Fig. 2.4 Long Marine Lab Local Context

Adjacent Agricultural Operations

The California coastline provides an iconic setting that is valued by residents and visitors alike. Much of Highway 1 north of Santa Cruz is protected under the County's Local Coastal Program and provides unimpeded ocean vistas from the road. The protection of agricultural uses (primarily brussel sprouts, strawberry and artichoke fields) is a prime policy objective of the California Coastal Act and is embodied in the policies and implementation measures of City and County land use controls. These protections assure a unique and picturesque visual environment directly west of Long Marine Lab. The agricultural uses are largely located on the ocean-side of Highway 1, as its topography is more consistently flat than the inland side of the road. The inland side of the road is largely untouched hillside, rocky cliffs and marine terraces with patches of agricultural use and grazing land.

Adjacent Residential Uses

The residential area directly adjacent to the east of the campus is De Anza Mobile Home Park, a private development where mobile home lots are on long-term leases. The mobile home park includes paved streets, landscaped yards, and a community hall with recreational facilities and a pool. The mobile home park is enclosed by a perimeter masonry block wall that runs along the east side of the Campus.

The property north of Delaware Avenue and directly across from De Anza Mobile Home Park is designated in the City General Plan low density residential (1.1 to 10 dwelling units per acre) but this designation has not been certified by the Coastal Commission. The land is currently vacant but a portion is being used in the interim as community gardens. To the immediate east of this property lies Antonelli Pond, which is fed and drained by Moore Creek.

Further east of De Anza Mobile Home Park are the neighborhoods that surround Natural Bridges State Beach and the West Cliff Drive area. Originally, these neighborhoods contained modest houses, primarily of the two or three-bedroom beach bungalow variety, and the proximity to the large industrial plants near Mission Street made them prime areas for employees of the plants to live. In recent years, however, rising property values and the premier shoreline location have contributed to making these neighborhoods some of the more desirable and expensive in the City.

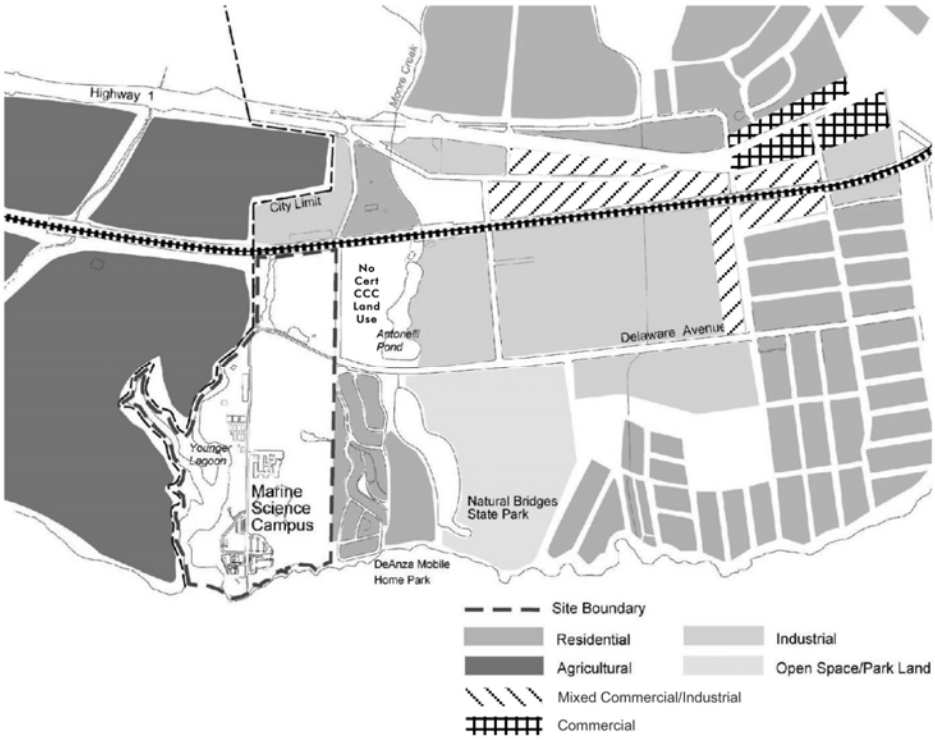


Fig. 2.5 Adjacent Land Uses

Fig. 2.6 Adjacent Agricultural Uses

Fig. 2.7 View of Campus from North Side of Railroad Tracks.

Adjacent Industrial Uses

The industrial uses adjacent to the campus along Delaware Avenue originated partially in response to the location of the Southern Pacific Railway (now Union Pacific Railroad) that runs parallel to Highway 1. The City of Santa Cruz General Plan refers to this area as Natural Bridges Industrial Park and notes the area's numerous coastal-dependent industries. Railroad-served industrial uses have a long history in Santa Cruz. Large, employee-generating industrial facilities built by such companies as Wrigley's (gum) and Lipton (tea and soup) used to line both sides of the tracks.

Recent redevelopment area activities have focused on attracting high-tech uses such as Raytek, Santa Cruz Biotechnology, and Texas Instruments. Other industrial uses along Delaware Avenue include biotechnology, fiberglass manufacturing of surfboards and windsurfing boards, and sailing-related light industrial uses. The area is now characterized as a mixed-use industrial zone of high tech and local light industrial uses among the formerly industrial sites.

Fig. 2.8 Adjacent Industrial Uses

Fig. 2.10 Antonelli Pond East of Shaffer Road

Fig. 2.9 View of Industrial Area North of Campus from Agricultural Fields to Northwest.

Fig. 2.11 Industrial Use Directly North of Marine Science Campus Site.

2.2. Existing Facilities

Over the 25 years of the Long Marine Lab's existence there have been hundreds of research projects undertaken and still ongoing as a result of the availability of high quality seawater and research lab and pool space, ranging from the more visible pool research involving dolphins, sea lions, seals, sea otters, sharks and fish, to the invertebrate research that takes place in the sea water labs focused on a wide variety of marine invertebrate organisms and questions.

At the time of CLRDP certification, UCSC Marine Science Campus was developed with 140,160 gross square feet (GSF) of research and educational facilities operated by UC or its affiliates. The facilities are summarized in the table below.

Fig. 2.12 Existing Facilities (Pre-CLRDP certification)

Facility	*Size (GSF)*
UCSC Long Marine Laboratory:	
Research Support Building	6,200
Younger Building	3,700
Service Building	2,300
Temporary Trailers	3,000
Seymour Marine Discovery Center	20,000
Ocean Health Building	23,000
Avian Facility	2,160
Temporary Caretaker Units	1,400
Seawater Facility	5,000
SUBTOTAL	66,760
Affiliates:	
Fish and Game Marine Wildlife Center	20,000
SUBTOTAL	20,000
Federal In-Holding:	
NOAA Fisheries Laboratory	53,400
TOTAL	140,160

Long Marine Laboratory buildings including Seymour Marine Discovery Center, the Center for Ocean Health building, the Avian Facility, and other buildings listed above comprise the UCSC

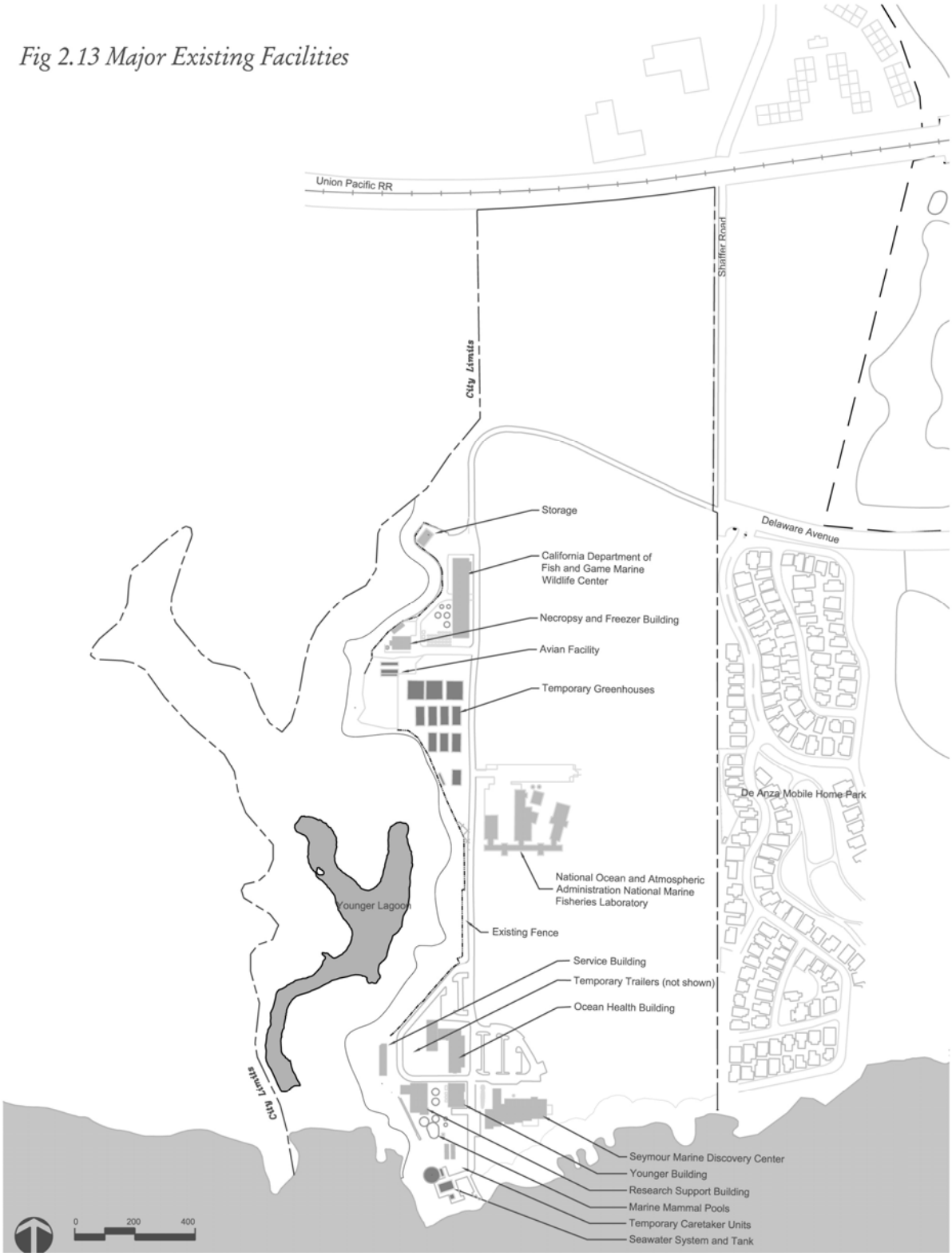
facilities on the campus and house current program operations for the Institute of Marine Sciences, an organized research unit (ORU) managed by UCSC for the University of California. The Seymour Marine Discovery Center is a significant educational facility promoting public understanding of the importance of marine science. The Center opened in March 2000.

Two affiliates of the Institute of Marine Sciences are located within facilities at the project site. The Marine Wildlife Veterinary Care and Research Center, operated by the California Department of Fish and Game (CDFG) at the project site since 1998, is currently housed in three one-story structures in the middle of the site. In addition, in the area south of the CDFG there are greenhouses that contain ancillary uses for Long Marine Lab and CDFG, along with leased operations. Since the coastal development permit for these greenhouses has expired, they are not counted as existing facilities for Figure 2.12 square footage purposes (although their location is noted in Figure 2.13).

Finally, there is one federal in-holding in the project site, which is not owned or controlled by the University of California. The National Oceanic and Atmospheric Administration (NOAA) Fisheries Laboratory, managed by the NOAA for the United States Department of Commerce, is housed in a two-story building in the center of the site.

Each of these existing facilities, plus existing outdoor support facilities, is discussed in the sections below. Figure 2.13 shows the location of existing facilities on the Marine Science Campus.

Fig 2.13 Major Existing Facilities



2.2.1. UCSC Buildings

The core of the existing Marine Science Campus is the Long Marine Laboratory (LML) complex owned and operated by the University. Components of this complex are discussed below.

Ocean Health Building

The Ocean Health Building is a 23,000 GSF two-story building located at the heart of the original Long Marine Lab. This building, along with a 33-car parking area located immediately north of the building, was completed in 2001. The building provides laboratory and office space, administrative support space, and meeting and teaching rooms. The administrative center for Long Marine Laboratory is housed in this building.

Research Support Building

The 6,200 GSF Research Support Building contains offices, wet and dry laboratories with fume hoods, and a meeting room, which is located in loft space. This building is located on the southwestern part of the upper terrace site, adjacent to the berm that separates LML facilities from the Younger Lagoon Reserve. Opening into the marine mammal research yard this facility houses a marine mammal food preparation area with refrigerated thawing rooms and walk-in freezer, a veterinary/pathology lab, multi-user laboratories, and individual researcher labs and offices.

Younger Building

The 3,700 GSF Younger Building contains wet (i.e. seawater) and dry laboratories. This facility forms the eastern boundary of the marine mammal outdoor research yard and includes general access procedure labs for marine mammals (four-lab suite with analytical labs, procedure room, and staging room for working with live animals), multi-user seawater labs, and individual researcher labs.

Fig. 2.14 Ocean Health Building

Fig. 2.15 Long Marine Laboratory

Seymour Marine Discovery Center

The Seymour Center is a permanent marine education center at LML that is open to the public and is self-supporting. It occupies a 20,000 GSF one-story structure at the southern-most end of the LML complex. The center opened its doors in March 2000. The building features an open interpretive exhibit and aquarium area, a wet and dry lab for K-12 school programs, a University marine biology teaching lab, a meeting room for up to 100 people and offices for staff.

The Seymour Center provides the public with an authentic experience inside a working marine laboratory. Neither museum, nature center, nor aquarium, the Center is a space where people can see how a marine laboratory works, who the people are who do this work, how and why they do so, and why marine research is important in ocean conservation.

A 72-car parking area is located to the north of the Seymour Center and an additional nine spaces are located west of the center. This area also accommodates bus parking for the school programs and provides short-term parking for visitors.

Fig. 2.16 Seymour Marine Discovery Center Whale Skeleton

Fig. 2.18 Seymour Marine Discovery Center Entry

Fig. 2.17 Ocean Health (l) and Seymour Discovery Center (r)

Fig. 2.19 Seymour Marine Discovery Center

Service Building

The 2,300 GSF service building houses service shops and field science support facilities for boat operations and research-related SCUBA diving.

Temporary Facilities

Four mobile office trailers comprising approximately 3,000 GSF provide surge office and dry laboratory space for research groups at Long Marine Lab. Two residential trailers with total of 1,400 GSF provide housing for on-site caretakers who are responsible to respond to facility emergencies after-hours, especially seawater system problems, and for after-hours security.

Avian Facility

The Avian Facility (also known as the Oiled Seabird and Predatory Bird Facility) is a recently completed adjunct to the CDFG Marine Wildlife Center, on a site of approximately 0.9 acres. The facility consists of two office trailers comprising 2,160 GSF, which provide office and dry lab research space, and a large outdoor paved area with drainage, which provides flexible space to set up temporary pools or holding structures and staging for both research needs and oil-spill response needs.

2.2.2. Affiliates

Leased Operations

Approximately 1.5 acres were formerly occupied by several commercial aquaculture operations that leased Marine Science Campus property and developed the site with eleven greenhouses to house their operations. This facility was connected to the LML seawater system, which was a necessary element of the operation.

Presently, one portion of the aquaculture site, including one 1,500 GSF greenhouse, is leased to a commercial testing operation (Toxscan) that performs tests for contaminated materials in dredged sediment samples taken from San Francisco Bay and other coastal waters. Another portion of the site, including seven greenhouses totaling 13,464 GSF, is leased to an organic plant propagation business.

California Department of Fish and Game Marine Wildlife Veterinary Care and Research Center

The Marine Wildlife Center, operated by the Office of Oil Spill Prevention and Response of the California Department of Fish and Game, is located in a complex of three one-story buildings of 20,000 GSF between the existing main access road and Younger Lagoon Reserve. This facility is mandated by state legislation to treat birds and mammals that may be affected by oil spills off the coast of California, in particular, the California sea otter (*Enhydra lustris*), a federally listed threatened population. In addition, scientists at both the University and CDFG use the facility for year-round environmental toxicology and marine vertebrate research.

A separate 11-car parking area and outdoor service yards are located within the complex, which also includes pool areas and holding pens for birds and marine mammals, a necropsy facility and large freezer facility, an equipment storage garage, and a large seawater recirculation and disinfection system.

2.2.3. Federal In-Holding

The NOAA Fisheries Lab, a federal in-holding not owned or controlled by the University of California, occupies a 53,400 GSF two-story building located on the east side of McAllister Way. This facility serves a group of 50 scientists and support staff relocated from the Tiburon Lab and several other facilities. They study the groundfish and salmon of the Pacific West Coast, their ecology, populations, and effects of environmental change. This group also conducts fishery management advisory work. Seawater piped from the campus's main supply system serves this laboratory.

A separate 52-car parking lot serves the Lab. The NOAA Fisheries Lab and parking areas sit on a separate 2.5-acre parcel and are owned and operated by NOAA.

2.2.4. Outdoor Support Facilities

This subsection describes existing outdoor support facilities on the Marine Science Campus.

Outdoor Research Yard

The 17,000 square foot research yard is situated between the Research Support Building and the Younger Building. This yard contains five large (up to 50-foot diameter) and five small permanent marine mammal pools and space for a variety of small temporary tanks and pools and securely-fenced haulout areas. The 50-foot marine mammal tank is designed to be acoustically quiet with no parallel surfaces. There is also an underwater viewing lab with five large windows that access both the large tank and circular 30-foot tank.

Service/Boat Yard

The service/boat yard consists of approximately 14,000 square feet of outdoor space between the Service Building and the Ocean Health Building, in an area surrounding four temporary office structures. The area is covered in concrete or gravel. The concrete slab area immediately adjacent to the Service Building is used as a staging area for fieldwork. Boats and equipment are readied for work there, and/or washed down upon return from sea. The remainder of the area provides space to park boats and trailers, and to store other field equipment.

Fig. 2.20 Marine Mammal Pools

Fig. 2.21 Storage/Maintenance Areas

2.3. Existing Circulation and Parking

This section describes pre-CLRDP certification circulation and parking on and adjacent to the Marine Science Campus. Figure 2.26 shows the location of existing streets and parking areas.

2.3.1. Off-Site Roadways

Existing street improvements include the primary access route along Delaware Avenue and the narrow paved improvements of Shaffer Road.

Delaware Avenue

Delaware Avenue has a wide paved roadway with capacity that exceeds traffic demand but reflects previous expectations that it would ultimately be extended as an arterial to Highway 1. The extension has been removed from the City's General Plan as an expression of the current policy to not extend the urban boundary beyond the existing western city limits. Delaware Avenue connects to Natural Bridges Drive, which in turn provides a direct connection to Highway 1 via Mission Street. Swift Street also provides a direct connection from Delaware Avenue to Highway 1/Mission Street. Delaware Avenue is designated an arterial by the City's General Plan from Bay Street westward to the intersection with Natural Bridges Drive.

Shaffer Road

Shaffer Road consists of a narrow paved section located on land immediately adjacent to the Campus. Shaffer Road is not a through road as it dead-ends at the railroad right-of-way (and at the small berm atop which lie the railroad tracks themselves), both heading north from Delaware Avenue and heading south from Highway 1/Mission Street extension. A future railroad grade crossing at Shaffer Road has been discussed to connect Mission Street with Delaware Avenue and thereby provide a more direct route from the Campus to Highway 1. Creating such a new crossing at the railroad tracks is not required or needed by the Marine Science Campus build-out provided for by this CLRDP.

Fig. 2.22 Delaware Avenue, Primary Access to the Site.

Fig. 2.23 The Southern End of Shaffer Road North of the Railroad Tracks.

2.3.2. On-Site Circulation

The only developed vehicle access road on the site extends from the Delaware Avenue/Shaffer Road intersection on the east edge of the site. This road traverses the property from east to west along a previous access easement alignment (often referred to as Delaware Avenue Extension) and connects to McAllister Way, a 20-foot wide oil and gravel road that runs along the edge of the former Long Marine Laboratory site. This road provides on-site access to gravel surfaced service roads, yards, and paved parking areas. Existing on-site pedestrian and bicycle circulation is provided along this existing roadway as well as by connecting trails that loop around the edge of the Campus site along the bluffs and back to the Shaffer Road/Delaware Avenue intersection. In addition, there are numerous "volunteer" trails throughout the Campus as well as a few pathways and courtyards developed with gravel or other compacted earth. A security gate with keyed access at Shaffer Road is generally closed after hours to restrict access to the Campus at night.

Fig. 2.24 McAllister Way on the Site.

2.3.3. Parking

The Marine Science Campus has a total of 191 parking spaces in paved and unpaved parking lots. A total of 52 spaces are located on the federally owned parcel and managed by NOAA. The remaining 139 spaces are managed by the Institute of Marine Sciences on behalf of UCSC programs and affiliates. At the present time, parking on the site is available for free on a first-come, first-serve basis for persons working on site as well as visitors to it; parking is not assigned and permits are not required.

Fig. 2.25 Existing Parking

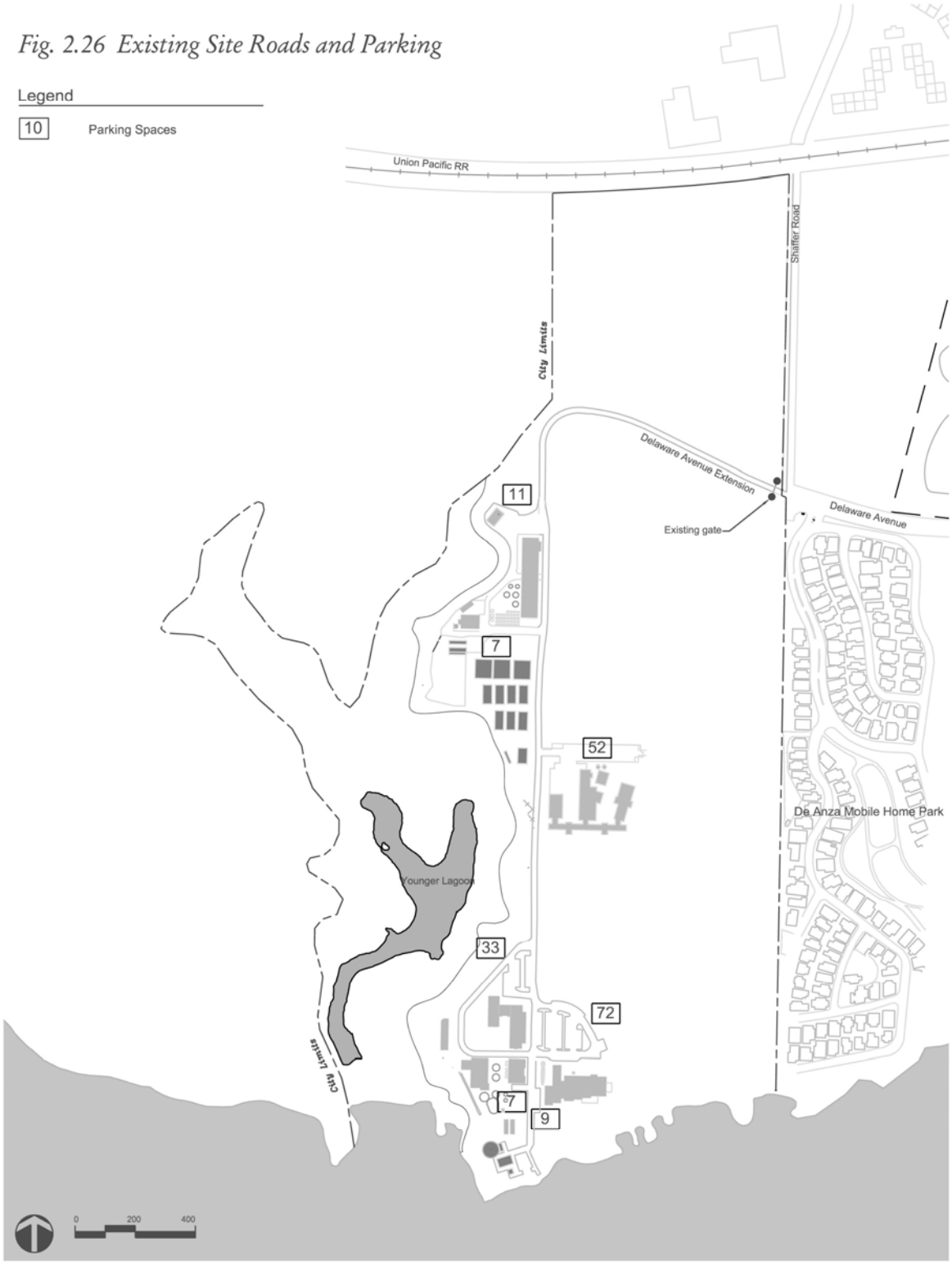
Location	*Standard*	*Disabled*	*Surface Type*
Center for Ocean Health	31	2	Paved
Seymour Marine Discovery Center	70	2	Paved
Long Marine Laboratory (LML) South*	15	1	1/2 & 1/2
NOAA Fisheries Lab	52	--	Paved
Avian Facility	6	1	Paved
California Department of Fish and Game	10	1	Gravel
TOTAL	184	7	

*Note: *Existing parking spaces in the LML south location include seven spaces the specific permit status of which is unclear.*

2.3.4. Campus Shuttle and Transit Access

The Marine Science Campus is connected via shuttle bus to the main campus. An existing Santa Cruz Metropolitan Transit District (SCMTD) bus route currently provides service to the Campus entrance (route 3B providing service between the site and downtown Santa Cruz via Mission Street and Delaware Avenue).

Fig. 2.26 Existing Site Roads and Parking



2.4. Existing Public Access and Recreation

This section describes pre-CLRDP certification public access and recreation opportunities on the Marine Science Campus. The lands that comprise the site contain significant natural features that affect the way that public access is provided at the site. The southern edge of the site consists of a steep cliff beyond which lies open ocean, and the western portion of the site is occupied by the Younger Lagoon Reserve. There are also wetlands on the terrace portion of the site. Pre-CLRDP access and recreation opportunities are described below.

2.4.1. General Public Access and Recreation

General public access to the Campus at the time of CLRDP certification was limited to the terrace portion of the site. Within YLR, although some unauthorized beach/surfing access occurred, general public access was not allowed. Rather, Campus visitors were provided docent-led tours to an overlook on the berm above the LML marine mammal pools and YLR. For the terrace portion of the site, access was during daylight hours via a trail network forming a loop on the terrace portion of the site that included the area along the Campus access road extending from the Delaware Avenue/Shaffer Road intersection to the oceanside bluffs (and an ocean overlook area), the trail along the terrace bluffs, and the trail along the wall adjacent to the De Anza Mobile Home Park. In addition to the trail loop, Campus parking areas were available on a first-come, first-serve basis for general public access visitors. Thus, general coastal access visitors to the Campus could access the trail loop from interior parking areas, from the main Campus entrance at Delaware Avenue, or from a coastal trail route near the bluffs adjacent to the Mobile Home Park (where a designated public access trail connected the Campus to Natural Bridges State Park).

Nearby the Campus and downcoast in urbanized Santa Cruz, the coastline provides an abundance of recreational opportunities, including almost continuous public access along the City's urbanized coastal frontage. West of Lighthouse Point the City shoreline is characterized primarily by high bluffs and some small pocket beaches where access is primarily by virtue of developed stairways, including staircases at Its Beach (next to the Lighthouse) and at Mitchell's Cove (at Almar Avenue). Natural Bridges State Beach just downcoast of the Campus provides general beach access to a large beach area approximately 1,000 feet east of the Marine Science Campus (on the opposite side of the De Anza Mobile Home Park from the Campus). There is a public access trail that extends from Natural Bridges through the Mobile Home Park and that enters the Campus near the coastal bluff edge; this trail, like those on the Campus, is open to general public access during daylight hours. The main beach access at Natural Bridges is related to Campus access inasmuch as it provides an entry point for the surfing break offshore Younger Beach (known locally as "Marine Labs" or "Younger"), albeit a difficult one given the paddle from the beach at Natural Bridges to the surf break offshore the Campus is over one-half mile, and even further to the associated surf breaks slightly further upcoast from Marine Labs.

Figure 2.27 shows selected access features on and near the Campus, including designated trails and access routes. In some cases, for example along Delaware Avenue Extension, these routes are

located on the shoulder of an existing road or on the roadbed itself. In other cases, for example along the eastern perimeter of the site, trails follow long established paths.

Fig 2.27 Selected Public Access Features

2.4.2. Public Access through the Seymour Marine Discovery Center

The Seymour Marine Discovery Center provides a significant educational and recreation-oriented visitor-serving facility. The Center is open Tuesday through Sunday and is staffed by University staff and volunteer docents. In addition to interpretive exhibits and programs in the Center itself, guided tours and interpretation are provided to some of the research facilities, including marine mammal pools, and to overlooks to Younger Lagoon Reserve and the Pacific Ocean. The Center has achieved remarkable success in reaching a wide audience, including school-age children, in meeting its mission of promoting understanding and respect for the marine environment.

2.5. Existing Utilities

This section describes pre-CLRDP certification utility systems on the Marine Science Campus, including: water, seawater, sanitary sewer, electrical system, natural gas, and communications.

2.5.1. Water System

Water is supplied to the Marine Science Campus 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). On site, a 10-inch water main distributes water to Long Marine Laboratory, affiliated facilities, and the NOAA Lab.

2.5.2. Seawater System

An integral and necessary part of Marine Science Campus and its location is its seawater system. There are two complementary parts of the seawater system. The first part of the system draws up to 1,000 gallons per minute (GPM) of raw seawater from the surf zone at the south edge of the Marine Science Campus. Two 10-inch intake lines, supported on steel beams at the base of the sea cliff, draw seawater up into a 40-foot high caisson, which was drilled through the roof of a natural sea cave and is exposed to the surf. This caisson houses the primary pumps that convey seawater through underground pipes to a filter system then into two 36-foot tall storage tanks located in the main LML complex of buildings. The second part of the system draws another 1,000 GPM through a pipeline extending seaward of the sea cave, through a second and larger caisson facility, and ultimately into a third storage tank near the bluff edge. Seawater is distributed from the storage tanks to the entire developed portion of the Campus.

2.5.3. Sanitary Sewer System

Sanitary sewer service to the lower part of the site is provided through the use of a 10,000 gallon holding tank and lift station pumping to a second lift station adjacent to the NOAA laboratory. Existing buildings in the middle of the site are served by gravity sewer lines to this lift station, which pumps to the City-owned system on Shaffer Road at Delaware Avenue. Pre-CLRDP system demand on the Marine Science Campus was estimated to be 14,257 GPD. Wastewater treatment occurs at the City's treatment plant at Neary Lagoon.

2.5.4. Electrical System

The site is served by a combination of overhead and underground primary electrical lines. The system has recently been upgraded to 21,000 volts. In the lower part of the site, the PG&E primary power system terminates at two transformers. One of these is a pad-mounted transformer located west of the Seymour Discovery Center, and the other is located on the northern edge of the parking lot adjacent to the Center for Ocean Health. From there, power is fed to an electrical room located in the Younger Building and distributed underground throughout the site. Facilities in the middle part of the site are served by three transformers. Electricity (as well as data and telephone lines) is brought to the site along an easement located off-Campus in unincorporated Santa Cruz County that runs along the City limit line stretching from the Campus to Shaffer Road (inland of the railroad) and Mission Street Extension adjacent to State Highway 1.

2.5.5. Natural Gas System

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 NOAA Laboratory and the Long Marine Laboratory buildings, and it is stubbed out for future connection to the Marine Wildlife Center.

2.5.6. Communication Systems

Telephone service to the site is provided by Pacific Bell, as well as by a private University of California owned and operated microwave telephone system. Pacific Bell facilities serve the site via a combination of overhead and underground lines. The private University system provides a microwave transmitter/receiving station mounted on the southeast corner of the Younger Building. 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. High capacity fiber optic cabling currently serves the NOAA Lab, with conduit connections to Long Marine Laboratory.

3. Site Planning Considerations and Constraints

The purpose of this chapter is to explain the site planning considerations and constraints that helped shape development of the CLRDP. This chapter is divided into 10 sections, each of which corresponds with a topic that has affected planning for the project site. Topic areas include: land resources, climate, topography, geology and coastal erosion, hydrology, soils, biotic resources, scenic and visual characteristics, cultural resources, and finally agricultural resources.

The Marine Science Campus project site and surrounding area have been studied extensively in the three decades preceding CLRDP certification, with over 35 technical studies produced as of December 2003. Included in this technical work are:

- Five environmental impacts reports (EIR on Proposed Coastal Marine Laboratory, 1976; Westside Properties Development Environmental Assessment, 1979; Westside Lands EIR, 1987; LML Master Plan EIR, 1993; and Terrace Point EIR, 1997)
- Fourteen biological studies, including wetland delineations, biotic assessments, studies on red-legged frog and peregrine falcon, wetland mitigation plans, and habitat management plans
- Four studies related to cultural resources
- Two transportation impact studies
- Five geotechnical/soil evaluations
- An agricultural viability report
- Various technical plans

The information contained in this section is based on these technical studies, plus analyses contained in Coastal Commission staff reports and comments of the California Coastal Commission.

3.1. Land Resources

The facilities and natural resources of the Campus are located on approximately 98 contiguous acres owned and managed by the University. Younger Lagoon Reserve is located on the western portion of the Marine Science Campus and is managed by the Natural Reserve System. Adjacent to Younger Lagoon Reserve, the existing Long Marine Laboratory complex has accommodated the needs of the Institute of Marine Sciences for its first 30 years of operation. In 1999, the adjacent terrace property was acquired by the UC Regents to accommodate future needs of the campus. A 2.5-acre federally owned parcel lies near the center of the UCSC Marine Science Campus and is occupied by the NOAA Fisheries Laboratory. Figure 3.1 provides a Campus acreage breakdown and Figure 3.2 provides a graphic depiction of the Campus acreages.

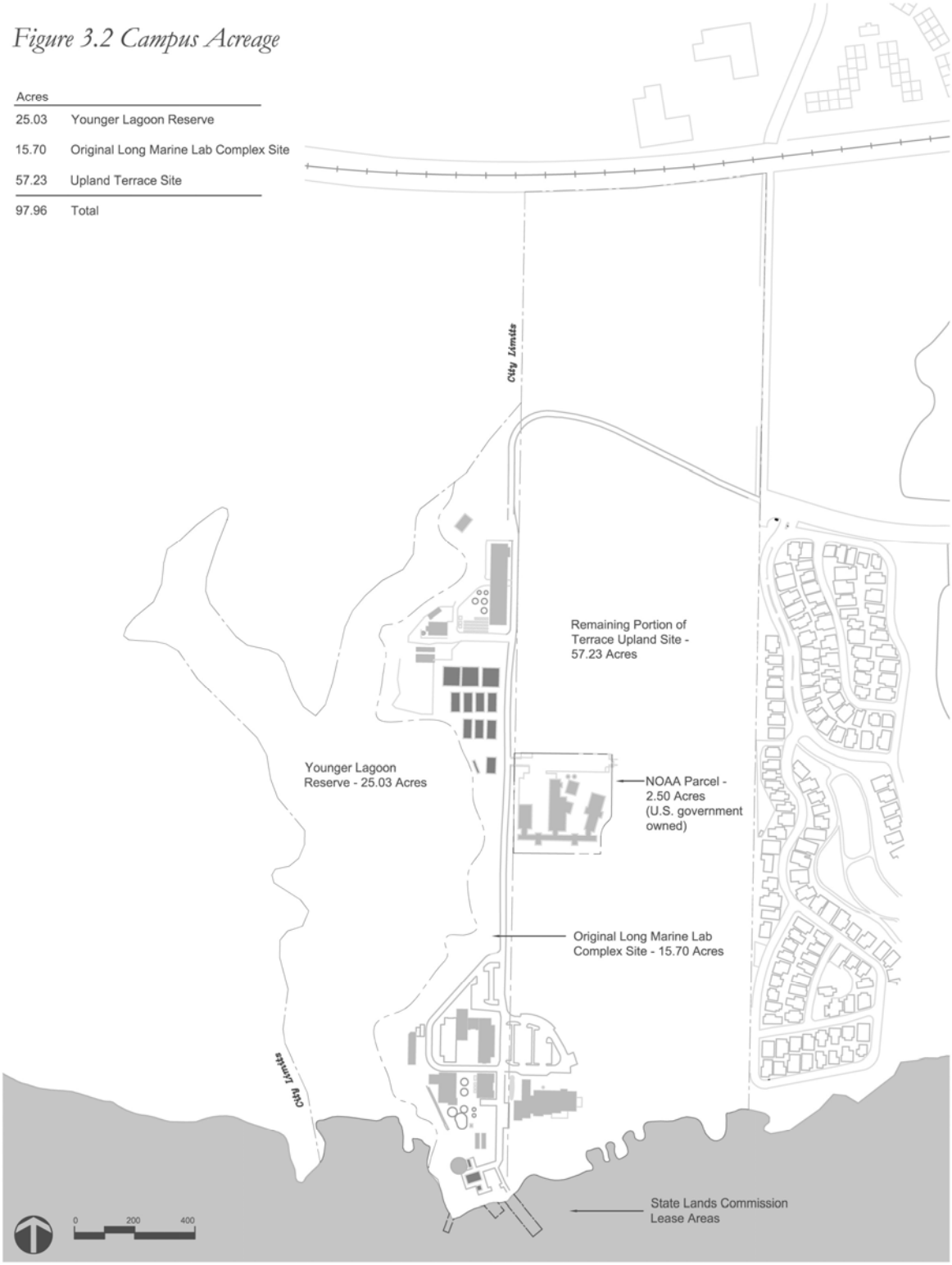
Fig. 3.1 Campus Acreage

Resource	*Acres*
Younger Lagoon Reserve	25.03
Original Long Marine Laboratory Site	15.70
Remaining Terrace Portion of the Site	57.23
TOTAL	97.96

Note: The original Record of Survey of lands conveyed to the University from the Younger Family was prepared by Bowman and Williams surveyors and recorded January 24, 1973. This land included both what was later to become Younger Lagoon Reserve and the original Long Marine Laboratory. The boundary between YLR and Long Marine Lab was first surveyed by Ifland Engineering in 1997 based on the written description contained in a UC Regents action item dated March 19, 1987 entitled: "Inclusion of Portion of Santa Cruz Campus in the Natural Reserve System". Further refinements to this boundary were made by the Huffman-Broadway Group in 2002 based on direction from Dr. Margaret Fusari, Director of Younger Lagoon Reserve, and Steve Davenport, Assistant Director of Long Marine Lab. This established boundary is shown in Attachment 21 of the Huffman-Broadway Group, Inc. report entitled "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" dated July 2004, and it is this established boundary that is shown and described in this CLRDP.

Figure 3.2 Campus Acreage

Acres	
25.03	Younger Lagoon Reserve
15.70	Original Long Marine Lab Complex Site
57.23	Upland Terrace Site
97.96	Total



3.1.1. Younger Lagoon Reserve (YLR)

The 25-acre Younger Lagoon Reserve (YLR) was included in the University's Natural Reserve System in 1986 and is jointly managed by UCSC and the UC Natural Reserve System for teaching and research uses. The YLR has met the stringent requirements of the UC Natural Reserve System for ecological value and appropriateness for research and educational activities and has been accepted into a select group of properties, statewide, that are administered by the UC Natural Reserve System. Most of YLR qualifies as Environmentally Sensitive Habitat Area (ESHA) by Coastal Act standards and access to the Reserve has been limited during most of the time it has been under UCSC control. The lands to the north and west of YLR are in agricultural production. The lands immediately to the east are developed with the built facilities of the Marine Science Campus. The presence of Younger Lagoon Reserve on the Marine Science Campus limits the type, location, and design of development possible on the site. These constraints are discussed in the section entitled: Biotic Resources.

Fig. 3.3 Younger Lagoon Reserve looking South

Fig. 3.4 Beach Area Fronting Younger Lagoon

Fig. 3.5 Younger Lagoon Reserve looking West

Fig. 3.6 Looking NW into Younger Lagoon Reserve

3.1.2. Long Marine Laboratory (LML)

The original 16-acre Long Marine Laboratory (LML) site is located on the coastal bluff adjacent to YLR, which lies to the west. An earth berm or fence lies along much of the boundary between the two. The 30-year-old LML facility is situated above the seawater intake system that brings seawater up to the research complex. Four buildings and improved outdoor pool and yard space provide the core of the UC research facilities, along with the Seymour Marine Discovery Center, which provides the core of public service, public education and outreach for the facility. The presence of existing LML facilities on the Marine Science Campus is fully compatible with, and an integral part of, the Marine Science Campus. LML's finite size constrains the amount of development that can be placed immediately adjacent to the facility.

3.1.3. Terrace Portion of the Site

The adjacent upland terrace and coastal bluff site extends the University property along the coastal bluff for an additional 900 feet. Like the land that the LML occupies, the 57-acre remaining terrace area was once active agricultural lands and produced brussel sprouts until 1987. Since then, the property has lain fallow. The recently completed Seymour Marine Discovery Center is located on a portion of this property, adjacent to the original LML facilities, and is part of the Marine Science Campus. In addition, the NOAA Fisheries Laboratory includes laboratories and offices on a federally owned 2.5-acre in-holding within this property. Both facilities are connected to the seawater intake system. Fresh water wetlands have been identified on the property, a portion of which drain to Younger Lagoon (see Biotic Resources section that follows). The property is bounded on the north by the Union Pacific Railroad, and on the east by Shaffer Road and the De Anza Mobile Home Park (south of Delaware Avenue). The terrace portion of the Marine Science Campus is the primary location for new development under this CLRDP, and its finite size limits the amount of development possible on the site.

3.2. Climate

The Santa Cruz area enjoys a Mediterranean climate typical of many California coastal areas. Summers are dry and warm, although 30% to 40% 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. Storm winds in the winter are generally from the southwest. Due to its exposed setting the site has somewhat harsher 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 limit development on the site by creating the need for wider setbacks from agricultural fields to the west, by creating the need for wind protected areas, and by limiting landscaping and habitat restoration plant lists.

3.3. Topography

The 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 site itself slopes gently (1 to 2%) 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. On the lower terrace two artificial berms approximately 10 to 12 feet in height and 40 to 50 feet in width roughly follow the top of the bank along the east side of Younger Lagoon Reserve to the west. Soils for the berm were excavated from the lower terrace during facility site development, accounting for grade changes on this part of the site. The relatively flat topography of the terrace areas constrains the design of drainage systems for the site.

Fig. 3.7 Coastal Topography

Fig. 3.8 Coastal Bluffs

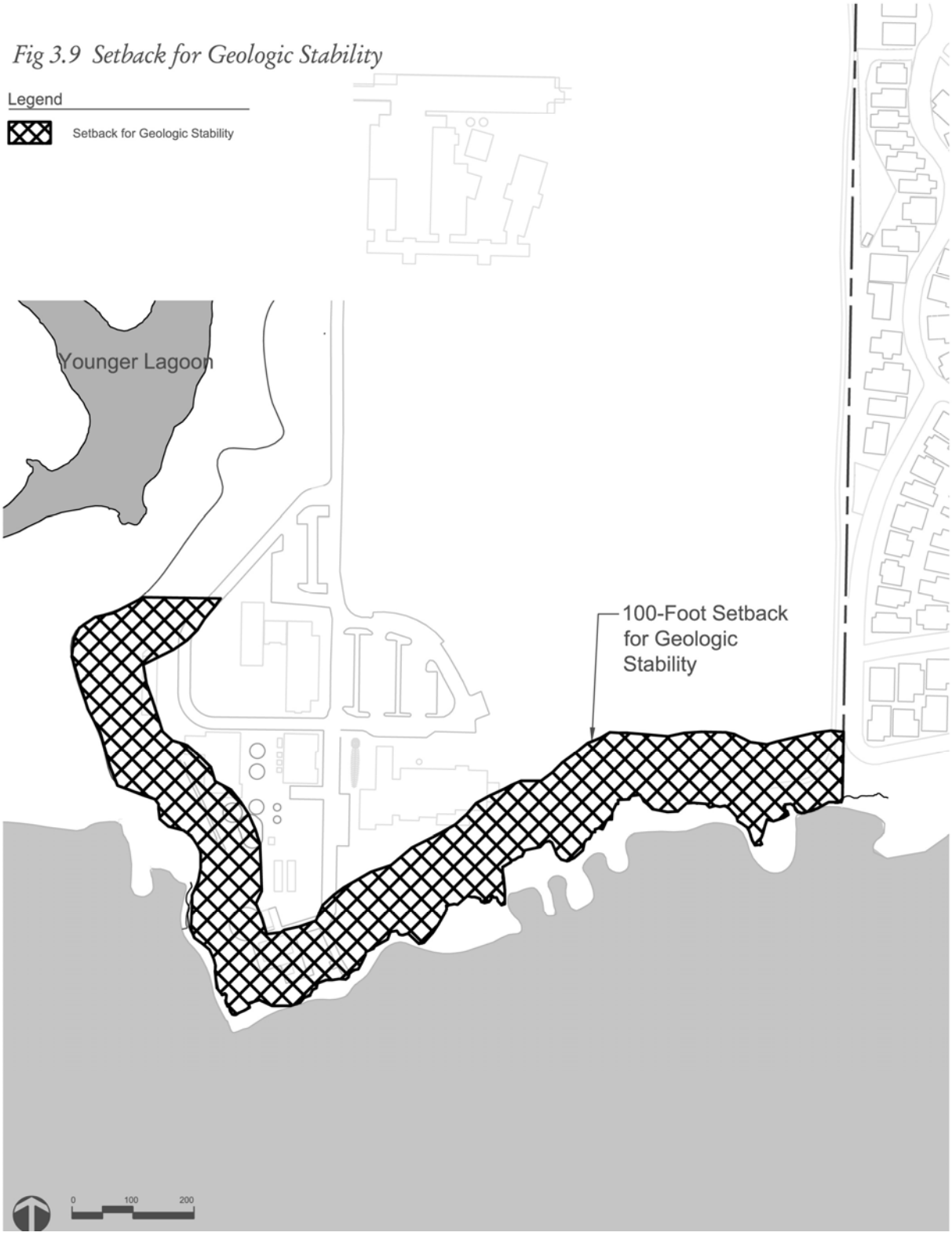
3.4. Geology and Coastal Erosion

Sea cliffs on the Marine Science Campus are in their natural form and there are no structural protective devices along the shoreline (other than development associated with the seawater intake structures themselves). Factors affecting sea cliff erosion rates include the ability of large storm waves to attack the base of the cliff, and the relative ease with which material can be dislodged. The principal mechanism of cliff retreat at the site is wave action that results in undercutting of the bedrock cliffs, and eventually the support is reduced to the point where the cliff face fails in an instantaneous rock fall (Foxx, Nielsen Associates, 1992). One clear indication of the rate of sea cliff erosion at the site is the existence of the mast of the La Feliz, a ship that foundered just offshore in 1924. This mast has been leaning against the cliff edge in a near vertical position directly in front of the Seymour Center for over 75 years. A very resistant bedrock platform in the Santa Cruz Mudstone at the base of the sea cliff has provided significant protection to this property and adjacent De Anza Mobile Home Park property for many years. The City of Santa Cruz General Plan identifies the coastline adjacent to the site as being an area at "moderate risk" of cliff erosion.

The on-going coastal erosion process along the shoreline of the Marine Science Campus limits development by requiring setbacks to protect structures from bluff erosion and cliff failure. Although cliff retreat is often expressed in feet or centimeters per year, the erosion usually occurs in episodes that correspond with significant coastal storm events.

In this case, according to geotechnical analysis, the average long-term rate of retreat at the LML site is estimated to be less than 0.5 feet/year (Foxx, Nielsen, 1992), and the analysis recommends a 100-year setback of 50 feet from the top edge of the terrace deposit to account for both ongoing and episodic (including seismic) erosion. Based on the 0.5 feet estimated rate of long term retreat, a setback of 100 feet would provide protection for an estimated 200 years. Of course, this is only an estimate, given the inherent uncertainty due to site-specific conditions, sea level rise, the episodic nature of erosion, and other unexpected factors.

Fig 3.9 Setback for Geologic Stability



3.5. Hydrology

This section summarizes basic hydrological conditions on the Marine Science Campus.

3.5.1. Younger Lagoon

The 140-acre Younger Lagoon watershed drains largely agricultural lands to the west of the Marine Science Campus and portions of the UC site. Rain, agricultural runoff, and groundwater from the terrace portion of the site are primary inflow sources. During most of the year, the action of ocean waves and littoral drift promotes the development of a barrier beach at the lagoon outlet. The beach and a bedrock shelf below the beach presumably inhibit salt and fresh water movement in and out of the Lagoon. However, flushing during winter storms does occur periodically during winter months creating alternating conditions in the lower lagoon. Maintaining hydrological conditions that sustain important habitats in Younger Lagoon Reserve impacts development on the Marine Science Campus by requiring the creation of drainage systems that maintain clean stormwater flows to the lagoon and serve to recharge groundwater on the terrace portion of the site.

3.5.2. Terrace Portion of the Site

The terrace portion of the Marine Science Campus appears to be largely a closed drainage system with only limited off-site flows entering the site. The northwestern portion of the site contains a small north-south drainage (and a wetland area just east of it), which channels upland drainage. This upland drainage includes that coming from a culvert located under the railroad tracks (emanating from the Raytek and City of Santa Cruz sites immediately north of the Campus and the railroad right-of-way, and from the undeveloped hillsides of the Moore Creek Preserve beyond). This watercourse also drains adjacent agricultural fields west of the site. Water from this system flows directly to Younger Lagoon Reserve and is an important source of water for the lagoon.

In addition to the northwestern watercourse area, stormwater also flows through the site from rainfall in the winter months. Rainfall leaves the site primarily through evaporation, evapo-transpiration, and groundwater that flows to De Anza Mobile Home Park, the ocean cliffs, and to the steep slopes above Younger Lagoon Reserve.

According to field studies by the Huffman-Broadway Group in 2001 through 2004, the terrace portion of the site is not a perched water table system in which water percolates vertically through the soil to an impervious layer (e.g., clay, bedrock) and subsequently fills up higher layers of the soil column like a bathtub. After precipitation, water descends through the soil column at varying rates based on local soil conditions (i.e., permeability, depth to bedrock). The water continues to move vertically until it hits bedrock, upon which it moves laterally. Where bedrock is closer to the surface or surface soils have higher clay content, ponding and surface soil saturation occurs for extended time periods. Where bedrock is farther from the surface and soils have lower clay content, water tends to move through the soil at a faster rate, precluding surface soil saturation.

Hydrological conditions on the terrace portion of the site impact development on the Marine Science Campus by requiring the creation of a drainage system that maintains clean stormwater flows to Younger Lagoon Reserve and the terrace wetlands, assures clean water, and recharges groundwater flows to the maximum extent practicable to sustain wetlands on the terrace portion of the site and in Younger Lagoon Reserve.

3.6. Soils

The coastal terrace that includes the 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. On-site wetlands are found on both soil types (Strelow, 1997; Gilchrist, 1997; Huffman, 2004).

The terrace portion of the campus was formerly under cultivation for brussel sprouts, but has lain fallow since 1987. This portion of the campus constitutes primarily non-prime farmland, although some of the soil meets certain definitions of "prime" farmland. Given the site's location within the Santa Cruz city limits, its existing development, its several wetlands, the adjacency of intensive urban uses at De Anza Mobile Home Park, and other factors such as availability of irrigation water, renewal of agricultural use of this land is not considered to be a viable alternative by the University.

The campus site was farmed in the past using conventional methods. A pesticide investigation has identified low levels of residual DDT and DDT derivative pesticide concentrations in the surface soils. The CLRDP EIR evaluated this issue and determined that there was no significant impact associated with pesticides. Soil conditions on the terrace portion of site may constrain development on the Marine Science Campus by affecting the design of surface retention features for the drainage system.

3.7. Biotic Resources

This section discusses biotic resources of the Campus, including, wetlands, vegetation, wildlife and marine resources found on and adjacent to the site, and environmentally sensitive habitat areas (ESHAs). The University of California retained the Huffman-Broadway Group (HBG) to undertake detailed biological surveys and to identify sensitive biological resources for the Marine Science Campus, including the preparation of a new wetland delineation.

3.7.1. Wetlands and Stream / Riparian Habitat

Younger Lagoon Reserve

Younger Lagoon, the largest and most significant Campus wetland, is located within the Reserve stretching from near the ocean to the upper portion of the Lagoon in its Western and Eastern arms extending towards the north of the Campus. The connection between the Lagoon and the Monterey Bay and other surrounding habitats, including the Moore Creek/Antonelli Pond system and Wilder Creek, coupled with its management as a part of the Reserve with limited human disturbance, contributes to an overall high wildlife and habitat value (see below, also). The Lagoon, and its location within the NRS Reserve, limits and impacts development on the Marine Science Campus by requiring buffers from adjacent development, special attention to building design, and standards for public access to the area. In Younger Lagoon Reserve and a small area on the terrace adjacent to its northeast corner, HBG found 11.05 acres of valuable wetland and stream/riparian habitat.

Terrace Portion of the Site

In the terrace portion of the site, HBG found twelve seasonal wetlands (designated as wetlands W1 through W12) with a wide range of habitat value. The absence of other valuable wetland habitat on

the terrace portion of the site was supported by a biological assessment performed by EcoSystems West Consulting Group (2001 and 2002).

Twelve wetland areas comprising approximately 7.65 acres have been delineated on the terrace portion of the site based on the wetland definition contained in the Coastal Act and the Coastal Commission's Regulations. These wetlands support six vegetation types (seasonal ponds, freshwater marsh-coastal terrace, willow herb-Douglas' baccharis, moist meadow, willow riparian forest, and annual grassland). In addition, some wetland indicator species, such as Italian ryegrass and Douglas' baccharis, are patchily distributed in upland areas. The twelve terrace wetlands were identified as wetlands W1 through W12, and were located as follows: wetlands W1, W2, W3, and W6, which act as a wetland complex, are located north and west of the Campus access road; wetlands W8 and W9, which appear to be hydrologically isolated from the W1-W6 wetland complex during most years, are located south of the Campus access road; wetland W4 is located near the center of the terrace adjacent to the De Anza Mobile Home Park; wetland W5, a large seasonal pond, is located between the NOAA facility and LML proper; wetland W7 is located near the northeast corner of the Campus; wetland 11 is just west of the NOAA facility and the campus access road; wetland W10 is a small wetland located on the eastern perimeter of the Campus south of wetland W4; and wetland 12 is the wetland complex nearest the ocean to the southeast of wetland W5.

Figure 3.10 shows an acreage breakdown of wetland and stream/riparian habitats in YLR and the terrace portion of the Marine Science Campus.

Fig. 3.10 Wetland and Stream/Riparian Habitats Acreage

Delineated Wetland, Stream, and Riparian Habitat	*Total Area (acres))*
Terrace Portion of Site	
Wetland W1	0.14
Wetlands W2 and W3	4.57
Wetland W4	0.42
Wetland W5	2.21
Wetland W6	0.09
Wetland W7	0.001 (43 sq ft)
Wetland W8	0.01
Wetland W9	0.002 (87 sq ft)
Wetland W10	0.0001 (4 sq ft)
Wetland W11	0.003 (115 sq ft)
Wetland W12	0.21
Subtotal Terrace Wetlands	7.65
Younger Lagoon Reserve	
Wetlands	5.56
Stream/Riparian Habitat	5.49
Subtotal YLR Wetland/Other	11.05
TOTAL	18.70

Source: Huffman-Broadway Group, 2004
California Coastal Commission CLRDP approval, 2007 and 2008

The presence of wetlands (including the degree to which they are also ESHA - see also ESHA section below) limits development on the Marine Science Campus by reducing the amount of land available for buildings, roads, trails, and other development. In addition, wetlands must be buffered from adjacent development, and these buffer areas are also unavailable for development. Wetland buffers for the Marine Science Campus are a minimum of 100 feet, unless demonstrated through the use of berms, walls, fencing, building design or other methods that narrower buffers would prevent development from significantly degrading wetlands on the site. Conversely, in some locations buffers in excess of 100 feet are necessary due to the sensitivity and value of the resource (i.e., portions of Younger Lagoon and wetland W5). This approach is consistent with typical wetland buffers required by the California Department of Fish and Game and by the California Coastal Commission in prior actions at the Campus. The presence of wetland on the site also impacts development by requiring special attention to building design and controlling public access to the areas. Finally, because water

is an essential element of the habitat, special care must be taken in the design of the drainage system to maintain the quantity and quality of water that flows from the developed area of the site into wetlands.

3.7.2. Vegetation

Younger Lagoon Reserve

The YLR 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 these habitat types occur in the lowlands: coastal strand, coastal salt marsh (pickleweed), three types of freshwater marsh (cattail, bur-reed, and Pacific oenanthe), central coast arroyo willow riparian forest (extending onto upland slopes in some areas), and barren area. Four habitat types occur in the uplands: coastal scrub, coastal scrub-grassland, central coast arroyo willow riparian forest, and ruderal.

In the lowland portion of the site, coastal strand occurs at the south end of the site, nearest the ocean. The coastal salt marsh (pickleweed) habitat type borders the open water of the lagoon continuously throughout the site except at the lower end near the ocean, and extends for some distance up both arms of the lowland beyond the upper end of open water. The three freshwater marsh habitats occur in the central portions of the two arms of the lowland. Central coast arroyo willow riparian forest occurs in the upper portions of both arms; it is continuous in the east arm, but occurs as more localized patches in the west arm. Coastal scrub occupies most of the upland portion of the YLR site. The coastal scrub-grassland habitat type occurs along the ridgeline separating the two arms and on a smaller spur ridge to the west, between the main lagoon and a small tributary drainage. The ruderal habitat type is a small area at the head of the west arm.

During surveys conducted in 2000 and 2001 by EcoSystems West Consulting Group, no special-status plant species were found in the YLR. This is consistent with the findings of previous botanical surveys (Habitat Restoration Group 1993; 1994; and John Gilchrist & Associates, 1997).

Vegetation communities found in YLR impact development on the Marine Science Campus by requiring special management in YLR to control invasive species and prevent the degradation of the vegetation communities. Management of vegetation on the terrace portion of the site is also required to prevent the dispersal of invasive plant species into YLR.

Terrace Portion of the Site

Seven distinct habitat types exist on the terrace portion of the site that are not associated with human activity or recent heavy or repeated human disturbance. These include 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 occupy most of the site. The coastal bluff community occurs only in a very narrow zone along the edge of the coastal bluff at the south end of the site. The seasonal pond occurs south of the NOAA facility in the central portion of the site. Three small

freshwater marsh habitat complexes occur on the site: one just north of the CDFG 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. Other wetland areas dominate the northern portion of the Campus, and are also found just northeast of the NOAA facility as well as between NOAA and LML.

No special-status plant species were found on the terrace portion of the CLRDP project site during surveys conducted in 2000 and 2001. This is consistent with the findings of previous botanical surveys (Habitat Restoration Group, 1993; 1994; and John Gilchrist & Associates, 1997).

Vegetation communities found in the terrace portion of the site constrain development on the Marine Science Campus by requiring special management to control invasive species and prevent the degradation of the vegetation communities in open space and habitat areas, including their interrelated wetland/ESHA value. Management of vegetation on the terrace portion of the site is also required to prevent the dispersal of invasive plant species into YLR.

3.7.3. Wildlife

Younger Lagoon Reserve

Both the aquatic and upland areas of the YLR provide excellent wildlife habitat for vertebrates and invertebrates. The beach and associated cliffs in the reserve provide high quality habitat for wildlife to nest, rest and/or forage on. A high diversity and abundance of birds also occurs throughout the remainder of the YLR boundaries. Over 200 species of birds have been seen in or near Younger Lagoon since the onset of record keeping in the 1970s, and 15 of these species have nested in the Reserve. During surveys conducted by EcoSystems West Consulting Group in 2000-2001 the following nesting birds were observed: pigeon guillemots, pelagic cormorants, western gull, black phoebe, cliff swallows, barn swallows, Wilson's plover, and killdeer. Additionally, a pair of saltmarsh common yellow throats (a California Department of Fish and Game (CDFG) species of special concern), were observed to show nesting behavior in the YLR. Other special-status birds have been observed foraging in the YLR, but no other sensitive bird species were observed nesting, or demonstrating nesting behavior in 2000-01.

Coyote and bobcat are abundant within the reserve area. Other native mammals known to use Younger Lagoon Reserve included mountain lion, wood rat, gray fox, non-native red fox, raccoon, and striped skunk. San Francisco dusky-footed woodrat (a CDFG species of special concern) and western red bats (a Western Bat Working Group "High Priority" species) may also occur in the YLR.

Fish species known to occur in Younger Lagoon Reserve include tidewater goby (a federal endangered species and a CDFG species of special concern) and three-spine stickleback. Additionally, California red-legged frog (CRLF) (a federal threatened species), may occasionally move across the upper drainages of the northern portion of the YLR; however, the Biological Assessment prepared by EcoSystems West (2002) concluded that the seasonal drainages that feed the YLR are considered to be too ephemeral to support CLRF reproduction or non-reproductive rearing habitat. The lagoon proper and open water, being saline, are not considered to provide CLRF habitat. No other special-status wildlife species are known to occur, or are expected to occur in the YLR.

Wildlife in YLR, which factors into the designation of a portion of this area as an ESHA (see also below), limits and impacts development on the Marine Science Campus by requiring buffers from adjacent development, special attention to building design, and standards for public access to the area.

Terrace Portion of Site

The upland and seasonal wetland areas (when dry) of the terrace portion of the site sustain populations of small rodents, lizards and insects. The wetland areas contain green foliage for an extended season, which in turn provides an extended food source for the small mammal populations. Small mammals observed on this portion of the site include California meadow voles and Botta's pocket gopher. Other mammals that may use the site include house mouse and deer mouse.

Small mammal species (especially the California vole and white-footed mouse) provide an abundant food source for raptors (falcons, hawks, and owls). During the 2000-2001 surveys conducted by EcoSystems West Consulting Group, the following raptor species were observed using the terrace for foraging*:* white-tailed kite, a pair of American kestrels, barn owl and a pair of northern harrier hawks. Other foraging species observed included: morning dove, rufous-sided towhee, black-headed phoebe, California towhee, American robin, California quail, white crowned sparrow, Anna's humming bird, barn swallow, tree swallow, Stellers jay, American crow, and purple finch. No special-status bird species were observed nesting, or are expected to nest, on the terrace portion of the site. A pair of mature northern harriers (a CDFG species of special concern) was observed foraging regularly across the terrace portion of the site during the 2000-2001 bird surveys as noted above. The 2000-2001 surveys, as well as previous surveys (Mori, 1997), indicate that this species does not nest on the site. A white-tailed kite (a federally protected species), was also observed foraging on the terrace portion of the site. Other special status bird species, including loggerhead shrike, peregrine falcon, black swift, and merlin may also occasionally use the site for foraging. Additionally, burrowing owl formerly nested on the site.

Adult Pacific tree frog and tadpoles have been observed in the seasonal pond south of the NOAA facility. Reptiles that are expected or known to occur include alligator lizard, western fence lizard, gopher snake, ring necked snake, and garter snakes.

Regarding the potential presence of California red-legged frog (CRLF) on the site, according to work conducted by EcoSystems West Consulting Group prior to CLRDP certification (2000, 2001 and 2002), one small CRLF was observed in May 2002 in a pool along the drainage adjacent to the railroad tracks along the northern margin of the site. Three juvenile CRLF were observed at this same location in 1997 (Mori, 1997). No other frogs were found on the site during focused surveys conducted in 1994, 1997, 2000, 2001, and 2002.

According to EcoSystems West, aquatic habitats on the terrace portion of the Marine Science Campus are too ephemeral to support CRLF reproduction, as surface water is unlikely to be present through late June, as is necessary to support successful reproduction. EcoSystems West also found that these areas are too ephemeral to support rearing habitat for non-reproductive juveniles.

The pool where the frogs were found in 1997 and 2002 provides known aquatic habitat for non-reproductive CRLF. Other wetlands along the northern and western margins of the site (specifically wetlands W1, W2 and W6) may also provide potential aquatic habitat, and/or temporary hydration points for CRLF during winter movements. Other wetlands in the central and southern part of the

site are not likely to provide potential aquatic habitat, upland habitat and/or temporary hydration points for CRLF during winter movements, due to their location, duration of ponding, and poor cover. Moreover, frogs have not been observed in these areas during past survey work conducted between 1997 and 2002.

The non-aquatic upland areas on the terrace portion of the site are considered to have extremely low potential for use by CRLF. The vegetation cover is of low height and offers little protection from predators. Moreover, frogs have not been seen in these upland areas during past survey work conducted between 1997 and 2002. Other than foraging habitat for some special-status species, as described above, no other special-status species are known to occur on this portion of the site.

Wildlife on the terrace portion of the site limits and impacts development on the Marine Science Campus, which should be addressed through buffers from adjacent development, special attention to building design, and standards for public access.

Wildlife Movement

The northern portion of the site appears to be used by wildlife that moves between Moore Creek, Antonelli Pond, YLR, and Wilder Creek/Lagoon. This wildlife movement probably occurs along existing transportation corridors such as the existing Campus access road from Delaware Avenue and the railroad right-of-way (adjacent to the northern Campus boundary) and across the undeveloped fields of the Upper Terrace. Movements of amphibians that require moist conditions may concentrate along wetlands W1 and W2, which extend in a north-south direction and connect to YLR through wetland W6, as well as east-west along that portion of the Campus along the railroad tracks.

Wildlife movement on the upper terrace portion of the Marine Science Campus could be facilitated through the establishment of enhanced wildlife corridors in this area that focus such corridors through the designated wetland and buffer areas and away from proposed development areas. These enhanced corridors would incorporate wetlands W1, W2, W6, W8, and W9, (and their buffers) for the north-south portion, and would include connecting west-east portions extending both along the railroad tracks (incorporating wetland W7) and through wetland W3. These corridors will help ensure continued habitat connectivity between YLR, Antonelli Pond/Moore Creek, and Wilder Creek/Lagoon. These corridor areas are designated as 20 feet wide with varying width buffers. Together, the corridor/buffer area will provide space sufficient for wildlife passage provided the animal is protected from disturbances that would discourage its passage. Thus, the area in the corridor/buffer needs to provide for appropriate vegetative terrain and cover, through connections at potential blockage points (e.g., at Shaffer Road and/or trails) and improvements both within corridors and at their periphery for the blockage of lights, noise, movements, and any other activity that would deter the animal from moving freely to and from YLR.

As such, these wildlife corridors and associated buffer areas could limit development on the Marine Science Campus by reducing the amount of land available for buildings, roads, and trails. In addition, the wildlife corridor and buffer areas on the site impact development by requiring special attention to adjacent building and public access design and control of public access into the area.

3.7.4. Marine Habitats

Intertidal Rock Benches

The shoreline adjacent to the project site consists of loosely consolidated soil atop terraces of soft mudstone. The marine portion of this area is within a cell of longshore sediment transport, and much of this area is seasonally covered and uncovered by sand. Many of the marine organisms present at this site are adapted to the rather harsh effects of sand inundation.

The rocky shore biotic community adjacent to the site is typical of many of the rocky shores in northern Santa Cruz County. Qualitative observations of species diversity and community structure were made during a site visit in December 1992. During this visit, 108 species of marine plants and animals were observed along the shore between the bluffs and approximately -1.0 ft below mean lower low water (MLLW) tidal elevation.

Throughout the area, benches were incised by deep channels that provided considerable spatial habitat diversity. Vertical walls normal to and parallel to incoming waves resulted in extremely exposed or relatively protected habitats, respectively.

There are two sea caves in the vicinity of the LML site; the larger one contains the intake structure for the existing LML seawater system. This cave is approximately 60 feet deep, with steep mudstone walls and a sandy bottom. The walls of the cave were covered mostly by sessile invertebrates and motile gastropods. The absence of any plant cover in the cave is likely the result of light limitation. The overall species composition of animals was similar between the two caves, although there were fewer species found in the smaller, easternmost cave. HBG has identified the intertidal area seaward of the Marine Science Campus as a sensitive biological resource.

The presence of an intertidal area limits development on the Marine Science Campus by requiring buffers from adjacent development. Also, because the area provides access to YLR, the management of public access to the area is required to protect YLR. Because water is an essential element of the habitat, special care must also be taken in the design of the drainage system to maintain the quality of water that flows from the developed area of the site. Finally, the presence of an intertidal area affects the design and operation of seawater intake facilities for the site.

Subtidal Habitats

The subtidal nearshore habitats consist of a mudstone substratum. The bottom forms a series of sloping ridges, with the faces of the ridges oriented toward the shore, and a shallow overall slope. This repeated ridge-and-depression topography produces sediment traps, and results in both sand-covered and uncovered substratum. Sediment enters the near coastal system from a number of small coastal streams, and from longshore transport of sand, predominantly from the west.

The distribution of benthic organisms in the area was apparently partly controlled by the availability of rocky substratum and the rates of movement of sand, which previous studies have concluded occurred at a relatively high rate (Mattison, et al, 1974). This was inferred from the presence of organisms (primarily colonial tunicates, sponges, cnidarians and algae) normally found on exposed surfaces, "living" under several centimeters of sand. This is consistent with conditions in the intertidal area, where sand inundation was commonly observed, and periodic movement of sand apparently resulted in high abundances of some species that are resistant to sand burial.

Previous studies have identified 227 species of marine plants and animals along subtidal transects directly offshore and adjacent to the site. The distributions of most groups of organisms were closely correlated with bottom type. Some species were found only on exposed shale (e.g., giant kelp and ascidians) while others were observed primarily on sand-covered rock (e.g., *Pterygophora californica*, and the ascidians). Although some species were only observed where sand cover was minimal or absent (i.e., on vertical faces of rock), all species in the area must have been accustomed to frequent sand movement and occasional burial. Species that generally grow in relatively sediment-free environments were rare. There was a dense kelp forest (*Macrocystis pyrifera*) beginning approximately 65 feet offshore in fairly shallow water that is continuous along the coastline. The extent of this kelp forest has not changed appreciably since 1974.

Overall, the subtidal biotic community near the LML site is diverse, represented by a wide array of taxonomic groups, and is strongly influenced by local variations in sediment distribution. There are no indications of negative effects of the existing stormwater discharge, but no recent subtidal surveys have been conducted.

The presence of subtidal habitats impacts development on the Marine Science Campus by requiring special care in the design of the drainage system to maintain the quality of water that flows from the developed area of the site. These habitats also affect the design and operation of seawater intake facilities for the site.

Special Status Species

Certain species whose continued well-being may be compromised by human activities are listed by state and federal agencies as being threatened or endangered. These species are afforded special protection from alteration of habitat or taking, which may include harassment. There are several marine species that are state or federally listed as threatened or endangered that, although they may be present in the vicinity of the Marine Science Campus, are not solely dependent on the area surrounding the site. These include the southern sea otter, the brown pelican, and the California gray whale, which are further described below.

Southern Sea Otter. Southern sea otters (*Enhydra lutris nereis*) are listed as threatened by both state and federal agencies. These animals were reduced by hunting to a small population of approximately 50 animals in the early part of this century. Sea otters expanded their northern range in the mid- and late 1970s beyond Point Santa Cruz and into the area adjacent to the project site. Since that time, otters have moved farther north and are commonly observed from Año Nuevo Island to Pigeon Point. The population at the time of CLRDP certification was estimated at approximately 1,464 individuals distributed between Point Año Nuevo and the Santa Maria River. At that time, a small number of otters could be observed feeding in the kelp forest offshore adjacent to the Marine Science Campus on most days. There has been no indication of negative effects of the existing seawater system on distribution, abundance or health of sea otters.

Brown Pelican. Brown pelicans (*Pelecanus occidentalis californicus*) are common in the Monterey Bay area and use the waters between Point Año Nuevo and Point Lobos. They are listed as endangered by both state and federal agencies due to severe population declines experienced during the 1960s and 1970s as a result of elevated concentrations of DDT in coastal waters that caused reproductive failure in several breeding populations. Many populations of brown pelicans have rebounded since major sources of DDT have been eliminated from the environment. DDT is not introduced into the

environment through Marine Science Campus facilities, and there has been no indication of negative effects of the existing seawater system at LML on health or abundance of pelicans. Primary summer and fall nighttime roosting areas for the brown pelicans are in the Moss Landing Wildlife Area and Año Nuevo Island. Overnight roosting areas are the most prone to disturbance and their protection is among the primary objectives of the recovery plan for the species. During the daytime, pelicans fish in the waters of Monterey Bay and surrounding areas and are commonly observed offshore of Santa Cruz and the project vicinity. Although birds do roost on a small offshore outcrop near Point Santa Cruz, there are no large roosting sites in the project vicinity.

California Gray Whale. California gray whales (*Eschrichtius robustus*) pass through the Santa Cruz area from November through January en route to breeding and calving lagoons in Baja California, Mexico, and through March through June en route to feeding waters in Alaskan and Canadian waters. In general the animals pass nearer to shore on the southern trip and father from shore on the northerly trip. Feeding during the migration is minimal, although animals have occasionally been observed frolicking in kelp beds. Gray whales have recently been "delisted" as a result of a decision that the North Pacific population has completely recovered from the effects of hunting in the last century and the beginning of the twentieth century, and has stabilized. Although it is no longer listed as threatened or endangered, it is still protected under the Marine Mammal Protection Act, which has provisions regarding habitat and harassment. There has been no indication of negative effects of the existing seawater system on the California gray whale population.

The presence of special status species in the marine habitats on and adjacent to the Marine Science Campus impacts development by requiring special care in the design of the drainage system to maintain the quality of water that flows from the developed area of the site. The presence of these species may also affect the design and operation of seawater intake facilities for the site.

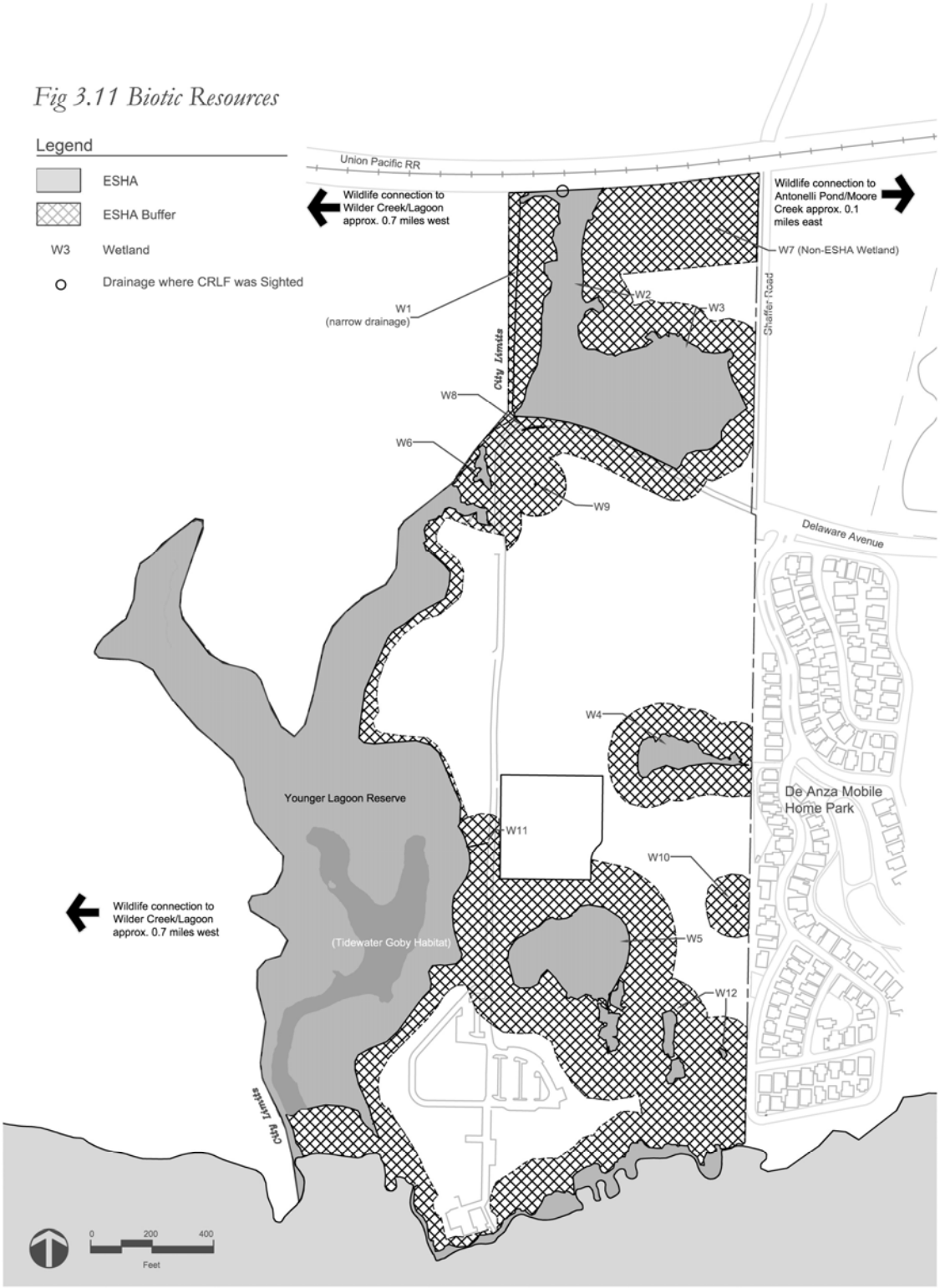
3.7.5 ESHA

The Coastal Act defines environmentally sensitive habitat area (ESHA) as any habitat 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. As described in the preceding sections, it is clear that the Campus is home to significant and interrelated biotic resources. Some of these biotic resource areas are considered ESHA by this CLRDP, and some are not. For example, although the majority of Campus wetlands are considered ESHA, wetland W7 is not. Similarly, although a number of raptors and other bird species, including several listed species, forage on the terrace portion of the site, this area has not been deemed ESHA by this CLRDP.

In the same manner, Younger Lagoon and related portions of the Reserve are clearly rich in resource value, but not all of the Reserve constitutes ESHA. Specifically, the sandy beach area seaward of the lagoon functions as a resource protection buffer. Although the beach area, particularly the inland coastal strand nearest the lagoon, has been known to foster habitat at times for special status species, and for which temporal and special restrictions may be necessary at times during the year, the beach area itself does not constitute ESHA for the purposes of the CLRDP. The remainder of YLR, though, has been deemed ESHA. See Figure 3.11 for biotic resource areas on the Marine Science Campus, including ESHA areas.

ESHA limits and impacts development on the Marine Science Campus, by requiring buffers from adjacent development, special attention to building design, and standards for public access.

Fig 3.11 Biotic Resources



3.8. Scenic Resources and Visual Characteristics

The campus site is located in a coastal location and the site is visible from several public vantage points, including portions of Highway 1, Wilder Ranch State Park, Moore Creek Preserve, and Natural Bridges State Park, as shown in the following photographs (see Figures 3.12 and 3.13). From the terrace portion of Wilder Ranch the site is at approximately the same elevation, and major vegetation screens large portions of the upper site. The site is more visible from higher elevations within Wilder Ranch. From Natural Bridges, also at a similar elevation, homes in the De Anza Mobile Home Park screen most of the site from view, although existing campus buildings are visible above the homes and nearest the bluff. From Highway 1, which lies somewhat above the terrace in elevation, the site may be seen intermittently from a traveling vehicle. Here the view is more complex: the ocean beyond the site is clearly visible above existing buildings; some of the flat terrace portion of the site can be made out as well. From the Moore Creek Preserve, which lies north and at a significantly higher elevation, the terrace portion of the site itself can be seen, and existing buildings fall mostly below the cliff horizon line, so that they only minimally block views of the ocean.

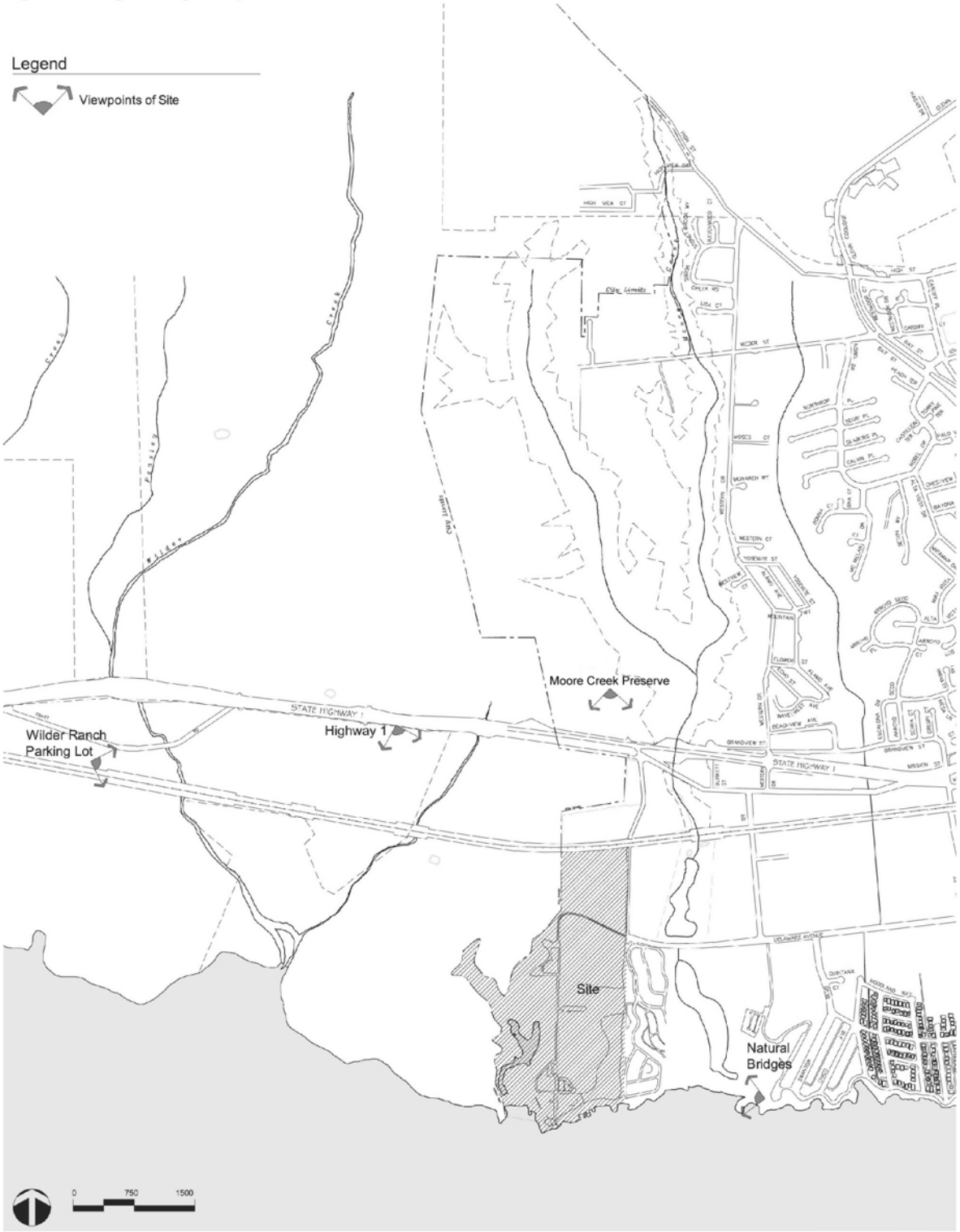
Panoramic views of Monterey Bay and Younger Lagoon are available from vantage points on the site, although from the more northern portions of the site, undulating site vegetation, while low, blocks views of the water. Closer to the cliff edge, the water view unfolds ahead. The site itself provides a visual transition between the more urban City of Santa Cruz to the north and east and the rural north coast to the west.

The existing LML complex is an assemblage of weathered original Lab buildings with board-and-batten siding and gray colored roofs, and newer buildings that have been designed to be complementary to this initial design aesthetic. Seymour Marine Discover Center and the Center for Ocean Health Building both have exterior finish treatments that pick up on colors in the site landscape. The NOAA Fisheries building is similarly finished to replicate the green and tan colors of the site.

The coastal scrub and coastal strand vegetation along the edges of the site form a low mat of gray-greens and browns. The vegetation of the terrace portion of the site ranges from deep green to browns and tans, depending on the season.

The need to maintain the scenic resources and visual characteristics of the Marine Science Campus and the surrounding area limit and impact development by reducing the amount of land available for buildings, roads, and trails. Maintaining scenic resources and visual characteristics also affects the design, scale, and number of buildings on the site, including necessitating height and mass limitations, and limitations in the use of color and materials in construction. Finally, maintaining scenic resources and visual characteristics affects how buildings may be arranged on the site.

Fig. 3.12 Sample Viewpoints of Site



Natural Bridges Parking Area Site Viewpoint

Moore Creek Preserve Viewpoint

Highway 1 Site Viewpoint

Wilder Ranch Parking Lot Viewpoint

Fig. 3.13 Sample Viewpoints of the Site

3.9. Cultural Resources

The Marine Science Campus appears to have low archaeological sensitivity or potential. An archaeological study and field reconnaissance conducted on the site in conjunction with the previously proposed Westside Lands Plan found no indications of cultural resources on the Marine Science Campus (ACRS, 1985) although a potential prehistoric resource was identified on the upper terrace area. Subsequent surveys found no indications of prehistoric or other cultural resources. In 2000 an updated records search of the entire property and a field reconnaissance of the Younger Lagoon Reserve also found no prehistoric or historic archaeological resources on the site. Comments in the public record have noted a 1924 shipwreck, the La Feliz, lies offshore of the site. The Seymour Marine Discovery Center has incorporated an interpretive display that includes the ship mast of the La Feliz.

Sensitive paleontological resources are identified along the coastline, from Younger Lagoon to approximately Monterey Street near Cowell Beach. The Santa Cruz mudstone that composes the majority of the seacliff face on the Marine Science Campus, however, appears to contain few fossils (Strelow, 1997).

There are no known cultural resources on the Marine Science Campus, and therefore development is not constrained in this regard. Nonetheless, the La Feliz ship mast should continue to be preserved for the education and enjoyment of future generations. If currently unknown cultural resources are discovered during the course of developing the terrace portion of the site, development activity will have to be regulated to ensure no adverse impacts on any such resources.

3.10. Agricultural Resources

The Marine Science Campus is adjoined immediately to the west by agricultural fields in production of crops. The daily operations of agricultural fields, which can include plowing, spraying, or the use of heavy machinery, can potentially cause conflicts with adjoining urban uses. An existing agricultural road acts as the established crop line within the agricultural property, and all crops have been planted west of this road for many years. While the agricultural operation does not currently use Telone II, the capability to use this in the future is an important part of the continued viability of the agricultural use. Telone II requires 300 feet of separation between the area of application (crop line) and adjacent non-agricultural uses.

Pre-CLRDP certification existing development on the site, which is separated from agricultural lands by Younger Lagoon Reserve, is set back from agricultural uses by approximately 150 to 700 feet. The closest building is the CDFG Marine Wildlife Center. Although prevailing winds sweep west to east from the adjacent farmland towards the Campus, UCSC and CDFG uses coexisted with adjacent agricultural operations for years. In the three decades that the Marine Science Campus has been operational, no formal complaints have ever been made by staff working at the site.

In addition to potential conflicts with adjoining urban uses, stormwater and irrigation runoff from agricultural fields west of the campus have resulted in erosion problems and the deposition of agriculture-related chemical pollutants into YLR. There is also a concern that on occasion farmworkers use YLR as a toilet thereby disturbing vegetation and wildlife in the area. Separating urban uses from adjoining agricultural uses is an important consideration in the development of the site. Figure 3.14 identifies agricultural setbacks associated with selected developments at or near the Campus prior to CLRDP certification.

Fig. 3.14 Distance to Adjacent Agricultural Property for Development at or near the Marine Science Campus

Facility (Year of Approval)	*Distance (feet)*
Long Marine Laboratory (1976 - 2004)	400
California Department of Fish and Game (1994 and 2005)	150
NOAA Fisheries Laboratory (1998)	700
Raytek (1975)	20
Raytek (2000)	200 bldg; 15 parking
Monarch Village Apartments (2002)	238

Source: California Coastal Commission; Steve Davenport

In all of these cases, proximity to agricultural uses was a factor considered in the site layout and design.

The presence of adjacent agricultural resources limits and impacts development on the Marine Science Campus by requiring setbacks that limit the area for development. Appropriate setbacks for the Marine Science Campus are 200 feet from the property line and 300 feet from the established crop line for non-accommodation uses (depending on the use's proximity to existing buildings and YLR) and 500 feet from the property line for accommodation uses, except those accommodations to be used for very short terms (i.e., one week or less) (see Figure 3.15). Proximity to agricultural resources may also require special design features to minimize conflicts between Campus use and 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, et al).

3.11. Conclusion

The Marine Science Campus and surrounding area has many sensitive coastal resources. These resources limit the location and intensity of development that can occur on the site. Figure 3.16 maps major constraints that have helped shape the plan, including wetland and ESHA locations and buffers, agricultural setbacks, certain view corridors, and geologic hazard setbacks.

Fig 3.15 Agricultural Setbacks

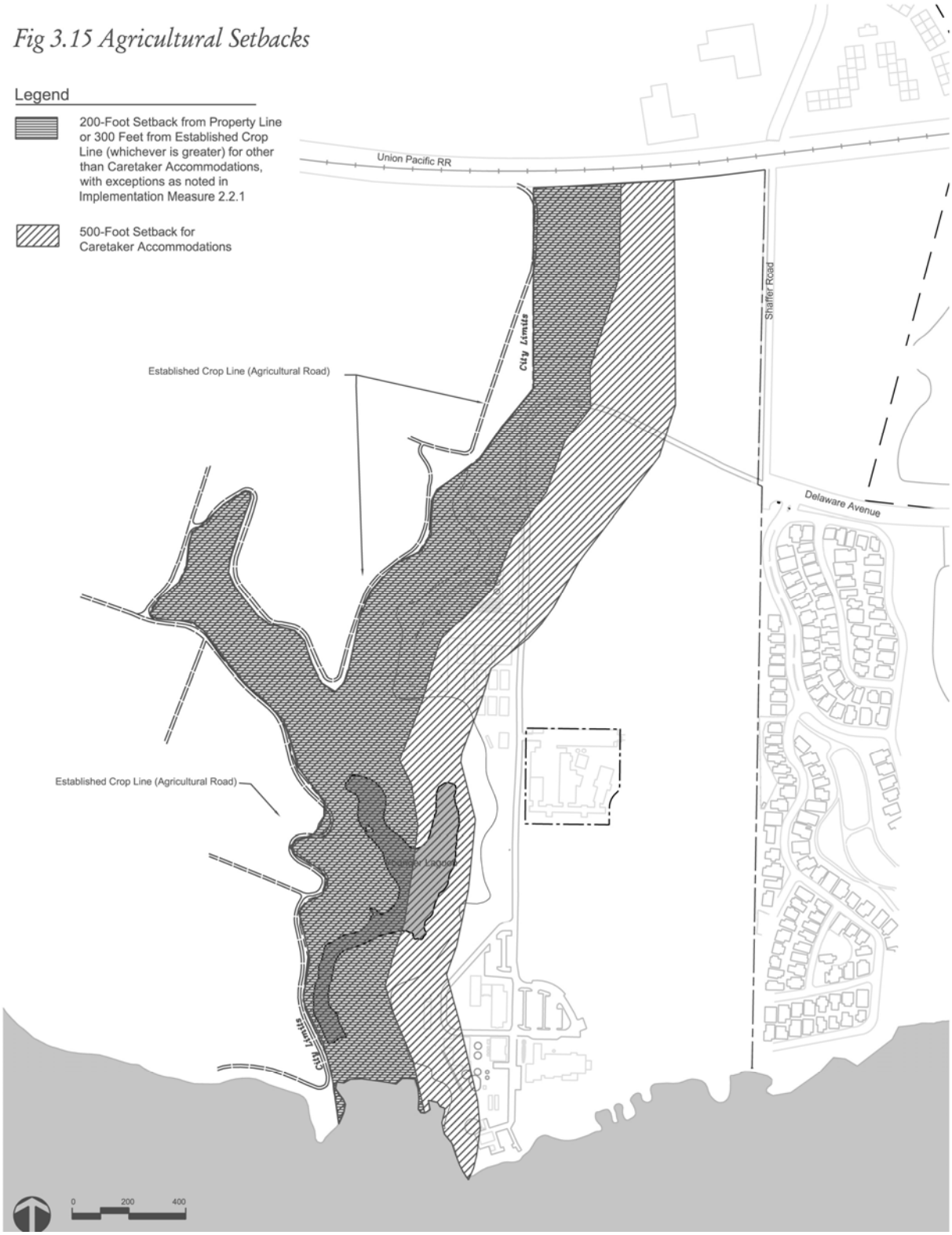
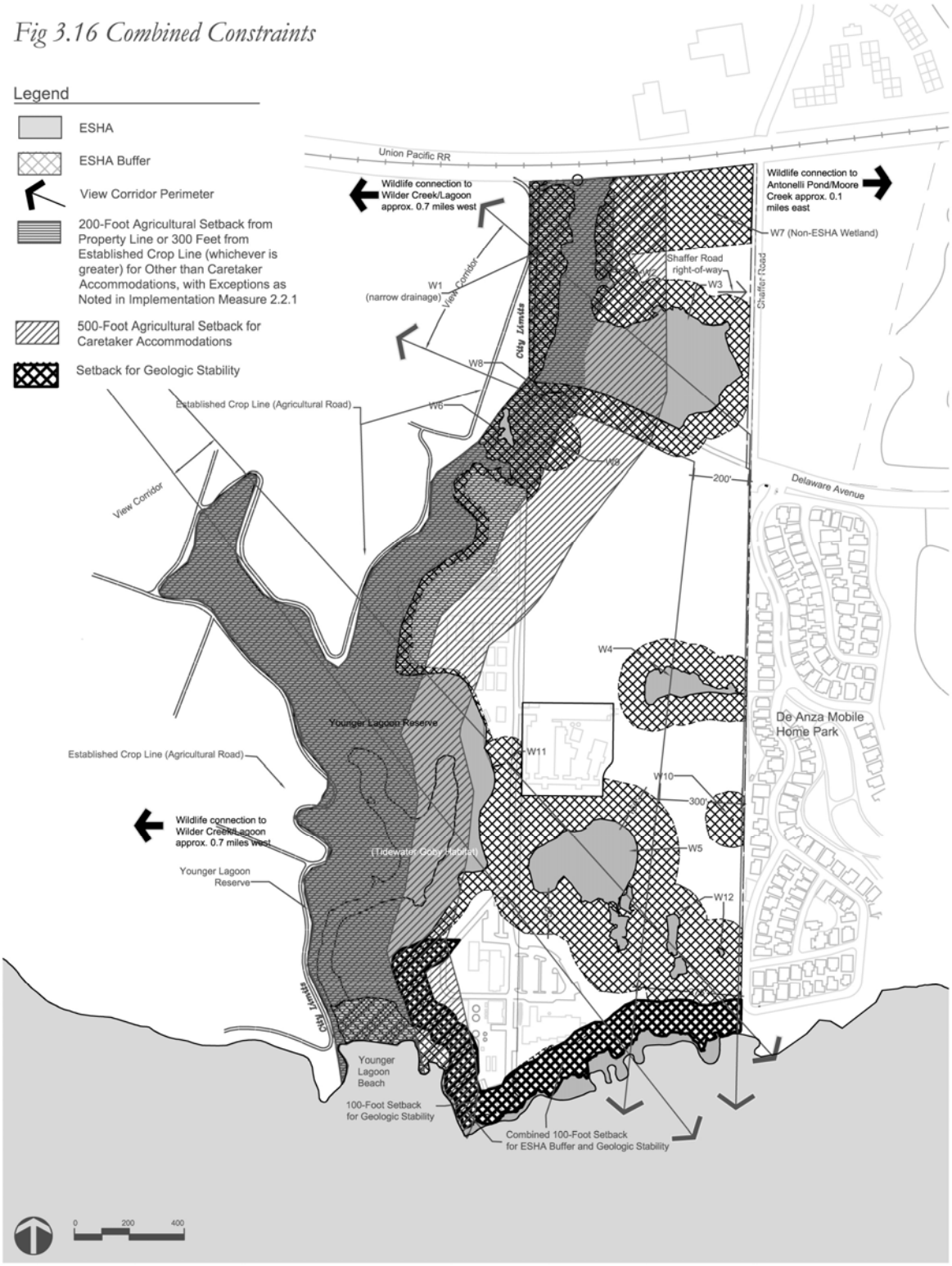


Fig 3.16 Combined Constraints



4. Planning Objectives, Program Overview, Design Principles, and Plan Concepts

The purpose of the chapter is to discuss the objectives of the CLRDP and justification for the development program that it contains. This chapter is divided into four sections. The first section sets forth planning objectives for the CLRDP. The second section provides an overview of program needs. The third section sets forth design principles for the Marine Science Campus based on the rural/agricultural landscape, and the last section describes campus land use concepts. These Chapter 4 elements are reflected in and implemented by the chapters that follow and the CLRDP appendices.

4.1. Planning Objectives

The purpose of the 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, consistent with the Coastal Act. The UCSC Institute of Marine Sciences and the UC Natural Reserve System, which share responsibility for managing the UCSC Marine Science Campus, 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 following are the University's planning objectives for the campus (organized under subheadings) that are addressed in this Coastal Long Range Development Plan.

4.1.1 Planning Objectives

- 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) 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 new and expanded facilities.
- 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 short-term accommodations for researchers, educators, students, caretakers, and visitors that are adjacent to coastal-dependent activities.
- 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 maximum extent feasible.

4.1.2 Protecting Natural Resources on the Site

- Avoid or minimize adverse effects on the natural physical setting consistent with the resource protection provisions of the California Coastal Act and other environmental regulations, and consistent with achieving the planning objectives described above.
- Rely on infill and clustering of facilities to provide for efficient use of the land while limiting development of undeveloped lands to the maximum extent feasible.
- Protect and enhance environmentally sensitive habitat areas and other coastal resources including vegetative and wildlife habitats.
- Site development in areas with similar uses to support pedestrian travel and to minimize vehicle use for circulation within the site.

4.1.3 Protecting Offsite Resources

- Avoid or minimize adverse effects on adjacent land uses, the local community and the region consistent with the California Coastal Act and the planning 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 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 short-term accommodations to reduce 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.

Terrace Point 1972

Long Marine Lab 1984

Long Marine Lab 1959

Marine Science Campus 2001

Fig. 4.1 Historic Aerial Photos of Campus

4.2. Program Overview

This section provides an overview of program needs for the Marine Science Campus.

4.2.1. Marine Research and Education (Including Outdoor Research Area)

Oceanography and marine sciences in the century ahead will be very different than that of the past. Due to the global scale and interdisciplinary nature of the problems and research questions we now face, it has become clear that individual scientists working in isolated laboratories cannot by themselves answer these questions and resolve these issues. Consortiums of marine institutions and scientists and integrated or interdisciplinary science has become necessary to deal with these complex local and global scale problems. The Ocean Drilling Program (ODP), Partnership for Interdisciplinary Studies of the Coastal Ocean (PISCO), and the Consortium for Oceanographic Research and Education (CORE) are a few examples of such groups. Scientists within the Institute of Marine Sciences at UC Santa Cruz are involved with these and other groups that are making important contributions to our understanding of the Monterey Bay, the Monterey Bay National Marine Sanctuary, and the global oceans.

Over the past decade the Institute of Marine Sciences has responded to these changes and issues and focused efforts in three directions:

1. Assisting in the development of excellent academic programs and outstanding marine instrumentation facilities.

2. Developing partnerships and collaborations with state and federal marine agency programs and the private sector to strengthen programs and expand capabilities at a time when University resources have been limited.

3. Developing public education and policy related programs to compliment and fully utilize our marine research capabilities and resources and share the results of research with the public at large and decision makers at all levels.

Program Development

Over the past two decades the Institute of Marine Sciences has worked with the UCSC academic departments of Ocean Sciences, Biology, Environmental Studies, and Earth Sciences to develop outstanding academic programs. UCSC is also the only Ph.D. granting institution in the Monterey Bay area and the top quality students drawn to the campus have been important assets to agency partners who want to relocate here. The Institute has also focused and leveraged resources to build a state-of-the-art set of marine instrumentation facilities, which are important attributes of any regional or national centers.

Partnerships and Collaborations

The University of California, Santa Cruz is now a state-assisted institution with nearly two-thirds of its budget coming from non-state sources. In the area of ocean research, the Institute's 42 marine faculty and approximately 30 researchers brought $10.5 million in external funds to the campus in 2000 - 2001 to support marine research, approximately 16% of the extramural funds brought to the entire campus. Marine sciences have been an integral part of the campus teaching and research efforts since the campus opened and have become increasingly important as the campus has grown, as ocean issues and concerns have become more paramount, and as the research and teaching opportunities associated with the unique location on Monterey Bay have been realized. The Institute of Marine Sciences and Long Marine Laboratory (LML) have long recognized that campus resources were limited and there are many benefits and opportunities available by working with state and federal agencies to develop cooperative programs and co-located facilities. By 2005 they had successfully developed collaborative research programs with:

- The National Oceanic and Atmospheric Administration (NOAA) Fisheries Service
- The United States Geological Survey (USGS) - Coastal and Marine Group
- The California Department of Fish and Game (CDFG)
- The Coastal Waters Program of the Nature Conservancy
- NOAA's Center for Marine Protected Area Science

These partnerships have brought new programs, scientists, funding, facilities and capabilities to the region which strengthen programs and expand collective ability to study and resolve important questions and problems about the ocean—the fate of sea otters impacted by oil spills, the status of salmon and sustainability of California fisheries, and impacts of El Niño events on the central coast are a few examples of some of this collaborative work.

These partners have significantly increased the University's capabilities and ability to undertake broad scale marine research and also train the next generation of scientists. UCSC has the foundation and

the potential to become a world-class marine research and education center and the Marine Science Campus site offers an ideal set of conditions to continue to pursue this goal. An oceanfront site with access to high quality seawater on the margin of the nation's largest national marine sanctuary, the presence of a strong core of internationally recognized marine scientists, a cadre of intelligent and motivated graduate students, as well as all the attributes of a major research university have become magnets to which others continue to be drawn.

Developing Public Education and Policy Programs

The University of California is charged by the state Master Plan for Higher Education to carry out programs in teaching, research and public service. The Marine Science Campus offers unique opportunities to develop programs in each of these areas and to benefit both the people of the region and the state but also the oceans.

Long Marine Lab has developed a very successful public education program, which has now been in existence since 1978, including its expansion in 2000 with the opening of the Seymour Marine Discovery Center. This privately funded facility is intended to ultimately serve 75,000 to 100,000 visitors each year, including 20,000 school children. The focus on a Window to Discovery and interpreting the research carried out by the Institute's marine scientists is unique in California. Public lecture series, summer programs for children, workshops for teachers, and a six day/week visitation and tour program are examples of contributions in this area, which may expand in the future.

The Center for Ocean Health is a research center at the Marine Science Campus with a focus on marine research with policy implications and activities, such that the results and findings can be integrated and shared with policy makers and agency staff in order to make more informed future decisions.

Looking to the Future

The foundation for a world-class marine research, education and policy center now exists in 2008 at the time of CLRDP certification. With the existing seawater system and laboratory research facilities, the Ocean Health building, the Seymour Marine Discovery Center for public education, the Younger Lagoon Reserve, the CDFG's Marine Wildlife Center, the NOAA Fisheries Laboratory, the NOAA Center for Marine Protected Area Science, and an Avian Facility (Oiled Seabird/Raptor Center), the Institute of Marine Sciences has developed unique capabilities and partnerships at the Marine Science Campus that make the whole greater than the sum of its parts.

The University's group of marine scientists will grow and expand its capabilities as the campus reaches build-out under its pre-CLRDP master plan, and they will need additional office, teaching and research facilities. The University already has more requests by school groups for its public education program than it can accommodate, indicating a need to plan for future growth in its public programs.

In 2001, the UCSC Division of Natural Sciences, the department that oversees both the Institute for Marine Sciences and the Younger Lagoon Natural Reserve, completed a strategic plan that projects growth and program development for the department to 2011. According to the strategic plan, marine sciences faculty will continue to play a major role in the research and educational mission of the campus and are projected to increase four-fold over the plan period (for a total of 21 faculty

members). Eleven of these faculty members would logically be located on the Marine Science Campus. This 57% increase in faculty would be accompanied by a similar level of growth in graduate students, post-doctoral students, researchers, and lab assistants. Unfortunately, the Center for Ocean Health reached capacity in the early 2000s, including using approximately 3,000 square feet of portable office space located behind the Center for Ocean Health. There was no additional office, laboratory, or graduate student/researcher space available to house these additional scientists and staff. The strategic plan projected the need for the Phase II of the Center for Ocean Health by 2006.

The University envisions the need for up to 254,500 square feet of additional marine research and education facilities on the Marine Science Campus under the CLRDP. The University also envisions the need for 70,000 square feet of additional outdoor research area. This projection is sufficient to accommodate future growth in UCSC and affiliated programs consistent with the need to provide open space and protect natural resources on the Marine Science Campus.

4.2.2. Support Facilities

An effective marine science and education program requires support facilities where scientists, faculty, and students can meet with their peers to discuss ideas, debate policy, and set agendas for future research. This CLRDP projects the need for a small seminar auditorium, meeting rooms, and food service. The auditorium will be suitable for lectures and presentations, and will enhance the ability of the Marine Science Campus to conduct meetings and workshops of a state, national or international scope, internal academic seminars and lectures, and community education activities. Meeting rooms will be included to complement the auditorium and will facilitate small conferences and symposia that can be conducted in smaller, seminar-type space accommodating 50 to 75 people each. Finally, a small dining hall will be included to provide food service for seminars and lectures and to reduce the need for on site researchers, staff and students to leave the campus for meals.

4.2.3. Short-Term Accommodations

Another important aspect of achieving a fully integrated education and research environment involving different types of scientists and students is the creation of on-site work-live capabilities for those whose learning experience or research requires or would be enhanced by their presence on the campus during extended hours. Those who would benefit from such facilities include scientists and degree candidates whose research effectiveness could be optimized by their 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 other students, researchers, and faculty.

Without such on-site accommodations, the campus would lose the important ability to attract short-term visiting scientists who can add immeasurably to the work being undertaken. The University would also lose the potential to develop onsite immersion programs for K-12 teachers, pre-college students, and university undergraduate students. Many decades of experience at leading marine research and education institutions such as Woods Hole Oceanographic Institution, Bodega Marine Laboratory, Oregon Institute of Marine Biology, Friday Harbor Marine Laboratory, Hopkins Marine Station, and the Hawaii Institute of Marine Biology indicate that providing some live-work accommodations for scientists and students yields opportunities and interactions which enrich the research and educational environment in a way not otherwise possible.

The campus lies within the California Coastal Zone, and planning for the campus has been guided by policies of the California Coastal Act concerning protection of resources of the Coastal Zone. Under the guidance of those governing policies for the Coastal Zone, planning has eliminated any consideration of any proposed use of a residential nature that is not integrally related to the coastal-dependent core marine research and educational functions of the Marine Science Campus. The short-term accommodations planned for the Marine Science Campus support, and are integrally related to, the core functions of the campus. These core functions, in turn, require close proximity to the existing and planned seawater pools, aquaria, laboratories, marine mammal facilities, and other ocean-linked facilities.

The University projects the need to provide limited short-term accommodations consisting of up to 30 researcher housing rooms and 10 visitor accommodation rooms. This projection represents a small fraction of the total accommodations required for the people who will work and study on the Marine Science Campus at buildout, but is consistent with competing needs to provide open space and protect natural resources on the Marine Science Campus. The short-term accommodations planned for the Marine Science Campus fall into five categories, and these are discussed below.

Visiting Scientist Accommodations

The presence of distinguished visiting scientists on-campus is of great importance to the strength and vitality of campus programs. These scientists, typically on sabbatical leave from other institutions, immeasurably enrich the facility they visit though collaborative research, lectures, and involvement with other faculty, researchers and students. During a typical stay of several months to a year, a visiting scientist living close to laboratories and work spaces can be available on a continuous basis to interact with colleagues and students and to participate in the marine research and learning activities. Without such housing, the ability to attract such scientists is greatly diminished.

Accommodations for Coastal Research and Learning by University Students

The greatest need in this category is for opportunities for graduate students to live in close proximity to their research laboratories, experiments, and observations. Graduate students typically are completely immersed in their research for a 2-to-4-year period. Their workdays do not normally end at 5 o'clock; research activities, seminars, and interactions with faculty and colleagues typically extend into the evening hours and weekends.

There is also need for some on-site accommodations for undergraduate students who would benefit from immersion in the marine research and education environment. During the academic year, some 70 undergraduate students are projected to be working directly with marine scientists at the labs. Living on site would enrich their opportunities for day-to-day interaction and discussion focused on marine science. In particular, these students' continuous presence on the campus will broaden opportunities for their senior thesis and research projects by expanding their access to graduate students, faculty, and use of Seymour Center as an undergraduate teaching laboratory. In addition, summer university-level classes relating to marine sciences (scientific diving, marine biology/ecology, etc.) are envisioned. These programs have become possible through addition of the Seymour Center and its teaching laboratory as well as the seminar/classroom in the Center for Ocean Health.

For both graduate and undergraduate students, the live-study experience at the campus will provide for enriched learning opportunities that could not be obtained in any other way.

Temporary Accommodations for K-12 Teachers and Students

The public education program at the Marine Science Campus has historically provided marine education programs for schoolteachers, and has expanded to include opportunities for junior high or high school students, interns and other short term site residence programs. With the completion of the Seymour Marine Discovery Center requests for these programs substantially increased. This CLRDP envisions the development of on-site quarters to accommodate visiting teachers and students during summer residence programs and teacher immersion programs.

Temporary Accommodations for Short-Term Visiting Scientists

Scientists working at the campus will attract a number of very short-term visitors who may present talks or seminars, collaborate on research, and engage in conferences or meetings. Typically these stays span from a few days to a week or two. There is need to house these visitors on-campus in order to maximize the time they can spend on activities that enrich the programs. On-site accommodations will extend the potential hours of these visitors' involvement in campus activities and release them from the time-consuming problems of finding off-campus accommodations and commuting.

Temporary Accommodations for New Faculty and Researchers

To sustain excellence, the campus must be able to attract excellent new faculty and researchers. In the effort to do so, the campus must compete for the same talent with other distinguished marine science institutions. For faculty and researchers starting their careers, the foremost challenge is getting their laboratory/research and teaching program up and running and becoming productive scientists in their first several years. This time is critical to their progress in the tenure and promotion process, and typically they spend long hours in the research and/or teaching settings during these years. Thus, the ability to offer close-to-work, affordable short-term accommodations near research labs at the beginning of an academic's career becomes an extremely valuable tool for the University and its affiliates to compete successfully in attracting the high quality faculty and researchers necessary for the campus to succeed.

4.2.4 On-Site Caretakers

The nature of marine research activities, with facilities, animals, sea water supply, and mechanical systems sensitive to mishap and human contact, makes it essential to provide security and protection 24 hours a day. On-site caretakers have provided this protection and have been an integral part of the campus since its operations began. This need will remain and expand as the program continues to develop. The University envisions the need for up to two caretaker housing units that are integrated into the Campus aesthetic.

4.2.5. Public Access, Recreation, and Education

Another important program component envisioned for the Marine Science Campus is public access, recreation, and education. These activities complement the public service and education aspects of the Marine Science Campus mission and maintain historic access opportunities to coastal resources as mandated by the California Coastal Act. Recreational activities are also important for the health and productivity of scientists, faculty, and students who work long hours. This CLRDP envisions an expanded network of public trails and controlled access trails on the Marine Science Campus that allow visitors and other site users to walk to overlook points at the ocean, Younger Lagoon Reserve,

and other natural resource areas on the site. The plan also accommodates controlled access into natural resource areas for research, nature study, and habitat restoration work. The plan also includes providing supervised access to the Younger Lagoon beach area, and ongoing evaluation over time of the appropriate level of access to that area. Finally, the plan envisions the development of approximately 8,000 square feet of paved and non-paved sport courts integrated into developed areas of the Marine Science Campus. This is sufficient to provide two courts (e.g., one volleyball court and one basketball court) for campus users and visitors.

4.2.6. Equipment Storage and Maintenance

Marine research and education requires operations and maintenance of ocean-going vessels and outfitting of highly specialized equipment. Shared warehouses and equipment yards are planned for the Marine Science Campus, which will allow continued on-site research outfitting of vessels and storage, maintenance and repairs of expensive and sensitive equipment. This plan projects the need for up to 37,500 square feet of centralized warehouse and storage facilities and 70,000 square feet of open laydown yard. This program is less than what has been requested by interested tenants (for example, USGS has expressed a need for up to 40,000 square feet of warehouse for its use alone) but is consistent with competing needs to provide open space and protect natural resources on the Marine Science Campus. The equipment storage and maintenance function will not replace facilities occupied by the University and others at boat harbors, where larger vessels are stored and many vessels are launched.

4.2.7. Seawater System

The primary reason for establishing Long Marine Laboratory at this site in the late 1970s was to develop a facility where marine research that required large volumes of high quality seawater could be carried out adjacent to an uncontaminated source. The seawater system pumping, filtration and storage system was developed to provide the supply, and the two original buildings, the Younger Building and the Research Building, were built with seawater supplied to all of the research laboratories. These facilities have functioned effectively since their construction. The marine mammal research complex with the specially designed large tanks and pools was also built to take advantage of the high quality seawater supply system and has allowed UCSC to develop the nation's strongest marine mammal university research program. The seawater system has been continuously upgraded and improved to meet expanding quantity and quality needs that have resulted from ongoing development of the campus.

With the expansion of the campus, new facilities requiring seawater have been constructed or have chosen to locate on site. The Seymour Marine Discovery Center has a significant seawater supply and distribution system to provide seawater for the large aquariums, the wet classroom, and also the University wet teaching laboratory and student research area. As part of the operations of the Seymour Center a large storage tank was built to provide backup seawater storage for sustained operations in the event of power failure or system breakdown. The CDFG Marine Wildlife Center requires large volumes of seawater to maintain the tanks and pools for both sea otters and birds during an oil spill (the facility has been used for multiple spills already) and also for related research projects involving marine animals that are held in seawater pools. CDFG also built its own seawater storage tanks and disinfection system.

The NOAA Fisheries Laboratory also requires large volumes of running seawater to conduct its research operations. Because the LML seawater system was not adequate to provide for the increasing seawater demands, NOAA requested additional federal funds for a joint UCSC-NOAA project to expand the seawater pumping, filtration, and storage system to provide for immediate NOAA needs (including NOAA's own seawater storage tank to provide short-term backup supply) as well as expanded future needs and additional LML demands. These seawater system upgrades were completed just prior to CLRDP certification. The University envisions a need for up to 6,000 gallons per minute of seawater capacity at buildout.

4.2.8. Parking Facilities

Finally, development of the Marine Science Campus requires the development of parking for site users and visitors traveling to the site in motor vehicles. This CLRDP envisions the development of expanded parking opportunities in proportion to the development of new building space on the site, and this includes parking for visitor-oriented facilities such as the Seymour Marine Discovery Center. In addition, the CLRDP includes parking spaces for those who visit the Marine Science Campus to enjoy its public trails, overlooks**,** and other resources. The CLRDP envisions a need for 604 additional parking spaces on the Marine Science Campus, including spaces to accommodate visitors who travel to the site to enjoy informal coastal access. This projection assumes an aggressive transportation management program wherein 40 percent of all person-trips to the campus will be made using an alternative mode of transportation rather than single-occupant vehicles.

4.3. Design Principles of the Rural/Agricultural Coastal Landscape

The model for design of the Marine Science Campus is the rural, open space, and agricultural coastal landscape of Northern California. Located in the zone of transition from urban development to rural and open space land uses, the campus should echo characteristics of both natural and man-made elements which comprise the rural, open space, State Park, and agricultural landscape extending upcoast to the west. The campus should extend the visual quality of the rural landscape into the transition area, softening the transition and creating a visually pleasing environment.

The principles on which such design should be based are to be found by viewing the rural, open space, State Park, and agricultural coastal landscape in its broadest context, including the buildings, plantings, natural areas, and water bodies. So viewed, the rural-agricultural landscape yields several key principles which will guide design of the campus.

- Buildings (e.g., agricultural complexes) are often tightly clustered and surrounded by broad open or forested areas, where natural landforms are undisturbed.
- Buildings may contain components that are quite tall, such as silos, lighthouses, and water towers; such tall elements, however, are seldom bulky and are usually subordinate to the character of the setting.
- Roof profiles are shallow.
- Plant communities and their resulting visual patterns are strong and simple, often with large areas that give the appearance of a single prominent species.

- Windbreaks and hedgerows of large trees provide structure at a large scale in the landscape. Generally, these are associated with building clusters to provide weather shelter and visual/habitat screening. They are usually perpendicular to the coast and tend to screen building complexes from view resulting in a much more naturalistic looking scene.
- Many buildings that would otherwise appear large are diminished in scale through plantings of large shrubs and small trees that reduce the apparent height and bulk of a building from the ground up. This is particularly noticeable and effective in areas where building groupings are surrounded by open agriculture or grasslands.
- Roadside drainage swales and other seasonally wet areas also provide the rural landscape with a strong, simple pattern of plant materials.
- The structure of the larger landscape is provided through interplay of topography, natural and man-made vegetation patterns. A dendritic drainage pattern is reinforced by vegetation that flows down from upland coastal grasslands and agricultural areas, culminating in incised canyons and gullies on the coastal edge. Layered onto this are the man-made structural landscape elements of hedgerows and windrows.
- The appearance of buildings is visually compatible with the character of the surrounding areas. The color, material, and style of buildings reflect the natural elements of the landscape. Common elements are earth tones colors, natural wood sidings, and low roof lines.
- Site fencing is minimal, purpose-driven, and constructed out of natural materials that are visually compatible with natural elements in the landscape and the coastal/agricultural architecture.
- Site signage is constructed out of natural materials that are visually compatible with natural elements in the landscape and the coastal/agricultural architecture.
- Buildings are designed to avoid impacts to ecological areas in terms of noise, lights, and other visual impacts.
- Wildlife habitat and habitat connectivity are maintained and enhanced.

In summary, the principles that have influenced the design of the Marine Science Campus reflect the goal of establishing a natural and built environment expressive of the rural-agricultural coastal landscape.

Fig. 4.2 Clustered Buildings

Fig. 4.3 Tall Building Elements

Fig. 4.4 Shallow Roof Profiles

Fig. 4.5 Prominent Plant Species

Fig. 4.6 Cypress Windbreaks

Fig. 4.7 Building Scale Reduction throught Planting

Fig. 4.8 Drainage Features

Fig. 4.9 Coastal Topography

Fig. 4.10 Compatible Building Character

Fig. 4.11 Fencing Made of Natural Material

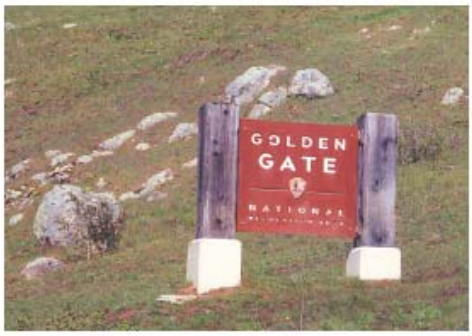


Fig. 4.12 Signage Made of Natural Material

4.4 Campus Land Use Concepts

This Coastal Long Range Development Plan envisions a physical campus suitable in character, size, and facilities to enable fulfillment of the objectives set forth in Chapter 4. Integral to those objectives is treatment of this unique campus site in a manner that protects and respects its natural resources and visual qualities. The land use concepts discussed below are divided into two categories – the built environment and the open space environment. These items are not formal land use designations and should not be mistaken for such. Instead, they are concepts that were used to shape the various elements of the development plan. Formal land use designations are presented in a subsequent section. Campus land use concepts are discussed below.

4.4.1. The Built Environment

The Marine Science Campus is intended be an integrated, fully developed education community consisting of coastal-dependent and coastal-related uses in support of marine education, research, and public service. The campus includes natural lands, laboratories, teaching and meeting facilities, offices, direct program-support facilities, and short-term accommodations for students, visiting scholars, newly recruited faculty, and others involved in the marine research and education activities of the campus. Maintenance of this campus in this location, distant from support facilities and services, also requires on-site food services, informal recreation areas, and similar support functions.

Development Zones

The built environment is organized into four primary zones of development, one each in the lower, middle, and upper portions of the site, and one at the Campus entrance, referred to in this CLRDP as Lower Terrace, Middle Terrace, Upper Terrace, and Campus Entrance development zones. Each development zone is intended to include a mix of marine research and education uses, except for the Campus Entrance zone, which is intended for more general support facilities such as parking and an entrance kiosk. Short-term accommodations are limited to certain development areas. These zones of development will be of varying scale and should evoke the rural complexes of buildings and landscape found on the coast to the west of the site. They are also planned and located to create a modulated transition from the continuous urban development of the city directly to the east, with its industrial and residential development nearby, to the open fields and clusters of rural agricultural buildings to the west.

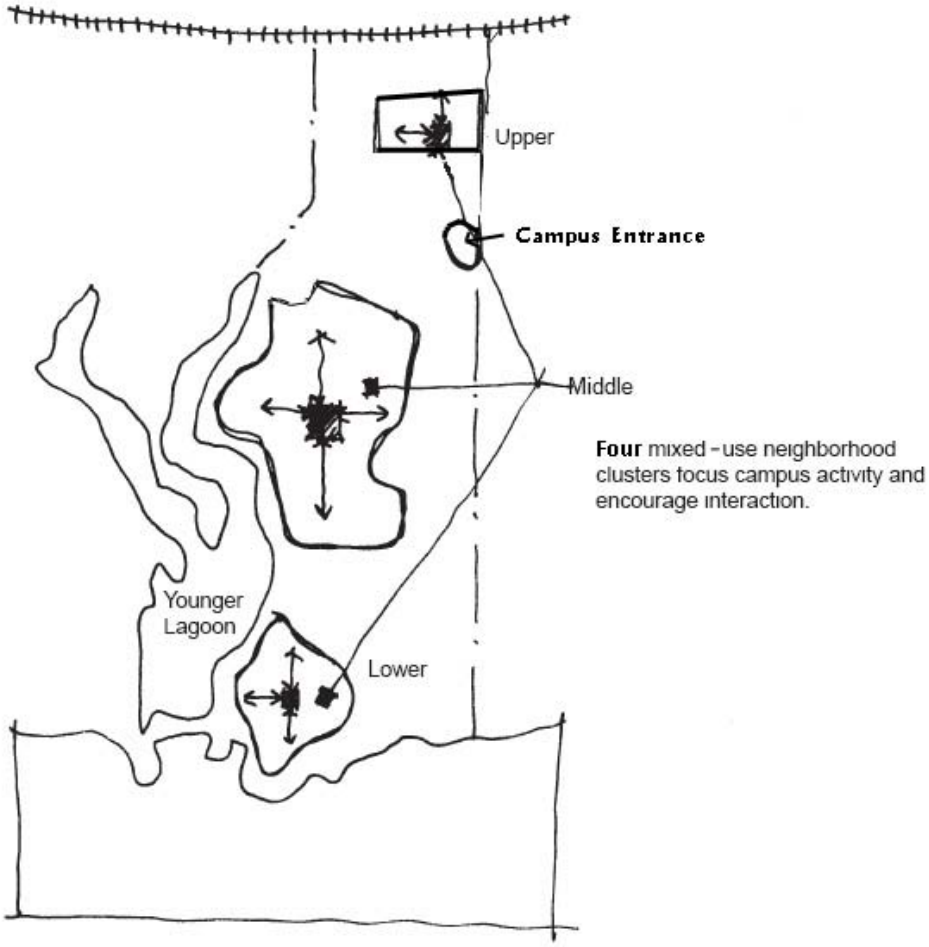


Fig. 4.13 Development Zones **Concept**

Compact Development Patterns

Within each development zone, buildings are arranged in compact clusters. This arrangement of uses creates a predominantly open space transition zone between the continuous urban development of the city directly to the north and east of the site, and the open agricultural areas to the west. It also helps protect site visitors, employees, and residents from frequently strong westerly winds.

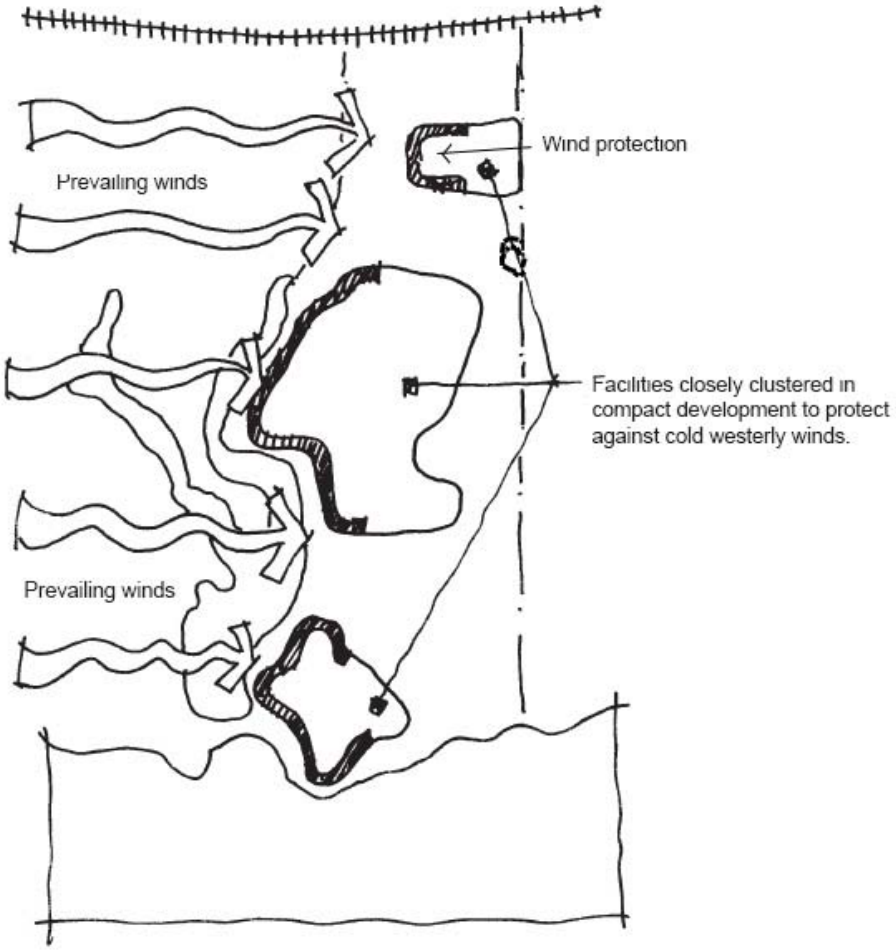


Fig. 4.14 Compact Development Patterns

Location of High Activity Uses

Facilities that attract users from throughout the campus, such as conference rooms and dining areas, are located in the Middle Terrace. In addition to convenience, this central location provides a venue for interaction and socialization among students, faculty, and visitors – an important ingredient of the education, research, and public service program elements. The central location places these facilities within walking distance for all, minimizing potential traffic and parking impacts.

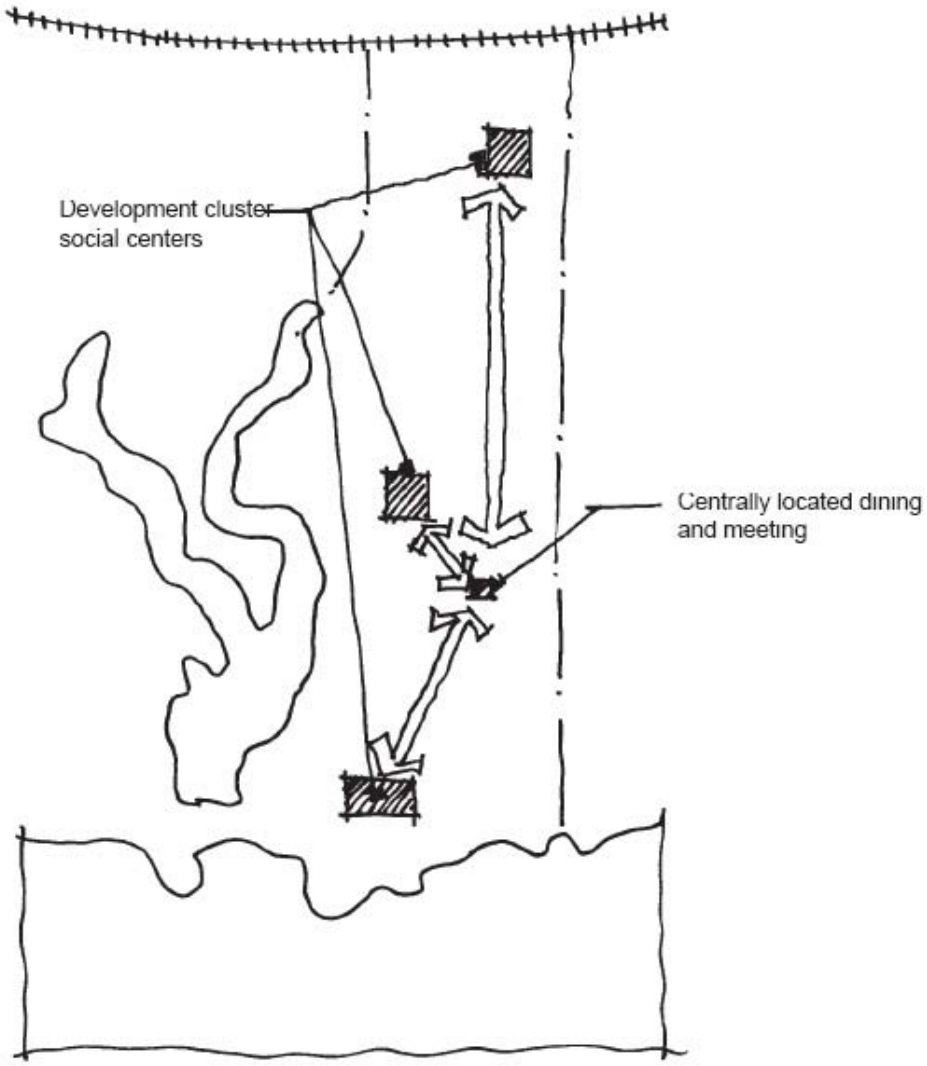


Fig. 4.15 Location of High Activity Uses

Public Access To and Within the Site

The public is able to freely access the campus in their automobiles via existing and new campus streets linked with public roads. Parking is located conveniently throughout the site, with signs marking visitor parking. Wherever possible, parking is to be provided in small lots that are tucked between buildings in areas of the site where they will have the least visual impact.

Key visitor destinations and facilities are located primarily in the Middle and Lower Terrace areas. Seymour Marine Discovery Center, in the Lower Terrace, continues to serve as a focal point for public education and community outreach and also serves as a base for docent-led resource-oriented site tours. The Middle Terrace conference area will occasionally host events open to the public. This area includes overnight accommodations for use by school groups participating in science programs. A network of trails provides public pedestrian and bicycle access across the site, along the coastal bluff edge on the southern perimeter, and along portions of the western bluff overlooking Younger Lagoon. Overlooks linked with the trails provide viewing of the beach and ocean, Younger Lagoon, and the main terrace wetland.

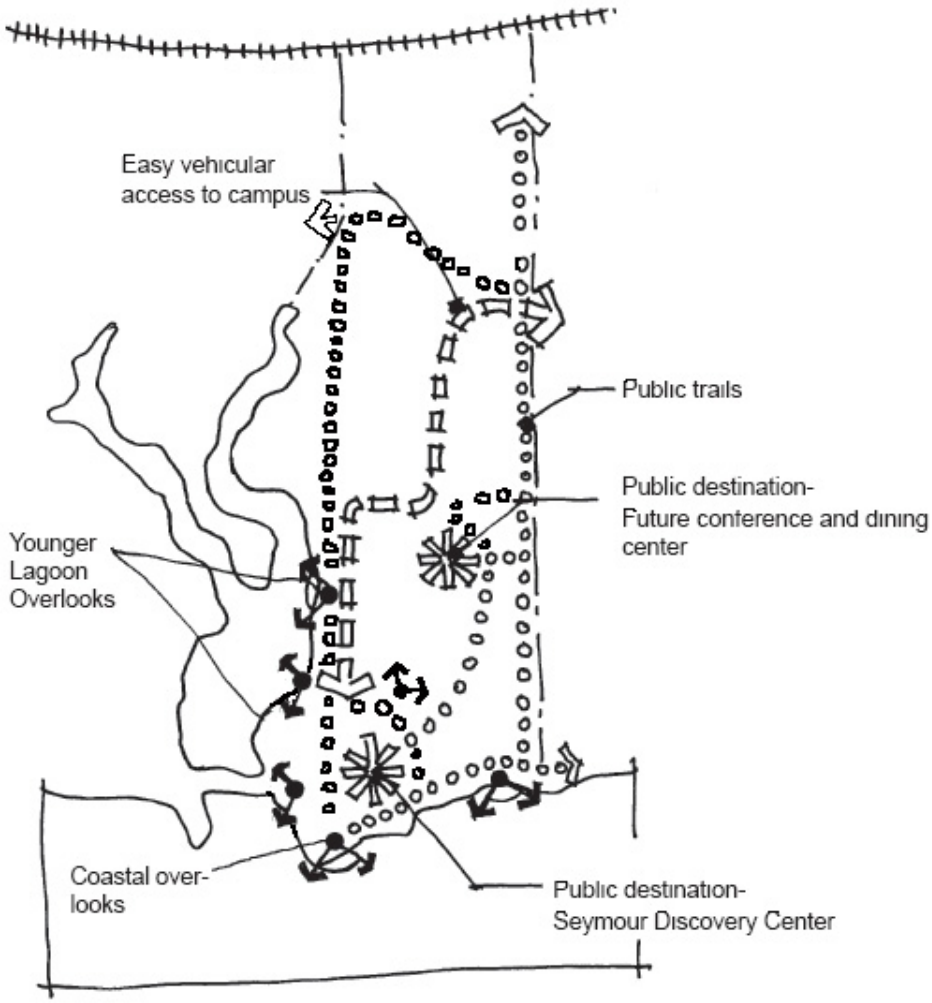


Fig. 4.16 ***General Public Access***

Protection of Scenic and Visual Qualities of the Site

Important views from the site to the ocean, the coastal hills, and the northerly agricultural lands are maintained through the clustering and design of buildings and placement of plantings. Where appropriate, views are provided to scenic natural features such as Younger Lagoon, seasonal wetlands, the beach and ocean, and coastal bluffs. Development of the campus emphasizes the creation of attractive interior and ocean vistas within the campus.

From outside the site, views of the campus encompass cypress windbreaks and transitional landscaping, which mitigate the scale of the buildings and partially screen them from view. The relatively low scale of buildings and their arrangements in clusters allows views from public vantage points to be maintained over and through the site to the ocean.

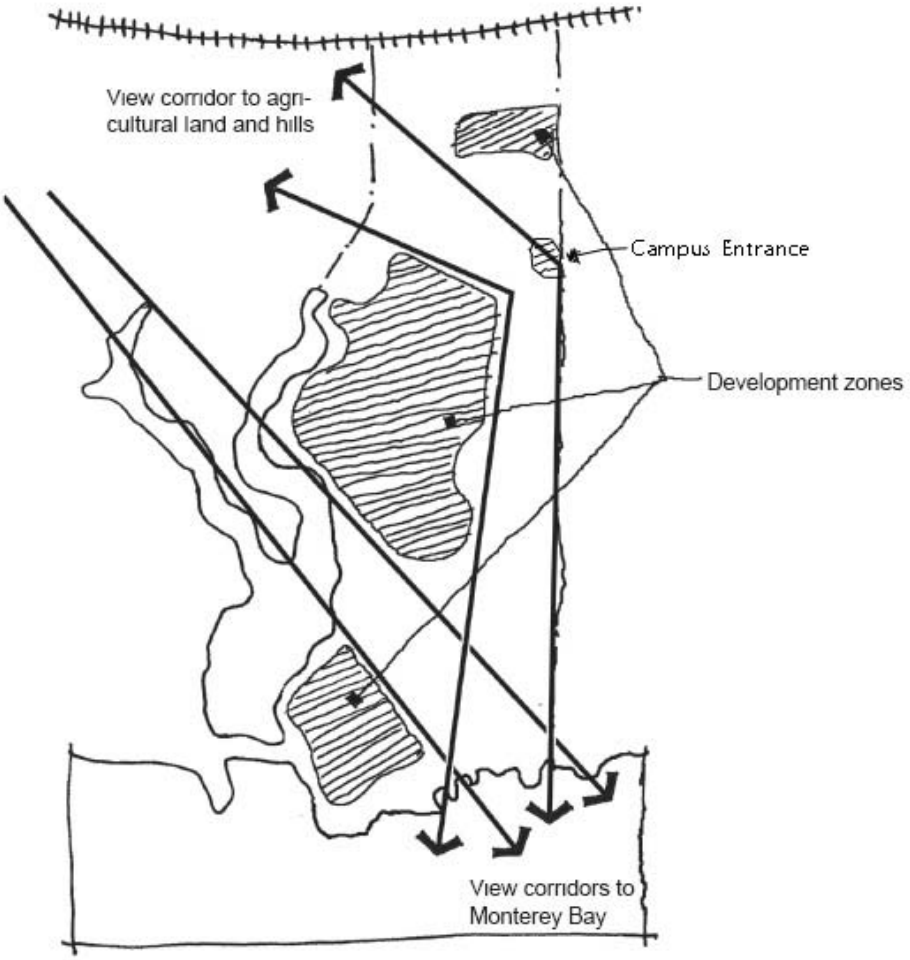


Fig. 4.17 Protection of Scenic and Visual Qualities of the Site

Protection of Ecological Elements Adjacent to Development

Lighting and human access that would adversely impact the wildlife and vegetation of Younger Lagoon Reserve and all of the terrace habitat areas are limited and carefully controlled in keeping with the mission of UCSC and UC NRS to protect habitat values and wildlife. In addition, developments are sited to maximize the available habitats and minimize hydrologic impacts, especially to YLR. Finally, policies are incorporated to prevent roaming pets, weeds, uses of pesticides and fertilizers, and other activities that would impact ESHA and other resources on the site.

4.4.2. The Open Space Environment

The UCSC Marine Science Campus is located on a spectacular stretch of Monterey Bay coastline. The site includes important natural landforms, wildlife, and habitat. In such a place, the un-built portions of the campus are as important as the built portions. The campus has been planned to respect the site's natural and scenic values and to incorporate them into the programs of learning to be carried on within the campus.

Planning and treatment of open spaces within the campus are guided by the design principles of the rural-agricultural coastal landscape, summarized in the section above. The intent is to incorporate visual qualities of that landscape into open areas of the campus, thus preserving the look of a rural place and providing a pleasing transition to intensive urban uses east of the campus.

The principal organizing elements of the open-space environment are:

- The Structural Landscape
- Natural Resource Protection Areas and Buffers
- Natural Drainage Areas
- Upland Grasslands and Coastal Scrub
- Transitional Landscape
- Ornamental Landscape

The Structural Landscape

The rural-agricultural coastal landscape is characterized by elements that provide large-scale structure. These include:

- The rugged coastal edge, with its cliffs, incised edges, lagoons, and gullies.
- Natural patterns of the upland drainage systems and related vegetation, typically characterized by only a few species.
- Large-scale man-made tree plantings in straight-line windbreaks or massings. Typically these plantings are perpendicular to the coastline, providing shelter from north-westerly winds and creating ocean view corridors from the uplands. These windbreaks are a component of the built aesthetic.

On the campus site, the large-scale structure is dominated by the visible presence of the rugged coastal edge and Younger Lagoon Reserve. Addition of large-scale plantings and a natural-based

drainage system contemplated by this CLRDP will reinforce the structural landscape. Most prominent will be continuous single and/or double rows of large-scale trees planted at close spacing. The dominant pattern runs in a north-south direction, parallel to primary site circulation, reinforcing views toward the ocean and dissipating strong westerly winds. These strong tree patterns serve to screen or reduce the scale of new and existing buildings, subordinating them to the scale of nearby natural elements.

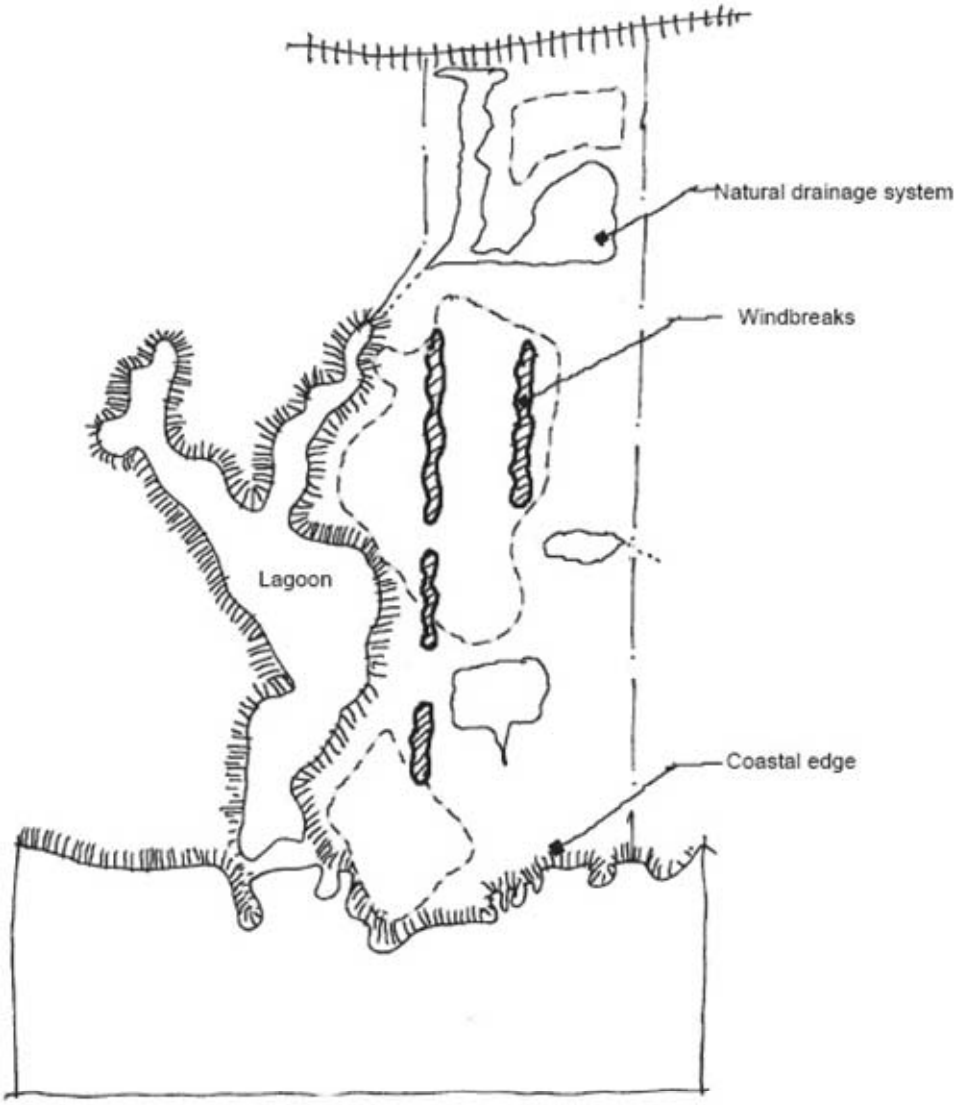


Fig. 4.18 The Structural Landscape

Natural Resource Protection Areas and Buffers

Resource protection areas located on the Marine Science Campus include the Younger Lagoon Reserve, various seasonal wetlands in the terrace portion of the site, and the cliff face and intertidal area at the ocean. With the exception of the portions in which trail and ocean access are provided for through this CLRDP, these habitat areas are permanently protected and managed in their natural

states, and a buffer is provided for each to separate the habitat from development. Wildlife corridors facilitate movement across the Campus between Younger Lagoon, Moore Creek/Antonelli Pond, and Wilder Creek/Lagoon. Specific management regimes and design criteria will assure that impacts are minimized and resources protected. The natural resource protection concept is shown in Figure 4.19.

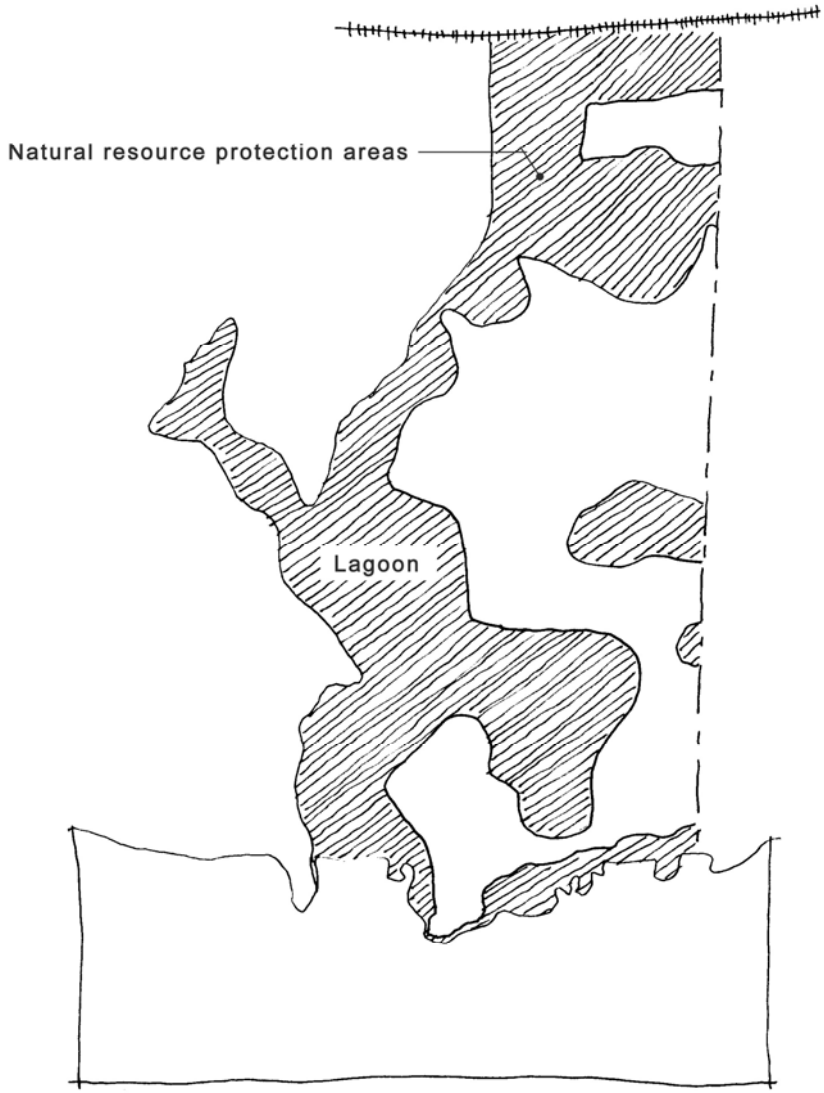


Fig. 4.19 Natural Resource Protection Concept

Natural Drainage Patterns

The overall surface drainage system of the site has been planned to reinforce the rural coastal landscape image of the site as a whole. Vegetated stormwater basins and drainage courses have been designed using Best Management Practices to ensure high water quality, curb erosion of the coastal bluffs, and reinforce the natural landscape patterns of the site. In most cases, new basins have been designed as a final component of a water quality treatment and flow management train connected to an open linear swale system. Like most areas in the coastal rural landscape, drainage will be conveyed in open swales adjacent to roadways and through constructed depressions in upland areas. This addresses functional requirements and adds a layer of interest to the naturalistic landscape.

The models for this approach are the roadside swales and minor drainage courses that exist throughout northern California. Generally, these areas support a unique mix of seasonal non-woody plant materials that change throughout the year, depending upon available moisture. They also provide additional habitat and protection for wildlife.

The basins and swales on the Marine Science Campus are designed to function in similar fashion. New drainage swales and stormwater basins will be planted with materials that assist in the filtration and absorption of stormwater runoff and that are complementary to the rural environment.

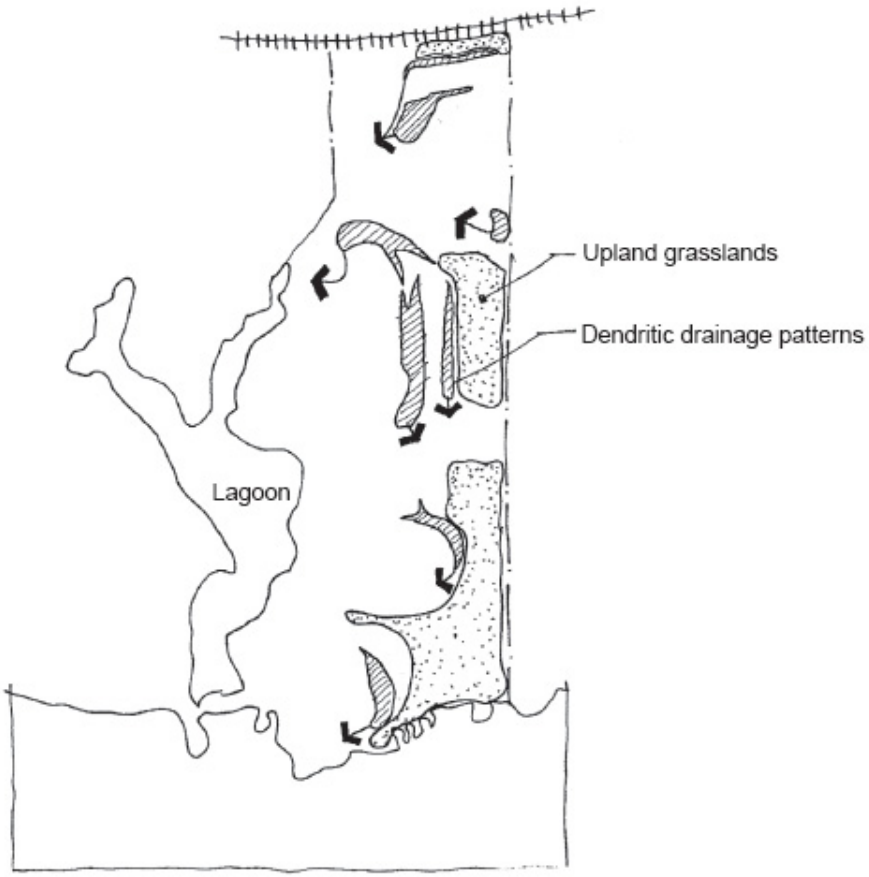


Fig. 4.20 Natural Drainage Patterns

Upland Grasslands and Coastal Scrub

Upland grasslands serve to enhance ocean and upland views between the clusters of buildings and to maintain the predominant sense of open space on the site. Grasslands will have a native component, and will be managed for wildlife and vegetation habitat enhancement, with appropriate allowance for public and research access. Much of the grassland area is available for access by members of the University community and general public through a defined and signed system of trails. A native coastal scrub community will be established near the coastal bluff with species adapted to climatic conditions in that area.

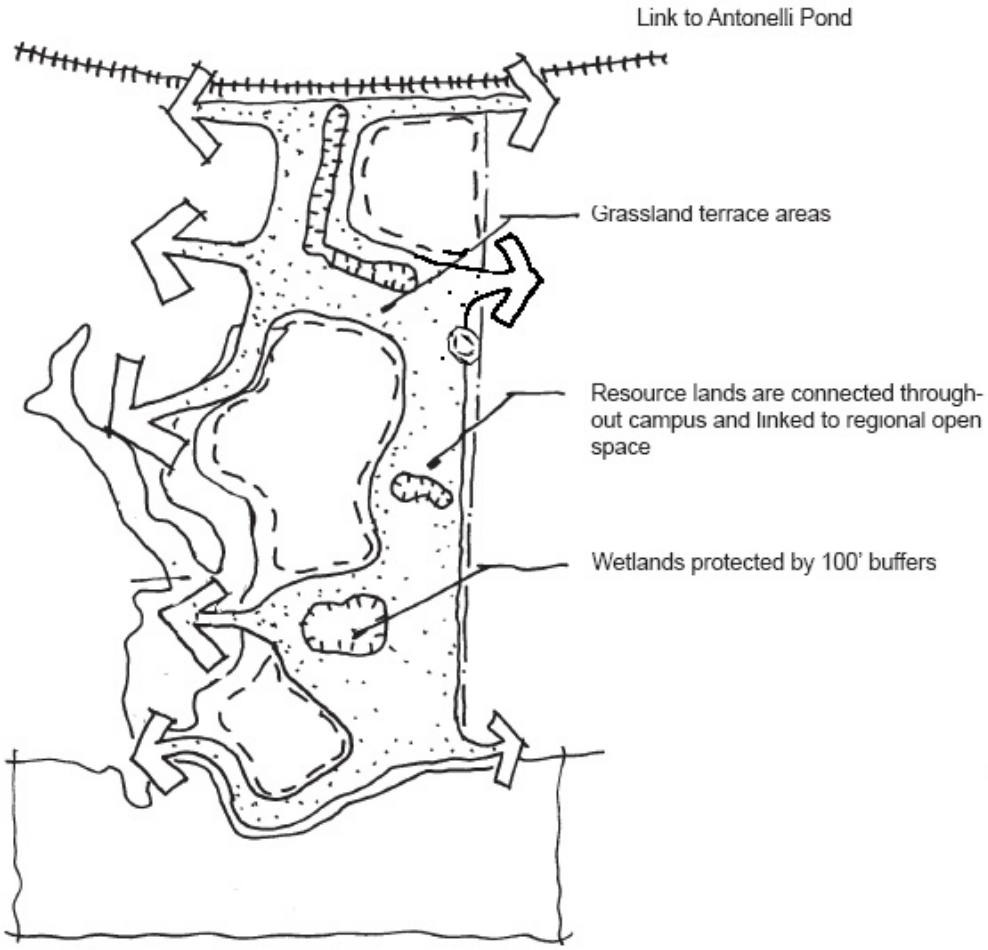


Fig. 4.21 Upland Grasslands and Coastal Scrub

Transitional Landscape

Transitional landscape refers to the landscaped area between new buildings and natural areas such as grasslands and wetlands. Transitional landscapes serve to mitigate the visual impact of structures and screen or buffer sensitive environmental areas from disturbance by development and activity that could degrade the resources. Specific landscape responses in these transition areas are determined in light of the characteristics of the resources to be separated from development and the scale and design of the affected building. As opposed to the structural landscape elements, these plantings would be less linearly arranged and ordered.

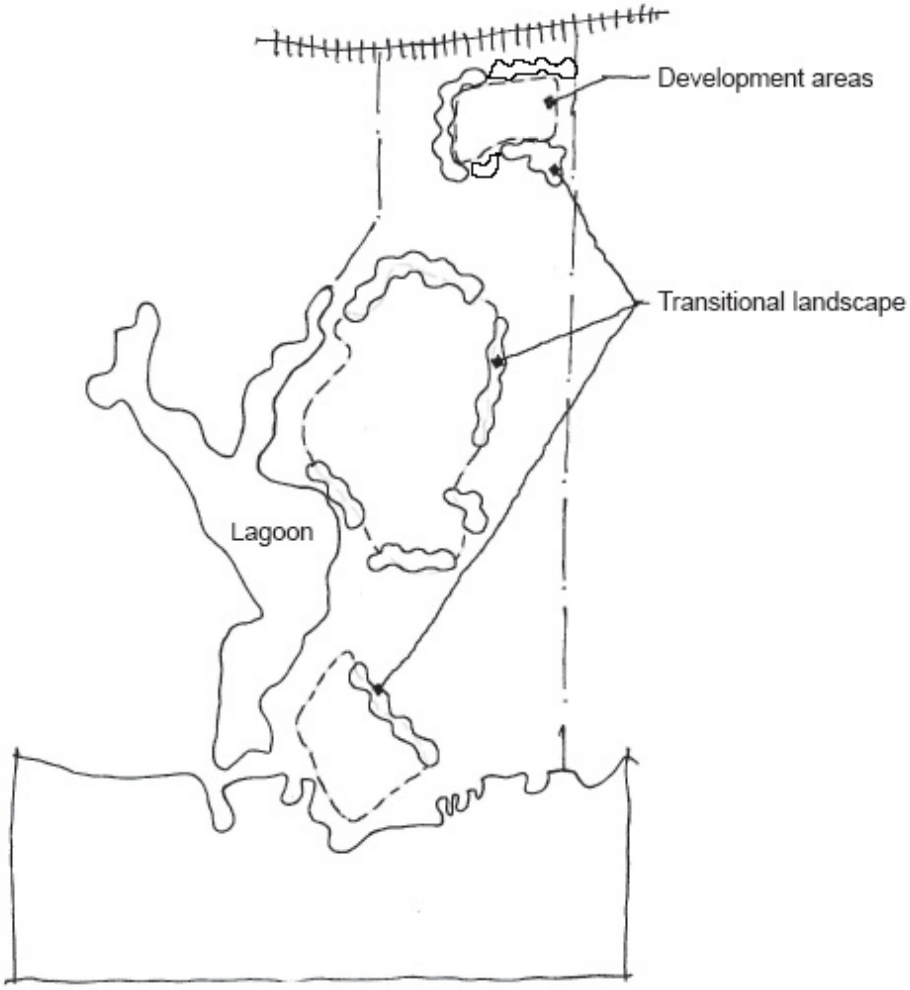


Fig. 4.22 Transitional Landscape

Ornamental Landscape

In general, the ornamental landscape of the Marine Science Campus consists of those un-built areas within building complexes that will be planted and maintained for passive and active recreational or strictly ornamental purposes. These areas are found only within the building envelopes of the four development zones. Special landscape improvements for a variety of purposes, including research, passive and active recreation, and gardens may be located within the sheltered courtyards, walkways and entrances in these areas. All efforts will be made to use a native, rural aesthetic in these plantings.

These areas may contain a more garden-like landscape of ornamental trees, shrubs and groundcovers that will vary depending upon the projected use of the area. Ornamental plants native to the Central California coast will be used. Weedy species with the potential to become invasive will be avoided. The ornamental landscape areas include:

- Active/passive recreation areas. This may include a small turf area within a building cluster suitable for active recreation, such as volleyball and Frisbee tossing. Sheltered areas with benches, special paving and seating areas suitable for picnicking and outdoor meetings will be provided.
- Building courtyards and pedestrian areas. These areas are generally improved with a "naturalistic" look using wildflowers and grasses and accent plantings.
- Roadways and parking areas. The landscape of major roadways traversing the internal areas of the site will be dominated by major tree species of the structural landscape and water-loving plantings associated with the drainage/infiltration swale system. Shrub screening of roadways occurs within the four clustered building areas of the campus. Roads outside these clusters, which pass through open meadows in some areas, should be planted with major structural plantings such as Monterey cypress, or pass through the meadow without landscape improvements other than restoration/enhancement plantings.

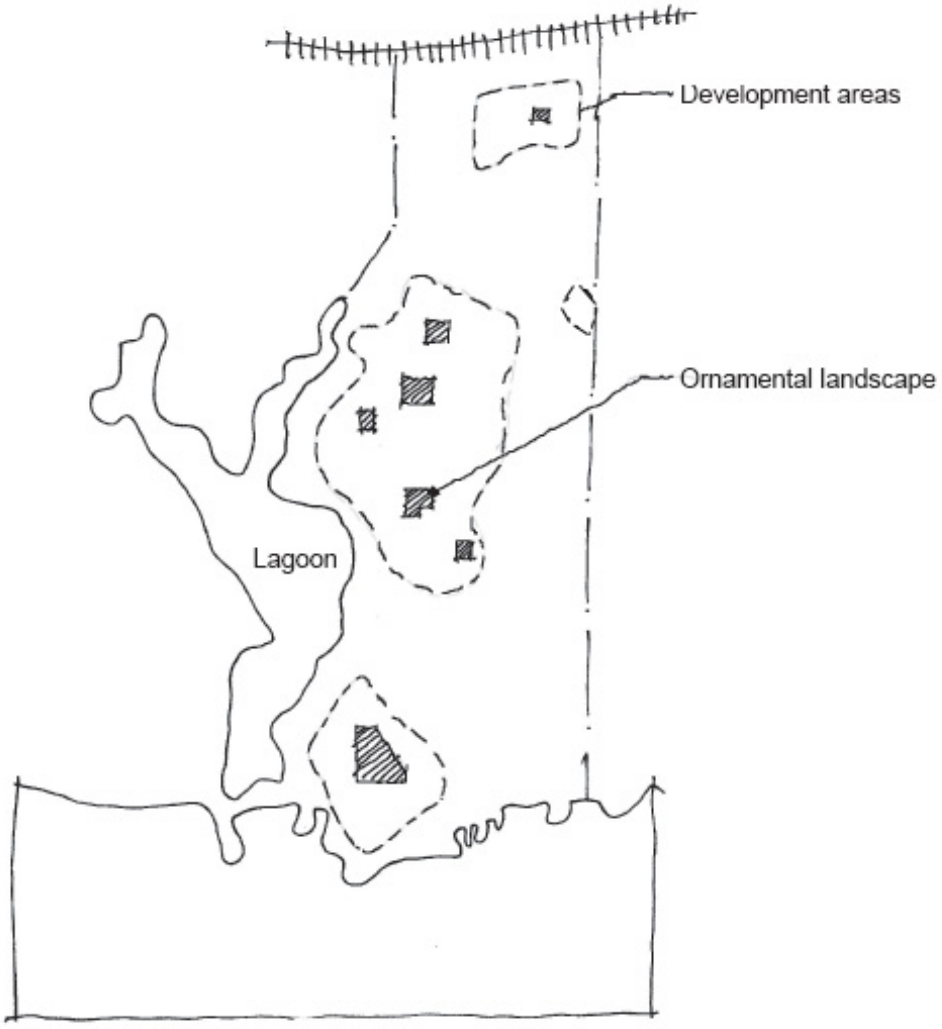


Fig. 4.23 Ornamental Landscape

5. Long Range Land Use Development Plan

The primary purpose of this chapter is to set forth a Long Range Land Use Development Plan for the Marine Science Campus. The building program, land use designations, diagrams, and policies in this chapter are an expression of the relevant provisions of Chapter 3 of the Coastal Act. This Long Range Land Use Development Plan reflects the planning objectives, program overview, design principles, and plan concepts discussed in Chapter 4 and should be considered and interpreted in light of the narrative and diagrams of that chapter. Chapter 7, Illustrative Campus Buildout Site Plan and Preliminary Designs, is based on this Long Range Land Use Development Plan, with the intervening design guidance of Chapter 6.

The Long Range Land Use Development Plan includes eight elements, which are presented in the sections that follow. These eight elements are:

5.1 Application of the Long Range Land Use Development Plan,

5.2 Land Use,

5.3 Natural Resource Protection,

5.4 Scenic and Visual Qualities,

5.5 Circulation and Parking,

5.6 Public Access and Recreation,

5.7 Hydrology and Water Quality, and

5.8 Utilities.

Each section is structured with a narrative introduction to the issue area, followed by policies that detail related requirements in that issue area, and then followed by implementation measures where necessary to help further define specific parts and/or aspects of the policy requirements.

As used in this chapter "may" is permissive in the sense that the activity or development in question is allowed under the CLRDP, provided all applicable requirements are met. "Shall" is mandatory. "Cumulative," "cumulatively," and "cumulative effect" mean the incremental effects of an individual project when reviewed in connection with the effect of past, current, and probable future projects.

5.1 Application of the Long Range Land Use Development Plan

This section sets forth the manner in which Long Range Land Use Development Plan shall be applied in order to ensure conformity with Chapter 3 of the California Coastal Act.

Development, as defined by the California Coastal Act and as that term is understood in this CLRDP, means:

> *On land, in or under water, the placement or erection of any solid material or structure; discharge or disposal of any dredged material or of any gaseous, liquid, solid, or thermal waste; grading, removing, dredging, mining, or extraction of any materials; change in the density or intensity of use of land, including, but not limited to, subdivision pursuant to the Subdivision Map Act (commencing with Section 66410 of the Government Code), and any other division of land, including lot splits, except where the land division is brought about in connection with the purchase of such land by a public agency for public recreational use; change in the intensity of use of water, or of access thereto; construction, reconstruction, demolition, or alteration of the size of any structure, including any facility of any private, public, or municipal utility; and the removal or harvesting of major vegetation other than for agricultural purposes, kelp harvesting, and timber operations which are in accordance with a timber harvesting plan submitted pursuant to the provisions of the Z'berg-Nejedly Forest Practice Act of 1973 (commencing with Section 4511). As used in this section, "structure" includes, but is not limited to, any building, road, pipe, flume, conduit, siphon, aqueduct, telephone line, and electrical power transmission and distribution line. (PRC Section 30106)*

5.1.1 Policies Governing Interpretation and Use of the Long Range Land Use Development Plan

Policy 1.1 Development Consistency
Development shall be deemed consistent with the CLRDP if it is consistent with the provisions of Chapters 5, 6, 7, 8, and 9, and Appendices A and B.

Implementation Measure 1.1.1 – Figures of Chapter 5. *Figures 5.1, 5.2, 5.3, and 5.4 show the kinds, locations, and maximum size and intensity of development allowed by this plan if such development is otherwise consistent with Chapters 5, 6, 7, 8, 9, and Appendices A and B. Development shall not be authorized unless it is of a type and location contemplated by Section 5.2. The locations of potential development and the maximum heights shown in Figure 5.4 shall be presumed consistent with Policy 4.1 and IM 4.1.1 with respect to protection of distant, non-campus public views (i.e., views from locations further than ¼ mile from the Campus boundaries), if such development is otherwise consistent with the CLRDP.*

Implementation Measure 1.1.2 – Lease Agreements. *Any lease or similar agreements between the University and tenants/affiliates (i.e., those entities occupying, using, or otherwise operating in Campus buildings and facilities, on Campus lands, etc.) shall include enforceable provisions that require the tenants/affiliates to fully abide by and implement the policies, implementation measures, required mitigation, required conditions, and other related provisions of this CLRDP that are applicable to the leased interest.*

Implementation Measure 1.1.3 – Federal Inholding and CLRDP. *Although the CLRDP is not the standard of review for development within the 2.5-acre federal inholding, the CLRDP does provide non-binding guidance should development be proposed there. Development within the federal inholding should be consistent to the maximum extent practicable with this CLRDP.*

Policy 1.2 University Commitments
Development shall be authorized by the University and allowed to commence only if all University commitments identified in this CLRDP, including but not limited to the improvements identified in Chapter 9, have been undertaken as provided for in this CLRDP, unless circumstances beyond the University's control have prevented such

implementation. Upon learning of any default on such a University commitment due to circumstances beyond the University's control, the Planning Director (UCSC) shall notify the Executive Director (CCC) of the manner in which the University proposes to remedy the default and a mutually acceptable schedule for monitoring and reporting progress on correcting the deficiency.

5.2. Land Use

This section sets forth the general plan for land use on the Marine Science Campus.

5.2.1. Building Program

The building program for the Marine Science Campus consists of eight program elements, and each of these is described below. Figure 5.1, Building Program (New Construction Only), sets forth the maximum allowable floor area for each building program element prescribed by this plan. Facilities that are ancillary to each of the eight program elements (such as outdoor patios, walkways, minor storage and service areas, etc.) are allowed as part of each element. Above ground ancillary facilities (e.g., storage sheds, etc.) shall be counted as part of the maximum square footages identified in each case, but ground-level ancillary facilities (e.g., walkways, patios, etc.) shall not.

Marine Research and Education Facilities

These are the major facilities associated with the operation of marine research laboratory and educational facilities and are limited to all existing facilities (except facilities specifically identified for removal in Figure 5.1 below), plus a total maximum of up to 254,500 additional square feet of facilities for the following uses:

- Laboratories, wet and dry, connected with the marine sciences,
- Teaching and seminar rooms associated with the marine educational or scholarly activities,
- Offices in support of the primary laboratory or educational activity.

Outdoor Research Areas

This includes existing outdoor research areas, plus a total maximum of up to 70,000 additional square feet of outdoor research area to be used in conjunction with marine research and education activities, including:

- Outdoor marine research pools,
- Other organized outdoor marine research facilities.

Support Facilities

These facilities provide places for scientists, faculty, students, staff, and visitors to meet, eat, and recreate, and are limited to:

- A seminar auditorium with a maximum of 350 seats, with a maximum of 5,000 square feet,
- Meeting rooms with a maximum of 200 seats total, with a maximum of 2,500 square feet total,
- Food service facilities, with a maximum of 3,500 square feet total,

- Paved and unpaved outdoor court sports areas (e.g., basketball and volleyball), with a maximum of 8,000 square feet total.

Short-Term Accommodations
The types of short-term accommodations allowed on the Marine Science Campus are limited to short-term researcher/student accommodations and overnight accommodations, solely for use by faculty, researchers, staff, students and visitors who are working on the Campus site or directly involved with University marine research and education programs that require their on-site presence on a regular and substantial basis. Facilities are limited to:

- A maximum of 30 rooms of researcher accommodations, with a maximum of 12,000 square feet total,

- A maximum of 10 rooms of overnight accommodations, with a maximum of 2,500 square feet total.

Caretaker Accommodations
Accommodations are allowed on the Marine Science Campus for on-site caretakers that provide security and facility oversight 24 hours a day. Facilities are limited to:

- A maximum of two caretaker units, with a maximum of 1,600 square feet total.

Equipment Storage and Maintenance Facilities
These include facilities and improvements that are required to service the campus, limited to:

- Centralized warehouse, maintenance and storage facilities, with a maximum of 37,500 square feet total,

- Open laydown yards, fenced or enclosed, with a maximum of 70,000 square feet total.

Public Access and Recreation Facilities
These include facilities for formal and informal active and passive recreation that serve campus occupants and visitors, such as trails, overlooks, and other improvements to support active and passive recreation and enjoyment by the campus population and visitors.

Seawater System
This includes all components of the seawater system, including: intake, treatment, storage, distribution, and discharge, and is limited to the existing system capacity, plus an additional 4,000 gallons per minute of capacity through a system expansion with a maximum of 12,000 square feet, where both interior space square footage and footprint square footage for structures without interior spaces are additive towards the 12,000 square feet maximum.

Parking Facilities
These include 191 existing parking spaces at the time of CLRDP certification, plus 604 additional parking spaces. Of the total number of spaces available on the Campus at any time, a minimum of 40 spaces shall be designated as dual use exclusively for access to the Seymour Marine Discovery

Center and for public coastal access visitors and a minimum of 30 spaces shall be designated exclusively for public coastal access parking, per Policy 5.3 and its implementation measures. Parking facilities include all driveways and sidewalks necessary to access parking spaces.

Temporary Facilities

These are facilities that are allowed on the Campus on a temporary basis only. Any square footage associated with these facilities shall count towards the 254,500 square feet of facilities identified under Marine Research and Education Facilities above. These facilities are limited to:

- A temporary small-scale desalinization research facility has been permitted and may be constructed within Subarea #13 (only) provided such facility is removed and the disturbed area restored as described in the permit.

- Within the first seven years following the date of CLRDP certification, 11 existing greenhouses are allowed to remain in place within Subareas #6 and #7 (only) provided that within seven years of certification or by December 31, 2013, whichever comes sooner, either: (a) such greenhouses are removed and the disturbed area restored; or (b) such greenhouses are made to conform to all CLRDP requirements, including design guidelines.

- At the time of CLRDP certification, a temporary ground-level storage area existed in Subareas #6 and #7 in the area located between the greenhouses and Younger Lagoon Reserve. This temporary storage area is allowed to remain in place in that configuration and at that level of use (i.e., pre-CLRDP certification level and configuration) for the first five years following CLRDP certification provided that: (a) the perimeter of this area where it is adjacent to Younger Lagoon Reserve (i.e., generally its west and southwest sides) is planted with species appropriate to the upland Reserve landscape and capable of screening the area from view from the Reserve (e.g., an extension of the willows providing a similar screen to the north); and (b) such storage area is removed and the disturbed area restored, or such storage area is made to conform to all CLRDP requirements (including design guidelines), within five years of CLRDP certification or when it or the sites adjacent to it are redeveloped (i.e., the greenhouses and/or the avian facility) whichever comes first.

- Within the first five years following the date of CLRDP certification, temporary parking and/or ground-level storage areas may be allowed within the Middle Terrace development zone (only) provided that within five years of certification either: (a) such parking and/or ground-level storage areas are removed and the disturbed area restored; or (b) such parking and/or ground-level storage areas are made to conform to all CLRDP requirements, including design guidelines.

Campus Entrance Facilities

These are facilities that would be installed and/or upgraded in the Campus Entrance development zone adjacent to the intersection of Delaware Avenue and Shaffer Road, and are limited to an entrance kiosk (no taller in height than 12 feet as measured from existing grade, and no more than 125 square feet in size) and a gate that shall remain open during daylight hours but that can be closed during nighttime hours.

Fig. 5.1 Building Program (New Construction Only)

Program Element	*Maximum Quantity*	*Units*
NEW BUILDINGS		
Marine Research and Education Facilities		
Marine Research and Education Uses	254,500	sq ft (gfa)
Temporary Office Trailers (to be removed)	-3,000	sq ft (gfa)
Support Facilities	19,000	sq ft (gfa)
Short-Term Accommodations		
10 Visitor/Overnight Rooms	2,500	sq ft (gfa)
30 Researcher Rooms	12,000	sq ft (gfa)
Caretaker Accommodations		
2 Caretaker Housing Units (Replacement units only)	1,600	sq ft (gfa)
2 Temporary Caretaker Housing Units (to be removed)	-1,400	sq ft (gfa)
Campus Entrance Facilities		
Campus Entrance Kiosk	125	sq ft (gfa)
Equipment Storage and Maintenance		
Centralized Warehouse	37,500	sq ft (gfa)
SUBTOTAL NEW BUILDINGS	322,825	sq ft (gfa)
OUTDOOR DEVELOPMENT		
Outdoor Research		
Outdoor Research Area	70,000	sq ft
Equipment Storage and Maintenance		
Open Laydown Yards	70,000	sq ft
Seawater System		
4,000 GPM Seawater System Expansion	12,000	sq ft
SUBTOTAL OUTDOOR DEVELOPMENT	152,000	sq ft
ADDITIONAL PARKING	604	spaces

Note: For the purpose of this CLRDP, gross floor area (gfa) shall be derived using Outside Gross Area method OGSF50. OGSF50 = Basic Gross Area+50% of the reported Covered Unenclosed Gross Area. The Basic Gross Area is the sum of all areas, finished and unfinished, on all floors of an enclosed structure (i.e., within the environmentally controlled envelope) for all stories or areas which have floor surfaces. The Covered Unenclosed Gross Area is the sum of all covered or roofed areas of a building located outside the enclosed structure (i.e., the environmentally controlled envelope) for all stories or areas that have floor surfaces.

5.2.2. Land Use Designations and Diagram

Five land use designations have been created 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. Figure 5.2, Land Use Diagram, shows the geographic location of these designations on the Marine Science Campus. The full-size version of this diagram is included in a pocket behind the back cover of the CLRDP. Figure 5.3, Locational Restrictions for Building Program, provides additional control over the location of individual building program elements within the Research and Education Mixed Use designation. The intended effect of the designations established by this subsection, the location of these designations and of uses within these designations, and the uses allowed within each are set forth below.

Research and Education Mixed Use

The primary purpose of this land use designation is to accommodate existing permitted uses and the building program elements set forth in Subsection 5.2.1 above. The building program elements allowed in each of the four areas designated for Research and Education Mixed Use and their maximum allowed intensities are specified in Figure 5.1. Additionally, utilities, lighting, signage, trails, drainage facilities, and landscaping are allowed in this designation.

The distribution of building program elements among the Lower, Middle, and Upper Terrace development zones, as shown in Figure 5.3, reflects the allocation of developable campus land that directly borders the sea primarily to new development that is most coastal dependent: the seawater system, marine research and education, coastal public access and recreation, and limited parking related to these uses. The other building program uses, which support these more coastal-dependent uses, are precluded from the Lower Terrace. The one exception is the caretaker housing units, which may be located close to the outdoor research areas located in the Lower Terrace. In addition, temporary desalinization research and organic agriculture uses and development are allowed in this designation on an interim basis as described above. Campus entrance facilities are limited to the campus entry development zone.

Resource Protection

The primary purpose of this designation is to protect wetlands and Environmentally Sensitive Habitat Areas (ESHA). Areas that are identified in this CLRDP as Resource Protection include most of Younger Lagoon Reserve, intertidal areas along the coast, and the delineated seasonal wetlands on the upland terrace. Uses and development allowed in the Resource Protection designation shall include adequate measures to ensure that resources are protected against any significant disruption of habitat values and are limited to:

- Habitat creation, enhancement, and restoration,
- Scientific and educational study,
- Nature/interpretative study,
- Other resource-dependent activities,

- Public access, including trails and other access and recreation facilities and features shown in Figure 5.6 and/or described in Section 5.6,

- Existing underground utility corridors,

- Seawater systems located in the coastal cliff area,

- Fencing, berms, and vegetative screening,

- Interpretive panels and signage,

- Repair and maintenance of existing and future facilities authorized by the CLRDP, including: trails, underground utilities, and seawater systems.

No other uses or development are allowed.

Resource Protection Buffer

The primary purpose of this designation is to protect wetlands and environmentally sensitive habitat areas from impacts that would significantly degrade them, and to enhance wildlife corridors by providing additional area within which movement and protection of wildlife can occur. Areas identified in this CLRDP as Resource Protection Buffer are located adjacent to Resource Protection Areas and Wildlife Corridors, and the size of these buffers is 100 feet unless a different width is designated in Figure 5.2. Buffers are narrower where existing roads or other site features interfere, where the use of berms, fencing, vegetation, and building design can support a smaller buffer, and where differing elevations provide vertical separation. Buffers are also different for the designated wildlife corridors, where in conjunction with resource management measures a varying buffer ranging from 100 to 275 feet is provided. Uses and development allowed in the Resource Protection Buffer designation shall be sited and designed to prevent impacts that would significantly degrade the areas being buffered and are limited to:

- All uses and development allowed in areas designated Resource Protection,

- Existing (i.e., pre-CLRDP certification) streets and trails,

- The non-forebay portion of vegetated stormwater basins and the discharge attenuation swales located either (1) adjacent to the Upper Terrace development zone, or (2) adjacent to the northwestern corner of the Middle Terrace Development zone as described in Appendix B only, and repair and maintenance activities described in Appendix B necessary to ensure the proper function of such features,

- If it is infeasible to provide reasonable access to the southeastern corner of the Middle Terrace development zone (within the development zone boundary and/or through a portion of the NOAA Fisheries inholding), then the minimum amount of development incursion into the buffer that is necessary to provide such reasonable access provided such development includes measures to commensurately offset and buffer such incursion from Wetland W4 at least as well as the 100-foot buffer distance alone (e.g., including berming, vegetative screening, etc.).

No other uses or development are allowed.

Wildlife Corridor
The primary purpose of this designation is to facilitate wildlife movement along the northern and southern perimeters of the Upper Terrace development zone that, in tandem with the Resource Protection Buffer area applied to them, provide for enhanced wildlife movement between Resource Protection areas on the Marine Science Campus and habitat areas nearby, including the Moore Creek/Antonelli Pond complex located east of the project site and the Wilder Creek/Lagoon system to the west.

Uses and development allowed in the Wildlife Corridor designation shall include adequate measures to ensure that the wildlife corridors are protected against any significant disruption of habitat values and are limited to:

- All uses and development allowed in areas designated Resource Protection.

No other uses or development are allowed.

Open Space
The primary purpose of this designation is to maintain, restore, and enhance the scenic and visual quality and the grassland habitat value of the Marine Science Campus. Open Space areas include all other areas of the campus not contained in one of the above designations. These areas, along with Resource Protection, Resource Protection Buffer, and Wildlife Corridor areas, will be maintained as open space to allow continued views of the ocean, agricultural coastline, and northern hillsides from and through the campus, and to enhance and protect grassland habitat. Uses and development permitted in the Open Space designation are limited to:

- All uses and development allowed in areas designated Resource Protection Buffer,
- Streets, parking, and trails consistent with Sections 5.5 and 5.6,
- Lighting for safety and wayfinding.
- Vegetated stormwater basins and discharge attenuation swales, and repair and maintenance activities necessary to ensure the proper function of such features, consistent with Appendix B.

No other uses or development are allowed.

Fig. 5.2 Land Use Diagram

Fig. 5.3 Locational Restrictions for Building Program (see Figure 5.4 for subarea locations)

Program Element	*Lower Terrace Development Zone*	*Middle Terrace Development Zone*	*Upper Terrace Development Zone*	*Campus Entrance Development Zone*
Marine Research and Education	----------No locational restrictions----------			Not allowed
Outdoor Research Area	Limited to existing facilities, plus a combined total maximum of 10,000 square feet of additional outdoor research area	Limited to existing facilities, plus a combined total maximum of 60,000 square feet of additional outdoor research area in the Middle and Upper Terrace development zones together		Not allowed
Support Facilities	Limited to existing facilities	Not allowed in Subareas No. 6, 7, or 10	Not allowed	Not allowed
Short-term Accom-modations				
Researcher	Not allowed	Not allowed in Subareas No. 2 or 7	Not allowed	Not allowed
Overnight	Not allowed	Not allowed in Subareas No. 2, 6, 7, or 10	Not allowed	Not allowed
Caretaker Accom-modations	Not allowed in Subareas No. 2, 6, 7, 10 or 14		Not allowed	Not allowed
Equipment Storage and Maintenance Facilities	Limited to existing facilities, plus new facilities ancillary to allowed uses	Not allowed in Subareas No. 4, 5, 6, 7, 9, or 10		Not allowed
Public Access and Rec. Fac.	----------No locational restrictions----------			
Seawater System	----------No locational restrictions----------			
Parking Fac.	----------No locational restrictions----------			
Campus Entrance Fac.	----------Not Allowed----------			No locational restrictions

Note: *Fig. 5.3 does not supersede other CLRDP provisions that provide additional detail on where certain types of development and uses are allowed. Other CLRDP provisions remain in effect and must be understood in tandem with the locational restrictions identified here.*

5.2.3. Land Use Policies

Stable Urban/Rural Boundary

Policy 2.1 Maintaining a Stable Urban/Rural Boundary
Development and use of the site shall be carried out in a manner designed to limit urban development north and west of the campus.

Implementation Measure 2.1.1 – Oversizing of Utility Lines Prohibited. *Utilities on the campus shall be limited to the size necessary to serve only the projected needs of the campus.*

Implementation Measure 2.1.2 – Utility Prohibition Zone. *New sewer and/or water utility lines and/or expansion of existing lines shall be prohibited within the utility prohibition zone at the western edge of the Campus (see Figure 5.7).*

Policy 2.2 Strengthening the Urban/Rural Boundary through the Protection of Adjacent Agricultural Resources
The urban/rural boundary shall be strengthened by avoiding conflicts with adjacent agricultural uses.

Implementation Measure 2.2.1 – Setback of Development and Uses from Adjacent Agricultural Use. *All caretaker accommodations shall be located no closer than 500 feet from the western Campus property line. All other development and uses shall be located no closer than 300 feet from established crop lines (as shown on Figure 3.15) and no closer than 200 feet from the western Campus property line, whichever is the greater distance, except that existing (i.e., pre-CLRDP certification) development and uses (and/or redevelopment and/or reuse of same, including minor expansion of the California Department of Fish and Game facility); ancillary unoccupied structures that support research activities; and public access and recreation facilities and features shown in Figure 5.6 and/or described in Section 5.6 in these agricultural setback areas shall be allowed without restriction with respect to agricultural setback. Short-term accommodations may be located in the area between the 300-foot/200-foot setback and the 500-foot setback only if users of such accommodations are prohibited from staying in the accommodations for more than one week at a time.*

Policy 2.3 Designing for the Urban Edge
Development on the Marine Science Campus shall be sited and designed to sustain a logical transition from urban landscape to rural and agricultural landscape.

Implementation Measure 2.3.1 – Cluster Development. *Except for allowed drainage facilities, development shall be clustered within, and open space shall be preserved outside of, areas designated for Research and Education Mixed Use including through such means as building clustering, building articulation and scale reduction at the boundary of development zones, rural/agricultural building design, limited lighting, and vegetative and other screening of development, as well as by use of agricultural setbacks, habitat buffers, natural habitats, view corridors, and open space areas. Among other things, this siting and design approach is intended to reinforce the sense of urban edge created by the canyon topography of Younger Lagoon Reserve, existing development, and the Santa Cruz city limit.*

Implementation Measure 2.3.2 – Impervious Coverage. *At least 30 percent of land area within the Lower and Middle Terrace development zones shall be maintained in a pervious state and free of impervious surfaces. One hundred percent of the land area within the Upper Terrace and Campus Entrance development zones may be developed with impervious surface as long as water quality standards are met.*

Implementation Measure 2.3.3 – Windbreak/Screening Trees. *Development sited adjacent to windbreak/screening trees shall include as part of it, installation of and long-term maintenance parameters for the designated windbreak/screening trees.*

Implementation Measure 2.3.4 – Buildout Planning. *Development shall not interfere with the ability to site and design future buildings and other development in a manner than can fully conform to the CLRDP, and shall not interfere with the University's ability to meet all commitments identified in the CLRDP.*

Implementation Measure 2.3.5 – Interim Weed Abatement Measures for Undeveloped Land Within Development Zones. *In conjunction with management measures RMP MM 1 and RMP MM 2 (see Appendix A), the University shall remove high priority weeds and control other weedy invasive annual grasses and herbs within the undeveloped portions of development zones until such time as the areas are developed.*

Short-Term and Caretaker Accommodations

Policy 2.4 Short-Term and Caretaker Accommodations
As demand presents itself, short-term and caretaker accommodations may be developed on the Marine Science Campus solely for use by Marine Science Campus users.

Implementation Measure 2.4.1 – Short-Term Accommodation Use Restrictions. *All short-term accommodations on the Marine Science Campus (researcher rooms and overnight accommodations) shall be solely for the use of faculty, researchers, affiliates, staff, students and visitors who are working on site or directly involved with Campus marine research programs that require their on-site presence on a regular and substantial basis. All such accommodations shall be for short-term rental or lease where users shall be limited to a maximum stay of up to one year for researcher rooms and up to 30 days for overnight accommodations and only as long as they remain directly involved with marine research programs that require their on-site presence on a regular and substantial basis. The eligibility, rental/lease, and length of stay terms stated in this measure above shall be incorporated into, and made enforceable parts of, all rental or equivalent agreements applicable to Campus short-term accommodations.*

Implementation Measure 2.4.2 – Caretaker Accommodations. *A maximum of two caretaker units shall be allowed on the Campus, and these units shall be limited to locations in the Middle Terrace or Lower Terrace development zones, consistent with the additional restrictions set forth in Figure 5.3. All such caretaker units shall be designed to emulate adjacent marine research and education buildings (including an absence of publicly visible outdoor residential development and yard space) and shall be seamlessly integrated into adjacent marine research and education buildings. The two existing (at the time of CLRDP certification) temporary caretaker units and related development (e.g., fencing, decking, landscaping, etc.) in the Lower Terrace development zone do not conform to the above-described design parameters and shall be replaced by units that do conform concurrent with any development in the Lower Terrace development zone that involves the footprint of the temporary caretaker units. If the temporary caretaker units and related development have not been replaced as described herein within five years of CLRDP certification, then the exterior of the caretaker units (i.e., siding, roofs, windows, etc.) and all related development shall be modified at that time to emulate the design of adjacent marine research and education buildings as described above. This caretaker unit requirement specific to the Lower Terrace development zone shall be made a condition of approval of the first development project authorized pursuant to the certified CLRDP.*

Implementation Measure 2.4.3 – Use Conversion. *Short-term and/or caretaker accommodations that have been constructed pursuant to CLRDP authorization may be converted to Research and Education Mixed Use uses. The square footage of any such development that is so converted shall not be counted against the Building Program*

maximums provided for Marine Research and Education Facilities in Section 5.2 and Figure 5.1 provided that an equivalent square foot reduction in the Building Program maximums allotted for short-term and/or caretaker accommodations, respectively, is made an enforceable component of any such change in use.

Campus Land Uses Limited to Marine/Coastal Research and Education, Resource Protection, and Public Access

Policy 2.5 Ensuring Appropriate Land Uses on the Marine Science Campus
All development and uses on the Marine Science Campus shall be limited to marine/coastal research and education, resource protection, and public access development and uses, including primarily coastal dependent and coastal related development and uses. All other development and uses on the Marine Science Campus shall be prohibited.

5.3 Natural Resource Protection

This section sets forth plans, policies, and implementation measures related to the protection of natural resources on the Marine Science Campus.

5.3.1 Protection, Enhancement, and Restoration of Natural Resources

Land use decisions affecting the natural resources of the Marine Science Campus are guided by the overarching goal of the University to protect, maintain, enhance and restore the natural resources of the campus. For the Younger Lagoon Reserve (YLR) portion of the site, which is a component of the University's Natural Reserve System, decisions are also guided by the UCSC Natural Reserves office and the Natural Reserve System's additional goal of providing the best possible environment for coastal-dependent and coastal-related research and education activities that: 1) are supportive of the University of California, Santa Cruz campus' academic plan, 2) are consistent with the mission and goals of the University of California Natural Reserve System, and 3) serve the best interests of the citizens of California.

The plan for managing natural resources on the terrace portion of the Marine Science Campus is set forth in Appendix A, Resource Management Plan. It is the intent of the University through this Resource Management Plan to restore, enhance, and manage all areas located outside of defined development zones (except for streets and trails) as high-quality open space and natural habitat area. One important feature of the Resource Management Plan is the restoration of wetlands on the northwestern part of the site. The primary purposes of this wetland restoration program are to restore wetlands located in this part of the Marine Science Campus to their historic functional value, to enhance the area's suitability to serve as a corridor for wildlife movement to YLR, and to establish a stable boundary between wetlands and urban uses on this part of the Marine Science Campus.

The Resource Management Plan also contains measures designed to protect and enhance other seasonal wetlands, maintain open space areas, facilitate wildlife movement, protect special-status species, enhance public access, and provide long-term maintenance and monitoring of habitats.

The resource protection policies, implementation measures, and other provisions set forth below address both the terrace portion of the Marine Science Campus and Younger Lagoon Reserve. For the terrace portion of the site, the resource protection policies and implementation measures set forth below rely in some cases on the Resource Management Plan, and this plan in turn contains detailed management measures and other provisions to carry out the policies and implementation measures.

For the purposes of this CLRDP, environmentally sensitive habitat area (ESHA) is 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 following areas shall be considered ESHA, unless there is compelling site-specific evidence to the contrary:

- Any habitat area that is rare or especially valuable from a local, regional, or statewide basis.
- Habitat areas that contribute to the viability of plant or animal species designated or candidates for listing as rare, threatened, or endangered under State or Federal law.
- Habitat areas that contribute to the viability of species designated as Fully Protected or Species of Special Concern under State law or regulations.
- Habitat areas that contribute to the viability of plant species for which there is compelling evidence of rarity, for example, those designated 1b (Rare or endangered in California and elsewhere) or 2 (rare, threatened or endangered in California but more common elsewhere) by the California Native Plant Society.
- Areas that are designated as an Area of Special Biological Significance or a Marine Protected Area.

The term "wetland" is defined by Section 30121 of the Coastal Act as lands within the coastal zone that 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.

It is clear that the Campus is home to significant natural resources, including wetland areas and ESHA areas (including wetlands that are ESHA). The Resource Protection designation has been applied to various resource areas. These include ESHA and wetland areas that were identified at the time of CLRDP certification. The dynamic nature of sensitive habitats and wetlands is recognized by the CLRDP, and the policies below also include the requirement that project areas be evaluated at the time of proposed development to determine whether circumstances that existed at the time of CLRDP preparation have substantially changed in a manner that would necessitate further protections for these resources.

It is also clear that there are certain designated resource and resource buffer areas in which the CLRDP envisions some amount of public access, and it will be important to appropriately balance such public access with resource protection. These include such areas as the realigned main Campus road area, the YLR and wetland overlooks, the trails extending through such areas, and the Younger Lagoon beach area. With respect to the latter specifically, the CLRDP provides for supervised access to this area, subject to an approved set of access parameters that are established through a development project review process on a five-year renewal cycle. The Younger Lagoon beach area boundary is located at the approximate location of the beginning of back beach dune morphology and significant vegetation (to the north), the toe of the bluffs to the east, the toe of the bluffs and the lagoon outlet to the west, and the Pacific Ocean to the south. Any five-year plan, including any use protocols or guidelines shall consider the entirety of the beach area, whether it ultimately allows or

disallows certain types of access to certain areas of it. The location of trail access to the beach area is shown in Figure 5.6. At the time of CLRDP certification, the entire beach area and its access trails were recognized as appropriate for supervised tours only (and it would not be open to any kind of general public access). This limitation was applied at that time in order to both protect beach area and adjacent resources within the Reserve and to allow for implementation of an applied research program within the Reserve. At the same time, the CLRDP recognizes that different access supervision parameters, whether more or less restrictive, may be the outcome of any subsequent required five-year review.

5.3.2 Natural Resource Protection Policies

General

Policy 3.1 Protection of the Marine Environment
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.

Implementation Measure 3.1.1 – Seawater System. *The Campus seawater system may be maintained and may be expanded consistent with Subsection 5.2.1 to supply the Marine Science Campus with fresh seawater for research and education uses, provided such maintenance/expansion is consistent otherwise with the CLRDP and proceeds in a manner that maintains, enhances, and where feasible restores marine resources. Entrainment and impingement shall be avoided to the maximum extent feasible, and all development that increases the seawater intake flow rate beyond that that existed at the time of CLRDP certification shall include all feasible measures to avoid entrainment and impingement. In addition, any proposed expansion of the seawater system that increases the seawater intake flow rate capability beyond 2,000 gallons per minute or that requires new ocean intake pipelines shall include a comprehensive entrainment/impingement study necessary to determine the extent of entrainment/impingement caused by the intake. Such study shall include an evaluation of methods (including alternative projects and/or project designs) that could be used to avoid or minimize entrainment and impingement, and shall identify all underlying study assumptions and methodologies. Any entrainment or impingement that can not feasibly be avoided shall be mitigated at levels necessary to minimize adverse impacts.*

Implementation Measure 3.1.2 – Discharge of Drainage/Stormwater. *The Campus drainage system shall be maintained and may be expanded consistent with Section 5.7, provided such maintenance/expansion proceeds in a manner that maintains, enhances, and where feasible restores marine resources.*

Policy 3.2 Protection and Restoration of Habitat Areas
The biological productivity and the quality of coastal waters, streams, and wetlands, appropriate to maintain the 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, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging wastewater reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural watercourses. Campus natural areas (i.e., areas outside of defined development zones) shall be protected, restored, enhanced, and managed as high-quality open space and natural 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, wetlands on the*

northern part of the site shall be connected, expanded, and restored to enhance their functional values. Such restoration program shall include integrating the hydrology of Wetlands W1 and W2 and expanding this consolidated area to provide enhanced biological values. The areas both east and west of the combined Wetland W1/W2 hydrologic corridor shall be restored as functioning wetland upland/transitional habitat, including as described in Appendix A (Resource Management Plan). The restoration program shall also enhance plant biology in Wetlands W1, W2, and W6 to create a consolidated north-south corridor for wildlife movement to YLR. As part of any development project involving wetland manipulation, a restoration plan shall be prepared consistent with this CLRDP including its Resource Management Plan (Appendix A) and submitted to the California Coastal Commission, California Department of Fish and Game, and the U.S. Fish and Wildlife Service for review and comment.

Implementation Measure 3.2.2 – Management of Terrace Wetlands. *The terrace wetlands shall be protected and enhanced by improving surface water flow, removing non-native and invasive plants, promoting the abundance and diversity of native plant species through small-scale plantings, creating buffers, implementing the Drainage Concept Plan (Appendix B), controlling access by humans and non-native animals, and implementing other enhancement measures in accordance with the provisions of this CLRDP, including its Resource Management Plan (Appendix A).*

Implementation Measure 3.2.3 – Protection and Enhancement of Wildlife Movement. *Wildlife movement across the site shall be facilitated and enhanced by establishing two enhanced wildlife corridors and associated buffers adjacent to the Upper Terrace development area (as shown in Figure 5.2) that provide enhanced habitat value and wildlife connectivity in the area between Younger Lagoon Reserve and the Moore Creek/Antonelli Pond system east of the Campus. Conditions for wildlife movement in these areas shall be enhanced by eliminating 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, providing fencing/building elements at the development zone boundary that screen Upper Terrace development zone noise, lights, and activities from wildlife in the corridors/buffers, and other enhancement measures in accordance with the provisions of this CLRDP, including its Resource Management Plan (Appendix A). The University shall also coordinate with the owners of the properties immediately east of Shaffer Road and the City of Santa Cruz (in the case of Shaffer Road itself) to promote the extension of the wildlife corridors and wildlife corridor buffers across Shaffer Road and to Moore Creek/Antonelli Pond in the manner most protective of wildlife (see also parameters for wildlife corridors in the Resource Management Plan (Appendix A)).*

Implementation Measure 3.2.4 – Management of Special Status Species Habitat. *Special status animal species and their habitats shall be protected, and their habitats enhanced consistent with the Resource Management Plan (Appendix A), including through protection and enhancement of wetland habitats (including for California red-legged frog) and grassland/scrub-grassland habitats outside of development zones (including for special status bird species), through protection from non-native predators, and through implementation of other enhancement measures in accordance with the provisions of this CLRDP.*

Implementation Measure 3.2.5 – Protect Habitat Areas From Human Intrusion. *Habitat areas on the Marine Science Campus shall be protected against degradation from human intrusion by developing trails and interpretive signs, managing trail use, and implementing other enhancement measures in accordance with the provisions of this CLRDP.*

Implementation Measure 3.2.6 – Natural Area Management. *The University shall restore, enhance, and manage all areas located outside of defined development zones (except for approved streets and trails) as high-quality open space and natural habitat area.*

Implementation Measure 3.2.7 – Management of Water Quality and Drainage Features. *Water quality shall be protected and enhanced and erosion shall be minimized by means including implementation of the Drainage Concept Plan contained in this CLRDP (see Appendix B). The vegetated stormwater basins, vegetated filter strips, vegetated swales, and other natural drainage features to be installed per the Drainage Concept Plan may exhibit ephemeral wetland and/or habitat characteristics over time, but their primary function is for water quality filtration and treatment, flow control, and infiltration. As such, maintenance within them on a regular basis is expected and necessary in this respect, and is allowed per this CLRDP (see maintenance parameters in the Drainage Concept Plan). It is the intent of the California Coastal Commission in approving installation of these drainage features that they not be treated as wetlands including for purposes of Implementation Measure 3.2.9, except that site specific mitigation measures other than setbacks may be required for development proposed adjacent to such features, to minimize impacts of construction and development on any sensitive resources identified pursuant to Implementation Measures 3.3.1 and 3.4.4.*

Implementation Measure 3.2.8 – Maintenance and Monitoring of Terrace Habitats. *Long-term maintenance and monitoring programs for the terrace habitats shall be developed and implemented in accordance with the provisions of this CLRDP.*

Implementation Measure 3.2.9 – Wetland Buffers. *Buffers for wetlands delineated at the time of CLRDP certification shall be as shown on Figure 5.2 and in no case shall they be reduced. For any new wetlands identified and delineated pursuant to Implementation Measure 3.3.1, development shall be sited and designed to minimize wetland impacts, and development shall be prohibited within a 100 foot buffer of any such wetlands unless it is development allowed within areas designated Resource Protection Buffer, except that a reduced or greater buffer distance may be applied if supported by a site-specific biological evaluation indicating that a reduced buffer would not result in a significant adverse effect to the wetland, or that a greater buffer distance is needed. To the extent that new wetland areas are identified pursuant to Implementation Measure 3.3.1 and the appropriate buffer area is not already designated Resource Protection Buffer on Figure 5.2, the Resource Protection Buffer designation shall be applied to the wetland buffer area.*

Implementation Measure 3.2.10 – Natural Areas Habitat Management. *Within six (6) months of CLRDP certification, the University in consultation with the Executive Director of the California Coastal Commission shall convene a scientific advisory committee (SAC) to guide the restoration, enhancement, and management of natural areas (i.e., all areas outside defined development zones, except for Younger Lagoon Reserve) on the Marine Science Campus (see Appendix A). Natural areas restoration, enhancement, and management may be completed in up to three phases corresponding to dividing the natural area into thirds (i.e., where Phase 1 accounts for at least one-third of the natural area, Phase 1 plus Phase 2 accounts for at least two-thirds, and all of the three phases together account for all of the natural area). All restoration, enhancement, and management activities shall be guided by Specific Resource Plans developed by the University in accordance with the SAC and the criteria contained in the Resource Management Plan (Appendix A) and current professional standards for such plans. The SAC shall be responsible for guiding development of Specific Resource Plans and shall complete its work on the Specific Resource Plan for Phase I restoration and enhancement efforts within four (4) months of convening. The content of Specific Resource Plans shall be consistent with the performance standards set forth in Appendix A, which may be adapted periodically based on findings from ongoing restoration work. The University shall file a Notice of Impending Development for Phase I work within one (1) year of CLRDP certification. All natural areas restoration and enhancement shall be completed within 20 years of CLRDP certification, with interim benchmarks that at least one-third of the restoration and enhancement shall be completed within seven years of CLRDP certification and that at least two-thirds shall be completed within 14 years of CLRDP certification.*

Implementation Measure 3.2.11 – CRLF Protection. *Surveys for California red-legged frog shall be conducted prior to authorization of any development project within 100 meters of an identified wetland resource. All authorized development shall include construction and post-construction safe passage and other mitigation measures (e.g., barriers along development perimeters) as appropriate.*

Implementation Measure 3.2.12 – USFWS Consultation Required. *Development project authorizations shall include either (1) evidence of authorization by the U.S. Fish and Wildlife Service, including but not limited to a Habitat Conservation Plan/incidental take permit; or (2) evidence from the USFWS that no authorization is required.*

Implementation Measure 3.2.13 – Rodenticides. R*odents on the Campus may be controlled as necessary to maintain public health and safety.* R*odenticide use shall be prohibited outside of developed areas within development zones. The impacts on non-target species from any rodenticide used on the Campus shall be minimized to the maximum extent feasible.* R*odent control areas shall be reviewed for the potential presence of non-target species – including special-status species – and the rodent control methods tailored to minimize non-target species impacts. When chemical control is required, the use shall be guided by label restrictions and any advisories published by the California Department of Pesticide Regulation or the County Agricultural Commission. In areas occupied by burrowing owls, fumigants shall not be used unless specifically determined safe by a qualified biologist. If necessary, alternative methods of rodent control shall be determined by a qualified biologist. The rodenticide applicator shall remove carcasses of poisoned animals, when they are found, to minimize secondary toxic effects on raptors or other wildlife. Carcass survey and disposal shall be performed in the treated area and the area surrounding it beginning on the third day following the initial exposure of toxic baits. Any exposed carcasses shall be disposed of in a manner inaccessible to wildlife. Carcass surveys shall continue for at least five days after toxic baiting has ceased and thereafter until no more carcasses are found.*

Implementation Measure 3.2.14 – Non-Invasive Native Plant Species Required. *All landscaping and vegetation on the Campus (including restoration and enhancement plantings, screening vegetation, stormwater system plantings, ornamental plantings, and all other plant material) shall be limited to non-invasive native plant species that are appropriate to the habitat and region and that are grown from seeds or vegetative materials obtained from local natural habitats so as to protect the genetic makeup of natural populations. Horticultural varieties shall not be used. Except for the planting of Monterey cypress, only locally collected seed, cuttings, and/or other propagules shall be used for landscaping. If feasible, materials should be collected from coastal habitats that are located within approximately one mile of the Campus and seaward of Highway 1.*

Policy 3.3 Use and Protection of Coastal Waters and Wetlands

The diking, filling, or dredging of open coastal waters and wetlands shall be permitted 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) incidental public service purposes, including but not limited to, burying cables and pipes or inspection of existing intake and outfall lines, (2) restoration purposes, and (3) nature study, aquaculture, or similar resource dependent activities. In addition, the diking, filling, or dredging of existing wetlands shall maintain or enhance the functional capacity of the wetland.

Implementation Measure 3.3.1 – Pre-development Evaluation of Wetland Conditions. *An evaluation of the development area shall be conducted prior to each development project. The evaluation shall include any changed site conditions that could affect wetland values protected by this CLRDP. A wetland evaluation shall be completed in the proposed development area (i.e., the proposed development footprint and a surrounding 200-foot buffer area) in consultation with the Executive Director, using the Coastal Act 30121 wetland definition. To the extent wetland areas are identified during this process that are not already designated Resource Protection on Figure 5.2, the Resource Protection designation shall be applied to the newly identified wetland area and uses and development limited in*

accordance with that designation (see Section 5.2.2, Resource Protection). For any newly identified wetland area, an appropriate buffer shall be established, based upon site-specific conditions in accordance with Implementation Measure 3.2.9.

Implementation Measure 3.3.2 – Update CLRDP With Respect to Wetlands. *For any wetlands and wetland buffers identified pursuant to implementation measures 3.3.1 and 3.2.9, the University shall amend the CLRDP to reflect the newly identified wetlands and wetland buffers, including all relevant CLRDP text, figures, and use and development restrictions applicable to those areas, and to remove those areas from development zones. The CLRDP amendment shall be submitted to the Coastal Commission before the effective date of the related development project authorization.*

Policy 3.4 Protection of Environmentally Sensitive Habitat Areas (ESHAs)
Environmentally sensitive habitat areas (ESHAs) shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas. Development in areas adjacent to environmentally sensitive habitat areas shall be sited and designed to prevent impacts that would significantly degrade those areas, and shall be compatible with the continuance of those habitat areas. ESHAs have been designated as "Resource Protection" in this CLRDP, and the uses and development allowed in this designation are identified in Section 5.2.2. ESHAs shall be buffered from urban uses as shown in Figure 5.2 and described in Section 5.2.2 (Resource Protection Buffer subsection).

Implementation Measure 3.4.1 – Additional Measures to Protect Habitat Areas. *Buffering of sensitive habitat areas shall also be achieved through development restrictions consistent with the policies and programs of this CLRDP, including those that regulate the location of windows, lighting, access, signage, and noise-generating equipment that would disrupt protected habitat values.*

Implementation Measure 3.4.2 – Noise Intrusion into Terrace ESHA. *Development shall be sited and designed so that noise sources are no closer than 100 feet from designated Resource Protection areas located in the terrace portion of the Marine Science Campus (other than development, such as paths, that may include minimal noise sources and that is planned and/or located within 100 feet of these areas and where measures are taken so that noise potentially audible from within these areas is limited to the maximum extent feasible). Use of Campus facilities shall occur in a manner that does not result in undue noise into designated terrace area Resource Protection areas. Noise shall be monitored periodically or upon complaint and appropriate noise attenuation measures shall be immediately implemented to lower any unacceptable noise generation.*

Implementation Measure 3.4.3 – Noise Intrusion into YLR. *YLR shall 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. For the purposes of this measure, "dBA CNEL" means a 24-hour energy equivalent level derived from a variety of single noise events, with weighting factors of 5 and 10 dBA applied to the evening (7pm to 10pm) and nighttime (10pm to 7am) periods, respectively, to allow for the greater sensitivity to noise during these hours.*

Implementation Measure 3.4.4 -- Pre-development Evaluation of ESHA Conditions. *An evaluation of the development area shall be conducted prior to each development project. The evaluation shall include changed site conditions that may affect ESHA values and new information that was not known at the time of the original ESHA determination. To the extent ESHA areas are identified during this process that are not already designated Resource Protection on Figure 5.2, the Resource Protection designation shall be applied to the newly identified ESHA and uses and development limited in accordance with that designation (see section 5.2.2, Resource Protection). For any newly identified ESHA area, an appropriate buffer shall be established, based on site-specific biological evaluation, and designated as Resource Protection Buffer.*

Implementation Measure 3.4.5 – Update CLRDP With Respect to ESHA. *For any ESHA and ESHA buffers identified pursuant to implementation measures 3.4.4, the University shall amend the CLRDP to reflect the newly identified ESHA and ESHA buffers, including all relevant CLRDP text, figures, and use and development restrictions applicable to those areas, and to remove those areas from development zones. The CLRDP amendment shall be submitted to the Coastal Commission before the effective date of the related development project authorization.*

Younger Lagoon Reserve

Policy 3.5 Special Protection for Younger Lagoon Reserve
The University recognizes the special biological significance of Younger Lagoon Reserve for habitat value and for research and education and therefore shall continue to provide special protection for the property by retaining it as part of the University's Natural Reserve System and protecting it consistent with this CLRDP.

Implementation Measure 3.5.1 – Protection and Enhancement of YLR Habitats. *The native plant and animal habitats of Younger Lagoon Reserve shall be protected and enhanced by controlling and removing non-native and invasive plant species, promoting the abundance and diversity of native plant species through small-scale plantings and re-vegetation of areas where exotics and/or invasives have been removed, implementing the Drainage Concept Plan (Appendix B), maintaining and installing fencing/barriers consistent with this CLRDP to control trespass from the terrace portion of the site into YLR, limiting access by humans (except access otherwise allowed by this CLRDP), prohibiting domestic pets, and other appropriate means that may become available.*

Implementation Measure 3.5.2 – Protection of Special Status Species in YLR. *Habitats for special status animal species that use Younger Lagoon Reserve shall be protected and enhanced.*

Implementation Measure 3.5.3 – Protection of YLR Resources. T*he biological productivity and quality of YLR shall be protected, including by minimizing the effects of stormwater discharges and entrainment, controlling runoff, preventing depletion of ground water supplies, maintaining natural vegetation buffers areas and minimizing alteration of natural features.*

Implementation Measure 3.5.4 – Development of Monitoring and Maintenance Program. *Long-term maintenance and monitoring programs for Younger Lagoon Reserve shall be developed and implemented to assist in long-term preservation of species and habitats in accordance with the provisions of this CLRDP.*

Implementation Measure 3.5.5 – Siting of Windbreak/Screening Trees. *The windbreak/screening trees required by this CLRDP in connection with new development in the terrace portion of the site (see for example Section 6.5 and Figure 6.6) shall be sited to maximize their ability to screen terrace development as seen from Younger Lagoon Reserve.*

Implementation Measure 3.5.6 – YLR Manager Consultation. *Development shall not be authorized by the University without consultation with the YLR Manager. Development shall incorporate measures to address issues and impacts identified through the consultation.*

Implementation Measure 3.5.7 – Movement Not Visible From YLR. *Movement associated with development (including within outdoor activity/research areas and buildings, and including all windows in buildings) shall not be visible from within YLR.*

Implementation Measure 3.5.8 – Protective Measures for YLR in Middle Terrace. *In conjunction with building construction west of McAllister Way in the Middle Terrace development zone, the University shall construct and/or plant protective barriers along the eastern edge of YLR in Development Subarea #7 and, if appropriate, extending south to connect to the existing berm. Such barriers may include fencing, dense vegetation, and/or an earthen berm. If an earthen berm is developed, it shall be sized so that no soil importation is required from outside the Marine Science Campus (i.e., the soil required to construct it would be less than or equal to the amount of soil that becomes available within the campus as a result of grading to prepare development sites), unless importation of additional soil is necessary to ensure proper berm function/configuration; and such soil is demonstrably clean and free of contaminants (including foreign seed stock). Any such berm shall be planted with native grasses and herbaceous shrubs consistent with CLRDP Appendix B, Resource Management Plan.*

Policy 3.6 Public Access to and within YLR

Access to Younger Lagoon Reserve may be controlled consistent with the need to protect YLR resources from disruption and degradation and to provide maximum public access consistent with the Coastal Act.

Implementation Measure 3.6.1 – Provision of Controlled Access within YLR. *Physical access within YLR by authorized management, emergency, research, student personnel, and/or docent-led general public consistent with the public access and recreation diagram and policies contained in this CLRDP shall be provided.*

Implementation Measure 3.6.2 –Visual Access to YLR. *Visual access to YLR shall be provided for the general public through overlooks (see Figure 5.5), at least one of which shall be available for unescorted (i.e., non-docent) public use.*

Implementation Measure 3.6.3 - Public Beach Access within YLR. *Supervised beach access to Younger Lagoon beach shall be provided to the general public consistent with and pursuant to a management plan for such access that is based on the best possible assessment of the capacity of the beach area to sustain use and the level of intensity of such use when considered in light of the fragility of the beach area and adjacent resources and ongoing research. Within six months of CLRDP certification, and at five-year intervals post-certification after that, the University shall submit a Notice of Impending Development to the Coastal Commission with all necessary supporting information for a development project to implement such a beach access management plan for the next five years. Each such management plan shall at a minimum include:*

- *A regular schedule of guided, educational tours to the beach area that is coordinated with and similar to other Marine Science Campus education and docent programs and designed to introduce visitors to the special aspects of beach ecology without causing deterioration of that ecology or loss of opportunity for feeding or breeding of beach dependent species. These tours may be weekly weather permitting, but shall be offered a minimum of two times per month.*

- *Identification of all parameters for beach access, including a clear depiction of the area within which such access is allowed, and a clear description of all related implementing measures (e.g., trail alignments, trail design, barriers/fencing, signage, timing restrictions, supervision requirements, etc.). Access shall be by way of controlled access trails shown on Figure 5.6. Trails shall be maintained, marked, and signed for safety and interpretation of YLR ecology.*

- *A monitoring program that evaluates trends in beach area conditions, where at a minimum such program shall include: user data (including identification of all user types and specific data on size and composition of beach tour groups); a selected set of repeatable photo points to be taken seasonally to show all major areas of the beach; presence/absence of tidewater goby and evidence of breeding activity; species composition and coverage of beach dune*

vegetation from the lowest (nearest to the mean high tide line) occurring terrestrial plant to 10 meters inland into the strand vegetation; evidence of seed production by beach strand species in this zone; species composition and abundance of animal tracks (vertebrate and invertebrate) on the beach and adjacent beach dune area; and regular counts of feeding shorebirds on the beach.

- *An assessment of beach area resources and the effect of beach area use and activities (including authorized and unauthorized uses, research use, YLR activities, etc.) on such resources in the time since the last five-year review and overall in the time since at least CLRDP certification;*

- *A description of existing public access opportunities on the Campus, and the way in which such opportunities relate to the amount and type of supervised access provided to the beach area.*

Coastal Bluffs and Blufftops

Policy 3.7 Protection of Coastal Bluff and Blufftop Areas
New development that creates or contributes to erosion or geologic instability or that would require the construction of protective devices that would substantially alter natural landforms along the bluffs shall be prohibited. Coastal bluff and blufftop vegetation shall be expanded and enhanced in accordance with the provisions of this CLRDP.

Implementation Measure 3.7.1 – Bluff Setbacks. *New development shall be sited and designed in such a manner as to avoid the need for shoreline armoring over the development's lifetime, and shall include enforceable provisions for addressing any future bluff retreat/erosion danger to the development without shoreline armoring (e.g., moving the development, removing the development, etc.). Development within 100 feet of the top edge of the coastal bluff shall be prohibited other than: existing buildings and streets; existing and proposed access and recreation amenities (see Section 5.6 and Figure 5.6); infrastructure improvements necessitating a near bluff edge location contemplated by the CLRDP (i.e., seawater system facilities); minor non-building research infrastructure (e.g., marine mammal pools); habitat restoration/enhancement; and directly related minor structures (such as irrigation, public safety fencing, etc.) that are consistent with the CLRDP.*

Implementation Measure 3.7.2 – Coastal Bluff and Blufftop Area Protection and Enhancement Measures. *The coastal bluff environment of the Marine Science Campus shall be protected and enhanced in accordance with the provisions of this CLRDP, including through University enhancement and management of the 100-foot bluff setback area identified in implementation measure 3.7.1 pursuant to the Resource Management Plan (Appendix A).*

Implementation Measure 3.7.3 – Protecting Existing Development from Coastal Erosion. *Shoreline armoring shall be allowed only as a last resort to protect structures existing at the time of CLRDP certification that are in danger from erosion, and only if: (a) less-environmentally damaging alternatives to armoring are not feasible (including relocation of endangered structures); and (b) the armoring has been sited, designed, and accompanied by measures to proportionately mitigate any unavoidable negative coastal resource impacts (on views, sand supply, public access, etc.).*

Agricultural Resources

Policy 3.8 Protection of Adjacent Agricultural Resources
The University shall minimize and, where possible, avoid conflicts with adjacent agricultural uses.

Implementation Measure 3.8.1 – Cooperation. *The University shall work cooperatively with the adjacent agricultural users to identify means of minimizing or avoiding any potential use conflicts (including the improvement of water quality in YLR), and to implement mutually acceptable conflict-avoidance strategies.*

Implementation Measure 3.8.2 – Agreement to Indemnify and Hold Harmless. *Prior to start of construction of any CLRDP facilities located north of the designated Lower Terrace Development Zone, the University shall offer to enter into an agreement substantially in conformance with the pre-CLRDP certification agricultural hold harmless and indemnity restrictions that apply to the Marine Science Campus, to indemnify and hold harmless the owners, lessees, and operators of the property from liability and costs resulting from the effect of normal and necessary farm operations upon the Marine Science Campus and its employees, students, agents, and invitees.*

Cultural Resources

Policy 3.9 Conservation of Cultural Resources
Reasonable mitigation measures shall be required, including those that may be identified through consultation with appropriate Native American representatives, where development would adversely impact archaeological and/or paleontological resources.

Implementation Measure 3.9.1 -- Construction Monitoring. *Should archaeological and/or paleontological resources be encountered during any construction on the Marine Science Campus, all activity that could damage or destroy these resources shall be temporarily suspended until qualified archaeologist/paleontologists and Native American representatives have examined the site and mitigation measures have been developed that address and proportionately offset the impacts of the project on archaeological and/or paleontological resources. Development shall incorporate measures to address issues and impacts identified through any archaeologist/paleontologist and/or Native American consultation.*

Hazardous Materials Management

Policy 3.10 Hazardous Materials Management
The Marine Science Campus environment shall be protected from contamination caused by the transportation, storage, and use of petroleum products and hazardous materials.

Implementation Measure 3.10.1 – Hazardous Materials Management. *The University, through the Office of Environmental Health and Safety, shall manage the use, and in the event of spillage the containment and cleanup of, hazardous materials and petroleum 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 3.10.2 – Protective Measures for Laydown Yard. *The University shall install appropriate features around the perimeter of that part of any laydown yards that are dedicated to the maintenance and servicing of heavy equipment to ensure that hazardous materials do not enter the stormwater drainage system, watercourses, and/or groundwater. (See also Implementation Measure 7.1.12)*

Air Quality and Energy Consumption

Policy 3.11 Energy Efficiency in New Construction
Sustainable practices shall be used in the design, construction, and use of campus facilities.

Implementation Measure 3.11.1 – Energy Efficiency in New Construction: *Sustainable design, technology and construction practices shall be incorporated into, and sustainably produced materials shall be used in the construction of new facilities.*

Implementation Measure 3.11.2 – Energy Efficiency in Use: *New development shall incorporate sustainable practices into ongoing facility use (including in typical daily operations, special events, ongoing maintenance, etc.).*

Policy 3.12 Air Quality and Energy Conservation through Land Use and Transportation Controls.
Land use and transportation controls shall require energy conservation and shall ensure good air quality.

Implementation Measure 3.12.1 – Air Quality and Energy Conservation through On-Campus Short-Term Accommodations. *As demand presents itself, short-term accommodations may be provided consistent with Policy 2.4 and its accompanying implementation measures to reduce travel demand to the Marine Science Campus.*

Implementation Measure 3.12.2 - Air Quality and Energy Conservation through Controlling Travel Mode Split. *The University shall work to achieve a 40 percent travel mode split consistent with Policy 5.2 and its accompanying implementation measures, in order to limit the number of single-occupant vehicles traveling to the Marine Science Campus.*

Implementation Measure 3.12.3 – Air Quality and Energy Conservation through Parking Control. *Parking shall be controlled consistent with Section 5.5 (including Policies 5.3, 5.4, and 5.5 and their accompanying implementation measures) to discourage automobile trips to the Marine Science Campus.*

Implementation Measure 3.12.4 – Air Quality and Energy Conservation through Alternative Transportation. *The University shall promote walking, bicycle use, and transit use consistent with Sections 5.5 and 5.6 to encourage energy efficient forms of travel.*

Implementation Measure 3.12.5 – Air Quality and Energy Conservation through Transportation Demand Management. *Transportation demand shall be managed consistent with Policy 5.8 and its accompanying implementation measures to encourage alternatives to automobile, and particularly single-occupant automobile, transportation for site users and visitors.*

Natural Resource Protection Analysis

Policy 3.13 Natural Resource Protection Analysis Required
For new development that may significantly affect natural resources, individually or cumulatively, the Project Report and other supporting information identified in Chapter 8 shall describe the manner in which the proposed development is consistent with and implements the natural resource protection provisions of this CLRDP, including those in Section 5.3 (Natural Resource Protection), Chapter 9 (Capital Improvement Program), and Appendix A (Resource Management Plan). The Project Report supporting information shall also include a long-term program for monitoring potentially affected natural resources and for maintaining consistency with CLRDP standards.

Policy 3.14 Permanent Protection
The University hereby establishes as a guiding CLRDP principle its intent to protect, in perpetuity, Campus natural areas (i.e., all areas outside of development zones) from development other than the low-intensity uses and development allowed in the Resource Protection, Resource Protection Buffer, Open Space, or Wildlife Corridor land use designations.

Designation of these natural areas to a Research and Education Mixed Use land use designation (or any subsequent and similar future CLRDP land use designation) shall be prohibited.

Implementation Measure 3.14.1 - Natural Areas Protection. *Within two years of CLRDP certification, all Campus natural areas (i.e. all areas outside of the four designated development zones) shall be incorporated into the University of California Natural Reserve System as an integral part of Younger Lagoon Reserve. Within two years and six months of CLRDP certification, the University shall submit to the Coastal Commission an amendment to the CLRDP to update it with respect to the revised configuration of Younger Lagoon Reserve and the natural areas. In addition, if any area within the four designated development zones as they are configured at the time of CLRDP certification is subsequently excluded from the designated development zones in the future (pursuant to Implementation Measures 3.3.1, 3.3.2, 3.4.4, and 3.4.5), then such area shall likewise be incorporated into Younger Lagoon Reserve within the same time frames and pursuant to the same parameters identified above with respect to the initial Reserve incorporation, but timed from the date that the required CLRDP amendment (required pursuant to Implementation Measures 3.3.2 and 3.4.5) is certified by the Coastal Commission.*

5.4. Scenic and Visual Qualities

This section sets forth plans, policies, and implementation measures related to maintaining scenic and visual qualities on the Marine Science Campus.

5.4.1. Scenic Corridor Protection

The Land Use Diagram (Figure 5.2) and Development Subareas (Figure 5.4) have been designed so that development and open space areas are located in such a manner as to protect significant public view corridors to the ocean, the agricultural coastline, and surrounding hillsides. Siting and design parameters, including regulation of building heights and maximum scale, are also required to protect on- and off-site public views of the site, including protecting the visual character of the site itself.

5.4.2. Scenic and Visual Resource Policies

Policy 4.1 Protection of Scenic Views

New development at the Marine Science Campus shall be sited and designed in a manner that protects public views, including the public view corridors depicted in Figure 3.16, and that limits development outside of the four Campus development zones to the maximum extent feasible.

Implementation Measure 4.1.1 – Location of Development. *The University shall cluster development on the Marine Science Campus as shown in Figures 5.2 and 5.4 so as to leave ample open space that protects identified public views, including identified public view corridors.*

Policy 4.2 Protection of Scenic Quality

New development at the Marine Science Campus shall be sited and designed to be compatible with existing Campus development and surrounding areas.

Implementation Measure 4.2.1 – Design Standards and Illustrative Campus Buildout Site Plan. *Decisions on siting, materials, height, clustering, and other aspects of project design shall be consistent with Chapter 5 and Chapter 6 and shall be guided by the Illustrative Campus Buildout Site Plan and the preliminary parameters for selected projects in Chapter 7. With respect to the development of the public overlooks, such overlooks shall be sited*

and designed consistent with the preliminary parameters identified in Chapter 7 unless alternative siting and design would result in both better public overlook value and better coastal resource protection.

Implementation Measure 4.2.2 – Alteration of Natural Landforms. *Development shall be sited and designed to minimize the alteration of natural landforms.*

Implementation Measure 4.2.3 – Building and Other Structure Heights. *Buildings on the Marine Science Campus shall be no more than two stories tall and shall be no higher, as measured from natural grade to the top of the roof, than the maximum height limits specified in Figure 5.4, except that laboratory buildings located within the Middle Terrace development zone may be as high as 36 feet above natural grade subject to Implementation Measure 4.2.4, and the Phase II wing of the Ocean Health building may be up to 36 feet in height. Except for temporary structures, flat roofs shall be prohibited. Mechanical equipment and any associated screening structures that extend above the roof shall be limited to the maximum extent feasible in height and bulk. Screening structures (or portions thereof) shall only be used where such structures will provide better public viewshed protection than leaving such equipment unscreened. If it is not feasible to keep such equipment and/or structures below the maximum height (e.g., by reducing their number and/or size, by locating at a lower elevation than the roof peaks, by reducing building heights, etc.), then such equipment and structures shall not exceed maximum height limits by more than 5 feet, their aggregated length shall not exceed 25 percent of the length of the building's ridgeline, and their aggregated horizontal footprint shall not exceed 25 percent of the area of the aggregate horizontal footprint of the roof. Those portions of buildings that are located nearest the perimeter of the development zones shall be stepped down in height relative to the building to avoid uniform massing at the maximum height limits on the perimeter of development zones (see also Chapter 6). All other (i.e., non-building) structures shall be no higher as measured from natural grade to the topmost element than the maximum height limits specified in Figure 5.4.*

Implementation Measure 4.2.4 – Laboratory Buildings. *Laboratory buildings located within the area limited to 30-foot heights may be as high as 36 feet above natural grade if it is not feasible to meet the 30-foot height limit due to the vertical clearance necessary for specialized laboratory requirements (for mechanical systems, ductwork, etc.).*

Implementation Measure 4.2.5 – Maximum Building Gross Square Footage. *Individual new buildings shall not exceed 20,000 gross square feet in the Lower Terrace development zone, shall not exceed 37,500 gross square feet in the Upper Terrace development zone, and shall not exceed 40,000 gross square feet in the Middle Terrace development zone.*

Implementation Measure 4.2.6 – Maximum Additional Gross Square Footage in Lower Terrace. *New building development in the Lower Terrace development zone after the CLRDP is certified shall not exceed 40,000 gross square feet in total, exclusive of structures that are part of the seawater system.*

Implementation Measure 4.2.7 – Construction Materials. *Stained vertical wood siding, roughcast concrete, high-quality shingle roofing, and other materials with compatible appearances (e.g., stone, wood, cor-ten steel, etc.) shall be used for the exterior of all buildings and other structures to ensure design compatibility among all buildings on the Marine Science Campus.*

Fig 5.4 Development Subareas

Legend

#1 Development Subarea

Development Zone Boundary

(1) Subarea No.	(2) Subarea Size	Max. No. of Stories	Max. Height	(3) Max. Building Coverage
1	59,000	(4) 1	(4) 30	64%
2	44,900	1	(5) 18	30%
3	69,500	2	(6) 30	60%
4	105,500	2	(6) 30	60%
5	26,000	2	(6) 30	60%
6	73,000	1	(7) 24	40%
7	34,500	--	(8) 10	--
8	116,000	2	(4) 30	40%
9	27,500	2	24	40%
10	79,000	2	24	40%
11	62,000	2	(9) 24	40%
12	30,000	2	24	40%
13	23,500	1	15	40%
14	20,000	--	(10) 6	--
15	77,500	1	24	40%
16	20,500	--	(11) 12	125 sf
	868,400			

Notes:

(1)Building development outside of subareas is prohibited. Development outside of subareas shall be limited to at-grade development (e.g., streets, parking areas, etc.) unless it is an above-grade development explicitly identified as appropriate in this CLRDP (e.g., an earthen berm extension); where any associated above-grade elements (e.g., fencing, light standards, etc.) shall not exceed the scale, including the heights, established for such elements in the CLRDP.

(2)Subarea boundaries are approximate within 10 percent plus or minus; actual boundaries will be field verified when development is proposed.

(3)Parking shall be allowed anywhere in the development zone provided it is consistent with all provisions of the CLRDP. Coverage associated with parking and with outdoor reasearch area, laydown, and storage does not apply towards maximum building coverage calculations. Maximum building coverage must also be understood in relation to maximum square footages in Section 5.2 that also apply, and in relation to other CLRDP provisions that might further limit development.

(4)A small portion of the warehouse (i.e. up to 20% of footprint) may be two stories high and a max of 36 feet in height.

(5)Above-grade development shall be concentrated to the south as much as possible.

(6)Building height may extend to 36 feet for buildings with ventilated lab space per IM 4.2.4; mechanical equipment enclosures may extend up to five feet above the maximum height in certain circumstances per IM 4.2.3.

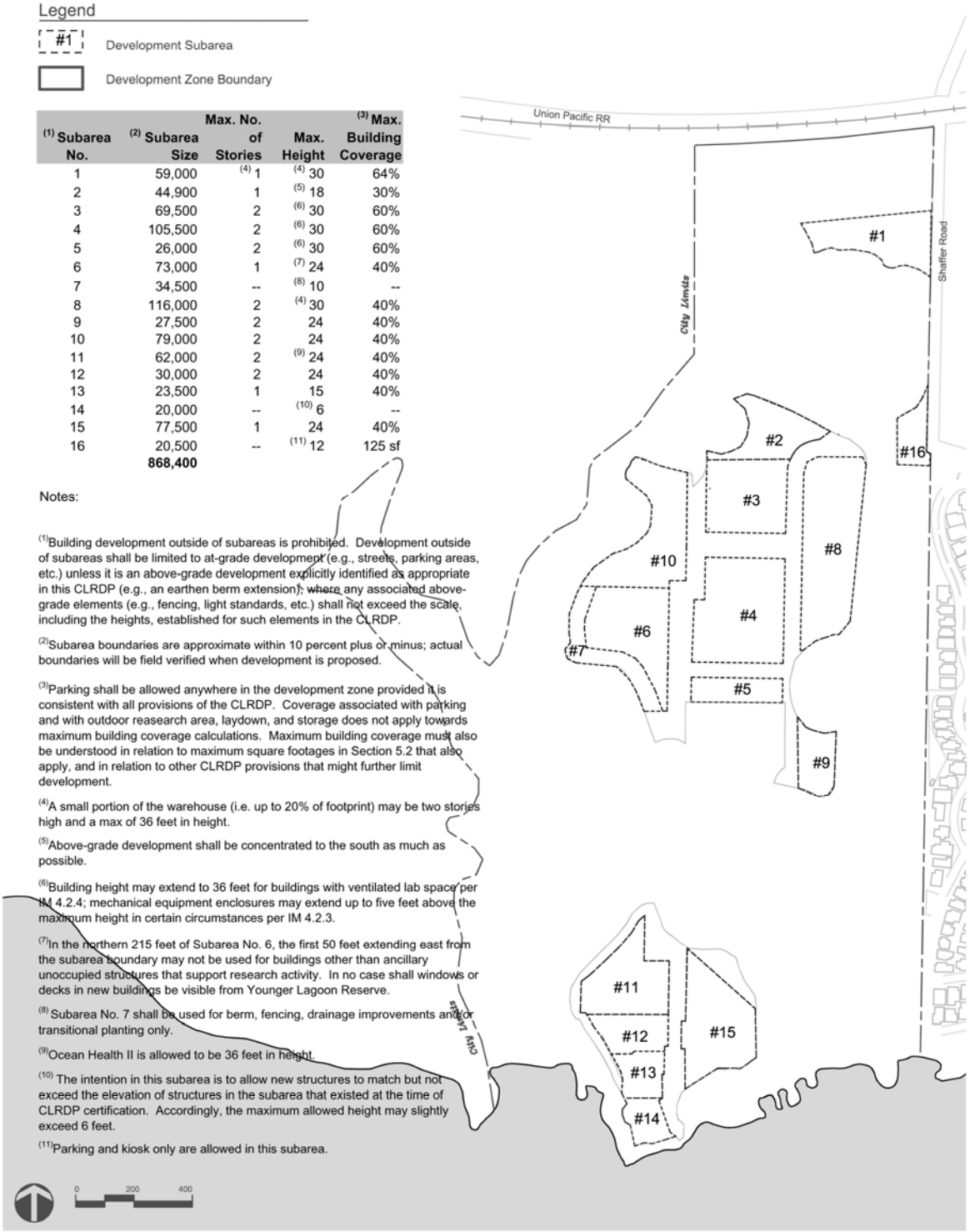
(7)In the northern 215 feet of Subarea No. 6, the first 50 feet extending east from the subarea boundary may not be used for buildings other than ancillary unoccupied structures that support research activity. In no case shall windows or decks in new buildings be visible from Younger Lagoon Reserve.

(8) Subarea No. 7 shall be used for berm, fencing, drainage improvements and/or transitional planting only.

(9)Ocean Health II is allowed to be 36 feet in height.

(10) The intention in this subarea is to allow new structures to match but not exceed the elevation of structures in the subarea that existed at the time of CLRDP certification. Accordingly, the maximum allowed height may slightly exceed 6 feet.

(11)Parking and kiosk only are allowed in this subarea.



Implementation Measure 4.2.8 – Building Setbacks. *New buildings on the Marine Science Campus shall be located no closer than 15 feet from campus streets and no closer than 20 feet from the pavement edge of Shaffer Road, as improved per Implementation Measure 5.1.3.*

Implementation Measure 4.2.9 – Building Length Limitations. *New building sections constructed on the Marine Science Campus shall not exceed 175 feet in continuous building length adjacent to a street or parking area.*

Implementation Measure 4.2.10 – Placement of Utility Lines Underground. *All utility lines on the Marine Science Campus shall be located underground.*

Implementation Measure 4.2.11 – Windbreak/Screening Trees. *The windbreak/screening trees required by this CLRDP in connection with new development in the terrace portion of the site (see Section 6.5 and Figure 6.6) shall be sited to screen development from public view without interfering with that portion of the public view not encumbered by development (e.g., maintaining ocean/horizon views over and around buildings).*

Implementation Measure 4.2.12 – Development in Northernmost Portion of Middle Terrace. *Development in that portion of the Middle Terrace development zone that is located in development Subarea #2, as identified in Figure 5.4, shall be sited and designed to minimize impacts to public views as seen from the Group 2 public trail segments, as identified in Figure 9.1.*

Implementation Measure 4.2.13 – Development Along Edge of Lower Terrace. *Development in that portion of the Lower Terrace development zone that is located in Subareas #13 or #14, as identified in Figure 5.4, shall be limited to low intensity uses and facilities sited and designed to minimize impacts to public views as seen from trails and other access and recreation facilities and features shown on Figure 5.6 and/or described in Section 5.6. Development located in Subarea #14 shall be limited to the seawater system, circulation, and public access improvements and shall not exceed the elevation of the existing seawater facilities. Development in Subareas #13 and #14 shall not significantly block public views and shall, if located within the footprint of the berm (along the western edge of the zone), be no taller than the top of the berm at the time of CLRDP certification.*

Implementation Measure 4.2.14 – Building Development West of McAllister Way in Lower Terrace. *Building development in that portion of the Lower Terrace development zone that is located west of the location of McAllister Way at the time of CLRDP certification shall be limited to uses that integrally relate to existing development or research activities in the development zone, need a location adjacent to YLR, or otherwise require a more isolated location.*

Implementation Measure 4.2.15 – Building Development West of McAllister Way in Middle Terrace. *Development in Subarea #6 shall be limited to uses that would benefit from a more isolated location, and development in Subarea #7 shall be limited to extension of the pre-CLRDP certification earthen berm, overlook improvements, natural drainage system components, fencing, and/or landscaping.*

Implementation Measure 4.2.16 – Building Development Outside of Subareas Prohibited. *Building development located outside of the subareas shown in Figure 5.4 shall be prohibited. Development located outside of subareas and inside of development zones shall be limited to at-grade development (e.g., streets, parking areas, etc.), unless it is an above-grade development explicitly identified as appropriate in this CLRDP (e.g. an earthen berm extension), where any associated above-grade development and structures (e.g., fencing, light standards, etc.), shall not exceed the scale, including the height, established for such development and structures in the CLRDP.*

Policy 4.3 Visual Intrusion and Lighting
Development shall be sited and designed so that the impacts of activity and direct light on wildlife and public views outside of development zones is limited to the maximum extent feasible.

Implementation Measure 4.3.1 – Visual Intrusion into YLR. *Development adjacent to YLR shall be sited and designed so that activity and direct light will not be visible from within YLR.*

Implementation Measure 4.3.2 – Visual Intrusion into Terrace ESHA and Other Areas Outside of Development Zones. *Development shall be sited and designed so that activity and direct light that may be visible from outside of development zones is limited to the maximum extent feasible, and so that any activity and/or direct light that is unavoidably visible is minimized in its intensity. In determining the measures needed to limit visual intrusion to the maximum extent feasible, the University shall consult with the manager of Younger Lagoon Reserve and the California Department of Fish and Game.*

Implementation Measure 4.3.3 – All Lighting. *Lighting on the Marine Science Campus shall be provided at the lowest footcandle levels necessary to achieve safety and efficient navigation.*

Implementation Measure 4.3.4 – Building Lighting. E*xterior lighting shall be located only at building entries and usable interior courtyards. No other exterior lighting of buildings, such as façade or accent lighting, shall be allowed, except where necessary for safety. Interior lighting shall be located so as to minimize the potential for light and glare to be visible from within Resource Protection, Resource Protection Buffer, and Wildlife Corridor areas and be consistent with the Uniform Building Code.*

Implementation Measure 4.3.5 – Street and Trail Lighting. *Streets on the Marine Science Campus may only be lighted within the development zones of the campus. Trails shall be lighted only to the extent needed for safety. Only low-intensity lights attached to low-height, wood bollards (i.e., up to 36" maximum height) shall be used for trail lighting, and all trail lighting shall be downward directed.*

Implementation Measure 4.3.6 – Parking Lot and Maintenance Yard Lighting. *Lighting in parking lots and maintenance yards shall be the lowest lighting intensity levels necessary to provide safety and security. All parking lot and maintenance yard lighting shall be full cut-off type lighting and shall be downward directed. Pole mounted lighting shall be limited to the maximum extent feasible (in number, height, and bulk) and shall not exceed 12 feet in height.*

Implementation Measure 4.3.7 – Sign Lighting. *Sign lighting on campus shall be limited to signs identifying important destinations, restricted areas, and/or dangerous terrain. All sign lighting shall be the minimum necessary to achieve design objectives. No backlighting of signs or use of neon shall be allowed.*

Implementation Measure 4.3.8 – Lighting Plan Required. *New development that includes lighting shall be authorized by the University only if it includes a lighting plan that details the manner in which the development individually and cumulatively is consistent with and implements the lighting parameters of this CLRDP, including Policy 4.3 and its implementing measures, and including long-term lighting system monitoring and maintenance.*

5.5. Circulation and Parking

This section sets forth plans, policies, and implementation measures related to circulation and parking on the Marine Science Campus.

5.5.1 Circulation and Parking Discussion

The development of circulation and parking facilities on the Marine Science Campus is primarily guided by the objectives, design principles, and land use concepts of Chapter 4 and by the policies of Chapter 5. Design standards for campus streets and parking are set forth in Chapter 6 (Section 6.2, Campus Street Design and Section 6.3, Parking Design). The location of campus streets is explicitly identified in the next section, which includes Figure 5.5, Circulation and Parking Diagram. The location of parking facilities is not explicitly identified in this section, because such siting is more dependent upon how the Campus develops over time and the relationship of buildings, streets, and other Campus facilities to potential parking lot locations.

New Main Campus Street and Abandonment of Part of Former Access Road

One key feature of the circulation plan for the Marine Science Campus is a new main access street section mostly located east of the existing Campus Street (see Figure 5.5) and the abandonment of a section of McAllister Way/Delaware Avenue Extension between Shaffer Road and the California Department of Fish and Game facility. This abandonment will take place concurrent with the construction of the new portion of the campus street shown in Figure 5.5. The majority of the existing pavement along this alignment will be removed except for a curvilinear portion of it that will remain to become a public access pathway. The roadbed fill will be retained to maintain terrace wetland hydrology, and the disturbed areas will be replanted with appropriate wetland and wetland buffer plant species.

Parking for Campus Use and Public Access

Another key feature of the circulation plan is the development of parking for campus use and public coastal access. Parking on the Marine Science Campus is limited at buildout under this CLRDP to a total of up to 795 spaces, and the University may control almost all of this parking through the use of programmatic means (e.g., including possibly parking permits and/or parking meters) to ensure that spaces are available for high-priority users such as visitors seeking coastal access and campus teachers, researchers, and staff. Without such controls, demand for parking by students could overwhelm capacity and result in parking shortages for higher priority users.

Parking to be provided on the Campus is purposefully limited so as to avoid covering large portions of the Campus with parking areas (thus better protecting on-site resources) and to reduce Campus reliance on automobile transportation (thus reducing its attendant adverse impacts on and off-site). Because of this parking space limitation, and because all Campus parking demand is to be accommodated on-site, the CLRDP includes aggressive transportation demand management programs designed to bring Campus users to the Campus by means other than automobiles, and if by automobile, by alternatives to the single-occupant vehicle automobile. To ensure that parking controls and parking space limitations have the minimum impact on public coastal access, the CLRDP policies in Section 5.5.3 below also include provisions for dedicated and shared public coastal access parking areas.

Shaffer Road Improvements

The University intends to improve the Shaffer Road/Delaware Avenue Intersection and that portion of Shaffer Road extending to the Upper Terrace development zone (where part or all of a shared laydown and warehouse facility is contemplated). These improvements will be coordinated with the City of Santa Cruz and with property owners across Shaffer Road from the campus, to the maximum extent feasible. Improvements to Shaffer Road will be limited to those necessary to serve Campus development.

The driveway entrance into the Upper Terrace development zone will be located in the center of the zone (e.g., as shown on Figure 7.2) so as to avoid the wildlife corridor and buffer areas both to the north and south of the development zone. Campus development does not require Shaffer Road to be extended north across the railroad tracks. Nonetheless, the City of Santa Cruz (which provides emergency services to the Campus) has indicated its desire to have secondary emergency access to the Marine Science Campus via Highway 1 and Shaffer Road, and accordingly, the University will collaborate with the City of Santa Cruz on the construction of an emergency grade crossing over Union Pacific Railroad (UPRR) tracks to connect the northern segment of Shaffer Road and Highway 1 with the Marine Science Campus. Alternatively, given the location of the wildlife corridor south of the railroad right-of-way and given the existing and potential uses of the railroad right-of-way itself (including potential public trail use), the City of Santa Cruz could choose to abandon the northern-most portion of the Shaffer Road (between the Upper Terrace development zone and the railroad tracks) and instead re-grade, replant, and reconfigure this paved road area as a habitat corridor enhancement.

In any event, where Shaffer Road intersects designated wildlife corridors and their buffers, improvements to the road will include measures to ensure habitat connectivity (such as adequately sized culverts under the roadbed to allow wildlife to safely move from one side of Shaffer to the other). These improvements will be coordinated with the owners of the property between Shaffer Road and Moore Creek/Antonelli Pond to ensure that the habitat corridor is properly aligned from one side of Shaffer Road to the other.

5.5.2. Circulation and Parking Designations and Diagram

Two circulation designations have been created for the UCSC Marine Science Campus: Major Campus Street and Minor Campus Street. Figure 5.5, Circulation and Parking Diagram, shows the specific geographic location of these designations on the Marine Science Campus. The intended effect of these designations and the circulation uses allowed within them are set forth in this section. Other symbols on the diagram include "Major Parking Locations" and "Intersection Improvement." The specific location of these developments will be determined in conjunction with specific future building authorizations, subject to the requirements of this CLRDP.

Major Campus Street

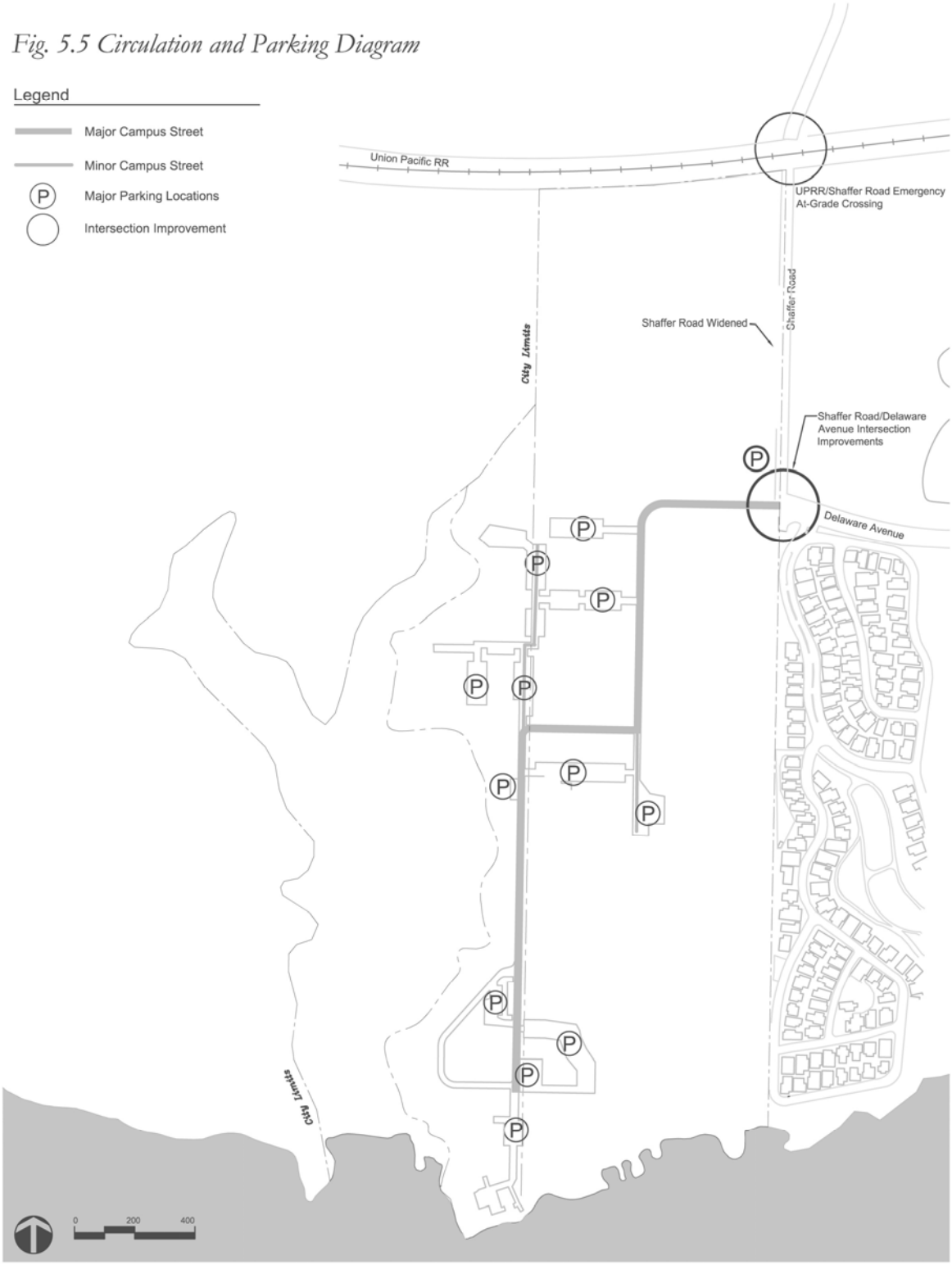
The primary purpose of this circulation designation is to accommodate access to the Marine Science Campus by motor vehicles. Bicyclists and pedestrians may use all campus streets at times as well, but separated multi-use trails are provided specifically for bicyclists and pedestrians (see Section 5.6 that follows). The type of circulation facility allowed in the Major Campus Street designation is limited to paved, public-use corridors with two undivided travel lanes (one each direction) and within development zones, limited on-street parking. The maximum allowable width of the corridor is 22 feet wide to allow regular traffic movement and meet emergency vehicle requirements. Bicycles, cars,

trucks and other road vehicles will share the facility without formal bike lanes or center stripe. Typically, curbs will not be provided on Major Campus Streets.

Minor Campus Street

The primary purpose of this circulation designation is to provide motor vehicle access to parking areas and buildings that cannot be directly accessed with Major Campus Streets. The type of circulation facility allowed in the Minor Campus Street designation is limited to paved, public-use corridors with two undivided travel lanes (one each direction) and within development zones, on-street parking. The maximum allowable width of the travel lanes is 22 feet wide to allow regular traffic movement and meet emergency vehicle requirements. Bicycles, cars, trucks and other road vehicles will share the facility without formal bike lanes or center stripe. Typically, curbs will not be provided on Minor Campus Streets.

Fig. 5.5 Circulation and Parking Diagram



5.5.3. Circulation and Parking Policies

Auto Circulation

Policy 5.1 Vehicular Access
Roadways on the campus shall 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 shall construct a new circulation system for the Marine Science Campus as shown in Figure 5.5.*

Implementation Measure 5.1.2 – Improve Shaffer Road/Delaware Avenue Intersection. *The Shaffer Road/Delaware Avenue intersection, at the entrance to the campus, shall be improved in conjunction with other road and development activities, in order to improve the functioning of this intersection (for vehicles, pedestrians, and bicyclists) and its safety.*

Implementation Measure 5.1.3 – Shaffer Road Improvements. *The University shall cooperate with the City of Santa Cruz to evaluate the permanent closure of Shaffer Road between the Upper Terrace development zone and the railroad tracks and conversion of the closed road section into an integral part of the wildlife corridor and its buffer located along the northern portion of the Marine Science Campus. Adjacent to the Marine Science Campus, those sections of Shaffer Road to remain open may be improved the minimum extent necessary to provide access to development authorized in the Upper Terrace development zone.*

Implementation Measure 5.1.4 – Access for Wildlife Across Shaffer Road (Upper Wildlife Corridor). *The University shall construct adequate passage (e.g., bridge, underpass, box culverts, etc.) across Shaffer Road north of the Upper Terrace development zone that is specially designed to facilitate wildlife movement, potentially including abandonment of the paved roadway section and reconfiguration of the road area as a habitat corridor. The driveway entrance into the Upper Terrace development zone shall be located in the center of the zone (e.g., as shown on Figure 7.2) so as to avoid the designated wildlife corridor and buffer areas that will be established both to the north and south of the development zone. For work undertaken by the University off its property, the University shall actively pursue and obtain all necessary permissions from any owner of land on which construction will occur. The University shall consult with the United States Fish and Wildlife Service during the design of the Shaffer Road wildlife passage.*

Implementation Measure 5.1.5 – Access for Wildlife Across Shaffer Road (Lower Wildlife Corridor). *The University shall construct adequate passage (e.g., bridge, underpass, box culverts, etc.) across Shaffer Road south of the Upper Terrace development zone that is specially designed to facilitate wildlife movement. For work undertaken by the University off its property, the University shall actively pursue and obtain all necessary permissions from any owner of land on which construction will occur. The University shall consult with the United States Fish and Wildlife Service during the design of the Shaffer Road wildlife passage.*

Implementation Measure 5.1.6 – Use of Former Access Road. *The existing (at the time of CLRDP certification) portion of McAllister Way/Delaware Avenue Extension between Shaffer Road and the California Department of Fish and Game facility, shall be abandoned as a campus street and restored as a public trail and habitat buffer area (i.e., the majority of the existing pavement shall be removed in this area except for a curvilinear portion of it that will remain to become a public access pathway; the roadbed fill elevation shall be retained to maintain terrace wetland hydrology; and the disturbed areas shall be replanted with appropriate wetland and wetland buffer plant species). The University shall consult with the U.S. Fish and Wildlife Service and the Executive Director at the time*

of proposed restoration to evaluate management measures to protect California red-legged frog, such as a prohibition on bicycle use of the trail or construction of safe passage corridors.

Implementation Measure 5.1.7 – Emergency Access. *The University shall, in conjunction with planned building construction on the Marine Science Campus as described in the CLRDP, collaborate with the City of Santa Cruz on the construction of an emergency grade crossing over Union Pacific Railroad (UPRR) tracks to connect the northern segment of Shaffer Road and Highway 1 with the Marine Science Campus. The purpose of this crossing would be to provide secondary, emergency-only, ingress and egress for the site. Bollards would be installed to restrict normal traffic.*

Travel Mode Split

Policy 5.2 Travel Mode Split
The University shall pursue a goal of having at least 40 percent of all person-trips to the Marine Science Campus made using alternatives to the single-occupant automobile.

Implementation Measure 5.2.1 – Encourage Alternatives to the Single-Occupant Vehicle. *The University shall enforce policies and implement measures to encourage alternatives to the single-occupant automobile.*

Implementation Measure 5.2.2 – Alternatives to the Single-Occupant Vehicle. *As part of each development project, the University shall clearly identify the methods to be used to encourage non-single-occupancy vehicle trips for that development in order to meet CLRDP circulation and parking requirements individually and cumulatively.*

Parking

Policy 5.3 Parking for Campus Use and Public Coastal Access
The University shall provide designated parking spaces for faculty, staff, students, and visitors to the Marine Science Campus and the adjacent shoreline. Parking on the Marine Science Campus shall be limited to a maximum of 795 spaces.

Implementation Measure 5.3.1 – All Campus Users Off-Hour Parking. *Campus parking areas shall be available on a free, first-come, first-serve, and unrestricted (i.e., no permits, meters, or other applied management requirement or restriction) basis during daylight hours (i.e., one-hour before sunrise to one hour after sunset) before 8:00 am and after 5:00 pm each weekday, and during all daylight hours on Saturdays, Sundays, and State holidays. Exceptions to this policy may be implemented in order to provide parking management in support of a limited number of special events occurring at the Marine Science Campus, provided such exceptions do not substantially impact public coastal access.*

Implementation Measure 5.3.2. Public Coastal Access Parking. *Public coastal access parking spaces shall be available on a free or low-cost (see implementation measure 5.3.8), first-come, first-serve basis during daylight hours (i.e., one-hour before sunrise to one hour after sunset) for the exclusive use of general public access visitors to the site and not for use by any others, including not for use by: (a) University or Campus affiliate staff, researchers, students, or their visitors; (b) Campus residents or their visitors, and/or (c) visitors to University or Campus affiliate facilities. Public coastal access parking spaces may be time limited provided such time limits are not for less than a three-hour length of stay; overnight parking in these spaces shall be prohibited. During non-State holiday weekdays between the*

hours of 8:00 am and 5:00 pm only, the University may use permits, meters, or other similar methods for managing such public coastal access parking spaces (except for public coastal access parking spaces in the Campus Entrance development zone where such parking shall be provided without such encumbrances) provided such methods are easily understood and followed (including that points of acquisition for any required placards, permits, meter slugs, etc. are conveniently located and operated with respect to public access visitors) and provided such methods provide an easy means of allowing parking space users who arrived prior to 8:00 am to continue to park in the public coastal access parking spaces without being penalized for early arrival. All public coastal access parking spaces are to be provided pursuant to the timing identified in Figure 9.4.

Implementation Measure 5.3.3 – Campus Entrance Public Coastal Access Parking. *A minimum of fifteen public coastal access parking spaces shall be provided adjacent to the intersection of Shaffer Road and Delaware Avenue in the Campus Entrance development zone.*

Implementation Measure 5.3.4 – Middle Terrace Public Coastal Access Parking. *A minimum of five public coastal access parking spaces shall be provided: (1) in that portion of subarea 9 (Figure 5.4) that is adjacent to any Campus support facilities in subarea 9 and that provides the easiest and most direct access to the public trails extending outside of the Middle Terrace development zone; or (2) in a location that provides the easiest and most direct access to Overlook E (Figure 9.1) and the public trail connection to Overlook E.*

Implementation Measure 5.3.5 – Lower Terrace Dual Use Parking (Public Coastal Access Parking and Discovery Center Parking). *A minimum of forty parking spaces in the Lower Terrace development zone shall be available and reserved exclusively for public coastal access parking and for parking by visitors to the Seymour Marine Discovery Center.*

Implementation Measure 5.3.6 – Lower Terrace Public Coastal Access Parking. *A minimum of ten public coastal access parking spaces shall be provided in the Lower Terrace development zone in a location that provides the easiest and most direct access to public coastal access amenities (e.g., in the parking bay along the east side of McAllister Way opposite the Ocean Health Building).*

Implementation Measure 5.3.7 – Parking Demand Satisfied On-Campus. *All parking demand shall be satisfied on Campus, and new development shall include adequate and enforceable measures to ensure that all parking demand is satisfied on Campus.*

Implementation Measure 5.3.8 – Free and/or Low Cost Public Coastal Access Parking. *Public coastal access parking spaces shall be available at no cost unless a Campus parking program is authorized as a development project pursuant to this CLRDP that requires a nominal fee for all or portions of such parking (except for public coastal access parking in the Campus Entrance development zone, where parking fees are prohibited), and only if such fee does not negatively impact public access.*

Policy 5.4 Parking Supply

The University shall regulate existing parking and develop new parking on the Marine Science Campus to ensure that parking spaces are provided in an amount commensurate with the requirements of Policy 5.3 and its implementation measures, and the demand created by new development.

Implementation Measure 5.4.1 – Development of New Parking. *New parking shall be developed as demand warrants up to a maximum of 795 spaces Campus wide. No new parking spaces shall be developed until existing parking spaces in a given development zone are greater than or equal to 90 percent utilized (on average). The parking*

supply requirements of Policy 5.3 and its implementation measures shall be satisfied pursuant to the timing identified in Figure 9.4.

Implementation Measure 5.4.2 – Lease Agreements. *The University shall 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 circulation and parking policies, implementation measures, and other related standards contained in this CLRDP.*

Implementation Measure 5.4.3. – Distribution and Intensity of Parking. *Parking shall be distributed among the four development zones as necessary to meet facility demand within each zone. Parking areas shall be designed to provide small, discrete parking areas.*

Policy 5.5 Parking Management

Parking on the Marine Science Campus shall be managed by UCSC Transportation and Parking Services (TAPS) or its equivalent, which will administer parking permits, operate shuttle service, disseminate commuter information, and monitor parking utilization annually. TAPS may regulate parking on the UCSC Marine Science Campus through the use of parking permits and time-limited parking in a manner consistent with this CLRDP.

Implementation Measure 5.5.1 – Permits Required. *With the exception of public coastal access parking spaces provided at the campus entrance at the intersection of Shaffer Road and Delaware Avenue, parking permits shall be required for the use of each parking space on the UCSC Marine Science Campus between the hours of 8:00 am and 5:00 pm each non-holiday weekday, provided a parking program that defines the permit distribution and use framework for the Campus has been authorized as a development project. Meters may be used in lieu of permits.*

Implementation Measure 5.5.2 – Public Coastal Access Parking. *Dedicated parking for public coastal access shall be clustered close to coastal access points (see also Policy 5.3 and its implementation measures and Figure 5.5), and clear signage and related measures (e.g., stencils, etc.) shall be provided to indicate that each such public coastal access parking space is for public coastal access parking only.*

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 and/or Temporary Events. *The University shall develop a strategy for managing parking demand for occasional special and/or temporary events, including rescue operations at the Marine Wildlife Center. Such strategy shall not substantially impact public coastal access and shall only be implemented if it is consistent with the parking policies, implementation measures, and other related standards contained in this CLRDP, and such strategy is authorized as a development project.*

Implementation Measure 5.5.5 – Entrance Kiosk. *The University may install a small information kiosk at the entrance to the UCSC Marine Science Campus to ensure campus security, provide parking permits, direct visitors, and control access during special events. Such kiosk shall be no taller in height than 12 feet as measured from existing grade and no more than 125 square feet in size.*

Implementation Measure 5.5.6 – Parking Limitation Seaward of Whale Skeleton. *Parking in the area extending seaward from the northern edge of the Younger Building and the northern edge of the whale skeleton (at the northwest corner of the Marine Discovery Center) shall be limited to: University-owned vehicles that are typically parked without movement for longer periods of time and that are not typically moved in and out of parking spaces*

multiple times during the course of a day, and service vehicles that cannot feasibly park elsewhere and still provide the required service. All other parking in this area (including but not limited to parking for University staff and visitors) shall be prohibited. In all cases, parking in this area shall be developed, identified, assigned and used in a manner designed to limit vehicular ingress and egress as much as possible to ensure that public access in and through this area is protected and enhanced (see also Overlook B enhancements as described in Section 7.2.6).

Implementation Measure 5.5.7 – Parking Enforcement. *The University may only enforce parking regulations on the Marine Science Campus consistent with this CLRDP.*

Pedestrian and Bicycle Facilities

Policy 5.6 Promotion of Bicycle Use and Walking
The use of bicycles and walking as a means of traveling to, from, and on the Marine Science Campus shall be promoted and accommodated with all development. (Note: see also Section 5.6 that follows for policies and implementation measures relevant to pedestrian and bicycle facilities on the Campus.)

Implementation Measure 5.6.1 – Sheltered and Secured Bike Parking. *Sheltered and secured bicycle storage facilities within buildings and/or within ancillary facilities associated with buildings shall be provided for all employees that bicycle to work and that use that building. Buildings and related facilities shall be designed and constructed to provide for an amount of sheltered and secured bicycle storage space adequate to accommodate the estimated number of bicyclist employees, and shall include adequate expansion space and provisions to accommodate any increased demand for such secure employee bicycle storage (up to and including the number of employees for any particular building). Each such secure bicycle storage parking space shall be accessible without moving another bicycle, may be configured vertically (e.g., with hooks for hanging bicycles), and shall include adequate space to allow room for maneuvering.*

Implementation Measure 5.6.2 – Bike Parking Outside Buildings. *Secure bicycle racks shall be provided that are conveniently located near the entrances to all buildings on the UCSC Marine Science Campus. Such racks shall be provided at a ratio of at least one bicycle parking space for every ten building users (where all fractions of bicycle parking spaces are rounded to the next highest whole number). Each bicycle parking space shall be accessible without moving another bicycle (i.e., generally allow for 2 feet by 6 feet for each bicycle parking space), and shall include adequate space to allow room for maneuvering (i.e., an aisle at least 5 feet wide behind all bicycle parking spaces).*

Implementation Measure 5.6.3 – Personal Lockers and Showers. *Lockers and showers shall be provided in conjunction with new building development, in convenient locations for regular users (i.e., not the general public) of the building who choose to bike or walk to the Marine Science Campus. Lockers shall be provided at a ratio of one locker for every twenty building users, and showers shall be provided at a ratio of one shower for every fifty building users (where all fractions of lockers and/or showers are rounded to the next highest whole number). The University may provide the required number of lockers and showers in individual buildings based upon the number of users of each such building, or may provide them in a centralized location or locations within each development zone provided the same ratio of lockers and showers is provided overall within each development zone and are conveniently located for users.*

Implementation Measure 5.6.4 – Coordinated Marketing with City of Santa Cruz. *The University shall 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 5.6.5 – Crosswalk Design. *Pedestrian and multi-use trail crossings shall be designed and constructed with crosswalks and signage that ensure public safety, trail continuity, and site aesthetics (e.g., this includes locating crosswalks at intersections or parking area entrances and the use of raised crosswalks, pressed asphalt*

pavement with integrated color to differentiate pedestrian crossings from other pavement treatments, low-intensity pavement-integrated lights, striping, different materials, combinations of all of these, etc.). Crossings shall be designed to maintain safety and trail continuity in a manner that is also consistent with CLRDP design guidelines.

Implementation Measure 5.6.6 – Siting Buildings for Ease of Access. *Buildings shall be located in a manner to be easily and conveniently accessible to one another; to paths and roadways; and especially to bus and shuttle stops. Siting shall occur in a manner that promotes pleasing and convenient pedestrian access throughout the Campus.*

Transit

Policy 5.7 Promotion of Transit Use
Adequate University and other public transit shall be provided to meet the 40 percent travel-mode split goal of the CLRDP, and the use of such transit as a means of traveling to and from the Marine Science Campus shall be promoted.

Implementation Measure 5.7.1 – Extension of Santa Cruz Municipal Transit District Transit Services. *The University shall work with SCMTD to increase the frequency of transit service to points adjacent to the UCSC Marine Science Campus as demand warrants and as necessary to meet the CLRDP's 40% travel-mode split goal. The University shall also encourage SCMTD to extend its service onto the Marine Science Campus.*

Implementation Measure 5.7.2 – Expansion of Shuttle Services. *The University shall provide shuttle service connecting the UCSC Marine Science Campus to the UCSC Main Campus as demand warrants and as necessary to meet the CLRDP's 40% travel-mode split goal. Shuttles shall be scheduled to correspond with classes, and class schedules will be developed in coordination with TAPS to minimize operational demands.*

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 bus and shuttle riders shall be developed at logical locations throughout the Marine Science Campus concurrent with the construction of new roadways, sidewalks, and related circulation improvements in a manner that is consistent with CLRDP design guidelines.*

Transportation Demand Management (TDM) Coordination

Policy 5.8 TDM Coordination
The University shall 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 shall provide services and programs to promote carpools and vanpools.*

Implementation Measure 5.8.2 – TDM Coordination. *The University shall implement and provide ongoing coordination of a 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, special event access planning, and enforcement of parking regulations. TAPS and the University shall be prohibited from enforcing and/or managing parking and transportation inconsistent with the provisions of this CLRDP.*

Implementation Measure 5.8.3 –Transportation Information. *The University shall widely disseminate transportation information to visitors, staff, faculty and students at the Marine Science Campus through the UCSC*

Web page. Printed information shall also be made available at central locations on the Marine Science Campus, and new users of the site shall be given an introductory package of information as part of their orientation to the site. All such TDM and other transportation materials shall include clear description of the CLRDP provisions of Section 5.5, including the travel-mode split requirements for the Campus; available shuttle, SCMTD bus, and other alternative transportation programs (including schedules, costs, etc.); availability of secured bicycle storage facilities within buildings for employees; availability of lockers and showers; Campus maps with appropriate facilities identified; etc.

Traffic Impacts on City Streets

Policy 5.9 Impacts Offset
New development shall include the payment of fair-share fees and/or commitment to construct necessary transportation upgrades attributable to the development's impact on City transportation infrastructure. The City of Santa Cruz shall be consulted regarding any fair-share fees and/or transportation infrastructure upgrades.

Circulation and Parking Plan

Policy 5.10 Circulation and Parking Plan Required
New development shall be evaluated with respect to individual and cumulative parking and circulation supply and demand relative to the Campus and immediately surrounding areas in a circulation and parking plan, and shall be required to provide adequate parking and circulation improvements to meet the provisions of this CLRDP. New development shall be authorized by the University only if the circulation and parking plan details the manner in which the development individually and cumulatively is consistent with and implements the circulation and parking parameters of this CLRDP, including those in Section 5.5 (Circulation and Parking) and Chapter 9 (Capital Improvement Program), and including long-term monitoring, maintenance, and management of same.

5.6. Public Access and Recreation

This section sets forth plans, policies, and implementation measures related to public access and recreation on the Marine Science Campus.

5.6.1. Public Access and Recreation Designations and Diagram

Four-public access designations have been created for the UCSC Marine Science Campus: 1) Public Trails, 2) Public Overlooks, 3) Controlled Access Areas, and 4) Controlled Access Trails. Figure 5.6, Public Access and Recreation Diagram, shows the geographic location of these designations on the Marine Science Campus. The intended effect of these designations and the way in which they affect access on the Marine Science Campus are set forth in this section.

Public Trails
The primary purpose of this public access designation is to provide pedestrian and bicycle access to scenic areas of the campus where access restrictions are generally not needed for protection of coastal resources, public safety, or maintenance of security of sensitive University activity. Public trails shall be sized as appropriate for their anticipated use, but shall be a minimum of six (6) feet wide and in some cases shall follow street alignments. If the trail follows a street alignment, it shall be separated from the street by a minimum 5-foot strip of vegetation designed to buffer trail users from vehicles. Public trails shall be constructed of compacted decomposed granite or similar

materials. Boardwalks, stairs, and/or bridges may be utilized if appropriate (e.g., where trails cross habitat features, uneven topography, etc.). Public access to these trails shall be free from restrictions, except those regarding hours of use and domestic animals set forth in the policies of this subsection. The public trails are provided to allow for low-intensity use that will not significantly disrupt the habitat values of Campus resource protection areas.

Public Overlooks

The primary purpose of this public access designation is to provide points of visual access to the ocean, Younger Lagoon Reserve, and the seasonal pond north of Seymour Marine Discovery Center. Some overlooks are located in controlled access areas, and the provisions of that designation also govern access to such overlooks. All overlooks except overlooks C and D are available for general public use during daylight hours. Overlooks shall include interpretive signs and related information. Illustrative plans for the design of new and improved overlooks on the Marine Science Campus are presented in Chapter 7.

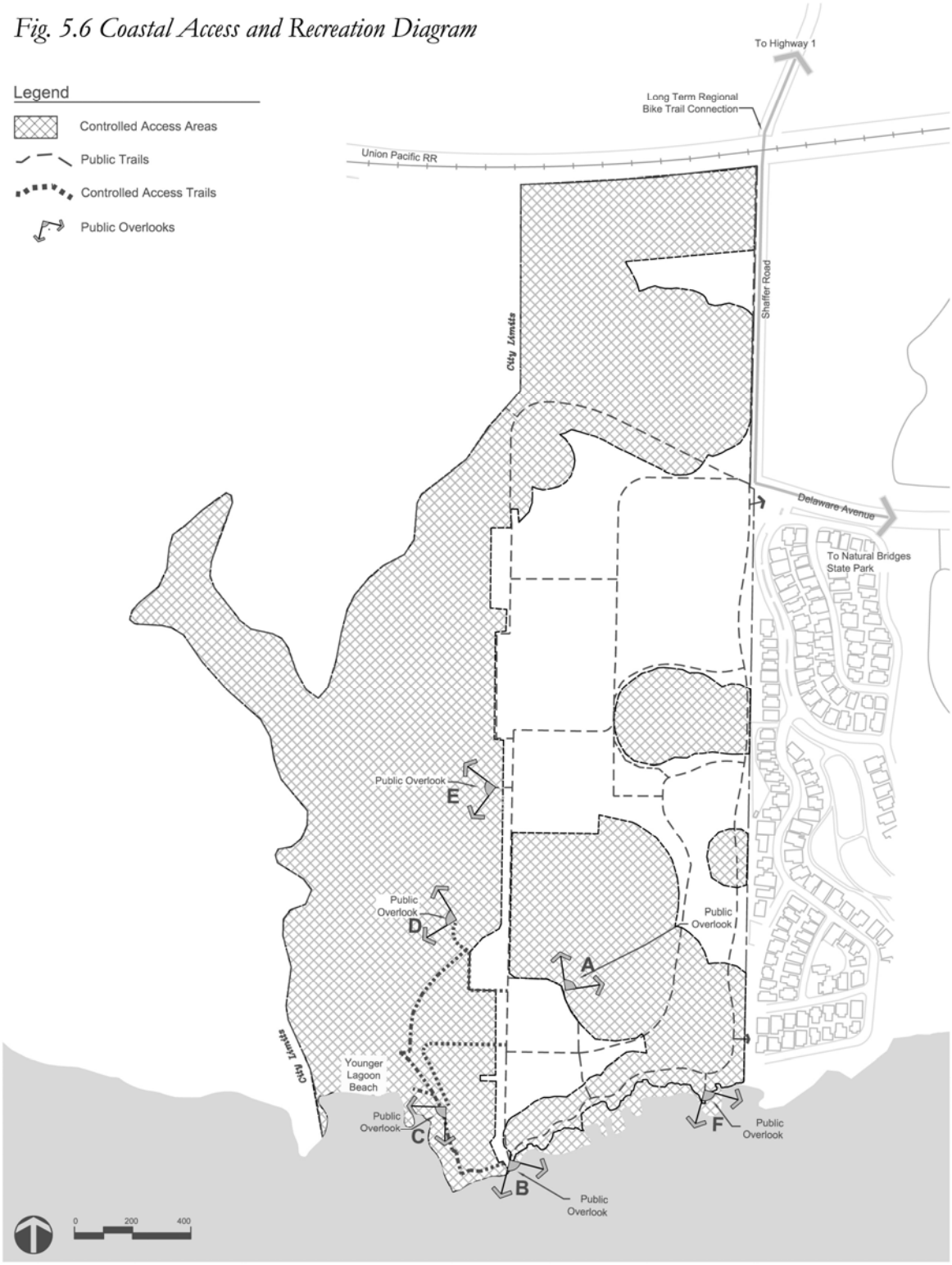
Controlled Access Areas

The primary purpose of this designation is to provide pedestrian access to scenic and coastal resource areas of the Marine Science Campus in a manner consistent with safety, security, and protection of sensitive coastal resources and research areas. Controlled access areas may be accessed only by authorized personnel for scientific or educational purposes; by authorized personnel for the construction, repair, or maintenance of facilities; by authorized visitors; by members of the public as part of a supervised tour; and, where Public Trails extend through Controlled Access Areas as shown on Figure 5.6, by the general public. For the Younger Lagoon beach area specifically, supervised access shall be allowed within this controlled access area consistent with and pursuant to a management plan for such access. The Controlled Access Area designation applies to portions of the Marine Science Campus that contain environmentally sensitive habitat and/or resource buffers or within which sensitive outdoor research activity is undertaken.

Controlled Access Trails

The primary purpose of this public access designation is to provide pedestrian access to overlooks and the Younger lagoon beach area that are located in Controlled Access Areas of the Marine Science Campus. Because the overlooks exist or are to be sited in areas that include sensitive coastal resources, research facilities and activities, and steep ocean cliffs, use of the overlook trails shall be limited to authorized personnel for scientific or educational purposes or for the construction, repair, or maintenance of facilities. Because access to the Younger Lagoon beach area is only allowed consistent with and pursuant to a management plan for such access, use of the beach access trails shall be subject to the provisions of such management plan. These areas may also be accessed by members of the public as part of a supervised tour or education program (e.g., those conducted by Seymour Marine Discovery Center or Younger Lagoon Reserve staff of the terrace areas and Younger Lagoon beach). Controlled Access Trails shall be ADA compliant (unless topography and/or sensitive natural resources preclude compliance) and constructed of compacted decomposed granite or similar materials.

Fig. 5.6 Coastal Access and Recreation Diagram



5.6.2. Public Access and Recreation Policies

Policy 6.1 Public Access to the Marine Science Campus
Maximum public access to the coastal resources of the Marine Science Campus and the adjacent shoreline and coastal area shall be provided 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 site.

Implementation Measure 6.1.1 – Free Public Access for Visitors. *Free public visitor access to the Marine Science Campus shall be provided during at least daylight hours (i.e., one hour before sunrise until one-hour after sunset). Modest fees may be charged only for access to the Seymour Marine Discovery Center and similar University facilities with developed educational and/or visitor-oriented programs.*

Implementation Measure 6.1.2 – Public Access Parking. *The University shall construct, provide, and maintain parking spaces that are available to the public consistent with the provisions of Section 5.5, Circulation and Parking, to facilitate public coastal access to the Marine Science Campus and the adjacent shoreline and coastal area.*

Implementation Measure 6.1.3 – Public Access Trails. *The University shall construct, provide, and maintain a public pedestrian and bicycle trail system to facilitate safe and passable public access within, along, and through the Marine Science Campus. The locations of these trails shall be substantially similar to those shown in Figure 5.6. All trails and associated facilities shall be clearly signed for public use."*

Implementation Measure 6.1.4 – Public Access Overlooks. *The University shall construct, provide, and maintain at least six overlooks to provide the public with visual access to natural resources on and adjacent to the Marine Science Campus such as Younger Lagoon Reserve and the ocean. The locations of these overlooks shall be substantially similar to those shown in Figure 5.6, and the University shall be guided by the illustrations contained in Chapter 7 of this CLRDP as it designs the overlooks.*

Implementation Measure 6.1.5 – Docent-Led Tours and Education Programs for the Public. *The University shall seek to support and enhance public appreciation of coastal resource values through educational programs and docent-led tours of the site. The Seymour Center shall 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 shall continue to include docent-led tours of the coastal terrace and bluff, the Younger Lagoon Reserve overlooks, and the Younger Lagoon beach.*

Implementation Measure 6.1.6 – 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 shall be implemented at the Marine Science Campus, in cooperation with other agencies and entities.*

Implementation Measure 6.1.7 – Interpretive Information. *Opportunities for interpretation of the activities occurring at the Campus shall be provided as appropriate. In addition to developed Campus programs, such opportunities shall include interpretive displays, signs, and facilities designed to be easily accessible at and adjacent to public use areas, such as accessways, trails, and overlooks.*

Policy 6.2 Management of Public Access
All public access to the Marine Science Campus shall be managed to maximize public access and recreation opportunities while also ensuring the security of research and marine facilities on the site, the protection of wildlife populations and other natural resources, and public safety.

Implementation Measure 6.2.1 – Public Use Hours for the Marine Science Campus. *General public access to the Marine Science Campus shall be allowed during daylight hours (i.e., one-hour before sunrise to one hour after sunset).*

Implementation Measure 6.2.2 – Public Trail Continuity. *Public trails shall follow the alignments shown in Figure 5.6, with minor alignment adjustments as necessary to ensure trail continuity. Examples of situations where such minor adjustments may be necessary include: moving the trail inland if erosion of the coastal bluff threatens the trail; adjusting the trail alignment if the final location of campus buildings and/or facilities dictates adjustment to enhance trail connectivity and use values; adjusting the trail alignment to avoid significant disruption to the habitat values of resource protection areas; and temporary detours in response to construction, temporary special events, etc.*

Implementation Measure 6.2.3 – Access to Resource Protection Areas. *Public access to designated Resource Protection areas shall be managed to protect against disruption of habitat values. The general public may use CLRDP-designated roads, trails, overlooks, and the Younger Lagoon beach area within Resource Protection areas consistent with the provisions of this CLRDP. Only authorized personnel shall be allowed outside of such areas, except that public access may be gained with the University's written authorization. Authorization shall be granted only on a temporary basis and only for personnel necessary for activities consistent with uses allowed by the CLRDP. The University may use a combination of devices to protect natural resources in designated Resource Protection areas (including fences, walls, berms, and vegetation) provided such devices are consistent with the provisions of the this CLRDP.*

Implementation Measure 6.2.4 – Access to Resource Protection Buffer Areas. *Public access to designated Resource Protection Buffer areas shall be managed to protect against significant degradation of Resource Protection areas. The general public may use CLRDP-designated roads, trails, overlooks, and the Younger Lagoon beach area within Resource Protection Buffer areas consistent with the provisions of this CLRDP. Only authorized personnel are allowed outside of such areas, except that public access may be gained with the University's written authorization. Authorization shall be granted only on a temporary basis and only for personnel necessary for activities consistent with uses allowed in the CLRDP. The University may use a combination of devices to protect designated Resource Protection Buffer areas (including fences, walls, berms, and vegetation) provided such devices are consistent with the provisions of the this CLRDP.*

Implementation Measure 6.2.5 – Access to Coastal Bluffs. *The University shall provide access to the coastal blufftop edge through existing, enhanced, and new trails and overlooks as shown in Figure 5.6. Except for trails identified in Figure 5.6, the University shall limit access down the face of the bluff to the rocky intertidal area to authorized personnel trained to use rope ladders. The University may install and maintain bluff-top signs in this area warning of the danger of traversing the bluff face and of occupying the rocky intertidal area or surf below. The University may use a combination of devices to protect the coastal bluffs in this area from human intrusion (including fences, walls, berms, and vegetation), provided such devices are consistent with the provisions of this CLRDP.*

Implementation Measure 6.2.6 – Access to Laboratories and Research Areas. *The University shall provide public access to laboratories and research areas in the Upper, Middle, and Lower Terrace development zones through supervised tours only. Public access to these areas shall be limited as necessary to ensure that the research and marine facilities of the site remain secure. The University may use a combination of devices to protect such laboratories and research areas (including fences, walls, berms, and vegetation) provided such devices are consistent with the provisions of this CLRDP.*

Implementation Measure 6.2.7 – Caretaker Residence and Lab Security. *The University may maintain a caretaker residence and undertake appropriate measures consistent with this CLRDP to maintain security in public and non-public areas on the campus. The University may, if needed, establish a controlled entryway at Delaware Avenue and Shaffer Road, provided that all implementing development (e.g., kiosks, gates, etc.) is consistent with the provisions of this CLRDP, and provided that any gates/barriers to public access remain open and/or are not present during daylight hours.*

Implementation Measure 6.2.8 – Bicycles on the Marine Science Campus. *The use of bicycles on the trails, roads, and parking areas of the Marine Science Campus shall be allowed, except on "Controlled Access Trails."*

Implementation Measure 6.2.9 – Domestic Pets. *Cats and dogs and other domestic pets shall not be kept on or brought temporarily onto the Marine Science Campus. The University shall ensure that information regarding this domestic pet prohibition is disseminated to all Campus users, and that it is strictly enforced.*

Implementation Measure 6.2.10 – Public Access Signage. *Signage and other media shall be used to provide visitors with information about coastal resources, identify the location of public trails, overlooks, parking, and other Campus access and recreation amenities, and warn of dangers in the environment. Signage shall also be provided to identify Controlled Access Trails, with information about supervised tours. Signs shall be located, at a minimum: at each trailhead (i.e., where visitors enter the Marine Science Campus); at each trail intersection with another trail or an overlook; at each overlook; at each public coastal access parking area; and at intervals along trails no more than 200 feet apart. Trail signs specifically shall be placed so as to be visible to trail users coming from either direction (e.g., back-to-back signs). Brochures or other media describing Campus public access amenities shall be consistent with all CLRDP provisions and shall be made available at convenient locations for visitors to the Campus (i.e., Campus entrance at Delaware Avenue, Seymour Center, public coastal access parking areas, overlooks, etc.).*

Implementation Measure 6.2.11 – Off-Campus Trail Connectivity. *Public trails on the Marine Science Campus shall be designed to connect to and seamlessly integrate with trails that are located at the boundary of the Campus (see Figure 5.6). Such connecting trail locations at the Campus boundary include existing connections at Delaware Avenue and at the seaward end of De Anza Mobile Home Park, and future connections at the railroad tracks bordering the north of the Campus and to the upcoast Younger Ranch property bordering the west of the Campus and Younger Lagoon Reserve should public access be provided and/or allowed on these adjacent properties.*

Implementation Measure 6.2.12 – Maintenance of Existing Public Access. *Public access resources existing at the time of CLRDP certification, including trails, overlooks, parking, and signage, shall, at a minimum, be maintained in their existing condition until such time as they may be enhanced pursuant to the provisions of this CLRDP.*

Implementation Measure 6.2.13 – Public Access to Younger Lagoon Beach. *The University shall provide public access to the Younger Lagoon Beach area consistent with and pursuant to an approved management plan pursuant to Implementation Measure 3.6.3.*

Policy 6.3 Public Access and Recreation Plan Required

New development that affects public access and recreation shall be authorized by the University only if it includes a public access and recreation plan that clearly details the manner in which the development individually and cumulatively is consistent with and implements the public access and recreation parameters of this CLRDP, including those in Section 5.6 (Public Access and Recreation) and Chapter 9 (Capital Improvement Program), and including long-term monitoring, maintenance, and management of same.

5.7. Hydrology and Water Quality

This section sets forth plans, policies, and implementation measures related to hydrology and water quality on the Marine Science Campus and, as applicable, offsite.

5.7.1. Drainage Concept Plan

The governing plan for hydrology and water quality on the Marine Science Campus is the Marine Science Campus Drainage Concept Plan (Drainage Concept Plan), which is included as part of this CLRDP as Appendix B. The Drainage Concept Plan recognizes that stormwater and other runoff from the Marine Science Campus ultimately enters important natural resource areas on and adjacent to the site, including Younger Lagoon Reserve, terrace wetlands, and the Monterey Bay National Marine Sanctuary. Stormwater runoff is vital to the maintenance of habitat values in wet areas on Campus, but with development of the site there is also potential for harm caused by increased energy flows, altered flow regimes, and urban pollutants.

Overall, the implementation of the Drainage Concept Plan should be a significant improvement over the existing (at the time of CLRDP certification) drainage system for the Marine Science Campus. First, the plan calls for the correction of various then-existing drainage deficiencies on the Marine Science Campus (e.g., the deposition of eroded soil caused by historical erosion problems on the bluffs of Younger Lagoon Reserve adjacent to the NOAA inholding) early in the implementation of this CLRDP.

Second, the plan protects sensitive habitat areas from the effects of future development by using a combination of natural drainage systems and engineered filtration systems. The natural systems, which are referred to as Best Management Practices (or BMPs) will be used in series, where possible, connecting vegetated filter strips to grassy swales that are in turn connected to vegetated stormwater basins. Each of these mechanisms serves to filter and treat stormwater and other runoff so the quality of water leaving the system should be of relatively high quality. In addition to providing a high level of water quality, these natural systems will augment groundwater supplies by providing ample opportunities for groundwater recharge. Natural systems will be supplemented with engineered filtration system BMPs that will be used in parking lot and other vehicular use areas, and in maintenance/laydown areas, to ensure cleansing of runoff prior to it entering the natural systems in series, including ultimately the vegetated stormwater basins. The "in ground" natural and engineered treatment and filtration systems will also be supplemented by source control (such as a Campus-wide stormwater educational program, use of less polluting materials, etc.) and operational BMPs (such as regular maintenance, street sweeping/vacuuming, etc.). Thus, the Drainage Concept Plan represents a state of the art "treatment train" BMP approach that is both sensitive to the site design aesthetic and designed to produce the highest possible quality of site runoff possible.

The Drainage Concept Plan has six key components:

- Use of natural and engineered treatment/filtration BMPs in concert with source control and operational BMPS in a "treatment train" approach designed to effectively remove typical urban pollutants from site runoff and to allow the filtered and treated runoff to be used to maintain and enhance habitat areas.

- Maintenance of pre-development drainage peak flows in the post-development drainage system.

- Treatment of stormwater and other runoff to meet defined water quality success criteria (including the requirements set forth in "California's Management Measures for Polluted Runoff," Section 6217 (g) of the Coastal Zone Amendment and Reauthorization Act, and the Central Coast Region Basin Plan).

- Maintenance of BMPs and monitoring of filtered and treated stormwater and other runoff to ensure that the drainage system is able to provide effective control of water quantity and quality consistent with plan objectives.

- Maintenance of groundwater recharge at pre-CLRDP levels to the maximum extent practicable.

- Correction of erosion and sedimentation problems in Younger Lagoon Reserve caused by drainage from the terrace portion of the site.

Policies and implementation measures upon which the Drainage Concept Plan is based are provided below. In carrying out the Drainage Concept Plan, decisions are to be guided by, and achieve consistency with these policies and implementation measures, and the Drainage Concept Plan.

5.7.2. Drainage Management Policies

Policy 7.1 Productivity and Quality of Coastal Waters
The Marine Science Campus shall be developed and used in a manner that shall sustain and, where feasible, enhance and restore, the biological productivity and quality of coastal waters on and adjacent to the Campus through controlling, filtering, and treating 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.

Implementation Measure 7.1.1 – Management of Stormwater and Other Runoff. *The stormwater and other runoff drainage system on the Marine Science Campus shall be sited and designed using a combination of good site planning, source control, and filtration/treatment best management practices (including engineered storm water treatment systems) to achieve water quality objectives, as detailed in the Drainage Concept Plan (Appendix B). Low Impact Development (LID) BMP strategies and techniques shall be used in all system design (e.g., maximizing infiltration in BMP design, reducing the hydraulic connectivity of impervious surfaces, etc.). The drainage system shall be designed to filter and treat (i.e., to remove typical and expected urban runoff pollutants) all site runoff prior to its use for on-site habitat enhancement, infiltration, and/or landscape irrigation, and/or prior to its discharge otherwise. The drainage system shall be sized to accommodate the volume of runoff produced from all applied water (such as for irrigation) and from each and every storm and/or precipitation event up to and including the 85th percentile 24-hour runoff event for volume-based BMPs. Drainage shall be directed to vegetated stormwater basins through vegetated filter strips and swales to further improve water quality prior to its discharge to receiving areas. The drainage system for equipment/vehicle use areas (i.e., parking lots, maintenance and laydown areas, etc.) shall also include engineered treatment systems and/or equivalent systems designed to filter and treat contaminants expected to be present in the runoff relating to the specific type of equipment/vehicle use.*

Implementation Measure 7.1.2 –Water Quality Standards. *Stormwater and other site runoff shall be filtered and treated to the extent necessary to meet the minimum water quality requirements set forth in the Drainage Concept Plan.*

Implementation Measure 7.1.3 – Pre- and Post-Development Flows. *The University shall develop and manage a drainage system on the Marine Science Campus that maintains pre-development drainage patterns and peak flow rates for up to the 25-year return storm in the post-development drainage system to the maximum extent feasible, provided that accommodating such flows does not require drainage system sizing that exceeds 85th percentile storm event requirements (see Appendix B). The one exception to this flow pattern standard is drainage from Basin 10, part of which shall flow to Basin 9 to avoid construction of a new outfall over the coastal bluff (see Drainage Concept Plan in Appendix B).*

Implementation Measure 7.1.4 – Pre-Development Drainage Patterns Defined. *"Predevelopment drainage patterns" means the pattern of stormwater and other runoff flows prior to certification of this CLRDP, as identified in Drainage Concept Plan.*

Implementation Measure 7.1.5 – Pre-Development Drainage Peak Flow Rates Defined. *"Pre-development drainage peak flow rates" means the estimated rates at which stormwater and other runoff flowed on the site assuming the site was covered in grassland vegetation, as estimated in the Drainage Concept Plan, with the exception that for drainage Basins 5 and 9 only, it means the estimated rates at which stormwater flowed on the site prior to certification of this CLRDP, as estimated in the Drainage Concept Plan.*

Implementation Measure 7.1.6 – Groundwater Recharge. *The University shall develop and manage a drainage system on the Marine Science Campus that maintains groundwater recharge at pre-CLRDP levels to the maximum extent practicable through the use of infiltration (e.g., in the vegetated stormwater basins and swales).*

Implementation Measure 7.1.7 – Seawater System. *Seawater pumped onto the site shall be contained and discharged so as not to impact freshwater resources and upland habitats on the Marine Science Campus.*

Implementation Measure 7.1.8 – Irrigation and Use of Chemicals for Landscaping. *Any water used for landscape irrigation on the Marine Science Campus shall not be applied in a manner that would cause significant erosion. Any use of chemicals for fertilizer and/or weed and pest control shall be limited to the maximum extent feasible, including as required by the Drainage Concept Plan, and any chemicals unavoidably used shall not enter habitat areas or the ocean in concentrations sufficient to harm wildlife and/or to degrade habitat.*

Implementation Measure 7.1.9 – Wastewater. *All wastewater generated on the Marine Science Campus shall be discharged to the City of Santa Cruz's sanitary sewer system.*

Implementation Measure 7.1.10 – Elements of the Stormwater Treatment Train. *The University has identified six primary treatment BMPs in the Drainage Concept Plan (Appendix B) to be used as appropriate in every project-specific drainage plan developed for the Marine Science Campus. Wherever possible, these BMPs shall be used in series as a treatment train, but any combination may be used, depending on what is appropriate in any particular drainage basin, provided a subset of these six BMPs and/or a substitution (of an equally effective BMP) for one or more of them would provide equal or better water quality and other resource protection. In every case, engineered stormwater treatment systems shall be installed as part of the treatment train where areas subject to vehicular-type pollutant generation (e.g., parking lots, maintenance areas, laydown areas, etc.) are tributary to the treatment train.*

Implementation Measure 7.1.11 – Runoff Containment for Laydown Yard and Food Service Washdown Areas. *Any laydown yard and/or maintenance areas shall include designated areas for maintenance and servicing of equipment, and all such activities shall be confined to these areas. All runoff within such designated areas and within any food service washdown areas (in all development zones) shall be contained. The perimeter of these areas shall be constructed so as to completely contain runoff (i.e., curbs, berms, shower drains, etc.), and the contained area shall be plumbed to the sanitary sewer. The sewer connection in these areas shall be equipped with shutoff valves and these areas shall be covered (e.g., roofs or awnings) in such a manner as to minimize discharge of high volume stormwater flows to the sanitary sewer.*

Implementation Measure 7.1.12 – Location of Treatment Train Components. *Vegetated stormwater basins (except for the forebay) and associated outlet conveyance swales may be sited outside of development zones where such components are: 1) consistent with the Drainage Concept Plan and other CLRDP requirements, 2) sited and designed to minimize resource impacts, 3) designed to minimize landform alteration by utilizing multiple, small vegetated basins (rather than a large, single basin) that closely mimics the existing topographic features, 4) minimized in area to the maximum degree possible, 5) located as far from the resources being buffered and as close to the development zone as possible (unless a different location would result in better resource protection), and 6) limited to areas designated Open Space on Figure 5.2 except in areas adjacent to the Upper Terrace development zone and adjacent to the northwestern corner of the Middle Terrace development zone where these allowed components may also be allowed within the Resource Protection Buffer designation in two limited instances (that are described in the Drainage Concept Plan).*

Implementation Measure 7.1.13 – Permeable Hardscape. *Hardscape development (such as roads, parking areas, paths, patios, etc.), where appropriate for water quality protection purposes, shall include permeable materials (e.g., permeable pavement/concrete, turfblock, etc.) to maximize infiltration. At a minimum, all parking areas shall be surfaced with porous/permeable materials.*

Implementation Measure 7.1.14 – Ocean Discharge. *In addition to any National Pollutant Discharge Elimination System (NPDES) requirements, all ocean discharge shall be subject to the monitoring, maintenance, and water quality standards and requirements identified in the Drainage Concept Plan.*

Implementation Measure 7.1.15 – Drainage System Interpretive Signs. *All drainage improvements shall include as part of them interpretive signs and facilities designed to explain the reason for and the operation of the selected treatment train drainage system components applicable to both the individual development and the Campus overall.*

Implementation Measure 7.1.16 – Design of Vegetated Stormwater Basins. *Vegetated stormwater basins shall be created by constructing low-profile natural looking berms to enclose a land area within which non-native and invasive plant species shall be removed and native grasses and other suitable native vegetation capable of enhancing water quality shall be planted consistent with the Resource Management Plan (CLRDP Appendix A). Any portions of such vegetated stormwater basins that are located outside of development zones shall be considered an integral part of the natural open space area within which restoration and management shall apply pursuant to the Resource Management Plan (CLRDP Appendix A), and within which other development is prohibited. The berms to be used to create the enclosed areas defining the vegetated stormwater basins shall be no higher than 18 inches from natural grade and shall be no steeper than a three-to-one grade. The berms shall include natural looking spillway areas designed to accommodate the release of detained runoff that exceeds the maximum capacity of the vegetated stormwater basins in a non-erosive manner.*

Implementation Measure 7.1.17 – Designation of Treatment Train. *All development projects that include new drainage system components (e.g., development of vegetated filter strips, swales, and stormwater basins) or that*

result in new drainage inputs to established drainage system components shall clearly identify the drainage system components that are designed to accommodate project drainage and address CLRDP water quality requirements. These components shall be considered a "BMP treatment train" for purposes of CLRDP water quality monitoring (see Appendix B). For each BMP treatment train so identified, its final discharge point and a representative initial input point shall be designated for purposes of CLRDP water quality monitoring.

Policy 7.2 Long-Term Maintenance and Monitoring

The University shall maintain and monitor the drainage system for stormwater and other runoff on the Marine Science Campus to provide control of water quantity and quality in a manner which maintains the quality and biological productivity of coastal waters and habitats on and adjacent to the Campus.

Implementation Measure 7.2.1 – Drainage System Monitoring and Maintenance. *The University shall regularly inspect and maintain Marine Science Campus drainage systems, and shall regularly monitor system discharge, consistent with the requirements of the Drainage Concept Plan to ensure that the integrity of the drainage system is maintained, to verify that the drainage system is improving the quality of the water draining from the site, and to ensure that discharge has been adequately filtered and treated to meet CLRDP water quality objectives.*

Implementation Measure 7.2.2 – Stormwater System Natural Features Maintenance. *The vegetated stormwater basins, vegetated filter strips, vegetated swales, and other natural drainage features to be created per the Drainage Concept Plan may exhibit wetland and/or habitat characteristics over time, but their primary function is for water quality filtration and treatment, flow control, and infiltration. As such, maintenance within them on a regular basis is expected and necessary in this respect, and is allowed per this CLRDP (see maintenance parameters in the Drainage Concept Plan).*

Implementation Measure 7.2.3 – Drainage System Sampling. *The University shall sample stormwater runoff within, and discharges from, each development zone (i.e., Upper, Middle, and Lower Terrace, and Campus Entrance) on the Marine Science Campus and in YLR in a manner consistent with the Drainage Concept Plan. Stormwater shall be tested to ensure that the BMPs incorporated into the drainage system are functioning consistent with the Drainage Concept Plan. If discharge water quality does not meet the objectives set forth in the Drainage Concept Plan, the University shall take action to determine the cause and make modifications as necessary to address the identified water quality issue and to meet the required water quality objectives. The results of stormwater sampling shall be made available to researchers investigating the performance of BMPs in California.*

Implementation Measure 7.2.4 – Long-Term Maintenance of Stormwater System. *The University shall regularly maintain all components of the campus drainage system, as specified in the Drainage Concept Plan.*

Policy 7.3 Drainage Discharge Points

The number of individual drainage discharge points shall be as specified in the Drainage Concept Plan. The University shall make improvements to them as necessary to correct existing erosion and/or other problems detrimental to maintenance of beneficial hydrology or water quality. Additional discharge points not identified in the Drainage Concept Plan shall not be created unless required to replace an identified 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 shall be designed to accommodate the 100-year storm event if otherwise consistent with the provisions of this CLRDP, including the Drainage Concept Plan.*

Implementation Measure 7.3.2 – Discharge Siting and Design. *All discharge points shall be sited and designed to minimize resource impacts.*

Policy 7.4 Drainage Plan Required
New development that alters drainage patterns shall be authorized by the University only if it includes a drainage plan that details the manner in which the development individually and cumulatively is consistent with and implements the stormwater and other runoff parameters of this CLRDP, including the Drainage Concept Plan, and including long-term drainage system monitoring and maintenance.

5.8. Utilities

This section sets forth plans, policies, and implementation measures related to utilities on the Marine Science Campus.

5.8.1. Utilities Program

The utilities program for the Marine Science Campus consists of six program elements, and each of these is described below. The Utilities Diagram is discussed in a subsequent section. All utilities are to be located underground (note see also Section 5.4).

Water System
Increased water supplies will be provided to the Marine Science Campus through expanded water lines in designated utility corridors. As in most new developments, the driving factor in sizing water mains will be the anticipated demand from fire suppression facilities within the system (hydrants and building sprinklers). Domestic use is expected to have a negligible impact to the sizing of new water infrastructure. The on-site water system will be expanded as necessary to support the fire suppression demands of new structures in terms of size and proximity. New mainline pipe sizes within the campus are expected to be 6, 8 or 10 inches in diameter, depending on projected fire flows, but in all cases are going to be limited to the minimum size necessary to serve Campus development only. New water mains will be located within campus roadways and utility corridors. There will likely be two connections to the City system: the existing connection at the intersection of Delaware Avenue and Shaffer Road and possibly a second connection in Shaffer Road at the entrance to the Upper Terrace development zone. City owned water facilities surrounding the site are of sufficient size to support the site. The City-owned 12-inch water main in Delaware Avenue at Shaffer Road provides water to the site at a static pressure of 90 pounds per square inch (PSI). The 10-inch water main in Shaffer Road at the railroad tracks will provide water to the site at a static pressure of 80 PSI. Tests indicate that fire flows of 2,500 GPM are achievable at both locations. No major off-site construction is required to provide water services to the site. There are currently no restrictions for water purchase through the City of Santa Cruz at the time of CLRDP certification, but there may be subsequent to that time and the University will need to closely coordinate with the City concerning potential effects of Campus demands on the municipal water supply. Water demand calculations are based on the estimated wastewater demands with an additional 10 percent for non-recovery. Peak hourly demand is estimated to be 5 times average hourly demand.

Seawater System

Expanded seawater capacity may be provided to the Marine Science Campus through utility corridors as shown in Figure 5.7. The demand for seawater on the Marine Science Campus is projected to be 6,000 GPM at full development of the CLRDP building program, and the capacity of the system is limited to this size. Any additional capacity would likely be provided via the reconstruction of the existing intake lines or the construction of new intake lines at the southern edge of the site, near the existing lines. However, this CLRDP also requires that entrainment and impingement be avoided to the maximum extent feasible, and alternative seawater system designs may be necessary to meet such requirements. In any case, an increase in intake capacity would also likely be accompanied by expanded seawater storage tanks, filtration and treatment facilities, and distribution improvements. Seawater systems will be designed with containment against possible spillage into resource protection areas.

Sanitary Sewer System

Sewer service to new development in the Lower Terrace will connect to the existing force main that connects to the Middle Terrace. No upgrade to this force main is necessary, but upgrades to an existing pump station adjacent to NOAA fisheries lab may be necessary. In the Middle Terrace, new development will connect to either the existing 8" gravity line extending north of the NOAA lab or to an existing 8" gravity line extending from the Fish and Game area south and east to the lift station at the NOAA lab. In the Upper Terrace, new development will connect to an existing gravity line in Shaffer Road. According to City of Santa Cruz officials, some City-owned off-site facilities downstream of the project are approaching capacity and will require upsizing to facilitate future projected demands (including the sewer pump station on Delaware). Wastewater treatment will continue to occur at the City's treatment plant at Neary Lagoon. There were no service or capacity restrictions at the wastewater treatment plant at the time of CLRDP certification, but there may be service restrictions and capacity issues subsequent to that time and the University will need to closely coordinate with the City concerning potential effects of Campus demands on the municipal wastewater treatment system.

Electrical System

Expanded electrical service will be provided to the Marine Science Campus through the PG&E electrical grid. The existing underground utility corridor at the time of CLRDP certification, which is located along the western edge of the site, will likely be used to accommodate projected electrical power needs (see also below). Improvements to off-site power lines may be required and could be accomplished by pulling new conductors through existing conduit or by replacing existing conduit with larger conduit. On-site improvements will consist of new transformers and the extension of underground services from existing and new transformers to new buildings. New meters may be required in some instances. There are no electrical service restrictions at the time of CLRDP certification, but there may be service restrictions subsequent to that time and the University will need to closely coordinate with PG&E concerning potential effects of Campus demands on the electrical grid.

The telephone, data, and electricity utility corridor is located outside of City limits, outside the Campus, and bisects the habitat corridor extending from Younger Lagoon along the western portion of the site, including an area identified for habitat enhancement. As such, maintaining and expanding utilities within it presents some concern regarding the urban-rural boundary and habitat protection. Therefore, for telephone, data, and electricity utility upgrades, which require significant ground disturbance, the University shall assess the alternative of re-routing all utilities out of this utility

corridor and/or adding the needed additional capacity through an alternative route. If found to be feasible and less environmentally damaging, the additional capacity shall be accommodated through an alternative route and the rerouting of the lines and any necessary utility abandonment measures (such as pulling out utility lines and restoring affected habitat area) shall be included within the University's development authorization.

Natural Gas System

Expanded natural gas service will be provided to the Marine Science Campus 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). At the time of CLRDP certification, no major off-site improvements are required to accommodate this demand. On-site improvements will include the extension of underground gas service to new buildings from existing gas mains. There are no natural gas service restrictions at the time of CLRDP certification, but there may be service restrictions subsequent to that time and the University will need to closely coordinate with PG&E concerning potential effects of Campus demands on the natural gas system.

Communication Systems

Expanded telephone and data service will be provided to the Marine Science Campus as needed to accommodate CLRDP building program needs. The existing underground utility corridor at the time of CLRDP certification, which is located along the western edge of the site, may be used to accommodate projected telephone and data service needs. As detailed above, communication utilities may instead be re-routed out of the western utility corridor. At the time of CLRDP certification, no major off-site improvements are necessary to accommodate increased demand. On-site improvements will include the extension of telephone and data lines through new underground conduits to new buildings.

5.8.2. Utilities Designations and Diagram

Three utility designations have been created for the UCSC Marine Science Campus: 1) Utility Corridor, 2) Utility Connection Point, and 3) Utility Prohibition Zone. Figure 5.7, Utilities Diagram, shows the geographic location of these designations on the Marine Science Campus. The intended effect of these designations is set forth in this subsection.

Utility Corridor

The primary purpose of this utility designation is to accommodate the utility program elements set forth in Subsection 5.8.1 above. The University will route all utility trunk lines related to the elements of the utility program described above through areas designated as "Utility Corridor" in the Utilities Diagram shown in Figure 5.7, and all lines will be sized to meet CLRDP building program needs consistent with resource protection.

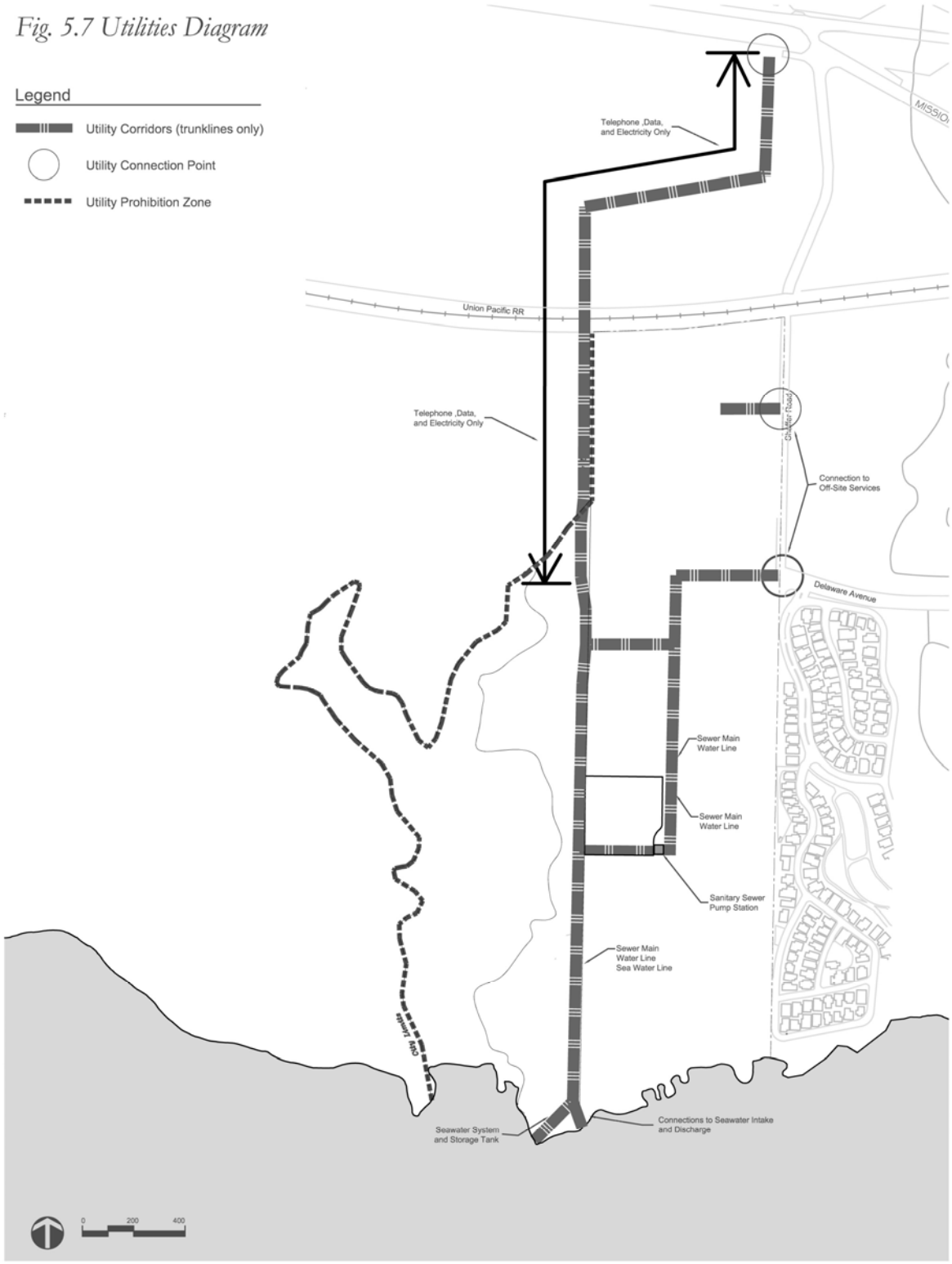
Utility Connection Point

The primary purpose of this utility designation is to prescribe the location at which sewer and water utilities will be connected to City sewer and water lines.

Utility Prohibition Zone

The primary purpose of this utility designation is to create an area through which the extension or expansion of sewer and water utilities to areas outside the City of Santa Cruz or otherwise beyond the Campus to the west is prohibited.

Fig. 5.7 Utilities Diagram



5.8.3. Utilities Policies

Policy 8.1 Provision of Public Works Facilities
New or expanded public works facilities shall be designed and limited to accommodate only 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.

Implementation Measure 8.1.1 – Sizing of Utilities. *Utilities and services to and on the Marine Science Campus, including water, sanitary sewer service, stormwater systems, and electrical and communication lines, shall be sized consistent with and limited to accommodating only the building program set forth in this CLRDP.*

Implementation Measure 8.1.2 – Seawater System. *The University may maintain and may expand its seawater system to provide fresh seawater consistent with this CLRDP. The capacity of the seawater system shall 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
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.

Implementation Measure 8.2.1 – Installation of New Utility Lines and Related Facilities. *New incidental public underground utility lines and related incidental public facilities shall be allowed below wetlands and riparian corridors only when there is no feasible less environmentally damaging alternative and where feasible mitigation measures have been provided to both minimize adverse environmental effects and to commensurately offset any unavoidable effects.*

Implementation Measure 8.2.2 – Seawater System. *The seawater system shall be operated in a manner that will protect against spillage and that will sustain the biological productivity and quality of coastal waters, streams, and wetlands.*

Implementation Measure 8.2.3 – Evaluation of Western Utility Corridor. *Development that requires or includes telephone, data, and/or electricity utility upgrades that require significant ground disturbance within the utility corridor along the western boundary of the site shall include an analysis detailing the measures necessary to re-route all utilities out of this utility corridor and/or adding the needed additional capacity through an alternative route. If found to be feasible and less environmentally damaging, the additional capacity shall be accommodated through an alternative route and, if feasible, the existing lines shall be rerouted. Any necessary utility abandonment measures (such as pulling out utility lines and restoring affected habitat area) shall be included within the University's development authorization.*

Policy 8.3 Water Conservation Required
New development shall include water conservation measures that reduce water use. Such conservation measures shall be applied to both interior water use (e.g., including but not limited to, ultra low-flow plumbing fixtures, flow restrictors, hot water re-circulation pumps, water pipe insulation, Energy-Star rated appliances, etc.) and exterior water use (e.g., including but not be limited to, drought tolerant landscape species, drip irrigation, cistern collection for irrigation, rain sensitive irrigation systems, overflow prevention mechanisms, automatic shutoff nozzles, etc.). The City of Santa Cruz shall be consulted regarding necessary water conservation measures.

Policy 8.4 Impacts to City Water and Sewer Systems Offset

New development shall include the payment of fair-share fees and/or commitment to construct necessary water and sewer system upgrades attributable to the development's impact on City water and sewer utility infrastructure. The City of Santa Cruz shall be consulted regarding any fair-share fees and/or water/sewer system upgrades.

Policy 8.5 Utility Plan Required

New development that requires utilities shall be authorized by the University only if it includes a utility plan that details the manner in which the development individually and cumulatively is consistent with and implements the utility parameters of this CLRDP, including Section 5.8 (Utilities), and including long-term monitoring and maintenance of same.

6. Design Guidelines

The purpose of this chapter is to provide design guidance for development on the UCSC Marine Science Campus that implements the design principles and land use concepts of Chapter 4 and is consistent with the policies and measures of Chapter 5. Campus development shall be consistent with the design guidelines of this Chapter. This Chapter contains eight subsections that address specific areas of design. These include:

6.1 Building Design

6.2 Campus Street Design

6.3 Parking Design

6.4 Trail Design

6.5 Landscape Design

6.6 Lighting Design

6.7 Signage Design

6.8 Fencing / Barrier Design

6.1. Building Design

Since the inception of the Marine Science Campus, care has been taken to design facilities that fit the site character. The original Long Marine Lab buildings were designed with natural board and batten siding and sloping roofs and in a number of respects resembled typical coastal rural and agricultural (or farm) buildings. More recently, additions to the campus have somewhat modernized this appearance, while still retaining the general shape, design, and form of building massing.

6.1.1. Intent

The intent of the building design guidelines is to establish a building design aesthetic at the Marine Science Campus that is sympathetic to the enduring qualities of the vernacular coastal, rural and agricultural architecture, similar to the original Long Marine Laboratory buildings. An overriding objective is to limit the visual impact of buildings to the maximum extent feasible consistent with program needs. This is to 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 coastal barn form should be the primary inspiration and is the foundation of these guidelines. In addition, design elements that could impact Younger Lagoon Reserve (YLR) and other habitat areas should be avoided.

6.1.2. Building Design Guidelines

The following guidelines are intended to reinforce the conception of the site as a transition zone between the rural, open-space, agricultural, and State Park coastal landscape to the west and north and the developed urban fabric to the east. Figure 6.1 depicts coastal rural and agricultural architecture.

Fig. 6.1 Coastal Rural and Agricultural Architecture

Building Arrangements

L-shaped or U-shaped forms lend themselves to creating the types of informal arrangements that typify the coastal form. As shown in Figure 6.2, these configurations will also provide the opportunity to create useful, sheltered outdoor space.

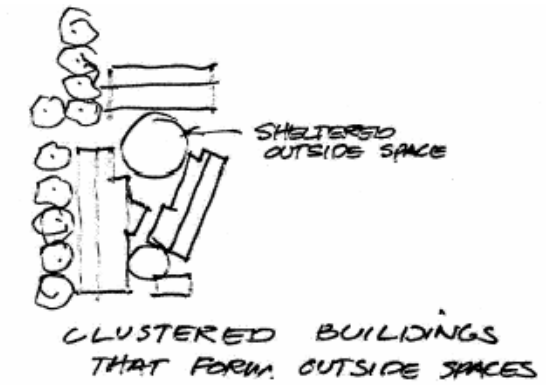


Fig. 6.2 Building Arrangements

Buildings shall be designed to encourage interaction among its inhabitants. Circulation, both vertical and horizontal, can be opportunities for interaction. Stairs should be designed to foster communication by being enjoyable places, providing access to daylight and views. Appropriately scaled stairs and landings can become places for chance meetings and encourage interaction among colleagues. Active public spaces should be located adjacent to outdoor spaces and pedestrian routes and pathways.

Although buildings will be clustered to encourage interaction, appropriate building scale and separation is also important so that development within each development zone is not perceived simply as a large mass of buildings both from within and from public views of the campus. In order to achieve the proper scale for CLRDP development on the Campus, and the proper scale within development zones, Figure 5.4 establishes development subareas within which building height and development intensity are regulated, the intended effect of which is to generally limit building heights, decrease building heights at the edge of building zones and to provide scale compatibility with existing buildings and the site overall. This is particularly important in the Lower Terrace

development zone due to the limited additional area allotted for new development and the substantially built up nature of this node. In all cases, the CLRDP prescribes a maximum square footage for new buildings, and requires that scale compatibility be achieved.

Furthermore, when the program requires a building to be a large form, it shall be articulated as a primary form, supported by smaller, secondary forms. In addition, this type of articulation shall apply to building elements at the perimeter of Campus development zones. This will help to break down the perceived bulk of buildings and Campus development nodes overall and give both scale. The overall effect should be one of buildings that have evolved over time and in harmony with their natural environment.

Outdoor Spaces and Courts

The windy climate of this site dictates that courts and occupied outdoor patio spaces are ideally situated on the lee side (east and north) of the building. Smaller patio spaces are preferable to large or monumental spaces as they are more likely to remain protected from the wind.

Building Profile

Existing buildings on the Marine Science Campus are a range of sizes with most being one-story from 12 feet up to a maximum of 24 feet above grade (usually less) in height. There are also two, two-story buildings, and these are the largest buildings on the site at 36 feet above grade in height (see Figure 6.3). In some cases, Campus buildings include even taller articulated elements above rooflines to screen mechanical equipment. The scale and massing of future facilities shall be consistent with the existing site character, as well as the desire to foster interdisciplinary interaction and a sense of community among the research, student and staff population.

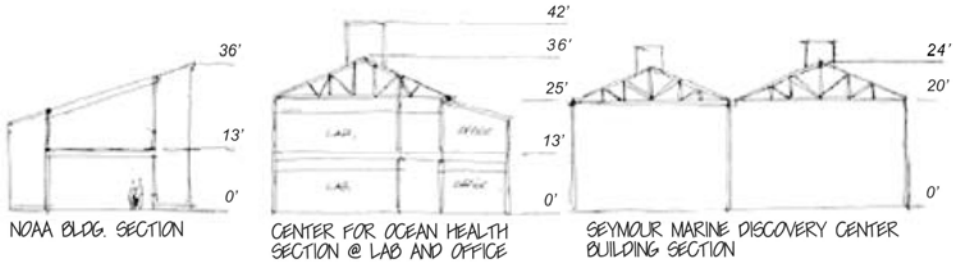


Fig. 6.3 Existing Building Heights

As prescribed in Chapter 5, buildings on the Marine Science Campus are limited to a maximum of two stories and maximum height of up to 30 feet (and up to 36 feet in certain circumstances for certain lab buildings) to minimize their perceived bulk and to allow good access to daylight and views. First floor levels should be as close to the existing grade as possible. Many support facilities, such as warehouse and storage buildings will be only one story and less than the maximum height and will tend to cluster at the edges of the development zones. Also, height limits are highest in the middle of development zones and lowest nearest the edges and the coastline. The resulting stepped profile of development (lowered and articulated building elements nearest the perimeter of development zones, as well as on the perimeters of individual buildings/complexes) recognizes the

scenic value of the site in the coastal zone, particularly nearest the shoreline. It establishes a visual form and massing of development that is compatible with this transition from the urban city edge of industrial and residential uses. Figure 6.4 shows the building profile for a typical maximum height lab building on the Marine Science Campus.

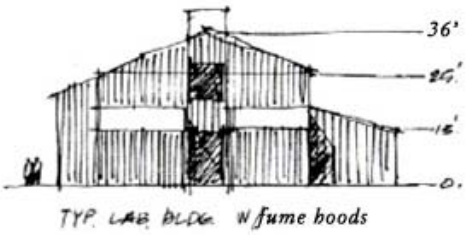


Fig. 6.4 Typical Lab Building Profile

Materials and Color

Construction materials will relate strongly to the vernacular style of coastal architecture. Stained vertical wood siding, roughcast concrete and high-quality shingle roofing are generally required. The existing Long Marine Laboratory buildings on site typify the required styles of material and color. Subdued, natural colors that offer little contrast to the surrounding environment are required, although building features such as windows and doors may have small color variations to enhance the building design. Differing colors shall harmonize rather than offer stark contrasts.

Exterior Walls: Siding materials shall be vertical board and batten construction of western red cedar or redwood with an integral stain finish, unless a different exterior treatment is deemed more in keeping with the site character and aesthetic.

Exterior Metals: The coastal environment is highly corrosive. Metals shall be corrosion resistant materials such as bronze, copper, stainless steel, cor-ten steel, or pre-finished aluminum. Selection of railing, doorframe, window, and roofing materials should reflect the special challenges posed by this site.

Exposed Concrete: Prominently exposed concrete surfaces such as the edges of a foundation wall will be board-formed or rough-finished (textured not smooth).

Base Floors/Foundation: First floors shall be concrete slab on grade over engineered fill with spread footing foundation, or supported on drilled piers with grade beams if required.

UC Green Building Policy

Effective July 2004, all University capital improvement projects must meet the standards set out in The Regents' Green Building Policy. At the time of CLRDP certification, this policy included the following green building standards and system-wide clean energy standards. Within regulatory and programmatic requirements and budget constraints, new buildings should strive for "Silver" and

must achieve the equivalent of at least a LEED "Certified" rating. The buildings must also outperform Title 24 energy requirements by 20%.

Temporary Greenhouses

Eleven existing temporary greenhouses shall be made to meet all applicable design and design-related guidelines as much as practicable, but are allowed to be inconsistent with some such guidelines provided reasonable attempts to meet such guidelines are applied, and provided such temporary facilities are made to conform to all CLRDP requirements, including design guidelines, or are removed and the disturbed area restored within seven years of CLRDP certification, or by December 31, 2013, whichever comes sooner.

6.2. Campus Street Design

This section sets forth design guidelines for streets on the Marine Science Campus.

6.2.1. Intent

The intent for the design of streets at the Marine Science Campus is to make the streets and the vehicles traveling along them as unobtrusive within the overall site environment as possible. Various strategies, ranging from planting to gentle berming, can be employed to achieve this goal. Figure 6.5 shows a section of how a typical campus street would be developed under the CLRDP.

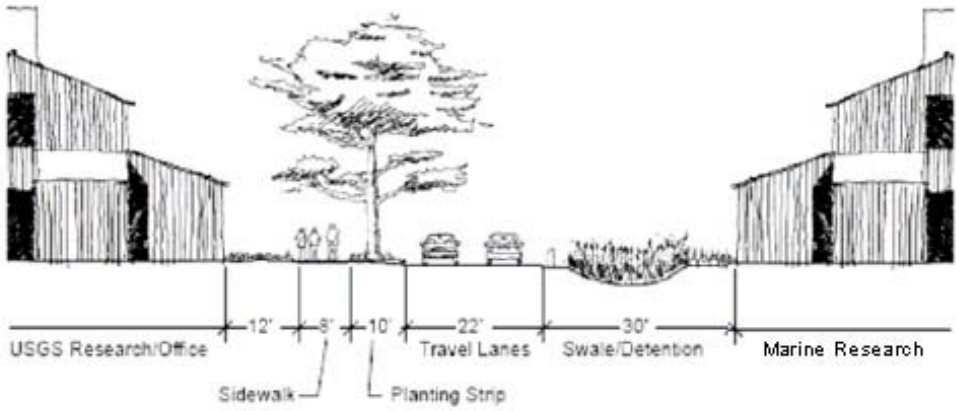


Fig. 6.5 Section of Typical Campus Street

6.2.2. Street Design Guidelines

The following design guidelines shall apply to street development on the Marine Science Campus.

- All streets shall be designed to accommodate two-way traffic flow. Pavement widths shall be no greater than 22 feet wide to minimize pavement area and to help reduce speeding. This maximum width may be increased by the minimum amount necessary if required to accommodate turning radii for large trucks and trailers accessing the site.

- All streets shall be constructed without curbs.
- Pavement edges in most areas shall be marked and off road movement discouraged through the use of a combination of landscaping, rope/cable and pole barriers, and small bollards or rails constructed of natural materials placed at regular intervals along both sides of the street. Outside of development zones, any such measures to keep vehicles on roads shall be limited to the maximum extent feasible and shall be sited and designed to match the natural grassland character of the surrounding natural area.
- Streets shall be surfaced with asphalt or other similar materials, and may include permeable sections (e.g., permeable pavement/concrete, turfblock, etc.) to enhance infiltration.
- Drainage swales shall be used adjacent to streets to filter drainage, regulate stormwater flows, and provide an attractive seasonally wet landscape feature, except where infeasible because of the potential for damage from automobiles accessing parking or building driveways.

6.2.3 Setbacks from Streets and Parking Lots

The following design guidelines shall apply to setbacks from streets and parking lots on the Marine Science Campus.

- Setbacks of facilities from roads and between buildings shall be sized to accommodate the CLRDP building program, to promote a compact development pattern within the development zones, and to diminish the perceived bulk of buildings and building clusters. Where surface drainage swales and basins are provided, building setbacks shall be increased appropriately. Setbacks shall be measured from the edge of roadway pavement or the parking area pavement edge.

- Buildings shall be located no closer than 15 feet from Campus Streets and parking lots. Building setbacks shall be increased to up to 30 feet where necessary to accommodate drainage swales and basins. The maximum continuous building length along a street setback line shall not exceed 175 feet.

6.3. Parking Design

This section sets forth design guidelines for parking areas on the Marine Science Campus.

6.3.1. Intent

The intent for the design of parking areas at the Marine Science Campus is to minimize their 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.

6.3.2. General Parking Area Design Guidelines

The following general design guidelines shall apply to parking area development on the Marine Science Campus.

- All parking areas and/or individual parking spaces shall be located only within the four designated development zones

- Parking areas on the Marine Science Campus shall be located and designed to minimize their visual impact to natural resource areas and to users and visitors of the site.

- Parking shall be distributed around the site in discrete parking areas rather than in large lots to help minimize the visual impacts of these features, to minimize the disruption to groundwater recharge during storm events, and to promote convenience for campus users.

- All parking shall be screened from view with planting or gentle berms or located within building clusters where they will not be visible from a distance.

- Wheel stops may be used to keep cars on pavement and in designated parking areas.

6.3.3. Specific Parking Area Design Guidelines

In addition to the general guidelines above, specific guidelines for particular elements of parking areas on the campus also apply and include the following:

Parking Area Drainage

Drainage from the parking areas shall be contained by natural materials (wood, concrete, and stone) that can be used as edge treatments (e.g., headers) as necessary to guide drainage to filtered outlets and control erosion of the pavement edge.

- Two types of surfaces are to be used for parking areas on the Marine Science Campus. All permanent parking areas shall be surfaced with porous/permeable materials (e.g., porous pavement/concrete, turfblock, etc.) to enhance infiltration.

- Temporary or overflow parking areas may be covered in gravel or decomposed granite, or left in a weedy ruderal (mowed) state.

Parking Area Screening

Parking areas shall be screened to minimize public view impacts through a variety of means depending upon the location of the parking on the site and the characteristics of the surrounding area. Appropriate strategies include:

- Gentle berms with native grasses in grassland areas.

- Native shrubs and small trees adjacent to Resource Protection Buffers or other areas where similarly-scaled materials exist in order to cause the parking and its screening to recede into the surrounding background.

Temporary Parking Areas/Ground-Level Storage Areas

The University may develop temporary parking and/or ground-level storage areas during the first five years after CLRDP certification. These temporary facilities shall be designed to meet all applicable design and design-related guidelines as much as practicable, but are allowed to be

inconsistent with some such guidelines provided reasonable attempts to meet such guidelines are applied, and provided such temporary facilities are made to conform to all design guidelines or are removed and the affected area restored within five years of CLRDP certification (see also Section 5.2.1).

6.4. Trail Design

This section sets forth design guidelines for trails on the Marine Science Campus.

6.4.1. Intent

Walks and trails on campus have two primary and overlapping uses: 1) daily use by site faculty, staff and students to access site facilities, and 2) visitor use for coastal access, docent-led tours, and informal interpretive walks.

The intent of the design of trails at the Marine Science Campus is, like streets, to make them as unobtrusive and natural appearing as possible while also providing functional pedestrian and bicycle circulation that is attractive to use in all seasons and weather conditions, thereby encouraging people to walk and bike to and on the site rather than traveling by car.

6.4.2. General Design Guidelines for Trails

The following general design guidelines shall apply to trail development on the Marine Science Campus.

Trail Widths

Trail widths will vary between 6 feet (at a minimum) and 12 feet (at a maximum) depending on location and function, except for controlled access trails that may be narrower than 6 feet if topography and/or sensitive natural resources preclude such width, and if the trails are still wide enough to accommodate the expected level and type of access. The larger widths should be limited to those direct routes between campus facilities that may see higher levels of pedestrian and bicyclist use. In general, narrower trail widths will be used outside of development zones.

Trail Materials

Materials utilized in trail construction shall be commensurate with their intended use and appropriate for their location. Material choices include, but are not limited to: concrete, pavers, asphalt, stabilized aggregate, compacted aggregate, wood boardwalks, and mulch topping.

Trail Amenities

Trails shall include benches, trashcans, recycling bins, bike racks, and similar amenities at appropriate locations. The intent is not to duplicate the amenities that are provided at Campus buildings, overlooks, and trailheads, but rather to ensure that convenient facilities for trail users are provided along trails. In addition, the intent is to provide for minor destination and stopping points along trails themselves that both take advantage of natural features for viewing and interpretation (such as the terrace wetlands, ocean, etc.), and that provide defined resting/stopping points in general. All trails

shall include such amenities as appropriate when considered in light of facilities available near the trail and destination points along the trail.

6.4.3. Specific Trail Design Guidelines

In addition to the general guidelines above, specific guidelines for specific trail types and uses at the campus also apply.

- Major trails shall be up to 12 feet wide and in most cases will follow roadways. Low-level lighting may be provided. Higher traffic routes may be constructed of concrete or asphalt.
- Minor trails are generally devoted to coastal access, docent-led tours, and interpretive walks and shall be a minimum of six feet wide, except in the buffer to Younger Lagoon Reserve, where the width of trails may be narrower (provided the trails are still ADA compliant, if feasible) to avoid major slope alterations. Minor trails that are located in open space areas will be constructed of decomposed granite or similar naturalistic materials. Boardwalks may be utilized if appropriate. No night lighting shall be provided unless needed for safety. Minor barriers to restrict pedestrian movement to the trails (e.g., rope and pole) may be installed if needed.
- If the trail follows a street alignment, it shall be separated from the street by a minimum five-foot strip of vegetation designed to buffer trail users from vehicles.
- Benches and associated trail amenities shall be provided, at a minimum, at locations adjacent to each terrace wetland and near the western Campus boundary oriented to the west.
- Campus trails should be viewed as a system of interwoven trails providing access both internal to the Campus as well as connecting to adjacent trails and accessways off the Campus. Trail continuity shall be maintained, including by the use of dedicated street crossings, and trails shall be located where they are most convenient to Campus users while avoiding coastal resource impacts.
- In certain circumstances, more significant structural components may need to be built into trails to avoid resources and/or to ensure their proper function. For example, avoidance of habitat, including wildlife corridors and their buffers, may require a raised trail and/or other habitat passageway in some circumstances.
- Except for signs identifying use parameters for the trail, and except for the ensuring that the gate is open during daylight hours (i.e., one hour before sunrise until one-hour after sunset), improvements to the beach access trail (from the ocean overlook to the beach fronting Younger Lagoon) are a discretionary and conditional requirement. Such trail improvements may be pursued as public access demand and use patterns dictate. Improvements shall be required when significant obstacles to continued public access are documented. The University shall evaluate trail demand for this segment on at least a yearly basis, and shall include said evaluation (including recommendations for improvements as necessary to meet CLRDP requirements) in all Public Access and Recreation Plans required by Chapter 5.

6.5. Landscape Design

The appropriate use of plant materials will be one of the most important considerations in the success of the Marine Science Campus. Plantings are a primary element of the character of the coastal rural/agricultural landscape. Therefore, planting applications have been carefully considered.

6.5.1. Intent

The intent of this section is to provide guidelines for landscaping natural drainage features and areas adjacent to, connecting, and within development zones. Where new planting in these areas is proposed at the Marine Science Campus the intent is:

- To use plant material (for both natural and ornamental areas) that is native to the Northern and Central California coast, and if possible native to the Terrace Point area.
- To plant material that is drought tolerant, non-invasive, low maintenance, and fire retardant.
- To plant native materials that are from the same gene pool.

6.5.2. Planting Design Guidelines

Guidelines for planting in and adjacent to developed areas and in areas serving a drainage function are discussed below. Figure 6.6, Landscape Design, generally illustrates the concept for siting landscape design elements for the developed areas of the Marine Science Campus. Figure 6.6 is not intended to represent the only way to realize the landscape concepts, but rather it is intended to provide a generalized illustration of how the concepts would be applied to developed areas of the site.

Stormwater Basins, Swales, and Filter Strips

Vegetated stormwater basins, swales, and filter strips to be installed for site drainage are intended to reinforce the natural dendritic pattern of the coastal landscape that is both naturally occurring and found along rural roadways. These new drainage features will be planted with materials that will assist in the treatment of stormwater runoff (including, as appropriate, plant species that are capable of improving particulate settling and uptake of dissolved contaminants) and that are also complementary to the surrounding rural/natural environment (see also Appendix B, Drainage Concept Plan, for additional specific planting and other related design guidance).

Windbreak/Screening Trees

Trees will be planted in rows as windbreaks on the Campus whose purpose is to reinforce views, provide visual screening of buildings and parking, enhance site aesthetics, and mitigate winds.

A single species, such as Monterey Cypress, is preferred for the windbreaks, but multiple complementary species, such as Monterey Pine, Bishop Pine, Gray Pine, Torrey Pine, Western Hemlock, may be used if the same general effect can be achieved. If multiple species are used on the site, individual rows of trees (or sets of rows in parallel) shall still be mono-species unless a mixture of species better satisfies the purpose of the windbreak plantings and other CLRDP requirements. Major tree species that are planted as windbreaks will generally be used in strategic locations associated with building groupings and shall only be placed in a north/south linear orientation. They shall not be planted in an east/west direction or used to completely surround or screen individual buildings, as planting trees in such a manner is not typical of the rural/agricultural coastal landscape. Furthermore, such an application would reduce the legibility of the trees as major landscape "structure" and reduce the opportunity to focus views to the ocean, the Monterey Peninsula, or major inland features.

Transitional Landscape

The transitional landscape area is defined as the area within development zones that is within 50 feet of the development zone perimeter. Development consistent with the CLRDP is not precluded within the transitional landscape area and planting in the transitional landscape area is intended to:

- Reduce the perceived scale of buildings.
- Provide a planted buffer between buildings and natural areas.
- Provide additional shrub and tree cover for wildlife habitat.

Where buildings are low scaled (up to 15 feet), plantings in the transition zone shall be an extension of the surrounding landscape, extending to the foundation of the building (depending upon the design of the building). This will be true in both areas adjacent to open grassland areas and in areas with taller vegetation such as adjacent to Younger Lagoon. In these areas, buildings shall be designed to appear as an integral feature of the landscape (see also design guidelines for buildings).

Elsewhere, where taller buildings are adjacent to major site natural areas and open spaces, the transition zone shall contain small trees and large shrubs whose primary purpose is to reduce the apparent height of the building. Strong continuous simple masses of plantings similar to those found throughout the rural coastal landscape shall be used.

It is not intended that plantings form a full-height visual screen around all tall buildings or building groups on the campus. This would depend on large-scale trees, which would take many years to grow to achieve their goal. Furthermore such treatment would be out of character with prevailing coastal rural character and would block views from within the buildings on campus.

Rather it is envisioned that transitional plantings will range in height from 3-12 feet, thereby reducing the apparent scale of buildings by visually "removing" and/or mottling the ground floor as seen from on and off site. These transitional plantings will also generally be tallest nearest the buildings with the height of species generally "ramping down" to shorter and shorter species as the transitional plantings extend toward the surrounding natural areas and open spaces (and approximating the height/density of plantings in this regard upon reaching the outward edge of the transitional planting area). This is typically seen in large-scale buildings throughout the Northern California coastal region. Plant species shall be limited to locally-collected native species. Individual specimen trees may also be used in the transitional landscape area to reduce the apparent scale of a building, or to provide a screen or break in the façade or corner at a strategic location. A group of no more than three trees should be used for this purpose. Tree species used should be similar to those utilized for the windbreak/screening trees described above.

Finally, transitional plantings in the Upper Terrace development zone shall be chosen for their ability to effectively screen development (including associated noise, lights, and activity) to ensure it does not significantly disrupt wildlife activity in the enhanced wildlife corridors and their buffers that are located both immediately north and immediately south of this development zone. These transitional landscape areas will need to provide enhanced functionality and seamless integration to the corridors/buffers themselves.

Ornamental Landscape

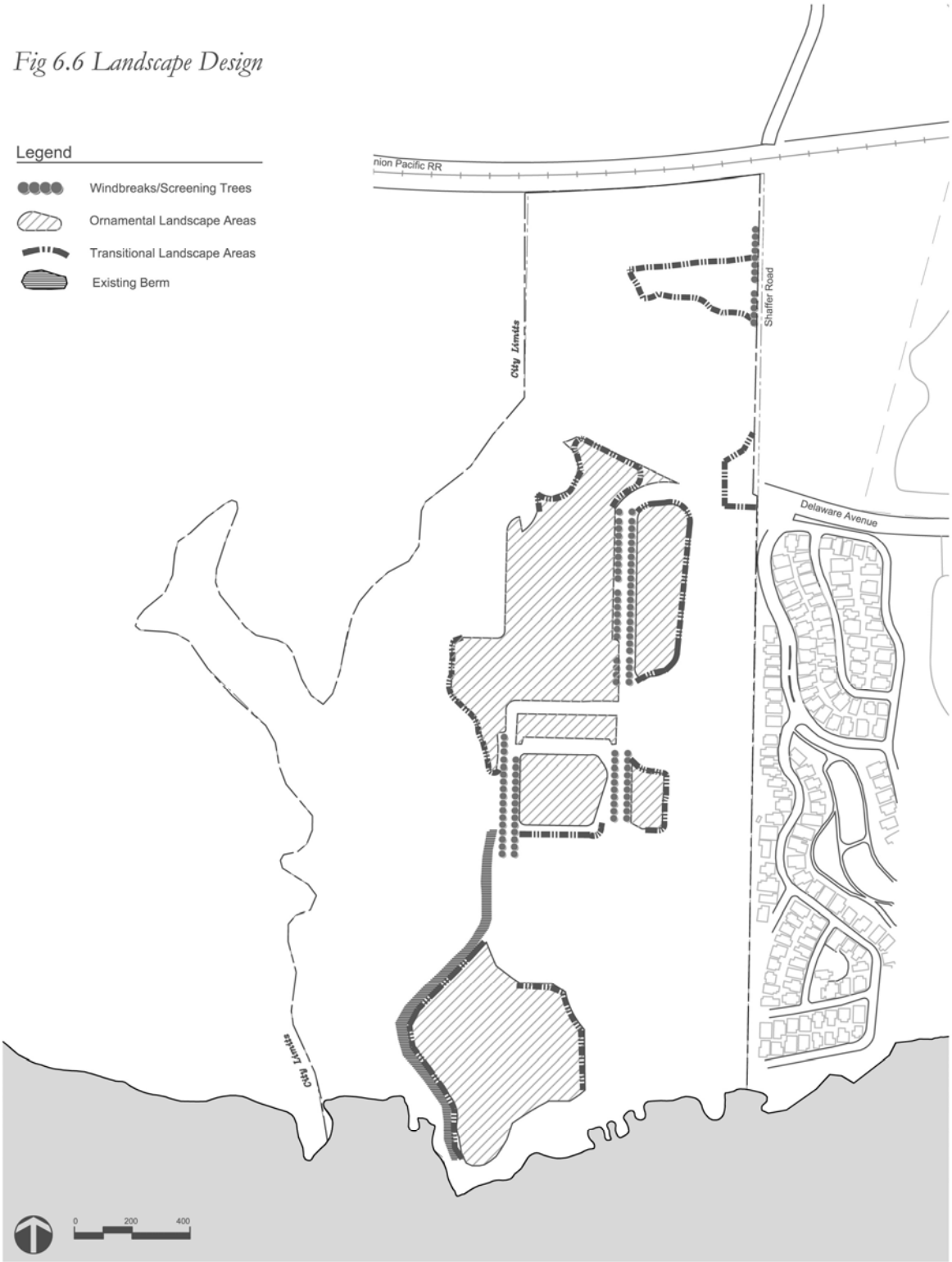
The use of native plant species is required for all plantings. A wide variety of native plant materials is appropriate to the ornamental landscape of the courtyards and spaces on the campus as appropriate. There are two primary considerations in the selection of ornamental plant materials for use in these locations:

- Non-invasive plants shall be chosen that will not be inclined to spread beyond the confines of their selected location. This is important from both an ecological perspective and a design perspective in order to insure that the landscape that is internal to campus building cluster areas has a different character from the landscape that is outside the building clusters.
- Plant materials shall be appropriate to the rural, open space, State Park, and agricultural coastal character and to the native vegetation character of the terraces.

Open Spaces within Development Zones

Open space areas within development zones areas are more traditional grassed areas within which more active recreational use is to be accommodated on the Campus. Some of these areas may be large enough as to be used by Campus users as general play areas for both passive (e.g., picnicking, reading, sunbathing, etc.) and active (such as frisbee, soccer, football, running, etc.) outdoor games and activities and shall be landscaped with native grasses to accommodate such uses while also providing for a transition at their perimeter to surrounding landscaping/uses.

Fig 6.6 Landscape Design



6.6. Lighting Design

This section sets forth design guidelines for lighting on the Marine Science Campus.

6.6.1. Intent

The intent of lighting design on the campus is to:

- Provide the lowest levels necessary to achieve safety and efficient wayfinding. This approach will avoid light that is detrimental to plant and animal biology and therefore be consistent with the character of the site and adjacencies to the natural habitat areas.
- Avoid spilling light into natural habitat areas, particularly Younger Lagoon Reserve, and surrounding neighborhoods.
- Minimize artificial light interference with views of the coastal night sky.

6.6.2. General Lighting Design Guidelines

The following guidelines apply generally to lighting throughout the site:

- Lighting on the Marine Science Campus shall be at the lowest luminosity levels necessary to provide for safety and efficient navigation.
- All light fixtures shall have cut-off or indirect fixture types with no visible source of light.
- Lighting shall be mounted at as low a height as feasible to avoid light spill and visibility of the light source. Light sources shall be sited and designed so that lighting, including light spill from individual fixtures, glare, etc. is confined within development zones to the maximum extent feasible.
- Bollard-type lighting (low-intensity, downward directed lights attached to low-height bollards) shall be used for site lighting where appropriate (e.g., trails, walkways, etc.)
- If the exteriors of buildings are to be lighted, spot lighting, direct flood lighting or indirect feature lighting shall be used.
- Fixtures shall be consistent with the rural, open space, agricultural, and overall campus character; overly dramatic light designs are inappropriate.
- All site lighting (including pole-mounted, bollard and low-level lighting) shall be of uniform design throughout the site and constructed predominantly of natural or natural looking materials.
- A vocabulary of standard lighting details shall be established for selection and use by all new projects on site.

6.6.3. Specific Lighting Design Guidelines

In addition to the general guidelines above, specific guidelines for specific areas and features also apply.

Building Facilities Lighting

- Exterior lighting shall only be located at entries and usable interior courtyards. No other exterior lighting of buildings, such as façade or accent lighting, shall be allowed, except where necessary for maintaining safety.
- Accent lighting of ornamental plantings, exhibits, and other features may be allowed, provided it is wholly within the building cluster or courtyard and does not illuminate areas outside development zones.
- Interior lighting that is visible outside of development zones may be allowed. However, its visibility and intensity shall be limited to the maximum extent feasible, including locating lighting sources so as to minimize the potential for light and glare to be visible from outside of development zones.

Street Lighting

- Streets shall be lighted only within the development zones of the campus and where needed for maintaining safety.

Parking Area Lighting

- Lighting in parking lots shall be the lowest levels necessary to provide safety and security.
- Only parking areas within the development zones shall be lighted.
- Bollard lighting is preferred. If bollard lighting is not appropriate, and pole lighting is required to achieve safety and efficient navigation, such pole top lighting shall be limited to the maximum extent feasible (in number, height, and bulk) and shall have cut-off type fixtures on a pole not to exceed 12 feet in height.

Pathway Lighting

- Pathway lighting shall only be located on primary pathways connecting major development areas within the development zones.
- Low height bollards (i.e., up to 36") made of natural or natural looking materials shall be used.
- A single unified bollard light design shall be used throughout the site except within individually designed internal building sites or clusters, where alternatives that are compatible with the courtyard design are allowable.

Special Area and Feature Lighting

- Unique lighting treatments may be provided in selected areas of the site. These include the campus entry, critical arrival points, and maintenance yards.
- Site entry lighting shall only be used to light the identity signage and the kiosk/gate area at the corner of Shaffer Road and Delaware Avenue.

- In maintenance yards and equipment lay-down areas, lighting may be pole mounted or wall mounted units. All lighting shall be cut-off type lighting designed to contain light in the work area without "spillover."

6.7. Signage Design

This section sets forth design guidelines for signage on the Marine Science Campus.

6.7.1. Intent

The intent of signage on the Marine Science Campus is to control traffic, provide directions for visitors, identify buildings, denote pedestrian pathways, inform regarding restricted areas, and to educate campus users and visitors about the natural history and character of the site and surrounding area and the research and related activities occurring at the Campus. In addition, it is intended that signage be the minimum amount necessary to convey information to site users in order to minimize the visual impact of signage and avoid clutter on the site.

6.7.2. General Signage Design Guidelines

The following guidelines apply to signage throughout the site:

The Campus shall use a unified sign design theme wherein all Campus signs shall use similar materials, colors, fonts, figures, symbols, layouts, and other associated sign elements. Campus signs may be categorized by sign types (e.g., trail signs, building signs, street signs, interpretive signs, informational signs, etc.) provided all Campus signs are consistent with the overall Campus theme. All signs within a sign type shall be similarly designed to facilitate ease of recognition (for example, sign types may use the same letter type and size, employ the same pallet of materials, and be installed at the same height). Signs shall be designed to fit with the natural character of the site. In addition, signage shall be:

- Fabricated of natural or natural looking materials that are compatible with site colors and site character to the maximum extent feasible and that have limited areas of contrasting materials and color (i.e., materials such as stone, wood, cor-ten steel, etc.).

- Integrated with architecture or other site features to the maximum extent feasible.

- Consolidated so as to limit the number of freestanding poles or other structures devoted exclusively to signage.

- Part of a coordinated hierarchy of information and related design elements such as sign size, text size, and color.

- A coordinated system color, size and style throughout the entire campus with the exception of specific internal building clusters and courtyards, where approved unique designs may be appropriate.

- A standard design or set of designs may be developed to meet these requirements for signs used on the Marine Science Campus.

6.7.3. Sign Lighting

Sign lighting on campus shall be limited to signs identifying important destinations, restricted areas, or where needed for safety. All sign lighting will be the minimum necessary to achieve design objectives. No backlighting of signs or use of neon shall be allowed.

6.8 Fencing/Barrier Design

This section sets forth design guidelines for fencing and other barriers on the Marine Science Campus.

6.8.1 Intent

Fencing and barriers are to be used only where necessary and must be designed and installed in a manner than interferes as little as possible with the open space and rural aesthetic of the campus. Fencing/barriers may be deemed necessary on the Marine Science Campus to protect natural resource areas and buffers from damage caused by human activity and intrusion, to assure public safety in the vicinity of coastal bluffs where steep cliffs and heavy surf pose a hazard, to protect laboratories and research areas from unauthorized access, and to protect areas adjacent to streets from unauthorized access by motor vehicles. Where fencing and/or barriers are installed, these should be as unobtrusive as possible.

6.8.2. General Fencing/Barrier Design Guidelines

The rule for any fencing and other barrier design on the Marine Science Campus is that its design be responsive to its purpose and need. The following standards shall be a part of all fencing and/or barrier design on the site:

- Fencing may be solid where it is necessary to screen development (including associated noise, light, and activity) from resource areas that would be significantly disrupted by development (e.g., natural resource areas or outdoor research areas on the site, such as portions of Younger Lagoon Reserve, the wildlife corridors and their buffers, marine mammal pool areas, etc.). Otherwise, fencing and/or barriers shall be see-through.

- Fencing and barriers shall be sited and designed so that they do not interfere with established view corridors.

- Fencing and barriers shall be sited and designed so that they do not interfere with wildlife movement between undeveloped areas of the campus and/or at the Campus border.

- Fencing and barriers shall be sited and designed to provide through and open trail access (e.g., for the trails designated on Figure 5.6, Coastal Access and Recreation Diagram). Such through access shall be provided through broad openings in necessary fences/barriers where they intersect trails (providing for at least two feet of opening on either side of the trail in addition to the opening for the trail itself). Operable gates or similar barriers across trails (where the trails intersect fencing/barriers) may only be used on designated controlled access trails.

- Fencing and barriers shall be minimized in size and scale as much as possible consistent with their identified function, and shall be sited and designed consistent with both the overall Campus design aesthetic and the specific aesthetics along the fence/barrier location.

6.8.3 Specific Fencing/Barrier Design Guidelines

In addition to the primary directive and general guidelines above, specific design guidelines also apply.

Solid Fencing

Solid fencing is used to completely block through views and attenuate noise. At the time of CLRDP certification, there was some existing solid wood fencing in the western portion of the Lower Terrace development zone (mostly interior to the Long Marine Lab cluster of buildings) and west of the Fish and Game facility in the Middle Terrace development zone. Except for that specifically described below in relation to the Campus Building Program, new solid fencing on Campus is only allowed in the area located between the northernmost portion of the Lower Terrace development zone and the then existing fencing west of the Fish and Game facility. Any additional solid fencing shall be installed on the Younger Lagoon side of both the barrier berm located at the edge of the terrace (where it exists) and the windbreak and transitional landscape areas (where the berm is not present) near the Reserve boundary. Landscaping at the fence line shall be used to soften the appearance of any fencing in public views.

Solid fencing shall consist of unfinished wooden posts with vertical unfinished wooden slats (hung on wooden rails between posts) that create a solid, opaque surface. As necessary to achieve the required sound attenuation criteria of this CLRDP relating to habitat areas, the solid wood fencing may be a facade that covers a solid wall structure (i.e., a concrete wall), so long as the solid wall structure is completely hidden by the wood facade. This facade approach applies to all solid fencing (i.e., fencing that existed at the time of CLRDP certification and that which did not). In any case, the height of solid fencing shall range from four (4) to six (6) feet above grade. Figure 6.7 shows an illustrative example of solid fencing.

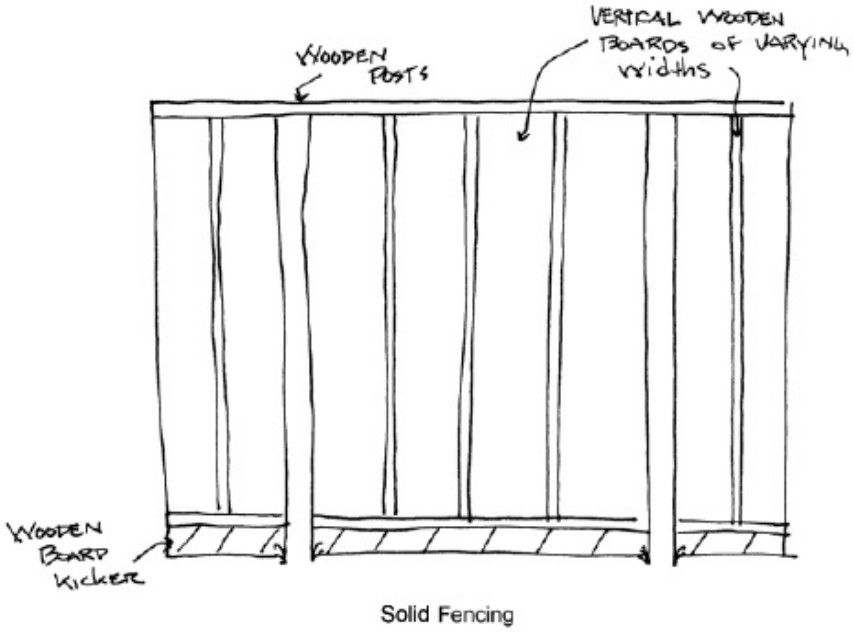


Fig 6.7 Solid Fencing

See-Through Fencing

See-through fencing is designed to demarcate Campus areas that are necessarily off-limits to general public access (e.g., to protect equipment, facility access, etc.) and/or to provide for public safety (e.g., the blufftop fence at the ocean overlook) while still allowing through views. This fencing type is generally used when complete screening is neither necessary nor desirable. Such fencing shall consist of wooden 4'x4' posts spaced 4 to 8 feet apart connected by a 1"x4" or 2"x4" wooden top rail cap (and a similar bottom rail if necessary for stability) and six (6) strands of flat black coated stainless steel cable strung horizontally between posts. The height of the see-through fencing shall be three and one-half (3½) feet above grade. Figure 6.8 shows an illustrative example of see-through fencing.

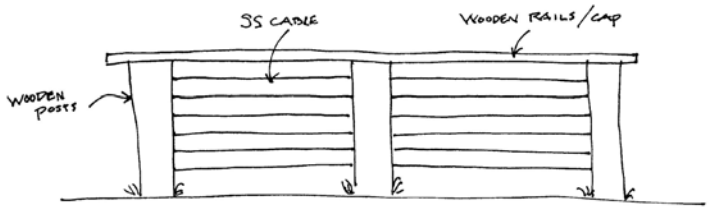


Fig 6.8 See-Through Fencing

Fencing/Barriers for Resource Protection

The University may install low-key fencing and/or barriers along trails and other areas where people move and congregate to protect natural resources when there is evidence that human intrusion has

caused significant damage to a natural resource. Such fencing/barriers shall not block off continued through access along trails and/or through access areas unless adequate replacement access is provided. Allowable fencing/barriers in this category are limited to wooden rough hewn split-rail fencing no taller than three (3) feet in height, or wood post-and-rope/cable barriers no taller than two (2) feet in height, both as measured from grade. All such fencing shall be designed to blend seamlessly into the site aesthetics. Figures 6.9 and 6.10 show illustrative examples of wooden rough-hewn split-rail fencing and post-and-rope/cable barrier, respectively.

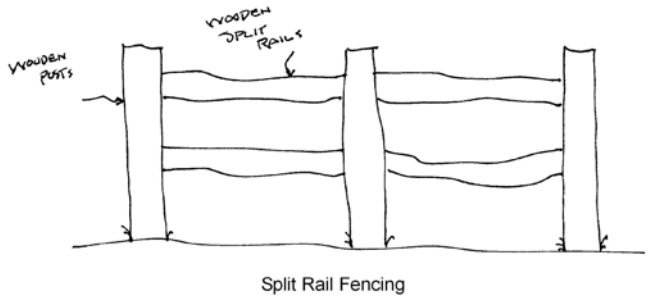


Fig 6.9 Split-Rail Fencing

Barriers along Streets and Roadways

The University may install low-key barriers along streets, roadways, and other areas where motor vehicles are present to protect off-road areas when there is evidence that intrusion by motor vehicles has caused significant damage to off-road areas. Allowable barriers in this category are limited to post-and-rope/cable barriers that are no taller than two (2) feet in height (see Figure 6.10), small bollards or rails constructed of natural materials, and landscaping.

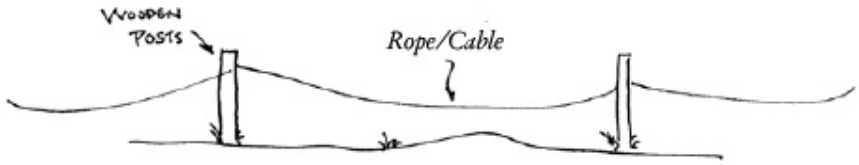


Fig 6.10 Post and Rope/Cable Barrier

Fencing/Barriers for Buildings, Research Areas, and Seawater System Intake, Filtration, and Storage

The University may install fencing and/or barriers as part of a building or its directly associated research areas when necessary to protect these areas from significant damage due to unauthorized access.

- Any such fencing/barriers shall be fabricated of natural or natural looking materials, and shall blend seamlessly into the design of the building to which the fencing is associated. Materials such as stone, wood, and cor-ten steel that are compatible with the building design and site character and that have limited areas of contrasting materials and color may be appropriate.

- Fencing/barriers shall be integrated with architecture and other site features.

- Fencing/barrier siting and design shall be appropriate to its intended function, but in no case shall be taller than eight (8) feet in height above grade.

7. Illustrative Campus Buildout Site Plan and Preliminary Designs

The purpose of this chapter is to set forth an Illustrative Campus Buildout Site Plan (ICBSP), meant to show one example of how the Campus may develop over time, and preliminary designs for a subset of specific projects proposed for the Marine Science Campus. The ICBSP and preliminary designs contained in this chapter derive from the design principles and land use concepts of Chapter 4, the provisions of Chapter 5, the design guidance of Chapter 6, and other provisions of the CLRDP.

These site plan and building studies are only examples and not intended to represent the only possible way to realize the concepts and provisions set forth in the previous chapters. The CLRDP as a whole is intended to allow the University flexibility to adjust the campus site plan and building designs to respond to ideas that may arise through more detailed design efforts and changing needs and conditions. Therefore, the University may proceed with a site plan and/or building designs that depart from the illustrations of this chapter, provided the proposal otherwise implements the design principles and land use concepts of Chapter 4, and is consistent with the provisions of Chapters 5, 6, 8, and 9, and the Resource Management and Drainage Concept Plans (Appendices A and B).

This chapter is divided into two sections. The first section presents an Illustrative Campus Buildout Site Plan that shows an example of where future development projects on the site may be located. The second section presents a set of preliminary designs that will serve to influence the design of a subset of potential future building projects, which were the subject of early project planning efforts underway at the time of CLRDP certification.

7.1. Illustrative Campus Buildout Site Plan

This section provides an example of how development described in the CLRDP building program of Chapter 5 could occur on the Marine Science Campus. Figure 7.1 provides estimates of facility user capacity and average daily user occupancy based on maximum facility square footages at buildout under the CLRDP building program prescribed in Chapter 5. These estimates indicate that the CLRDP could result in an increase in design capacity of approximately 1,316 persons, with an increase in average daily occupancy of approximately 783 persons. The Marine Science Campus has an existing design capacity for approximately 760 persons, with an average daily occupancy of approximately 420 persons. These estimates represent an example of the increase in population that could result with full development under the CLRDP.

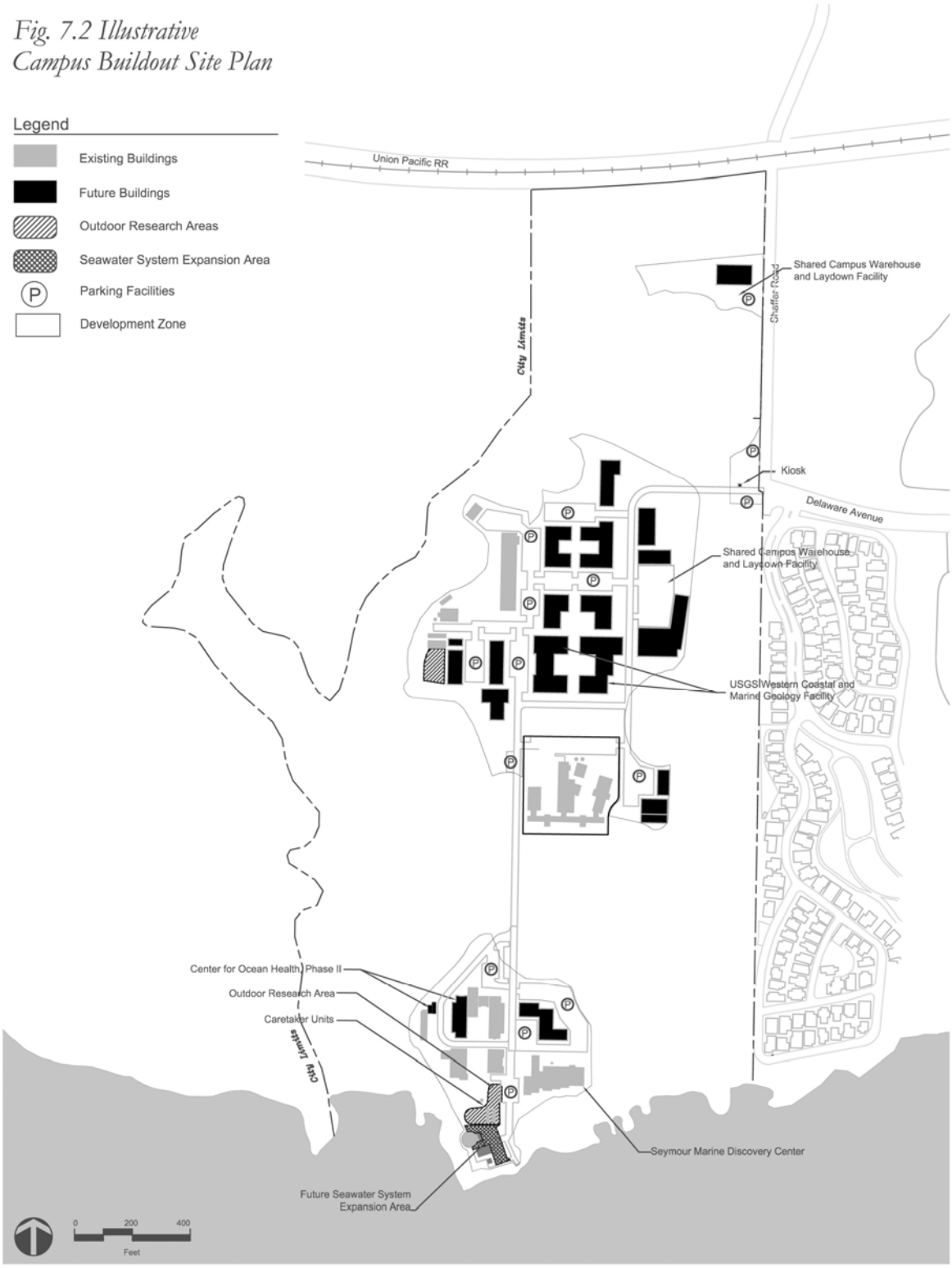
The Illustrative Campus Buildout Site Plan shown in Figure 7.2 provides an example of how development consistent with the CLRDP building program could be arranged on the Marine Science Campus. Amongst the building footprints depicted in the Illustrative Campus Buildout Site Plan are sites for three potential future projects that could be constructed in the early phases of campus development under the CLRDP. While it is impossible to predict exactly which projects are most likely to occur in the immediate future, these potential near-term projects were identified based on

early project planning efforts that are underway at the time of CLRDP certification. These projects include: (a) Center for Ocean Health, Phase II, (b) United States Geological Survey Western Coastal and Marine Geology Facility, and (c) Shared Campus Warehouse and Laydown Facility. Additional information about these three projects is provided in the following subsections.

Fig. 7.1 Population Projections Associated with Maximum Campus Buildout Site Plan

	Size (s.f.)	*Design Capacity (persons)*	*Average Daily*
EXISTING FACILITIES			
Seymour Marine Discovery Center	20,000	518	197
Ocean Health, Phase I	23,000	120	112
Other Primary Long Marine Lab Buildings	15,200	43	39
Avian Facility	2,160	5	5
Temporary Caretaker Units	1,400	4	4
CDFG Marine Wildlife Center	20,000	10	9
NOAA In-holding	53,400	60	54
Seawater System	5,000	0	0
Subtotal	140,160	760	420
CLRDP BUILDING PROGRAM			
Marine Research and Education	254,500	633	610
Outdoor Research Area	70,000	0	0
Support Facilities			
Seminar Auditorium	5,000	350	13
Meeting Rooms	2,500	175	11
Food Service	3,500	105	5
Sport Courts	8,000	0	0
Short-Term Accommodations			
Visitor/Overnight Accommodations	2,500	10	5
Researcher Rooms	12,000	60	30
Caretaker Accommodations			
Replacement Caretaker Units	1,600	4	4
Equipment Storage & Maintenance			
Shared Warehouse	37,500	10	9
Shared Laydown Yard	70,000	0	0
Public Access and Recreation (trails/overlooks)	n/a	0	0
Seawater System Expansion	12,000	0	0
Subtotal	479,100	1,347	687
CHANGED OCCUPANCY OF EXISTING FACILITIES			
Seymour Marine Discovery Center (increased use)	0	0	106
Ocean Health (increased use)	0	0	18
Original LML Buildings (trailer removal)	-3,000	-27	-24
Temporary Caretaker Units (removal)	-1,400	-4	-4
Subtotal	-4,400	-31	96
NET INCREASE (with changed occupancy)	474,700	1,316	783
TOTAL NEW PLUS EXISTING	614,860	2,076	1,203

Fig. 7.2 Illustrative Campus Buildout Site Plan



7.2. Preliminary Parameters for Selected Projects

7.2.1. The Center for Ocean Health, Phase II

The Center for Ocean Health building is the core research and administration facility for Long Marine Lab (LML). The Center for Ocean Health is located in the Lower Terrace development zone, just north of the Younger building, and consists of laboratory and office space, administrative support space, and meeting and teaching rooms. Completed in mid-2001, it was already at capacity at the time of CLRDP certification, as were four mobile office units in the adjacent service yard. The addition of an approximately 18,000-square foot wing to this building (Center for Ocean Health, Phase II) would permanently replace the mobile units, allow for modest growth in the LML scientist population, and would increase the number of laboratories available that are plumbed with seawater. Such a wing was contemplated in the siting and design of the existing building making this an efficient facility expansion. This project would be implemented 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. Figures 7.3 and 7.4 provide preliminary building studies for this project.

7.2.2. The United States Geological Survey Western Coastal and Marine Geology Facility

The United States Geological Survey (USGS) has long been working with the University on a program to relocate some of its marine-related functions to the UCSC Marine Science Campus in an approximately 78,500 square foot Western Coastal and Marine Geology Facility. This new facility would be located in the Middle Terrace development zone and would include space for offices and laboratories to accommodate a combination of marine biologists, hydrologists and geologists from their Biological Resources Division, Water Resources Division and Coastal and Marine Group. USGS has also expressed the desire for future expansion in an approximately 50,000 square feet facility to accommodate additional marine-related functions, but this latter potential project is not explicitly identified on Figure 7.2. The 78,500 square foot USGS project that is identified would be implemented 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. Figures 7.5 and 7.6 provide preliminary building studies for this project.

7.2.3. Shared Campus Warehouse and Laydown Facility

A Shared Campus Warehouse and Laydown Facility is identified in the Upper Terrace development zone and/or in the Middle Terrace development zone. Such a facility may be split between these zones (e.g., as shown in Figure 7.2) or it may be completely contained in one or the other. Marine research requires operations and maintenance of ocean-going vessels and other equipment, and outfitting of highly specialized equipment. The Shared Warehouse and Laydown Facility, including approximately 37,500 square feet of shared warehouse space and 70,000 square feet of shared laydown yard, would allow for continued onsite outfitting of ocean-going research vessels, as well as maintenance and repair of equipment. The building would likely include a repair shop, warehouse

space, and some offices and laboratories. This facility will not replace facilities occupied by the University and others at boat harbors, where larger vessels are stored and many vessels are launched. This project would be implemented under the Equipment Storage and Maintenance portion of the CLRDP building program, which allows for shared warehouse and equipment yards. Figures 7.7 and 7.8 provide preliminary building studies for this project.

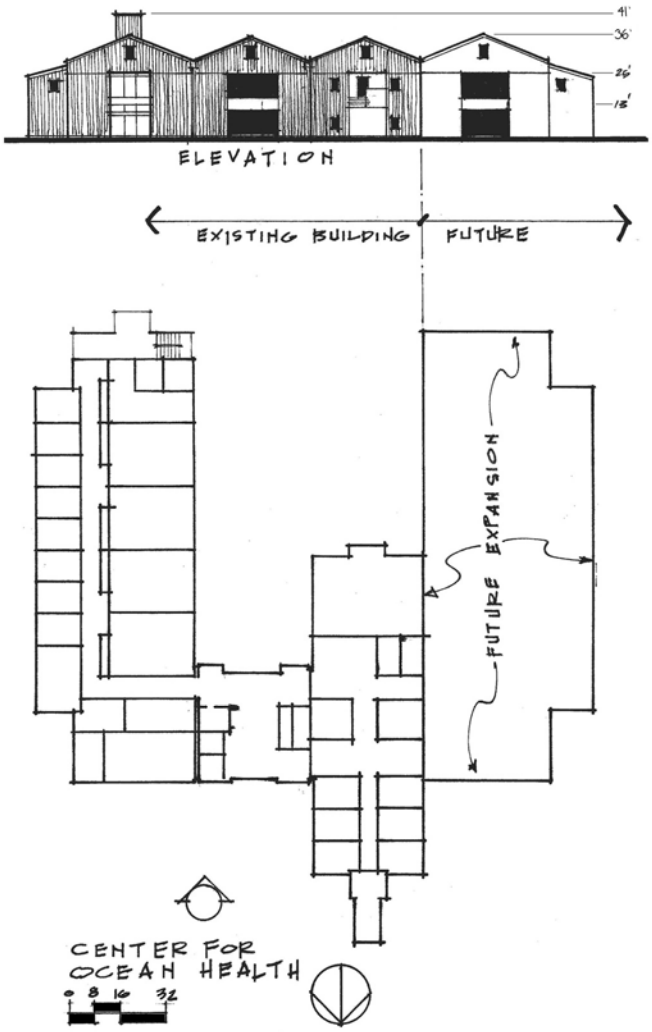


Fig 7.3. Center for Ocean Health

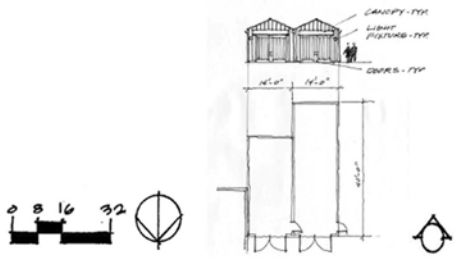


Fig. 7.4 Center for Ocean Health (Out Building)

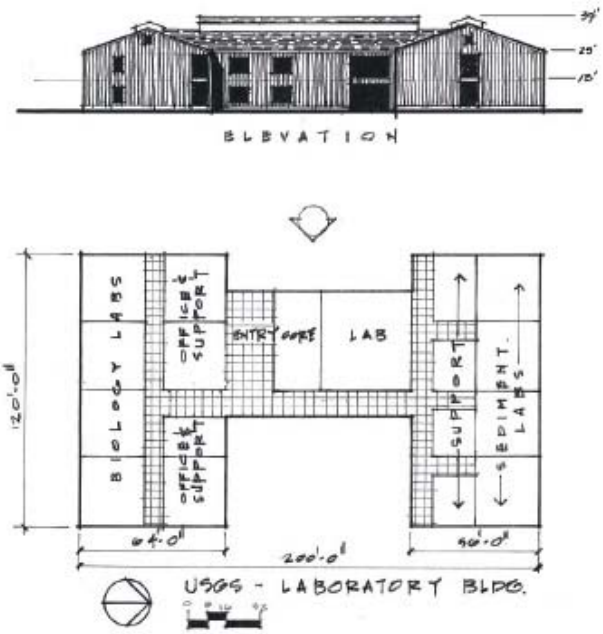


Fig. 7.5 USGS Laboratory Building

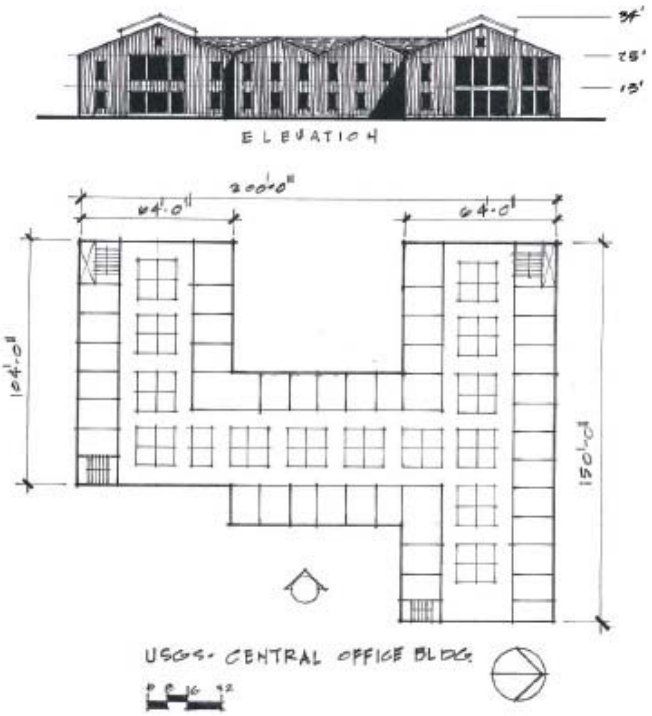


Fig. 7.6 USGS Central Office Building

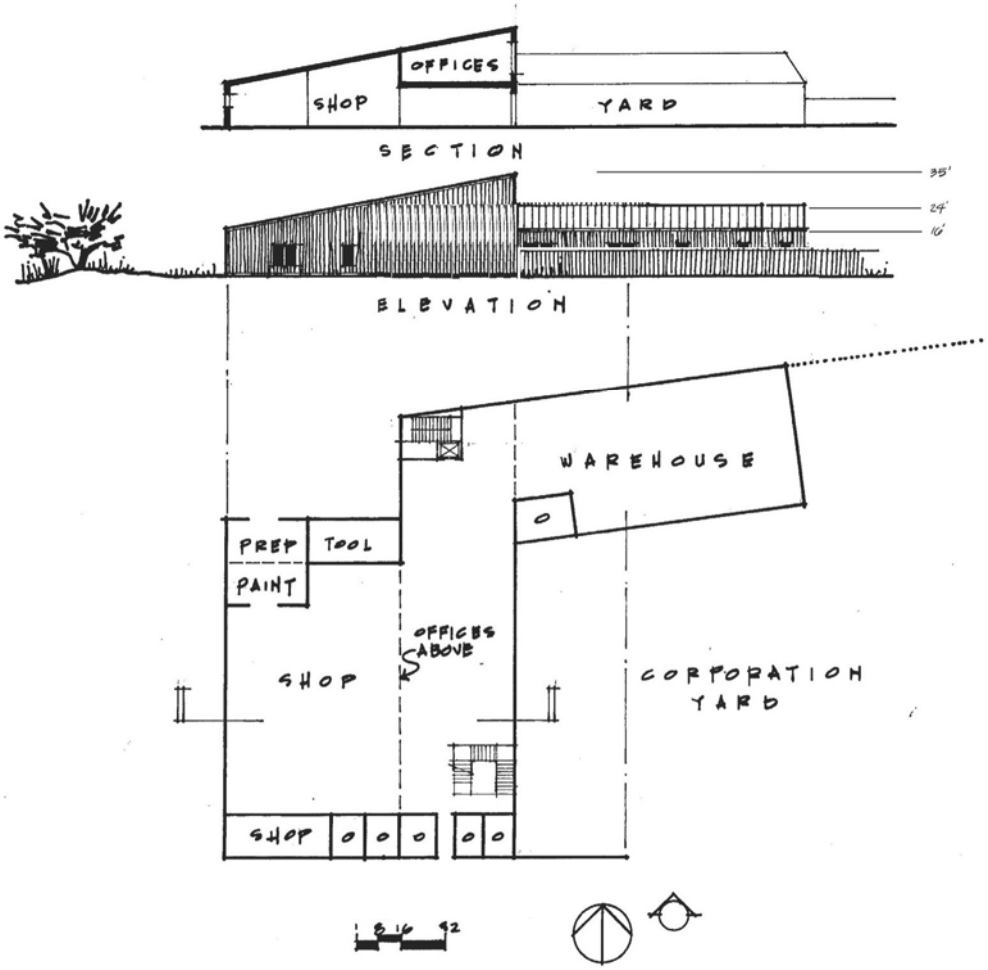


Fig. 7.7 Shared Warehouse, Shop, and Laydown Facility

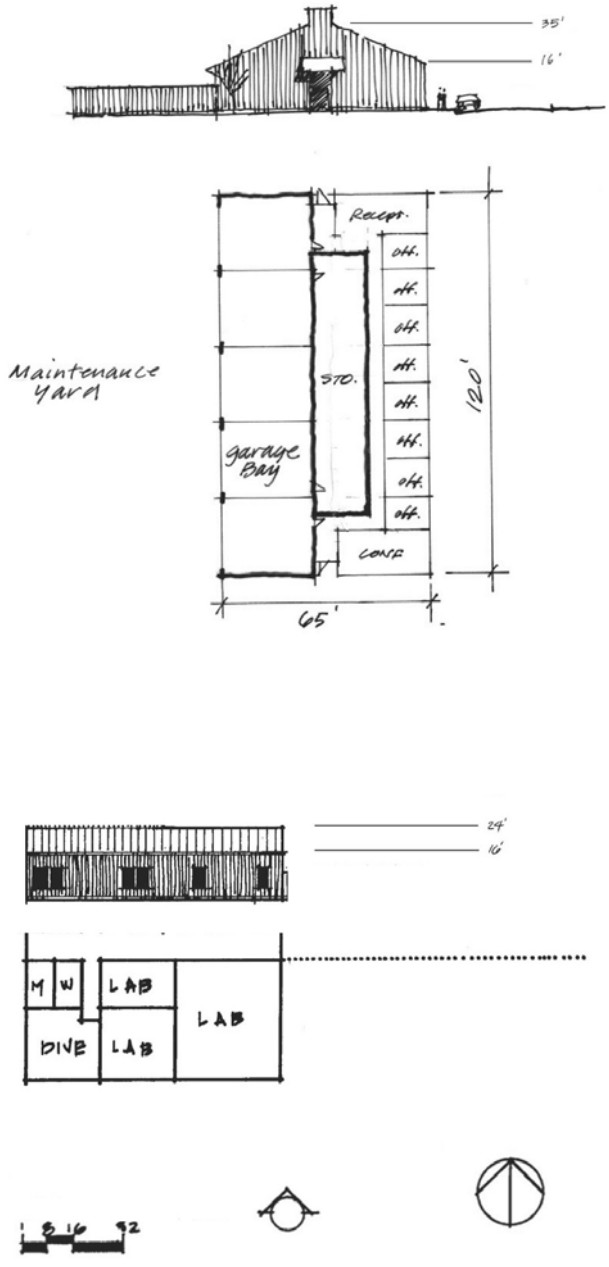


Fig. 7.8 Shared Warehouse, Shop, and Laydown Facility

7.2.4 Overlooks

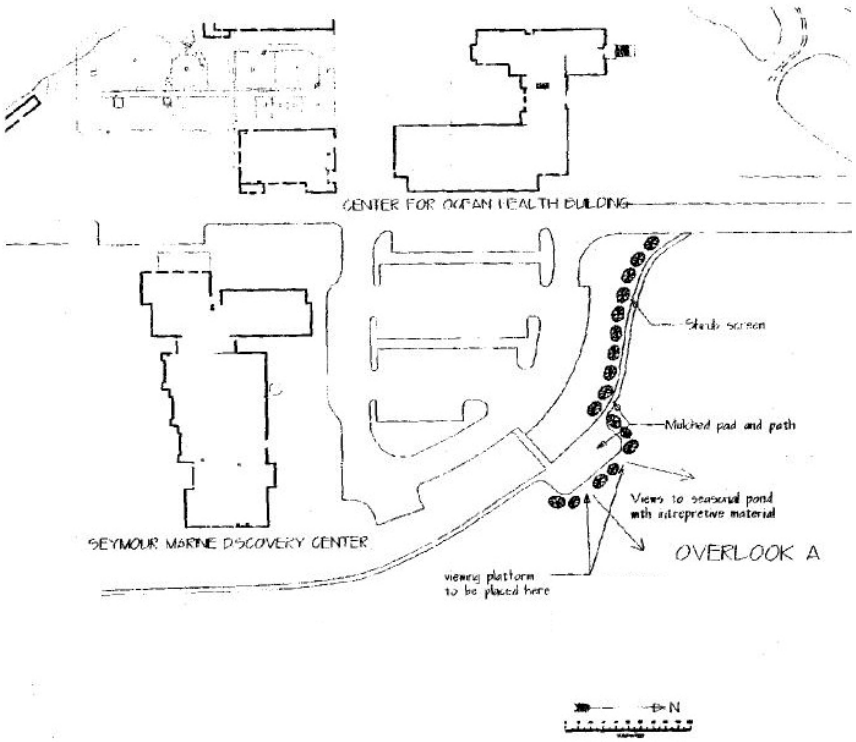
Overlook A

Overlook A is a new overlook to be developed adjacent to the Seymour Marine Discovery Center (see also Figure 9.1). This overlook will permit viewing of the seasonal wetland (Wetland W5) to the northeast.

This overlook area, just north of the parking lot of the Seymour Marine Discovery Center, would provide two slightly raised viewing platforms in a native shrub screen that would surround a level mulched pad with picnic tables. This area is connected to the public access pathway that leads around the outside of the parking lot and thus would serve as a stopping/observation point for pedestrians using the public pathway, as well as for school groups and other visitors to the Seymour Center. A panel at each of the two platforms would interpret the natural aspects of the seasonal pond to the north and northeast along with other visible features the landscape. Please refer to Figure 7.9.

The two wooden viewing platforms would be two steps above grade (approximately 14 inches) and would measure approximately eight by four feet surrounded by a railing on three sides. A 6-foot high vegetation screen of locally selected native shrubs would be planted to contain the area, discourage foot traffic off of the pad area, and to provide visual and wind screening. Overlook A will be directly accessible as part of the public access trail system.

Figure 7.9: Overlook "A" Illustrative Plan

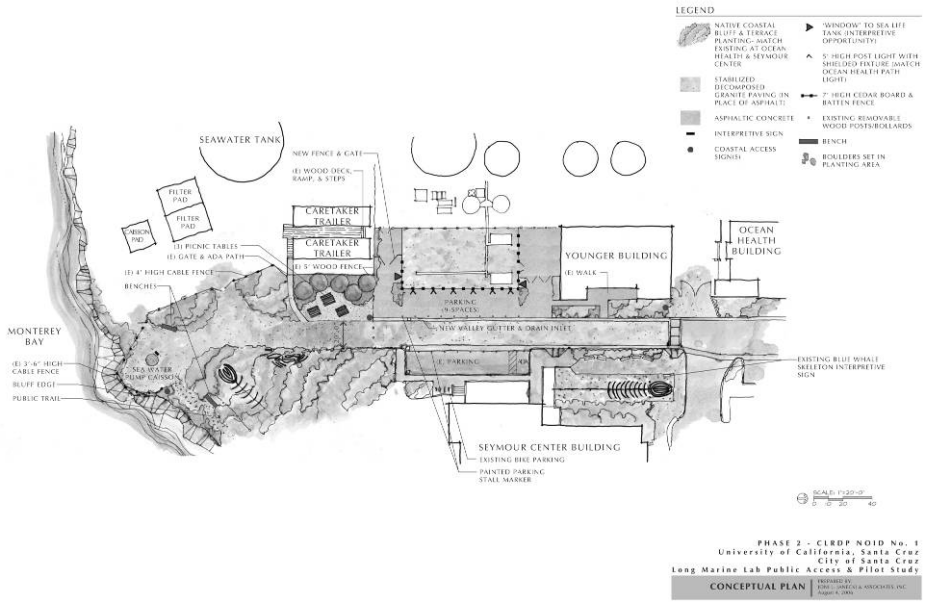


Overlook B

Overlook B is the existing ocean overlook located at the blufftop at the end of McAllister Way that allows exceptional views of the Monterey Bay National Marine Sanctuary and the shoreline both up and down coast (see also Figure 9.1). Many visitors use this site, and its proximity to the Seymour Discovery Center makes it an ideal overlook. It is fully handicapped accessible and open during daylight hours. This overlook shall be enhanced to become part of a continuous public access area extending seaward from the northern edge of the Younger Building and the northern edge of the whale skeleton at the northwest corner of the Marine Discovery Center (see Figure 7.10). Within this area, the existing roadway pavement shall be removed and converted to decomposed granite, or similar pathway material. Spaces along the pathway shall be redeveloped as a primary public access point with landscaping, benches, picnic tables, interpretive facilities (i.e., for the adjacent research areas, the seawater system, the ocean, etc.), and other amenities (i.e., telescopes, bike racks, and recycling, etc.). Limited vehicular access through this area may continue (i.e., parking for University-owned vehicles only, service access, emergencies, seawater system maintenance, etc.). The area is intended to look and function as a public access area through an active and working marine research facility with ample interpretation of various ongoing research activities. Toward this end, the northern entry (at the whale skeleton) shall include clear public access and service/campus vehicles only signage and either removable bollards or, if necessary for the vehicles allowed here, bollards designed to narrow the entry as much as possible while allowing a single lane for authorized vehicle ingress and egress. Further, removable bollards shall be placed at the southernmost extent of this parking area to prevent overflow parking and vehicle access. The public access area shall be decomposed granite, or similar material, to match the rest of the public trail system. The area shall include abundant landscaping to screen the access area from buildings and facilities, to define different activity areas within it (e.g., around interpretive displays, around picnic benches, etc.), to create meandering edges, and to keep users out of more sensitive areas as needed. The improvements shall be integrated with existing vegetation and trails fronting the Marine Discovery Center, including through the redesign of such landscaping and trails as necessary to maximize the value and function of the public access area overall including its relation to the blufftop trail extending to the east. The overall intent and objective is to create a user friendly, attractive, and interactive public access area that can function as a primary public access destination and outdoor interpretation area related to marine research activities. Figure 7.10 is a conceptual plan showing an example of how this area might be configured to accomplish the enhancements related to Overlook B and describes their conceptual framework. The above textual description provides the controlling parameter for design and implementation of the Overlook B extended public access area enhancements.

The University would phase the implementation of these improvements as specified in Chapter 9 of the CLRDP, while maintaining the current access to this area throughout the phased implementation period, except as precluded by construction activity during short periods of time. Overlook B is and will be directly accessible as part of the public access trail system.

Figure 7.10: Overlook "B" Illustrative Plan



Overlook C

Overlook C is an existing overlook located immediately west of the LML marine mammal pool on top of the berm (see also Figure 9.1). The California Conservation Corps originally built this overlook as a cooperative project between LML and YLR. It overlooks both LML and YLR and therefore affords opportunities for docent interpretation both of the marine mammal research on the LML side, and Monterey Bay, front and back beach, seacliff and lower lagoon portions of YLR on the other side. There are existing interpretive panels on LML dolphin research and improvements to this overlook will likely be limited to adding new YLR and Monterey Bay National Marine Sanctuary interpretive panels on the west side of the overlook. Access to this overlook is by docent-guided tour only through the center of the LML facilities. Public access to Overlook C has and will be carefully controlled to prevent adverse impacts to the marine mammals, marine mammal research efforts, and YLR wildlife.

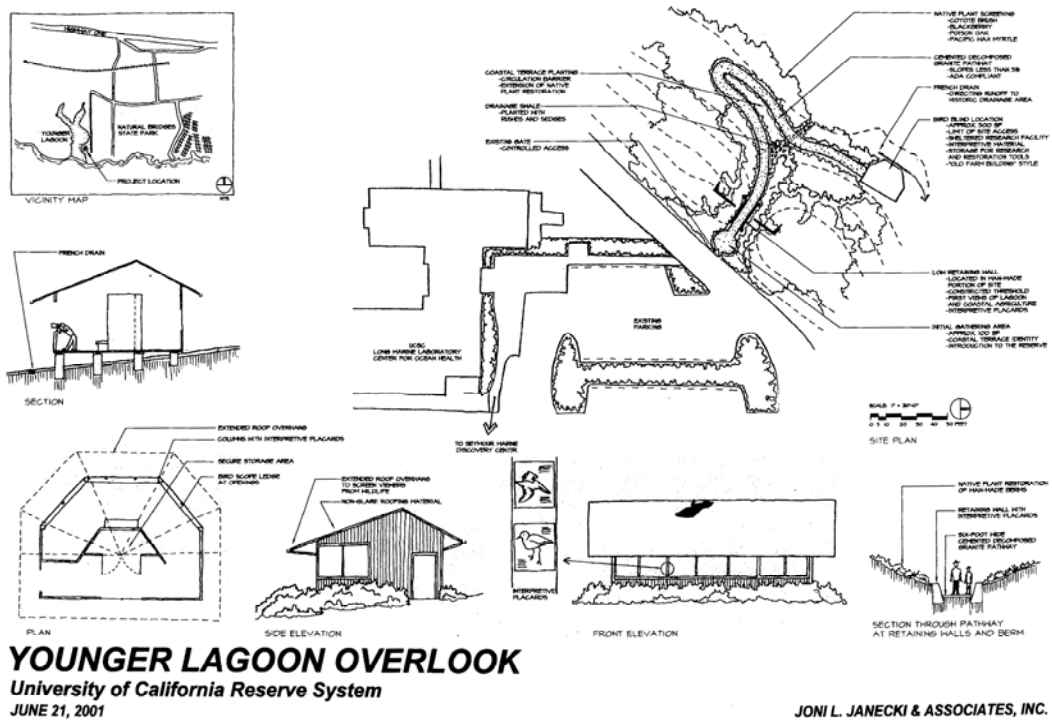
Overlook D

Overlook D is an existing rudimentary overlook located north of the Ocean Health building on the Younger Lagoon side of the earthen berm that provides a view of the lower part of YLR (see also Figure 9.1). Presently, the area is accessed by a temporary pedestrian path through a gap in the berm to the nearly level overlook area, which contains a bench. Improvements to this overlook shall include construction of an enclosed observation blind to allow observation of the lagoon wildlife without disturbance, a surfaced access path that meets ADA and drainage criteria for slope and surface, vegetation screening of the pathway from the lagoon, and interpretive materials at the blind. The University would phase the implementation of these improvements as specified in Chapter 9 of the CLRDP, while maintaining the current interpretive docent-guided access to this area throughout

the phased implementation period, except as precluded by construction activity during short periods of time. General public access to this overlook would continue via docent-guided tours from the Seymour Marine Discovery Center. Access for bird or other research observation would remain by arrangement with the Younger Lagoon Reserve manager. Please refer to Figure 7.11.

The pathway would require light grading to meet ADA slope standards and runoff/erosion control, and would include two short sections of low retaining wall where the path passes through the gap in the earthen berm. The path would be surfaced with cemented decomposed granite. The observation blind would be of wood-framed construction with shed roof in non-reflective, earth tone colors. The vegetation screening, some of which is already in place, would consist of native plant materials grown from on-site stock.

Figure 7.11: Overlook "D" Illustrative Plan

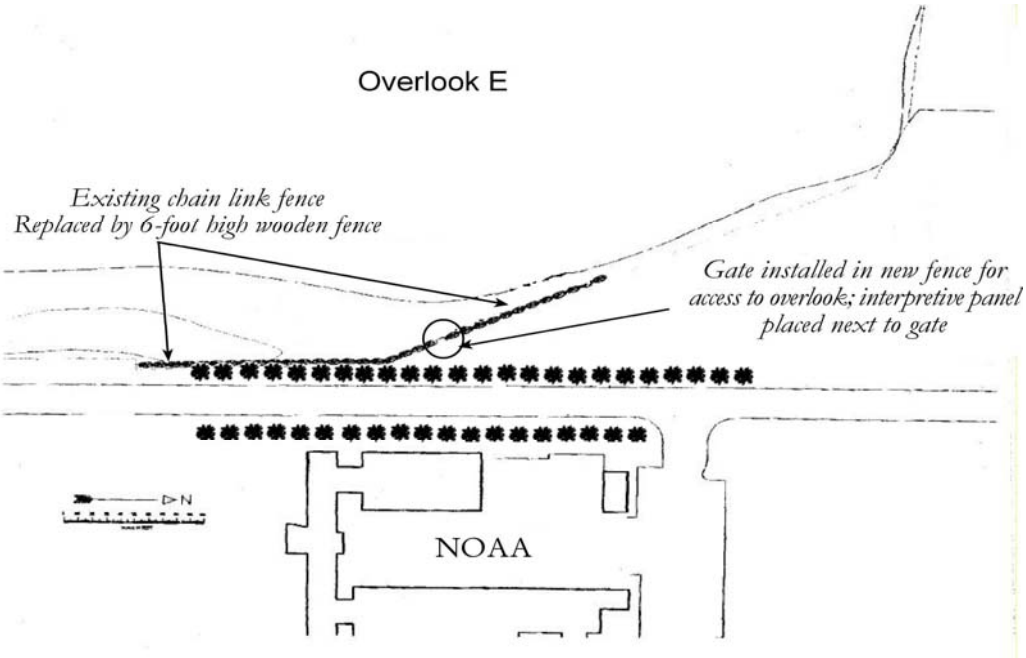


Overlook E

Overlook E is a new overlook to be located above the middle section of Younger Lagoon Reserve in an area near the NOAA Fisheries building and immediately adjacent to McAllister Way: it would be directly accessible as part of the public access trail system (see also Figure 9.1). This overlook will provide pedestrians that are walking along this public access route with a view into the lagoon, and an opportunity to step off the path and linger in the overlook area. An interpretive panel would introduce the visitor to the significance of protected areas such as Younger Lagoon to coastal ecology. A minor alteration to the fence line would provide an alcove from which views of the lagoon are possible to the south toward the beach, west toward the main section of the lagoon and agricultural fields beyond, and to the northwest up the lagoon's upper arms. Along the fence existing at the time of CLRDP certification, where neither earthen berm nor vegetation screening was in place, shade cloth originally acted as a visual screen. Replacement fencing and landscaping in this area are provided for by this CLRDP. This overlook would be improved by developing a solid fence and a native plant screen in two tiers: a six-foot high screen of native shrubs along the west side of the fence (with a break at the overlook to allow through views) to provide screening from McAllister Way, and a row of cypress trees, which when grown into full tree form would provide a larger scale screen of the NOAA building to the east (see also fencing and landscape design in Chapter 6). The location of the fence line in Figure 7.12 is illustrative only. Its actual location and siting is dependent upon, and must relate to, the location of CLRDP building program elements (including parking areas) and CLRDP applicable provisions (including protection of public views, protection of

Younger Lagoon Reserve, etc.). The overlook area would be accommodated within a ten-foot wide and four-foot deep alcove on the Younger Lagoon side of the fence line. Within this overlook alcove the solid fencing and vegetation would be limited to four feet in height to provide views over the top of the fencing/landscaping while minimizing the amount of people movement visual from the wildlife/lagoon perspective. A firm pedestrian surface (i.e., decomposed granite, tight gravel, wood platform, etc.) would be provided in the alcove and at its entrance. The interpretive panel would hang on the fence immediately adjacent to and/or within the alcove.

Figure 7.12: Overlook "E" Illustrative Plan



Overlook F

Overlook F is a new blufftop overlook to be established inland of the blufftop edge at the southeastern corner of the Campus (see also Figure 9.1). This overlook would be sited to be easily accessed by the public blufftop trail at the promontory in the bluff roughly 100 feet west of the De Anza Mobile Home Park. Benches and bicycle racks and trash/recycling cans shall be provided. The overlook shall be oriented so as to best provide panoramic ocean views with as little obstruction as possible. Low vegetative barriers rather than fencing shall be used to ensure public safety if feasible, and interpretive signs shall be low key and placed so as not to adversely impact ocean views. The overlook shall be developed with a decomposed granite main area of approximately 200 square feet and landscaped with native blufftop species, where the landscaping, decomposed granite, and amenities are sited and designed to appear as natural as possible (including avoidance of linear forms).

All Overlooks

All overlooks shall include CLRDP appropriate signage and interpretive panels that identify the major natural features that can be observed. All overlooks shall be designed to seamlessly integrate into the natural site aesthetic. Paths shall be marked appropriately and shall be fully handicap accessible according to ADA regulations.

8. Development Procedures

The purpose of this chapter is to set forth procedures for reviewing and authorizing development on the Marine Science Campus. This chapter is divided into eleven sections. The first section sets forth procedures for reviewing proposed development. The second section sets forth public notice requirements. The third section sets forth categories of development that are excluded from certain development review procedures of this chapter. The fourth section sets forth the Coastal Commission's areas of responsibility with regard to the CLRDP development review process. The fifth section sets forth the procedure for amending development authorizations. The sixth section sets forth the procedure for determining the effective and expiration dates of development authorizations and provisions for extension of authorizations. The seventh section describes areas over which the Coastal Commission retains direct development review jurisdiction. The eighth section sets forth a post-project-authorization monitoring program. The ninth section sets forth procedures for the enforcement of the CLRDP. The tenth section sets forth procedures for emergency authorizations. The eleventh section sets forth requirements for non-conforming uses and structures.

8.1 Review and Authorization of Proposed Development by the University

8.1.1 Definitions

"California Coastal Commission" and "Coastal Commission" and "Commission" mean the California Coastal Commission.

"Contained in" means that a proposed development is of a kind contemplated by the CLRDP and is within the parameters of the CLRDP, including but not limited to the size, location, type, and intensity of the proposed development.

"Development" means, on land, in or under water, the placement or erection of any solid material or structure; discharge or disposal of any dredged material or of any gaseous, liquid, solid, or thermal waste; grading, removing, dredging, mining, or extraction of any materials; change in the density or intensity of use of land, including, but not limited to, subdivision pursuant to the Subdivision Map Act (commencing with Section 66410 of the Government Code), and any other division of land, including lot splits, except where the land division is brought about in connection with the purchase of such land by a public agency for public recreational use; change in the intensity of use of water, or of access thereto; construction, reconstruction, demolition, or alteration of the size of any structure, including any facility of any private, public, or municipal utility; and the removal or harvesting of major vegetation other than for agricultural purposes, kelp harvesting, and timber operations which are in accordance with a timber harvesting plan submitted pursuant to the provisions of the Z'berg-Nejedly Forest Practice Act of 1973 (commencing with Section 4511).

"Development Project" means a project that includes development; for the purposes of this CLRDP, "development project" and "development" are often used synonymously.

"Notice of Impending Development" means a notice of the University's intention to undertake a development project provided by the Director of Campus Planning to the Coastal Commission and to certain other persons, and also conspicuously posted at the Campus and the site of the impending development.

"Person" means any individual, organization, partnership, limited liability company, or other business association or corporation, including any utility, and any federal, state, local government, or special district or an agency thereof.

"Public works" means (a) all production, storage, transmission, and recovery facilities for water, sewerage, telephone, and other similar utilities owned or operated by any public agency or by any utility subject to the jurisdiction of the Public Utilities Commission, except for energy facilities; (b) all public transportation facilities, including streets, roads, highways, public parking lots and structures, ports, harbors, airports, railroads, and mass transit facilities and stations, bridges, trolley wires, and other related facilities and (c) all publicly financed recreational facilities, all projects of the State Coastal Conservancy, and any development by a special district.

"The Director of Campus Planning" and "the Planning Director" and "the Director" mean the Director of Campus Planning for the University of California at Santa Cruz (UCSC) or his/her designee.

"The Executive Director of the California Coastal Commission" and "the Executive Director" mean the Executive Director of the California Coastal Commission or his/her designee. All required coordination/consultation with the Executive Director shall be initiated through and facilitated by planning staff of the Coastal Commission's Central Coast District office. Note that all materials required to be sent to the Executive Director shall be sent to the Coastal Commission's Central Coast District Office.

"The Regents," "Board of Regents," "UC Regents," and "University" mean the Board of Regents of the University of California or its authorized representatives.

8.1.2 Computation of time

The time in which any act under this CLRDP is to be done shall be computed by excluding the first day and including the last, unless the last day is a weekend or state holiday, and then it is also excluded.

8.1.3. Director of Campus Planning

The Director of Campus Planning shall be the responsible point of contact for inquiries concerning CLRDP implementation.

8.1.4 Procedures for Development Review and Authorization

1. **Preparation of Project Reports**

   Except as provided in Section 8.3, the Director of Campus Planning shall review all proposed development projects located on the UCSC Marine Science Campus and shall prepare a Project Report for each proposed development project.

2. Contents of Project Report

The Project Report shall include any information the Regents deem necessary to satisfy the standards for development authorization set forth in this CLRDP. At a minimum, the Project Report shall include:

(a) A description of the proposed development that is: sufficient to understand its size, location, type, and intensity (including but not limited to site plans and elevations showing the proposed development as appropriate); and sufficient to determine that the development is contained in the CLRDP;

(b) A detailed discussion regarding the consistency of the proposed development with the provisions of the certified CLRDP and, if applicable, with prior CLRDP authorizations and/or approvals by the Coastal Commission pursuant to the Coastal Act;

(c) Environmental documentation for the proposed development prepared pursuant to the California Environmental Quality Act and/or the National Environmental Policy Act;

(d) All technical reports associated with the proposed development (such as biological reports, geotechnical reports, traffic analyses, etc.), including all reports and plans required by Chapter 5 (e.g., habitat evaluation, lighting plan, circulation and parking plan, public access plan, drainage plan, utility plan, etc.);

(e) The results, including any supporting documentation, of any consultation with persons and agencies interested in, with jurisdiction over, and/or affected by the proposed development, including consultations with Federal and State resource agencies (such as the United States Fish and Wildlife Service, California Department of Fish and Game, Regional Water Quality Control Board, etc.), and including consultations required by Chapter 5 (e.g., with the City of Santa Cruz, the Younger Lagoon Reserve Manager, etc.);

(f) All implementing mechanisms associated with the proposed development (including but not limited to CEQA mitigation monitoring reports, legal documents, lease agreements, etc.);

(g) All correspondence received on the proposed development; and

(h) Identification of a person (to be referred to as the Project Manager) responsible for ensuring that the proposed development is constructed to authorized specifications, that all terms and conditions of approval are met, and that any budget shortfalls that could affect these commitments are identified and brought to the attention of decision-makers.

3. Early Coordination with the Coastal Commission

The University shall consult with the Executive Director of the Coastal Commission as early as possible in the planning of a development project with the objective of identifying issues of possible concern to the Commission. Project Reports shall be provided to the Executive Director as soon as possible but in no case later than the same time they are provided to The Regents for hearing, if any, and decision. The University shall provide the Executive Director with all public notices and documentation circulated to the public

pursuant to the Regents' required development review process, including the process for that portion of the public who explicitly request to be noticed.

4. Distribution of Project Reports to The Regents

The Director of Campus Planning shall submit a Project Report and an action recommendation to the Regents for each proposed development.

5. Development Authorization by the Regents

The Regents may authorize a proposed development based on information contained in the Project Report and any other information in the record provided that:

(a) The proposed development has been reviewed in compliance with the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA), the Regents have certified all related final CEQA and/or NEPA documents, and all conditions and/or mitigation measures identified in those CEQA and/or NEPA documents have been incorporated as part of the proposed development;

(b) The Regents find that the proposed development project advances the objectives of this CLRDP, as set forth in Chapter 4;

(c) The proposed development has been reviewed by the Director of Younger Lagoon Reserve, and the Director's comments have been reviewed and considered.

(d) The proposed development, as modified by any conditions and/or mitigation measures incorporated as part of the project, is contained in and is consistent with the certified CLRDP.

6. Development Authorization Required

No development shall be undertaken without prior authorization in accordance with this chapter.

8.2. Notice of Impending Development

8.2.1 Provision of Advance Notice and Information to Coastal Commission

The Director shall provide the Executive Director written notice of the University's intent to submit a Notice of Impending Development at least 30 days prior to submittal of the Notice of Impending Development to the Coastal Commission.

8.2.2 Recipients of Notice of Impending Development

After authorization of a development project by the Regents and at least 30 working days prior to the beginning of construction, the Director shall send via first-class mail a written Notice of Impending Development to the following persons and agencies informing them of the Regents decision:

1. The Executive Director;

2. The Director of Planning at the City of Santa Cruz;

3. The Director of Planning at the County of Santa Cruz;

4. Owners of each parcel of record within 100 feet (excluding road rights-of-way) of the UCSC Marine Science Campus;

5. Persons residing on properties located within 100 feet (excluding road rights-of-way) of the UCSC Marine Science Campus;

6. The manager of De Anza Mobile Home Park;

7. The manager or director of each facility on the Campus that is operated by an entity other than UCSC (e.g., the California Department of Fish and Game's Marine Wildlife Center), all persons occupying on-Campus short-term accommodations for three months or more (persons occupying on-Campus short-term-accommodations for less than three months shall be notified by posting of the Notice of Impending Development in lobbies and public areas associated with short-accommodations), all persons occupying on-site caretaker units, and the manager/director of the federal in-holding surrounded by the Campus;

8. The manager/director of Younger Lagoon Reserve;

9. All persons and agencies consulted with pursuant to Section 8.1.4.2 above;

10. All persons and agencies who have requested in writing to receive such notice, either for the project that is the subject of the notice and/or for all Marine Science Campus development projects; and

11. All persons and agencies that are known by the University to be interested in the specific development project that is the subject of the notice (i.e., persons and agencies that submitted testimony or other comments during the CEQA/NEPA and/or Board of Regents process for the project).

8.2.3 Contents of Notice of Impending Development

The Notice of Impending Development shall be clearly titled as such and shall, at a minimum, include the following information regarding the development project authorization:

1. The project description and location, including identification of the existence of a Project Report and information regarding where and when it is available for public review.

2. The Regents' decision on the project;

3. The expected date of commencement of construction;

4. The appropriate UCSC contact person(s) and/or designated Project Manager and their contact information;

5. The process for Coastal Commission review of the development project (including contact information for Commission staff); and

6. A list of recipients of the Notice of Impending Development.

8.2.4 Posting Requirements for Notice of Impending Development

The Director shall post the Notice of Impending Development in conspicuous locations at the proposed development project site no later than the date that the Notice of Impending Development is sent pursuant to Section 8.2.2, and at least 30 working days prior to the beginning of construction. The Notices shall be subject to the following parameters:

1. Notices that are posted shall be clearly visible and printed with black text/graphics on a brightly hued background (e.g., golden-rod yellow) using card-stock weight (at the least) paper or functional equivalent (e.g., wood, cardboard, corrugated plastic (or "coroplast"), plastic, vinyl, metal, etc). Notices shall be laminated or otherwise weatherproofed so as to be legible at all times, and shall be at least 8 inches by 11 inches in size, and no greater than 4 feet by 8 feet in size.

2. Notices shall be posted against a solid background at least as large as the notice itself (e.g., posting a card-stock notice on an 8-inch by 11-inch piece of plywood attached to a stake) or shall be printed onto an integral solid background (e.g., coroplast), and shall be posted at a readable height (i.e., approximately three to six feet).

3. Notices shall be posted at locations on the perimeter (and/or within the perimeter as appropriate) of the proposed project site where the site intersects public use areas (streets, paths, parking lots, etc.). Notices shall also be posted at: the main entrance to the Campus (at the Shaffer Road/Delaware Avenue intersection); the parking lot area nearest to the main entrance to the Campus; and the trailhead nearest to the main entrance to the Campus (i.e., the trailhead to the public trail providing access to the south along the eastern portion of the Campus).

4. Notices that do not meet the criteria listed above, that otherwise become illegible, and/or that fall to the ground or disappear (for whatever reason) must be immediately replaced. All notices shall remain posted until the effective date of development authorization (in accordance with Section 8.6).

8.2.5 Supporting Information for the Notice of Impending Development

Supporting information sufficient to allow the reviewer to determine whether the proposed development project is consistent with the certified CLRDP shall accompany the Notice of Impending Development mailed to the Executive Director and to persons and agencies requesting such information. At a minimum, the supporting information shall include:

1. The Project Report, updated to include any changes or additions made in the course of review by the University, and provided that copies of lengthy and/or oversized studies, reports, and technical materials included as part of the Project Report shall be provided only to the Executive Director and to interested persons and agencies that specifically request these materials

2. Any final authorization documents from the Regents (e.g., resolutions, signed/stamped certification, etc.) not included in the Project Report;

3. A separate document that identifies all project conditions and mitigations and explains how compliance will be achieved and measured for each;

4. Copies of all correspondence received on the proposed development project; and

5. For the Executive Director only:

   (a) A mailing list with names and addresses for each of the persons and/or agencies listed in Section 8.2.2, above, where the list is labeled and organized by each of the categories listed;

   (b) One set of plain (i.e., unadorned with no return address) regular business size (9-inch by 4-inch) envelopes stamped with first class postage (metered postage is not acceptable) addressed to each of the listed addressees from Section 8.2.2, above, for each Commission hearing on the matter (i.e., if there are multiple Commission hearings on the matter, then multiple such envelop sets shall be provided as directed by the Executive Director); and,

   (c) Evidence that the Notice of Impending Development has been posted pursuant to the parameters of Section 8.2.4, above (e.g., evidence might include a site plan with the notice locations noted and/or photos of the notice locations attached).

8.3. Development Excluded from Certain Development Review Procedures

The categories of development identified in this section are excluded from the requirements of Sections 8.1.4, 8.2, and 8.4, except if: (1) any such development occurs on tidelands, submerged lands, public trust lands, beach, or immediately adjacent to the beach or mean high tide line; and/or (2) any such development is inconsistent with any provisions of this CLRDP or any term or condition of a prior authorization under the CLRDP or the Coastal Act.

The Director shall maintain a record of development excluded from the requirements of Sections 8.1.4, 8.2, and 8.4 in accordance with this section. The record shall include a brief description of the development and its location and the basis for its exclusion. This record shall be available for review by members of the public and representatives of the California Coastal Commission and shall be included in the annual written CLRDP monitoring report to be produced pursuant to Section 8.8.

The categories of development covered by this section are as follows:

A. Installation, testing, and placement in service or the replacement of, any necessary utility connection between an existing service facility and any development authorized pursuant to this Chapter, including utility hook up activities described in the document entitled "Repair, Maintenance and Utility Hook Up Exclusions from Permit Requirements," adopted by the Coastal Commission on September 5, 1978, provided that any adverse impacts on coastal resources, including scenic resources, have been mitigated.

B. Improvements to existing structures other than public works facilities, including all fixtures and other structures directly attached to the structure, and landscaping in the immediate vicinity provided all the following requirements are met:

1. The structure or improvement is not located on a beach, in a wetland, in a stream, in an area designated as highly scenic in a certified land use plan, seaward of the mean high tide line, in an environmentally sensitive habitat area, or within 50 feet of the edge of the coastal bluff.

2. The improvement does not include any significant alteration of landforms, including the removal or placement of vegetation, on a beach or sand dune; in a wetland, stream, or ESHA, in a highly scenic area; or within 100 feet of the edge of a coastal bluff.

3. The improvement does not require the use of mechanized equipment within 50 feet of the top edge of a coastal bluff.

4. The improvement, when combined with all previous improvements to the structure in the time since CLRDP certification together, does not increase the floor area or height of the structure (as measured at the time of CLRDP certification) by more than 10 percent or above any maximum height and/or floor area requirements identified in the certified CLRDP.

5. The improvement does not include the expansion or construction of water wells or septic systems.

6. The improvement does not change the intensity of use of the structure.

7. In the event that the Coastal Commission has declared by resolution after public hearing that there is a critically short water supply that must be maintained for protection of coastal recreation or public recreational use in the area of the Campus, the development is not a specified major water-using development, including but not limited to swimming pools, or the construction or extension of any landscaping irrigation system.

C. Repair or maintenance activities that do not result in an addition to, or enlargement or expansion of, the object of those repair and maintenance activities, including those specifically described in the document entitled "Repair, Maintenance and Utility Hook-up Exclusions from Permit Requirements," adopted by the Coastal Commission on September 5, 1978, provided the activity does not include:

1. Any method of repair or maintenance of a seawall, revetment, bluff retaining wall, breakwater, groin, culvert, outfall, or similar shoreline work that involves substantial alteration of the foundation of the structure being repaired or maintained; placement of rip-rap or other solid material on a beach or in coastal waters, streams, estuaries, or wetlands, or on a shoreline protective work; replacement of 20 percent or more of the materials of an existing structure with materials of a different kind; or the presence of mechanized construction equipment or construction materials on any sand area, bluff, or environmentally sensitive habitat area, or within 20 feet of coastal waters or streams.

2. Any repair or maintenance to facilities, structures, or work located in an environmentally sensitive habitat area, any sand area, within 50 feet of the edge of a coastal bluff or environmentally sensitive habitat area, or within 20 feet of coastal waters or streams, that includes: (a) the placement or removal, whether temporary or permanent, of rip-rap, rocks, sand, other beach materials, or any other form of solid materials; and/or (b) the presence, whether temporary or permanent, of mechanized equipment or construction materials.

3. Any routine maintenance dredging or disposal of dredge materials that involves the dredging of 100,000 cubic yards or more within a twelve (12) month period; the placement of dredged spoils of any quantity within an environmentally sensitive habitat area, on any sand area, within 50 feet of the edge of a coastal bluff or environmentally sensitive habitat area, or within 20 feet of coastal waters or streams; or the removal, sale, or disposal of dredged spoils of any quantity that would be suitable for beach nourishment in an area the Commission has declared by resolution to have a critically short sand supply that must be maintained for protection of structures, coastal access or public recreational use.

4. For activities described in the "Repair, Maintenance and Utility Hook-up Exclusions from Permit Requirements" referenced in this subsection, above, any activity that will have a risk of substantial adverse impact on public access, environmentally sensitive habitat area, wetlands, or public views to the ocean.

D. The replacement of any structure, other than a public works facility, destroyed by disaster, provided the requirements of this subsection are met. "Disaster" means any situation in which the force or forces that destroyed the structure to be replaced were beyond the control of its owner.

1. The replacement structure conforms to all applicable CLRDP regulations;

2. The use of the replacement structure is the same as the destroyed structure;

3. The replacement structure does not exceed either floor area, height, or bulk (i.e., the total interior cubic volume as measured from the exterior surface of the structure) of the destroyed structure by more than 10 percent; and

4. The replacement structure is sited in the same location on the affected property as the destroyed structure.

E. Development authorized by a coastal development permit issued by the Coastal Commission prior to certification of this CLRDP.

8.4. Coastal Commission Review of CLRDP Development Projects

The Coastal Commission shall review development projects contained in the CLRDP that have been authorized by the University for consistency with the CLRDP in accordance with the procedures of this section.

8.4.1 Filing the Notice of Impending Development

Within ten days of receipt of the Notice of Impending Development and all applicable supporting information (as described in Section 8.2, above) for a proposed development project, the Executive Director of the Coastal Commission shall review the submittal and shall determine whether additional information is necessary to determine if the proposed development project is consistent with the CLRDP, and if additional information is deemed necessary, shall request such information from the Director of Campus Planning. The Notice of Impending Development shall be deemed filed as follows:

1. If the Executive Director does not respond to the Notice of Impending Development or any subsequent information submittal within ten days following its receipt, the Notice shall be deemed filed on the tenth day following the Executive Director's receipt of the Notice or the subsequent information submittal, or

2. The Notice shall be deemed filed when all necessary information requested has been received by the Executive Director.

   In the event of disagreement concerning the need for additional information or the adequacy of the subsequent information submitted to enable the Commission to determine consistency with the certified CLRDP, the Executive Director or Director of Campus Planning may submit the disagreement to the Commission for resolution. The Executive Director shall schedule the matter for hearing and resolution at the next Commission meeting or as soon thereafter as practicable, but in no event later than sixty (60) calendar days after the Executive Director's receipt of written notice by the Director of Campus Planning that the University disagrees that the Executive Director's request for information is necessary to determine if the proposed development is consistent with the certified CLRDP.

   The matter shall be scheduled and heard by the Commission in accordance, to the extent practicable, with the procedures set forth in 14 California Code of Regulations Section 13056(d).

8.4.2 Coastal Commission Hearing Deadline

The thirtieth working day following the day the Notice of Impending Development is deemed filed is the Hearing Deadline. If the Commission fails to act upon the Notice on or before the Hearing Deadline, the noticed development project shall be deemed consistent with the certified LRDP. The Hearing Deadline may be extended if, on or before the Hearing Deadline, the Director of Campus Planning waives the University's right to a hearing within thirty working days, and agrees to an extension to a date certain, no more than three months from the Hearing Deadline, to allow for Commission review of the proposed development project at a later hearing.

8.4.3 Coastal Commission Review and Determination of Consistency with CLRDP

The Executive Director shall report in writing to the Commission the pendency of the proposed development project for which a Notice of Impending Development has been deemed filed. The Coastal Commission shall review the proposed development project at a scheduled public hearing prior to the Hearing Deadline.

If the Executive Director determines that one or more proposed development projects are de minimis with respect to the purposes and provisions of the CLRDP, they may be scheduled for Commission review at one public hearing during which all such items may be taken up as a single matter pursuant to procedures comparable to the Commission's consent calendar procedures (California Code Regulations, Title 14, Sections 13101 through 13103).

For all other proposed development projects, the Executive Director's report to the Commission shall include a description sufficient to allow the Commission to understand the location, nature, and extent of the proposed development, and a discussion and recommendation regarding the consistency of the proposed development project with the certified CLRDP. On or before the Hearing Deadline the Commission, by a majority of its membership present, may take one of the following actions on a proposed development project:

1. Determine that the proposed development project is consistent with the certified CLRDP, or

2. Determine that conditions are required to render the proposed development project consistent with the certified CLRDP and vote to impose any condition necessary to render the proposed development project consistent with the certified CLRDP.

Following Commission action, the Executive Director shall inform the Director of Campus Planning of the Commission's action and shall forward any conditions associated with it. If the Commission has voted to impose any condition necessary to render the project consistent with the CLRDP, development shall not be undertaken until the conditions have been incorporated into the project.

Coastal Commission review of a proposed development project shall be deemed complete on either:

1. The date of a Commission action determining that the proposed development project is consistent with the CLRDP (with or without conditions to render it consistent); or

2. If the Commission has failed to take action on the proposed development project by the Hearing Deadline, the date of the Hearing Deadline.

Upon completion of Commission review, the University may undertake the development project provided that any conditions imposed by the Commission to render the development consistent with the CLRDP have been incorporated into the project.

8.5 Amendment of Development Project Authorizations

Authorization for development that has been deemed consistent with the CLRDP by the Regents and/or the Coastal Commission may be amended in the same manner specified by this CLRDP for the initial review of proposed development. Development that requires amendment of a pre-CLRDP certification Commission action and that is not subject to the Coastal Commission's retained permit jurisdiction and/or other retained review authority (see Section 8.7) shall be pursued through the Coastal Commission directly, unless the Executive Director, in consultation with the Planning Director, or the Commission determines that de novo review under CLRDP procedures is more appropriate. The determination shall be made on the basis of the extent to which the proposed change significantly alters the effect of terms and/or conditions of the original approval. In either case, the standard of review is the certified CLRDP.

8.6 Effective Date and Expiration Date of Development Project Authorizations; Extension of Authorizations

8.6.1 Effective Date of Development Project Authorizations

Unless expressly stated otherwise in the approval documents, the effective date of a development project authorization shall be the date the Coastal Commission's review of the proposed project is deemed complete pursuant to Section 8.4.3.

8.6.2 Expiration Date of Development Project Authorizations

Unless explicitly stated otherwise in the approval documents, the expiration date of a development project authorization pursuant to this CLRDP shall be three years following its effective date. Thereafter, development of the project may not commence unless the authorization has been extended as provided herein, or a new authorization and review by the Commission has been completed in accordance with CLRDP provisions for initial review of proposed development.

8.6.3 Extension of Development Project Authorizations

The expiration date of a development project authorization may be extended for a period not to exceed one year if the Planning Director determines that there are no changed circumstances that may affect the project's consistency with the CLRDP. In such a case, before the expiration of the authorization, the Planning Director shall submit to the Executive Director notice of intent to extend authorization of the development together with supporting information sufficient for the Executive Director to determine whether there are changed circumstances that may affect the development's consistency with the CLRDP, including any modified and/or new materials making up the supporting information described in Section 8.2.5 above. The submittal shall stay the expiration of the authorization and the start of construction.

If the Executive Director determines that the extension is consistent with the CLRDP, the University shall post notice of the determination consistent with the posting requirements in

Section 8.2.4 above and the Executive Director shall mail the notice to all persons and agencies on the original mailing list for the project and to all persons and agencies known by the Executive Director to be interested in the proposed extension. The notice shall include a summary of the extension approval process and information on contacting the University and the Coastal Commission concerning the proposed extension. If no written objection is received at the Commission office within 10 working days of posting and mailing notice, the determination of consistency shall be conclusive.

If the Executive Director determines that due to changed circumstances the development project may not be consistent with the CLRDP, the proposed extension shall be reported to the Commission at a noticed public hearing. The report shall include any pertinent changes in circumstances relating to the proposed extension. If three or more commissioners object to the extension on grounds the development may not be consistent with the CLRDP, the matter shall be set for hearing as though it were a new Notice of Impending Development, including that the University shall post notice and shall provide the Executive Director with supporting information in the manner prescribed for new proposed development projects.

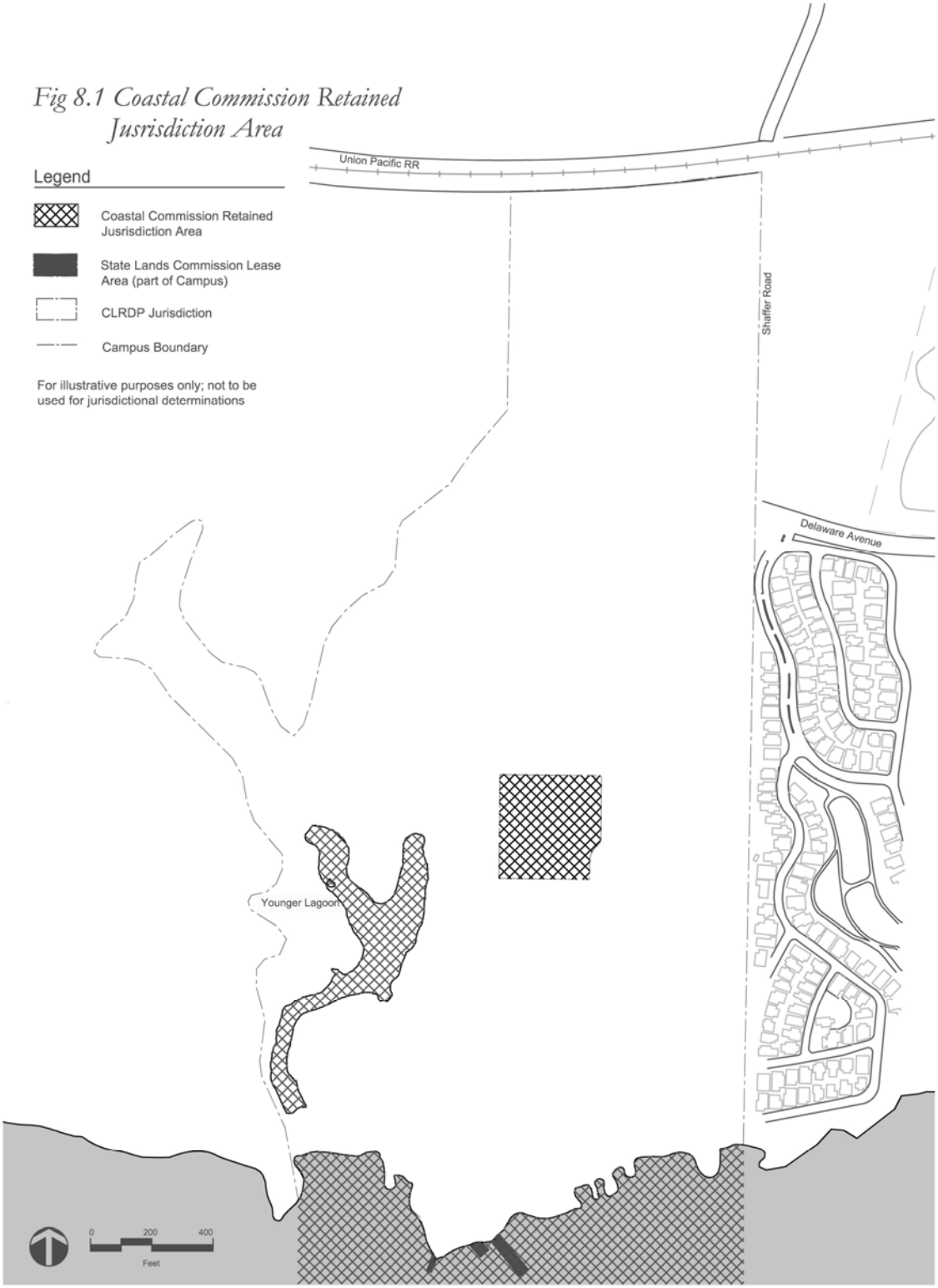
Successive extensions of an authorization may not exceed one year each.

8.7 Coastal Commission's Retained Jurisdiction

After certification of the CLRDP, the Coastal Commission retains permit jurisdiction over development on tidelands, submerged lands, and public trust lands, whether filled or unfilled, on and adjacent to the campus (see "Coastal Commission Retained Jurisdiction Area" in Figure 8.1). Under the Federal Coastal Zone Management Act, the Commission also retains federal consistency review authority over federal activities and federal permitted activities on or adjacent to the campus. The CLRDP shall provide non-binding guidance for such permit and federal consistency review by the Commission.

The Commission also retains permit jurisdiction outside of the retained jurisdiction area over Campus development that was approved by Commission action before the date of CLRDP certification. Any proposal to expand such existing development shall be subject to the development review procedures of the CLRDP. For any proposal to modify such existing development, the determination of whether to treat the proposal as an amendment to the Commission authorization or as a new development subject to CLRDP review shall be made on a case-by-case basis as provided in Section 8.5 (Amendment of Development Project Authorizations).

Fig 8.1 Coastal Commission Retained Jusrisdiction Area



8.8 Monitoring of Development Projects

The Regents shall be responsible for ensuring that all terms, conditions, and mitigations associated with authorized development projects, including but not limited to mitigation measures and CEQA/NEPA requirements, are fulfilled. Project managers and other UC personnel assigned responsibility to implement and/or monitor authorized development projects shall contact the Director of Campus Planning annually by the end of each calendar year to provide information regarding compliance with the terms and conditions of each CLRDP authorization that year and continuing obligations from authorizations in previous years. The Planning Director shall verify that all terms and conditions have been timely fulfilled and shall update each project's list of conditions and mitigations (see Section 8.2.5, above) with compliance information on at least a yearly basis. The Director shall also review as-built project plans and verify that development has been constructed consistent with them, including affixing written documentation to that effect to the as-built plans. The Director shall maintain the updated copies of the required approval documents and shall maintain the verified as-built plans, and they shall be available for public review.

The Director shall include within on-going development monitoring programs of the University an annual written CLRDP monitoring report that includes a cumulative and calendar year summary of: CLRDP-authorized development project compliance; development excluded from Sections 8.1.4, 8.2 and 8.4 by virtue of Section 8.3; emergency authorizations pursuant to Section 8.10; enforcement undertaken pursuant to Section 8.9; CLRDP-required annual monitoring reports (e.g., the water quality reports, etc.); status of CLRDP-required improvements and other University commitments; and any comments received on CLRDP implementation. The Director shall maintain a record of these annual summary reports in the Director's office, and they shall be available for public review. The Director shall submit a copy of each annual report to the Executive Director within ten days of its completion.

8.9 Enforcement

In addition to all other available remedies, the provisions of the CLRDP and the Coastal Act shall be enforceable pursuant to Chapter 9 of California Public Resources Code Division 20. Any person who performs or undertakes development on the Marine Science Campus that is (a) in violation of the CLRDP, (b) inconsistent with any pre-CLRDP Coastal Commission authorization (including coastal development permit approval), and/or (c) inconsistent with any CLRDP development project authorization may, in addition to any other penalties or remedies, be civilly liable in accordance with the provisions of Public Resources Code Sections 30820, 30821.6 and 30822.

The Regents shall ensure that development on the Campus is consistent with the CLRDP and is consistent with the terms and conditions of development authorizations pursuant to the CLRDP. The Director of Campus Planning shall investigate in a reasonable time allegations regarding development being undertaken inconsistent with the provisions of the CLRDP and/or CLRDP development authorizations, and shall attempt to resolve any such inconsistencies discovered. The Executive Director and/or Coastal Commission may also enforce the terms of the CLRDP and the Coastal Act.

8.10 Emergency Authorizations

A. Definition of Emergency

For the purpose of this Section the term "emergency" means: A sudden unexpected occurrence demanding immediate action to prevent or mitigate loss or damage to life, health, property or essential public services.

B. Emergency Development in Areas Outside of the Coastal Commission's Retained Jurisdiction

1. Chancellor's Authority

Where immediate action by the University is required to protect life and property of the University from imminent danger, or to restore, repair, or maintain University property, utilities, or services destroyed, damaged, or interrupted by natural disaster, serious accident, or in other cases of an emergency, the UCSC Chancellor may authorize emergency development on the Campus outside of the Coastal Commission's retained jurisdiction area (see CLRDP Section 8.7 and Figure 8.1) in compliance with this Section. Emergency work within areas subject to the Coastal Commission's permit jurisdiction is addressed in Subsection 8.10.C below.

2. Extreme Emergency Requiring Immediate Action

If an emergency is so extreme that it does not allow time for the written requests, authorizations, and coordination described in this section, the University and persons undertaking any emergency development shall adhere as closely as reasonably possible to the written request, authorization, and coordination portions of these procedures. If an emergency is so extreme that it does not allow time for the written requests (Section 8.10.B.3), authorizations (Sections 8.10.B.4.1, 8.10.B.4.3, 8.10.B.5, and 8.10.B.6), and coordination (Sections 8.10.B.4.2) described in this section, the University and persons undertaking any emergency development shall adhere as closely as reasonably possible to the written request, authorization, and coordination portions of these procedures. In all cases, compliance with Section 8.10.B.7 is required.

3. Request for Emergency Development Authorization

A request for an emergency development authorization shall be filed with the UCSC Chancellor in writing if time allows, or in person or by telephone if time does not allow. In such a case, the written request and authorization shall be provided as described in subsection 8.10.B.2, above. The request shall include, at a minimum:

1. The nature and location of the emergency;

2. The cause of the emergency, insofar as this can be established;

3. The remedial, protective, and/or preventative development proposed to address the emergency, including an evaluation of potential alternatives if time allows; and

4. The circumstances associated with the emergency that justify the emergency development proposed, including the probable consequences of failing to take action.

4. Chancellor's Responsibilities

Prior to authorizing emergency development, and to the extent time allows, the UCSC Chancellor or his/her designee shall:

1. Verify the facts associated with an emergency authorization request, including the existence and nature of the emergency;

2. Coordinate with planning staff in the Central Coast District office of the California Coastal Commission as to the nature of the emergency and the scope of the emergency development proposed; and

3. Provide public notice of the emergency development, with the extent and type of notice determined on the basis of the nature of emergency.

5. Findings Required for Authorization of Emergency Development

The UCSC Chancellor may authorize emergency development on the Campus if he/she first finds that:

1. Immediate action by the University is required to protect life and property of the University from imminent danger, or to restore, repair, or maintain University property, utilities, or services destroyed, damaged, or interrupted by natural disaster, serious accident, or in other cases of emergency;

2. The emergency requires action more quickly than could occur through the CLRDP's normal development review procedures, and the emergency development can and will be completed within 30 days unless otherwise specified in the emergency authorization;

3. Public comment on the proposed emergency development has been reviewed, if time allows;

4. The Chancellor has coordinated with planning staff in the Central Coast District office of the California Coastal Commission and/or the Executive Director pursuant to CLRDP Subsection 8.10.B.4;

5. The emergency development proposed is the minimum necessary to address the emergency and, is the least environmentally damaging temporary alternative for addressing the emergency; and

6. The emergency development proposed would be consistent with the CLRDP and/or would not impede attainment of CLRDP requirements following completion of the emergency development.

6. Form of Emergency Development Authorization

The emergency development authorization shall be a written document and, at a minimum, shall include:

1. The date of issuance;

2. The scope of development to be performed;

3. The timeframe for completion of the emergency development (not to exceed 30 days);

4. Terms and conditions of the authorization;

5. A condition indicating that the emergency development must be completed within 30 days, that the development is considered temporary unless it is subsequently authorized through regular CLRDP review procedures, and that regular CLRDP review must commence within 30 days of issuance of the emergency authorization.

6. A provision stating that any development or structures constructed pursuant to an emergency authorization shall be considered temporary until authorized by the regular CLRDP development authorization processes, and that issuance of an emergency authorization shall not constitute an entitlement to the erection of permanent development or structures; and

7. A provision stating that the development authorized through the emergency process must be removed and the affected area restored if a development project authorization has not been received within six months of authorization of the emergency development (or within one year if a CLRDP amendment is also required). If it is not so authorized, the emergency development authorized, or the unauthorized portion of the development, shall be removed and the affected area restored.

7. Notice of Emergency Development Authorization

No later than three days of the occurrence of the disaster or the discovery of the danger, the Chancellor shall provide the Executive Director of the Coastal Commission with at least telephonic notice of the type and location of the emergency action taken. As soon as possible and no later than 7 days after the emergency, the Chancellor shall submit a written Notice of Emergency Development Authorization to the Executive Director. The Notice shall include information documenting compliance with this section, including the written emergency authorization. The notice is informational only.

C. Emergency Development in Areas within the Coastal Commission's Retained Jurisdiction

In the event of an emergency necessitating emergency development on land on which the Coastal Commission retains jurisdiction (see CLRDP Section 8.7 and Figure 8.1) the procedures of this subsection shall apply.

1. The Chancellor or Planning Director shall apply for an emergency permit to the Executive Director, by letter if time allows, and by telephone or in person if time does not allow. All processing of the proposed emergency permit shall be in accordance with 14 Cal. Code of Regulations Sections 13136-13143.

2. Where immediate action by the University is required to protect life and public property from imminent danger or to restore, repair, or maintain public works, utilities, or services damaged or interrupted by natural disaster or other emergency, the requirement for obtaining an emergency permit may be waived, in accordance with Section 30611 of the Coastal Act; provided that the University shall comply with the requirements of Section 30611. The University shall notify the Executive Director of the type and location of the emergency work within three days of the disaster or discovery of the danger, whichever comes first. This subsection does not authorize erection of any permanent structure valued at more than $25,000. Within seven days of taking action, the University shall notify the Executive Director in writing of the reasons why the action was taken and provide verification of compliance with the expenditure limits. The University's submittal to the Executive Director shall be reported to the Commission and otherwise processed in accordance with 14 Cal. Code of Regulations Section 13144.

8.11 Non-Conforming Structures

A. "Non-conforming structure" and "non-conforming use" means an existing structure or use that: (1) existed prior to the certification date of this CLRDP; (2) was and remains lawfully authorized pursuant to the Coastal Act by coastal development permit or other authorization (e.g., a coastal development permit waiver, a determination that no permit was required, etc.); (3) was lawfully authorized by all other regulations applicable at the time of its original development; and (4) does not conform to the policies and implementation measures of this CLRDP or any amendments thereto.

B. No non-conforming use shall be intensified or expanded into an additional location beyond its coverage at the time of CLRDP certification, except as identified in IM 2.2.1.

C. Repair or maintenance of a non-conforming structure may not result in enlargement of the structure beyond its size at the time of CLRDP certification, except as identified in IM 2.2.1. Demolition and/or reconstruction that results in replacement of more than 50 percent of non-conforming structures, where the 50% is a cumulative total that includes all demolition and/or reconstruction undertaken after certification of the CLRDP, is not permitted unless such structures are brought into conformance with the CLRDP.

D. Additions and/or improvements to non-conforming structures may be authorized, provided that the additions and/or improvements themselves comply with the CLRDP, except as provided in Subsection 8.11.E.

E. If a non-conforming use or structure is damaged or destroyed by disaster as described in Section 8.3.D, replacement shall be subject to provisions of CLRDP Subsection 8.3.D (Structures Destroyed by Disaster).

F. If any non-conforming use and/or structure is abandoned for a continuous period of 6 months, any subsequent use of such land and/or structure in and/or on which the use was located shall be in conformity with the CLRDP.

9. Capital Improvement Program

The primary purpose of this chapter is to set forth an outline of programmed improvements and the timing of their implementation for the Marine Science Campus. This Capital Improvement Program implements key elements of the CLRDP and all components of it are enforceable requirements of the CLRDP pursuant to Chapter 8 and shall be interpreted in conjunction with the narrative and diagrams of previous chapters and subsequent appendices. This Capital Improvement Program is intended to address the scheduling of certain infrastructure improvements and habitat enhancements that will be undertaken by the University in conjunction with the Marine Science Campus Building Program.

The Capital Improvement Program consists of four sections, which are presented below. These four sections are:

9.1 Public Access Improvements

9.2 Habitat Enhancements

9.3 Circulation Improvements

9.4 Drainage System Improvements

9.1. Public Access Improvements

This section sets forth the implementation timing for specified public access improvements on the Marine Science Campus consistent with this CLRDP.

9.1.1. Public and Controlled Access Trails

The University shall enhance existing public and controlled access trails and construct new public trails and related amenities on the Marine Science Campus consistent with the parameters for such trail improvements specified in this CLRDP, including Sections 5.6 and 6.4. Trail improvements shall be completed as shown in Figures 9.1 and 9.2.

Fig. 9.1 Trail and Overlook Improvements

Fig. 9.2 Timing of Public Trail Improvements (see Figure 9.1)

Trail Group	*Timing of Improvement*
Group 1	Improvement of this group of trail segments shall be undertaken and completed concurrent with the development of any new building in the Lower or Middle Terrace development zones.
Group 2	Improvement of this group of trail segments shall be undertaken and completed concurrent with the development of the realigned "Major Campus Street."
Group 3	Improvement of this group of trail segments shall be undertaken and completed concurrent with any new development in the Upper Terrace development zone, or when the first 10% of the new building floor area (square footage) contained in the Campus building program set forth in subsection 5.2.1 is completed.

9.1.2 Overlooks

The University shall construct new overlooks and improve existing overlooks on the Marine Science Campus consistent with the parameters for such overlook improvements specified in this CLRDP, including Section 5.6 and Chapter 7. The improvements at Overlook B shall encompass the areas adjacent to the overlook as described in Chapter 7. These new and improved overlooks shall be completed as shown in Figure 9.3

Fig. 9.3 Timing of Overlook Improvements

Overlook	*Timing of Improvement*
All Overlooks (A – F)	Unless required to be completed earlier by the timing described in the remainder of this figure, at a minimum, all overlook improvements shall be completed when the first ten percent of new building floor area (square footage) contained in the Marine Science Campus Building Program set forth in Subsection 5.2.1 is completed.
Overlooks A, C, D, and E	All overlook improvements shall be completed within 12 months of CLRDP certification.
Overlooks B and F	All overlook improvements shall be completed concurrent with the development of any new building in the Lower or Middle Terrace development zones or within two years of CLRDP certification, whichever comes first.

9.1.3 Public Coastal Access Parking

The University shall construct and/or dedicate new and/or existing parking on the Marine Science Campus consistent with the parameters for such parking improvements and their use specified in this CLRDP, including Sections 5.5 and 6.3, to provide dedicated public coastal access parking. In order to implement the CLRDP's public coastal access parking use parameters, all Campus parking signs and related information must be updated, and a parking program may be put in place. Specifically, signs with updated information must replace existing Campus parking signs, information regarding CLRDP parking use parameters must be made available to Campus users and visitors, and a convenient means for complying with any parking program provisions that implement the CLRDP provided to the public. As new parking areas are developed, Campus parking information must be regularly updated to reflect these new parking areas. Public coastal access parking improvements shall be completed as shown in Figure 9.4.

Fig. 9.4 Timing of Public Coastal Access Parking Improvements

Type of Improvement	*Timing of Improvement*
Lower Terrace Public Coastal Access Parking. At least 10 dedicated public coastal access parking spaces shall be identified in the Lower Terrace development zone in a location that provides the easiest and most direct access to public coastal access amenities (e.g., in the parking bay along the east side of McAllister Way opposite the Ocean Health building).	Improvements shall be undertaken and completed concurrent with the implementation of any Campus parking program (e.g., permit distribution and use framework for the Campus or portions thereof), or within 12 months of CLRDP certification, whichever comes first.
Lower Terrace Dual Use Parking. At least 40 dual use parking spaces (i.e., reserved exclusively for public coastal access parking and for parking by visitors to the Seymour Marine Discovery Center) shall be identified in the Lower Terrace development zone in a location that provides the easiest and most direct access to public coastal access amenities and the Marine Discovery Center.	Improvements shall be undertaken and completed concurrent with the implementation of any Campus parking program (e.g., permit distribution and use framework for the Campus or portions thereof), or within 12 months of CLRDP certification, whichever comes first.
Middle Terrace Public Coastal Access Parking. At least 5 dedicated public coastal access parking spaces shall be developed in the Middle Terrace development zone located either: (1) in that portion of subarea 9 that is adjacent to any Campus support facilities in subarea 9 and that provides the easiest and most direct access to the public trails extending outside of the Middle Terrace development zone; or (2) in a location that provides the easiest and most direct access to Overlook E and the public trail connection to Overlook E.	Improvements shall be undertaken and completed concurrent with any parking or support facility development in subarea 9, or within 5 years of CLRDP certification, whichever comes first.

Type of Improvement	*Timing of Improvement*
Campus Entrance Public Coastal Access Parking. At least 15 dedicated public coastal access parking spaces shall be developed in the Campus Entrance development zone in a location that provides the easiest and most direct access to public coastal access amenities (e.g., the Campus public trail system).	Improvements shall be undertaken and completed concurrent with any new development in the Upper Terrace development zone, or when the first 10 percent of new building floor area (square footage) contained in the Campus Building Program (Section 5.2.1) has been completed, whichever comes first.
Updated Signs and Information. New and/or updated signs and information regarding CLRDP public coastal access parking availability consistent with Policy 5.3 and its implementation measures shall be installed/provided throughout the Campus at appropriate locations.	Initially, improvements shall be undertaken and completed concurrent with the implementation of any Campus parking program (e.g., permit distribution and use framework for the Campus or portions thereof), or within 12 months of CLRDP certification, whichever comes first. Subsequent to such initial improvements, improvements shall be undertaken and completed concurrent with the development of any new public coastal access parking spaces.
Parking Program. A parking management program, including any associated physical development (e.g., signs, kiosks, etc.), that is consistent with all CLRDP parking requirements shall be implemented to ensure that public coastal access parking areas are used for public coastal access use only.	Improvements shall be undertaken and completed when the first 10 percent of new building floor area (square footage) contained in the Campus Building Program (Section 5.2.1) has been completed, or if review of any circulation and parking plan (pursuant to CLRDP Policy 5.10) indicates that public coastal access parking areas are being used for non-public coastal access use and such use is negatively impacting public coastal access, whichever comes first.

9.1.4 Identification of Access Facilities

All public access facilities (including trails, overlooks, parking areas and the Marine Science Campus in general) shall be clearly signed for public access in a manner that maximizes the ability of the public to make use of such facilities. The University shall design and install a coordinated "suite" of way finding, identification and interpretive signage, and shall provide readily available handouts and brochures with campus-wide information on public access facilities. As the development of the Marine Science Campus evolves over time, existing access facility signage and information shall be updated to coordinate with the overall campus signage and information program.

9.2 Natural Resource Improvements (Protection, Enhancement, Management, and Maintenance)

The CLRDP commits the University to natural resource protection, enhancement, restoration, management, and maintenance of areas outside of the Campus development zones. As guided by Section 5.3 and other portions of the CLRDP, the goals, management measures, performance standards, and implementation timing guidelines identified in the CLRDP Resource Management Plan (Appendix A) set forth the general parameters for natural resource improvements on the Marine Science Campus. Among other things, the Resource Management Plan, under the guidance of the SAC, requires wetland restoration and enhancement, wildlife corridor and buffer enhancement, grassland restoration and management, native plant revegetation, new Campus access road location, wetland berming, and long-term management and maintenance of Campus natural resources in the natural areas outside of defined development zones. Natural areas restoration, enhancement, and management may be completed in up to three phases corresponding to dividing the natural area into thirds (i.e., where Phase 1 accounts for at least one-third of the natural area, Phase 1 plus Phase 2 accounts for at least two-thirds, and all of the three phases together account for all of the natural area). All natural areas restoration and enhancement shall be completed within 20 years of CLRDP certification, with interim benchmarks that at least one-third of the restoration and enhancement shall be completed within seven years of CLRDP certification and that at least two-thirds shall be completed within 14 years of CLRDP certification.

In addition to the overall natural areas restoration, enhancement, and management described above, the University also commits to the following specific natural resource improvement separate from the process described above as follows. At the time of CLRDP certification, there existed an informal parking area located along the west side of McAllister Way between the Lower Terrace development zone and the greenhouses in the Middle Terrace development zone. Within one year of CLRDP certification, the University shall remove this parking area and shall restore the area impacted by it to a natural state consistent with this area's function as buffer for Younger Lagoon Reserve and Wetland W5. To make up for the parking spaces removed, the University may develop a temporary parking facility in the area immediately north of the NOAA Fisheries lab parking area. Subject to Sections 5.2.1 and 6.3, such a temporary parking facility shall be designed to meet all applicable design and design-related guidelines as much as practicable, but it is allowed to be inconsistent with some such guidelines provided reasonable attempts to meet such guidelines are applied. In this case, the University shall at a minimum: limit the size of such parking area as much as possible (and in no case shall it extend further east than the existing NOAA parking area), including limiting the number of spaces to match those removed in the Younger Lagoon Reserve/Wetland W5 buffer restoration area; orient it in a west-east direction to match the orientation and layout of the NOAA parking area; grade the temporary area to positively drain to one side of the parking area (e.g., to the south) where a vegetated filter strip and/or vegetated swale shall be constructed that is designed to accommodate said drainage and transport it to existing drainage facilities able to handle it; and locate the temporary parking facility and all vegetated strips/swales as close to the NOAA Fisheries parking area as possible. Also pursuant to Sections 5.2.1 and 6.3, such a temporary parking facility is only allowed within the first five years of CLRDP certification and by

the end of that time shall either: (a) be removed and the disturbed area restored; or (b) made to conform to all CLRDP requirements, including design guidelines.

9.3 Circulation Improvements

This section sets forth the implementation timing for specified circulation improvements on the Marine Science Campus consistent with this CLRDP.

9.3.1 Shaffer Road

The University shall make improvements to Shaffer Road consistent with the parameters for such improvements specified in this CLRDP, including Section 5.5 and the CLRDP Resource Management Plan. Such improvements shall be undertaken and completed concurrent with any new building in the Upper Terrace development zone of the Marine Science Campus. All Shaffer Road improvements shall be coordinated with the City of Santa Cruz.

9.3.2 Realigned Main Campus Street

The University shall realign the main campus street of the Marine Science Campus consistent with the parameters for such improvements specified in this CLRDP, including Section 5.5, Figure 5.5, and the CLRDP Resource Management Plan. This improvement shall be undertaken and completed concurrent with the first 10 percent of new building floor area (square footage) contained in the Marine Science Campus Building Program set forth in Subsection 5.2.1.

9.3.3 Shaffer Road/Delaware Avenue Intersection Improvements

The University shall make improvements to the intersection of Shaffer Road and Delaware Avenue consistent with the parameters for such improvements specified in this CLRDP, including Sections 5.5, 5.6, and Chapter 6. These intersection improvements shall be coordinated with the City of Santa Cruz and shall be constructed at the same time as the construction of the realigned main campus street for the Marine Science Campus per Subsection 9.3.2 above.

9.4 Drainage System Improvements

This section sets forth the implementation timing for specified stormwater system improvements on the Marine Science Campus consistent with this CLRDP. The University shall enhance the Marine Science Campus drainage system consistent with the parameters for such drainage improvements specified in this CLRDP, including Section 5.7 and the Drainage Concept Plan (Appendix B). At a minimum, specified drainage improvements shall be completed as shown in Figure 9.5 (see also additional information on these projects in the "Specific Drainage Improvement Projects" section of Appendix B).

Fig. 9.5 Timing of Drainage System Improvements

Specified Improvements	*Timing of Improvement*
Repair/replace the 24-inch drainage pipe from Wetland W4 to the De Anza Mobile Home Park. Improve the stormwater outfall directing discharge toward Younger Lagoon Reserve west of the NOAA Fisheries facility. Improve the percolation trench and berm directing Middle Terrace development zone discharge toward Younger Lagoon Reserve.	All specified drainage system improvements shall be undertaken concurrent with any new development in the Middle Terrace development zone of the Marine Science Campus or within three years of CLRDP certification, whichever comes first.

Appendix A. Resource Management Plan

A.1. Introduction

This Resource Management Plan augments the natural resource related provisions, including the policies and implementation measures, of the CLRDP, providing specificity and detailed guidance for protecting, maintaining, restoring, and enhancing the natural resources of the non-developed areas as well as avoiding impacts to Younger Lagoon Reserve. The plan describes the physical and biological characteristics of the terrace portion of the campus, including the upland habitats as well as the permanent and seasonal wetland areas. It outlines overall goals for resource management, and details specific goals for each defined vegetation type or wetland area. Measures for restoration, enhancement, and management of biological resources, including long-term maintenance and monitoring, are outlined. Performance criteria and implementation timing guidelines are also provided.

The purpose of this resource management plan is to outline parameters for the restoration, enhancement, and management of biological and open space resources on the terrace portion of the Marine Science Campus. Restoration and enhancement efforts are organized into two seven-year phases and one six-year phase – a total of twenty years for all three phases. Within each phase, approximately one-third of the area outside of development zones will be restored and enhanced. At the end of the last phase, all the natural areas will have been restored and enhanced and management of these areas will continue indefinitely. A scientific advisory committee will guide restoration, enhancement, and management efforts, using this Resource Management Plan as a guide. As such, specific measures, performance criteria, and implementation timing guidelines outlined in this plan may be adjusted through the process of developing Specific Resource Plans, and by adapting such plans based on results in the field of on-going restoration work (see Implementation Measure 3.2.10).

A.1.1 Marine Science Campus Location

This Resource Management Plan (RMP) applies to the Marine Science Campus (Campus) of the University of California, Santa Cruz (UCSC). The site is located on the coast at the western edge of the City of Santa Cruz (Figure A-1). It encompasses the laboratory complex known as Joseph M. Long Marine Laboratory (LML), a flat, gently southward-sloping coastal terrace that ends at a bluff approximately 35 feet above the waters of the Monterey Bay National Marine Sanctuary, and the University of California's Younger Lagoon Reserve (YLR). The site is located within the coastal zone of the City of Santa Cruz.

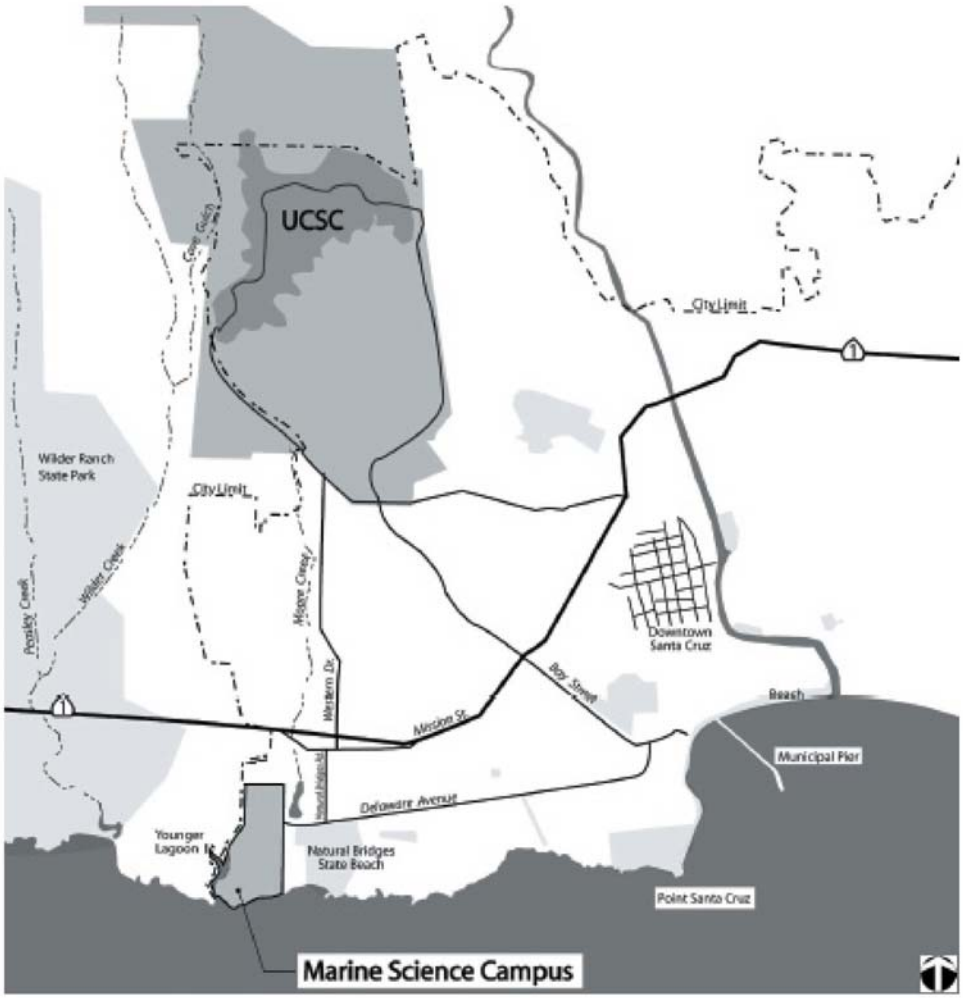
The Campus is bordered by a variety of land uses. Agricultural land lies to the west of the site, along the western boundary of YLR. The northern boundary of the campus is formed by the Union Pacific Railroad tracks, beyond which are an industrial area. Shaffer Road runs along the eastern boundary of the site north of Delaware Avenue. East of Shaffer Road is undeveloped land that is currently vacant except for a community garden. Antonelli Pond lies to the east of this area. South

of Delaware Avenue, the Campus is bounded on the east by the De Anza Mobile Home Park. The Pacific Ocean forms the site's southern boundary. The primary access to the site is provided at the intersection of Delaware Avenue and Shaffer Road via an east-west paved roadway (sometimes referred to as Delaware Avenue Extension), which becomes McAllister Way as it extends north-south on the site.

A.1.2 Resource Management Plan Summary

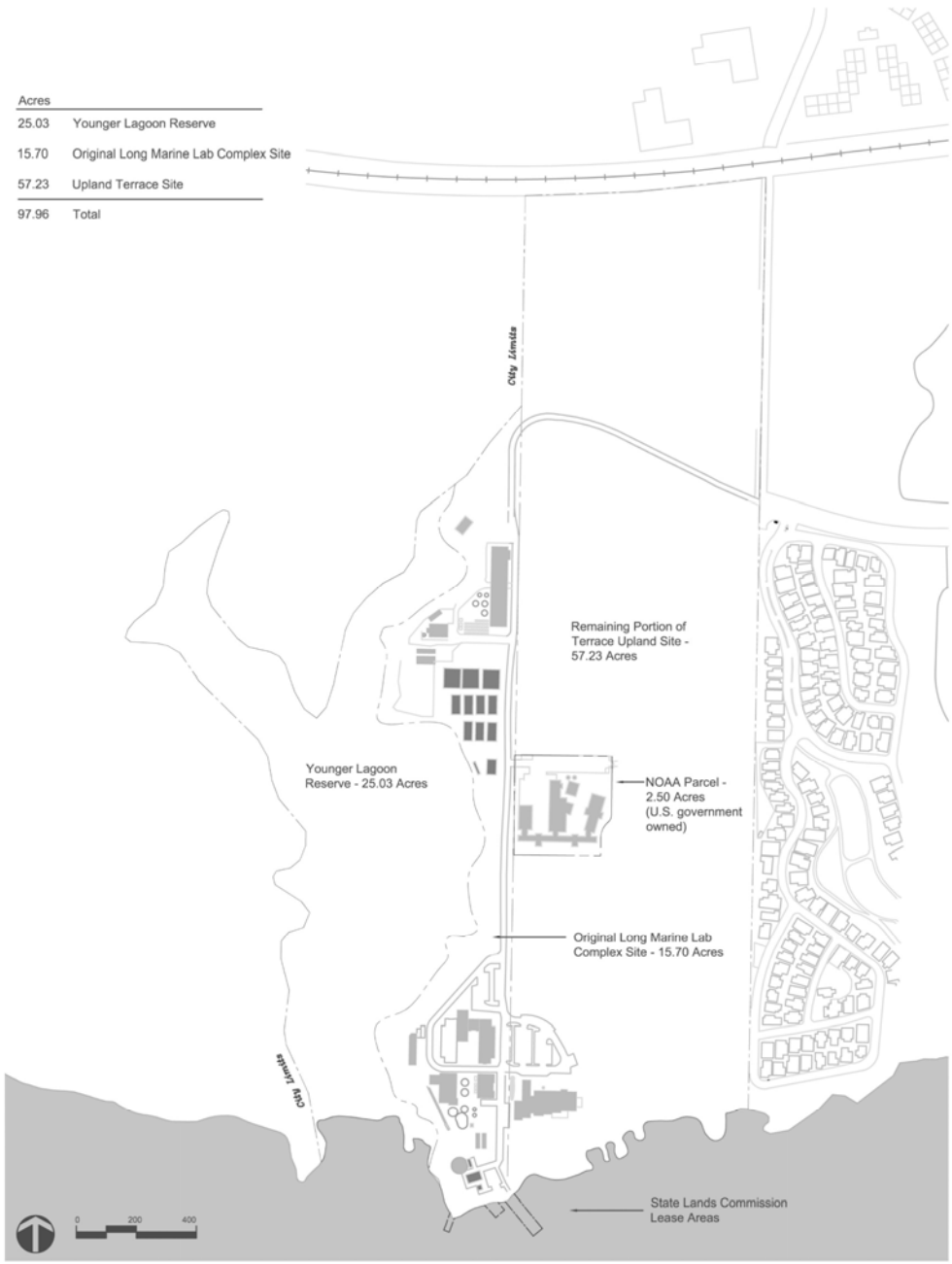
The Campus brings together the original LML site (15.70 acres), the upland terrace site (57.23 acres), and YLR (25.03 acres) to form a combined site totaling 97.96 acres (see Figure A-2). NOAA has a 2.5-acre federal in-holding on the property that is occupied by NOAA Fisheries Laboratory. This facility is not covered by this plan or the CLRDP. The University of California is the agency responsible for Campus planning and development as well as long-term management.

The Resource Management Plan (RMP) sets forth parameters for protection, restoration, enhancement, and management of the natural resource and open space areas of certain terrace portions of the Campus. These areas are those not proposed for building and similar development under the CLRDP, but rather are proposed for long-term protection of resource values.



P City Park

John Gilchrist & Associates ENVIRONMENTAL CONSULTANTS	Resource Management Plan Marine Science Campus Coastal Long Range Development Plan LOCATION MAP	FIGURE A1



John Gilchrist & Associates ENVIRONMENTAL CONSULTANTS	Resource Management Plan Marine Science Campus Coastal Long Range Development Plan MARINE SCIENCE CAMPUS ACREAGE	FIGURE A2

As stated in this CLRDP, development of the Marine Science Campus is planned to protect and enhance the natural resources of the site and to maximize the amount of naturalistic landscape and open space through the clustering of buildings within defined development area. Development will be centered in three main nodes and one Campus entrance node separated by natural resource and open space areas.

It is the intent of the University to restore, enhance, and manage all areas outside of development zones (except for the paved portions of streets and trails) as high-quality open space and natural habitat area. YLR, seasonal wetlands, and associated buffers will be permanently protected. Upland areas will be managed to increase the abundance and diversity of native plant species and to promote the movement of wildlife between Younger Lagoon and Moore Creek (including Antonelli Pond) and Wilder Creek systems. As part of the CLRDP Drainage Concept Plan, new vegetated stormwater basins, drainage swales, and filter strips will be created and landscaped with native plant species compatible with surrounding habitats and capable of biologic filtration. Improved landscaped and open space areas will be provided, with transitional landscaping providing a buffer between developed and natural areas.

The RMP focuses on the management of areas identified in the CLRDP as natural resource areas, buffers, naturalistic open space areas, and habitat for the site's special-status species. This includes areas designated Resource Protection, Resource Protection Buffer, Wildlife Corridor, and Open Space. The RMP does not explicitly cover drainage areas for stormwater management or landscaped areas within development zones; these are addressed separately in the CLRDP. Outside of development zones, any portions of vegetated stormwater basins and related system components are considered an integral part of the natural open space area within which restoration and management also apply pursuant to this Plan. Natural resource areas to be managed include special-status species habitats, seasonal wetland areas on the terrace, terrace scrub areas, wildlife corridors, other grasslands areas, the intertidal area below the bluff, and associated buffers.

Restoration, enhancement, and management activities on the Marine Science Campus will be guided by a Scientific Advisory Committee (SAC) that is made up of independent professionals and academicians experienced in and knowledgeable about the habitats of the natural areas on the Marine Science Campus. The SAC shall guide the development of Specific Resource Plans, which shall be consistent with the performance standards set forth in this RMP, and which may be adapted periodically based on findings from ongoing restoration work. The RMP goals and performance standards may be adjusted as directed by the SAC in coordination with the Executive Director to ensure the success of Campus restoration, enhancement, and management efforts. As such, the RMP goals and performance standards are not static requirements per se so much as initial guidelines that may be refined during the SAC process so long as such refinement is consistent with current professional restoration, enhancement, and management goals and standards, and with achieving high quality open space and natural habitat area in perpetuity consistent with this CLRDP. RMP adjustments in this respect may require a CLRDP amendment, unless the Executive Director determines that an amendment is not necessary.

As such, the RMP is primarily intended as a guide to the enhancement and management of the natural areas of the site rather than an explicit implementation document for specific projects per se.

Its main purpose is to provide overall management goals and guidelines, which can then be used to develop specific proposals for implementing RMP recommendations and requirements through individual projects (e.g., project specific planting plans, restoration plans, etc.). In this regard, the intent of this RMP is that the performance standards be made more specific and detailed at the time of further plan development and project approval. It is possible and expected that such elaborated performance standards will differ from RMP performance standards to the extent necessary to be consistent with professional restoration/revegetation standards, and to provide for the best possible resource outcome.

Overall natural areas restoration, enhancement, and management pursuant to this RMP and the CLRDP may be completed in up to three phases corresponding to dividing the natural area into thirds (i.e., where Phase 1 accounts for at least one-third of the natural area, Phase 1 plus Phase 2 accounts for at least two-thirds, and all of the three phases together account for all of the natural area). All natural areas restoration and enhancement shall be completed within 20 years of CLRDP certification, with interim benchmarks that at least one-third of the restoration and enhancement shall be completed within seven years of CLRDP certification and that at least two-thirds shall be completed within 14 years of CLRDP certification.

In any case, for each of the natural resource areas covered, the RMP describes the physical and biological characteristics, management goals, management measures, and performance standards to be achieved. The RMP also identifies parameters for long-term maintenance and monitoring, and an implementation timing guidelines.

A.1.3 Overview of Marine Science Campus Site

The Campus encompasses existing and planned laboratory facilities, the terrace, and YLR (Figure A-3). At the time of CLRDP certification, the existing marine laboratory facilities included the original Long Marine Laboratory (LML), which comprises a seawater intake and storage system as well as laboratory buildings, outdoor work and research areas, and holding tanks located on the bluff. The Seymour Marine Discovery Center is situated on the bluff adjacent to the original LML site. A small area of native coastal bluff vegetation has been planted next to the Center. Farther inland to the west of McAllister Way are the Marine Wildlife Center operated by the California Department of Fish and Game (CDFG), the Avian Facility operated by the UCSC Predatory Bird Research Group, and greenhouses, some of which are leased for commercial operations. Inland and to the east of McAllister Way is the NOAA federal in-holding that includes a laboratory building and parking area.

Future marine laboratory facilities planned under the CLRDP include research buildings, conference and workshop facilities, equipment storage and maintenance facilities, and housing. These facilities will be clustered in three primary development nodes on the terrace (see CLRDP Figure 5.2).

The upland terrace stretches from the coastal bluff area northward to the Union Pacific Railroad tracks at the site's northern boundary. The majority of the site was used for agriculture and produced brussels sprouts until 1987, since which time it has lain fallow. As described more fully below, the coastal bluff and terrace support a mix of native and non-native vegetation, most of which is characterized as non-native grassland and coyote brush scrub-grassland. Seasonal freshwater

wetlands and wetland buffers are also on the terrace. A narrow intertidal rock shelf exists at the base of the bluff.

YLR is a protected natural reserve under the University of California Natural Reserve System, managed for research and other educational activities. It lies along the western edge of the site and includes the lagoon itself as well as portions of tributary drainages and immediately adjacent upland habitats. The Reserve supports several different vegetation types and diverse wildlife.

The terrace and YLR contain known or potential habitat for several special-status wildlife species, as described more fully below. No special-status plant species have been found to occur on the Campus.

Several areas on the Campus also meet the definition of environmentally sensitive habitat area (ESHA) under the California Coastal Act. An ESHA is defined 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. At the time of CLRDP certification, portions of YLR qualified as ESHA, as did seasonal wetlands on the terrace and the rocky intertidal zone.

A.1.4 Overall Resource Management Goals

The overall management goal for the RMP is to support the CLRDP goals for the Campus while also protecting, maintaining, restoring and enhancing the natural resources of the non-developed areas as well as avoiding impacts to YLR. This philosophy is reflected in the planning of the Campus itself, which is based on maximizing the amount of naturalistic landscape and open space through clustering of buildings; maximizing views from and through the site to the ocean, the coastal hills, to the agricultural lands to the north and, where appropriate, to adjacent natural features such as YLR and the coastal bluffs; optimizing views of the site when viewed from external locations; and the overall goal to protect and enhance the natural resources of the site.

In addition, the RMP shares two basic goals with the California Coastal Act: (1) to "protect, maintain, and where feasible, enhance and restore the overall quality of the coastal zone environment and its natural and artificial resources," and (2) to "maximize public access to and along the coast and maximize public recreational opportunities in the coastal zone consistent with sound resources conservation principles and constitutionally protected rights of private property owners" (Public Resources Code Section 30001.5) For the CLRDP, this latter goal is adapted to meet the specific needs of the site, such that maximum public access will be provided but will be managed to ensure that the research and marine facilities of the site remain secure, and that the natural environment and its wildlife populations are not significantly disturbed.

A.2. Resource Management for Overall Terrace Resources

A.2.1 Physical Description of Terrace

The terrace and bluff of the Campus are part of the lowest and southernmost of a series of marine terraces along the Santa Cruz coastline. The terrace is essentially flat, with a 1-2% slope to the south.

Its elevation ranges from 51 feet above sea level at the northern edge to 37 feet above sea level at the bluff top, its southern boundary. The southwestern edge of the terrace, between the original LML and YLR, is partially edged by an artificial berm approximately 10 to 12 feet high and 40 to 50 feet wide.

The site is subject to a Mediterranean climate, with wet, cool winters, and dry warm summers with little rainfall. This pattern helps to account for the mostly seasonal nature of the site's wetlands. Summer fog is typical on 30% to 40% of the days. Prevailing winds are from the northwest in the summer; winter storm winds are generally from the south. Total rainfall averages approximately 30 inches per year. The site is exposed and subject to relatively higher wind velocities, coastal fog, and salt spray than more protected areas of the City to the east.

Soils on the terrace tend to exhibit generally poor drainage, with portions of the site experiencing saturated soil conditions and temporary shallow inundation during the wet season (November through March). Soils fall into three soil series, Elkhorn Sandy Loam, 0-2% slope; Elkhorn Sandy Loam, 2-9% slope; and Watsonville Loam, thick surface, 0-2% slope (SCS 1980). These soils tend to be deep with slow runoff and loamy textures, having developed on alluvial fans and marine terraces from old alluvium and marine deposits. The 0-2% slope soils are on the Natural Resource Conservation Service hydric soils list for Santa Cruz County (NRCS 1992) but field observations do not support this designation for most of the property (Huffman Broadway Group (HBG) 2004). The soils are underlain by Santa Cruz Mudstone, with the water table generally 2 to 10 feet below the surface depending on time of year (Philip Williams and Associates 1995).

Water primarily enters the property from a culvert at the railroad tracks near the northwest corner of the site, through on-site precipitation, and by site runoff (Huffman-Broadway Group, Inc. 2004). Water leaves the site through evaporation and evapotranspiration, as well as drainage to Younger Lagoon, De Anza Mobile Home Park, and the ocean. Natural drainage patterns have been altered by LML and related Campus development as well as ditches and surface reconveyance from past farming activities. Subsurface seeps on the coastal bluff and YLR slopes also indicate near surface perched groundwater exits the site at these locations.

Extensive burrowing activity by rodents is evident throughout the terrace and may have loosened the upper portions of the soil profile and aerated the soils. This may be improving soil drainage characteristics and increasing vertical and horizontal water movement through the site (HBG 2004).

A.2.2 Biological Resources on the Terrace

The terrace supports a number of vegetation types, in both wetland and upland habitats, which in turn support a variety of resident and non-resident wildlife. Wetland areas (Figure A-5) have been identified and mapped separately from the wetland vegetation types. Wetland areas do not necessarily correspond with discrete vegetation types because some species, such as Italian ryegrass, occur in both wetlands and uplands.

Habitat for sensitive species represents another resource that addresses the specific requirements of sensitive species, and also overlaps with wetland areas. Areas of particular concern for ongoing resource management under the CLRDP include the seasonal wetlands, the movement of wildlife

across the site, and sensitive species habitat. With one exception (Wetland W7), the seasonal wetlands qualify as ESHAs. In addition, two vegetation types within the wetlands ("freshwater marsh" and "coastal terrace and seasonal pond") are also California Natural Diversity Database (CNDDB) "high priority" habitats for protection (Holland 1986, CDFG 2000).

The information provided below comes from three main sources. EcoSystems West prepared an assessment of then existing biological conditions on the site to support the preparation of the CLRDP and its EIR. They compiled information from biotic surveys conducted over 10 years and conducted field surveys in 2000 and 2001 for plants, amphibians, reptiles, birds, fish, and invertebrates. An extensive investigation of wetland habitats on the terrace was performed by the Huffman-Broadway Group (Huffman-Broadway Group, Inc. 2004) with subsequent peer review and refinements through the CLRDP approval process (2007). John Gilchrist & Associates (JGA) and The Habitat Restoration Group (HRG) performed a variety of studies in review of previous development proposals at the site (JGA and EH 1998; HRG 1994; HRG 1993). An overview of the results of these studies is provided here. Numerous previous studies were also reviewed (see References).

Vegetation

The different vegetation types on the terrace reflect differences in drainage patterns, environmental stresses (such as exposure to salt spray and ocean winds), and historical use (Figure A.4). These include five wetland vegetation types (seasonal pond, freshwater marsh-coastal terrace, herb community dominated by willow-herb and Douglas baccharis, moist meadow, and central coast arroyo willow riparian forest), non-native grassland, coyote brush scrub-grassland, coastal bluff community, ruderal, and planted berm habitats. Non-native grassland and coyote brush scrub-grassland occupy most of site. The vegetation types are described more fully below under protection and enhancement of specific habitats.

A total of 101 species of vascular plants have been identified from the site (see EcoSystems West 2002). Of these 101 species, 37 are native or believed to be native (some may be escapes from adjacent native plantings), 62 are non-native. Bush lupine (*Lupinus arboreus*) is native to the region but it is not known whether it is native to the site; *Conyza* sp. could be identified only to genus and could be either a native or non-native species.

The terrace has been surveyed for special-status plant and animal species many times over the years (EcoSystems West 2002; JGA and EH 1998; Habitat Restoration Group 1993, 1994). The studies have included the identification of target species and both focused and comprehensive field surveys. No special-status plant species have been found on the terrace property. This is likely a consequence of the site's past farming activities, which occurred over the majority of the property.

Wildlife

Wildlife on the terrace site includes a variety of species, ranging from amphibians and reptiles to small and large mammals and birds. Information comes from a variety of sources and includes both known sightings and expected occurrences (EcoSystems West 2002, JGA and EH 1998). The

studies included the identification of target sensitive wildlife species. Sensitive wildlife species are described briefly here in the general discussion of wildlife and in more detail later in this plan under the discussion of protection of special-status wildlife species.

Several amphibian and reptile species have been observed or are expected to occur. Amphibian species on the terrace include Pacific tree frog (*Pseudacris regilla*) adults and tadpoles that have been sighted in the wetland areas. Three sub-adult California red-legged frogs (CRLF) (*Rana aurora draytonii*), a species listed as threatened under the federal Endangered Species Act and a California species of concern, were sighted in 1997 in the seasonal wetland at the northern boundary of the property adjacent to the railroad tracks (Mori 1997) (Figure A-4). Previous surveys before 1997 did not detect red-legged frogs on the site. In 2002 a single CRLF was observed in the same wetland. CRLF may use this wetland occasionally as non-reproductive habitat, especially during the wet season (Mori 1997; Ecosystems West in prep). The western toad (*Bufo boreas*) may also occur here as well as California slender salamanders (*Batrachoseps attenuatus*). Reptiles expected or known to occur include the alligator lizard (*Elgaria* sp.), western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis melanoleucus*), and garter snake (*Thamnophis* spp.).

The terrace habitats support populations of small rodents as well as larger mammals. Observations have been made of California meadow voles (*Microtus californicus*) and Botta's pocket gopher (*Thomomys bottae*); the site likely supports deer mouse (*Peromyscus* sp.) also. The rodents are a prey base for larger predatory species such as coyote (*Canis latrans)* and bobcat (*Lynx rufus*). Mountain lion (*Felis concolor*), gray fox (*Urocyon cinereoargenteus*), longtail weasel (*Mustela frenata),* raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and the non-native red fox (*Vulpes vulpes*) occur in YLR and may migrate through the terrace portion of the site.

With its variety of habitats, the terrace supports a number of bird species. Raptors have been observed foraging at the site. Species sighted include the white-tailed kite (*Elanus caeruleus*) (CDFG Fully Protected species, federal protected species), American kestrel (*Falco sparverius*), barn owl (*Tyto alba*), northern harrier hawk (*Circus cyaneus*) (CDFG Species of Special Concern), merlin (*Falco columbarius*) (CDFG Species of Special Concern), and peregrine falcon (*Falco peregrinus*) (California endangered species, federal protected species). Burrowing owls *(Athene cunicularia*) (CDFG Species of Special Concern, federal Species of Concern species and protected species) have been observed and may have formerly nested on site (Pele 1995).

Non-raptor bird species have been seen foraging on seeds or insects, including the mourning dove (*Zenaida macroura*), rufous-sided towhee (*Pipilo erythropthalmus*), black-headed phoebe (*Sayornis nigricans*), California towhee (*Pipilo crissalis*), American robin (*Turdus migratorius*), California quail (*Callipepla californica*), white-crowned sparrow (*Zonotrichia leucophyrys*), Anna's hummingbird (*Calypte anna*), barn swallow (*Hirundo rustica*), tree swallow (*Tachycineta bicolor*), Steller's jay (*Cyanocitta stelleri*), American crow (*Corvus corax*), and purple finch (*Carpodacus purpureus*). Tricolored blackbird (*Agelaius tricolor*) (CDFG Species of Special Concern, federal Species of Concern and protected species), loggerhead shrike (*Lanius ludovicianus*) (CDFG Species of Special Concern, federal Species of Concern and protected species), and black swift (*Cypseloides niger*) (CDFG Species of Special Concern, federal protected species) have also been observed. A number of waterfowl use the seasonal pond.

The CLRDP designates the northern margin of the terrace as a wildlife corridor for wildlife moving between Antonelli Pond/Moore Creek and YLR, as well as laterally along the railroad tracks to the west. A second corridor is designated on the southern edge of the Upper Terrace development zone (connecting through Wetland W3). These wildlife corridors are discussed in more detail below.

Non-native animals observed on the site include the red fox and domestic animals, both dogs and cats (Fusari 2001a, 2002). These animals pose a serious threat to native wildlife. Roaming domestic cats are especially dangerous for ground-nesting birds such as northern harrier.

A.2.3 Overall Resource Management Goals for the Terrace

The resource management goals for the terrace habitats are described below. They are consistent with the overall goals for the Campus, and encompass maintenance and enhancement of open space habitats, protection and enhancement of sensitive biotic elements, controlled public access, and long-term maintenance and monitoring. Management measures, performance standards, and a general implementation schedule to attain these goals are presented in the following sections.

RMP Goal 1. Maintain open space areas; protect and enhance the grassland, ruderal, and coyote brush scrub-grassland areas through eliminating highly invasive weeds, controlling lower priority weeds, promoting the abundance and diversity of native plant species through small-scale plantings, and preventing unauthorized trail development.

RMP Goal 2. Protect and enhance the coastal bluff areas through eliminating highly invasive weeds, promoting the abundance and diversity of native plant species through small-scale plantings, preventing unauthorized trail development, and increasing the extent of coastal bluff vegetation.

RMP Goal 3. Protect and enhance 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 CLRDP Drainage Concept Plan, and controlling access by humans and non-native animals.

RMP Goal 4. Protect wetlands from adverse impacts due to weeds, noise, human and non-native animal intrusion, lighting, predation, and sedimentation.

RMP Goal 5. Protect and enhance the wildlife corridor and wildlife corridor buffer areas by appropriately siting and designing development adjacent to them (and trails that may be adjacent and/or that may pass through them), eliminating highly invasive weeds, planting native species to provide better protective cover and visual screening for wildlife than existing vegetation, maintaining existing surface drainage patterns, controlling access by humans and non-native animals and providing a safe crossing for wildlife if Shaffer Road is improved.

RMP Goal 6. Protect YLR from adverse impacts associated with terrace use by enhancing the YLR buffer area (including the berm in the lower portion of the terrace) through enhanced fencing and vegetative screening to block terrace noise, lights, and activities from YLR, controlling highly invasive weeds, and replanting with native species.

RMP Goal 7. Protect terrace water quality and habitats, and prevent erosion, by implementing the Drainage Concept Plan and actively addressing any erosion that occurs.

RMP Goal 8. Protect special-status wildlife species through protection and enhancement of wetland habitats (for CRLF) and grassland/scrub-grassland habitats (for special-status bird species), and through protection from non-native predators.

RMP Goal 9. Develop long-term maintenance and monitoring programs for the terrace habitats.

Figure A.3 shows terrace restoration and enhancement areas.

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Resource Management Plan
Marine Science Campus Coastal Long Range Development Plan
TERRACE RESTORATION AND ENHANCEMENT AREAS

FIGURE
A3

A.3. Resource Management Measures for Specific Terrace Resources

Management measures to protect and enhance the terrace habitats and species emphasize naturalistic elements to provide protection and vegetation changes to maintain habitat while altering species composition. Restoration will be guided by a Scientific Advisory Committee (SAC) composed of three to four native restoration professionals and academicians. This committee will meet on an annual basis at a minimum (more frequently as needed), and provide overall guidance for resource plan preparation, revegetation installation, long-term maintenance and monitoring. Under this CLRDP, revegetation goals for the entire terrace habitat management area are to be met within 20 years of CLRDP certification. Development siting and design, as well as protective berms, fencing /barriers, and landscaping with native species are all used to shield sensitive wildlife areas and guide human use away from sensitive habitats. Where appropriate, fencing and signing will also be used to restrict access to sensitive habitat areas. Vegetation changes will be effected by control of invasive weeds and shifting species composition to native species through phased plantings. Specific management measures for terrace habitats are described below. Guidelines for how these measures will be implemented are provided at the end of this section.

A.3.1 Grassland, Ruderal, and Coyote Brush Scrub-Grassland Habitats

Description

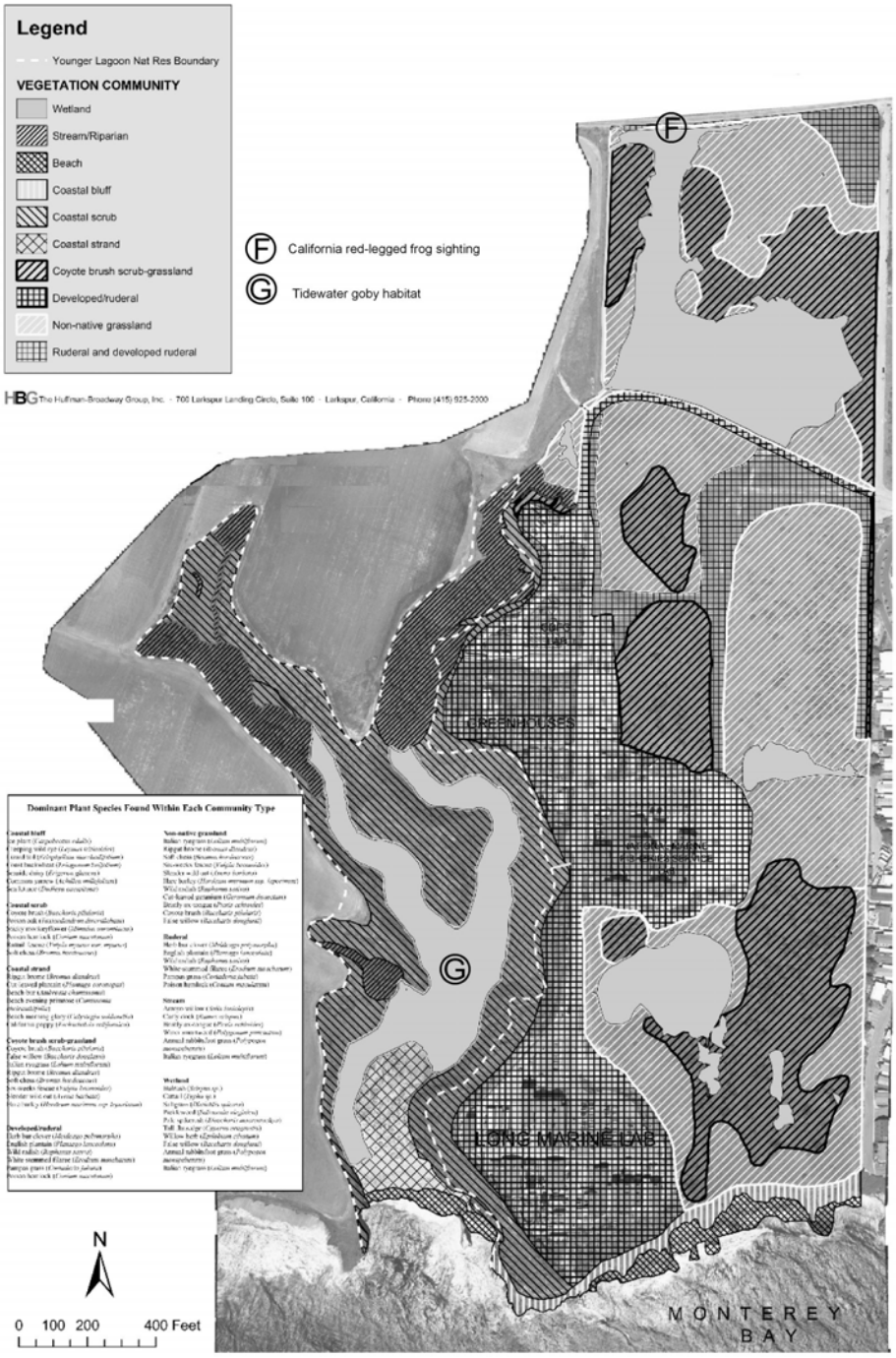
Non-Native Grassland

Non-native grassland is one of two dominant vegetation types on the terrace, occupying most of the site along with coyote brush scrub-grassland (Figure A-4). It developed after farming stopped in 1987 and is now composed almost entirely of weedy non-native and mostly annual species. The dominant species are all non-native and mostly annual grasses, including ripgut grass (*Bromus diandrus*), soft chess (B*romus hordeaceus*), six-weeks fescue (*Vulpia bromoides*), slender wild oat (*Avena barbata*), hare barley (*Hordeum murinum* ssp. *leporinum*), and Italian ryegrass (*Lolium multiflorum*). Herbs include wild radish (R*aphanus sativus)*, cut-leaved geranium (*Geranium dissectum*), bristly ox-tongue (*Picris echioides*), and Bermuda-buttercup (*Oxalis pes-caprae*). The abundance of Bermuda-buttercup, which reproduces by vegetative bulblets, likely results from past cultivation and tilling activities.

Patches of coyote brush (*Baccharis pilularis*) are widely scattered through the grassland at relatively low densities (lower than in areas designated as coyote brush scrub-grassland). Dense, widely scattered patches of Douglas' baccharis (*Baccharis douglasii)* are also scattered over much of the grassland, especially in the southern half of the site. As discussed in detail in the wetland investigation (Huffman-Broadway Group, Inc. 2004), the presence of this wetland species in the upland grassland habitat is ecologically anomalous and may be due to several factors, including historical disturbance and changes in drainage patterns. If left undisturbed, upland portions of this grassland would probably succeed toward a coyote brush scrub community.

Ruderal

The ruderal designation includes an area that supports a linear underground utility corridor (Figure A-4). All vegetation was removed during construction and the area is now colonized by a dense cover of the weedy, non-native herb bur-clover (*Medicago polymorpha*). Other species include non-native weeds such as white-stemmed filaree (*Erodium moschatum*), Cretan lavatera (*Lavatera cretica*), pampas grass (*Cortaderia jubata*), poison hemlock (*Conium maculatum)*, and annual grasses.



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Resource Management Plan
Marine Science Campus Coastal Long Range Development Plan
VEGETATION COMMUNITIES AND SPECIAL STATUS WILDLIFE

FIGURE
A4

Coyote Brush Scrub-Grassland

As described above, coyote brush scrub-grassland occupies most of the site along with non-native grassland (Figure A-4). It is characterized by abundant clumps of coyote brush of various sizes interspersed with open grassland areas. It is similar in composition to the non-native grassland and also includes scattered patches of Douglas' baccharis. Many coyote brush individuals are very tall, reaching 10 feet or more. Bermuda-buttercup is generally abundant under the coyote brush.

Protection and Enhancement Management Measures for Grassland, Ruderal, and Coyote Brush Scrub-Grassland Habitats

Management of the non-native grassland, ruderal, and coyote brush scrub-grassland habitats will be combined as all habitats are essentially different stages of ruderal succession on the terrace and have similar management requirements. The emphasis will be on maintenance and enhancement of grassland and coyote brush scrub-grassland habitat types (Figure A-4). Management will focus on shifting plant species composition to native species to approach a native coastal terrace prairie type of grassland community. An adaptive management approach will be used that includes review of successful coastal terrace prairie establishment at other central coast sites and some experimentation with site preparation and plant installation techniques at this site. Coastal terrace prairie floristic composition is variable, with native perennial grasses dominant but exotic annual species still abundant (Hamilton 1997, Heady *et al.* 1977). Therefore performance standards for these habitat types will provide for continued presence of annual grassland species but strive towards natives as much as possible. Subject to review by the SAC, the natural areas (i.e., the areas outside of development zones) will be divided into three approximately equal areas, each representing a separate phase with an expected completion time of 7 years for the first two phases and 6 years for the third phase. Thus, the grassland, ruderal, and coyote brush scrub areas may be broken up into different timed phases for enhancement work. Some habitat continuity for wildlife corridors across the terrace should be maintained. Under this CLRDP, revegetation goals for this entire habitat are to be met within 20 years of CLRDP certification. Performance standards for these management measures are shown in Table A.1. Non-native weeds are identified in Table A.2, and are classified there as high, medium, and low priority for removal. Table A.3 identifies appropriate species for the planting described in these management measures.

RMP MM 1. Remove high priority weeds (see Table A-2) using appropriate methods that may include intensive discing or tilling prior to native revegetation. Weeds should be removed prior to seedset.

RMP MM 2. Control other weedy invasive annual grasses and herbs (medium and low priority for removal; see Table A-2) by initial tilling prior to revegetation and mowing of established grassland at least three times through spring and summer. Mowing should be timed to prevent annual species seedset. Mowing should be performed with a rotary or sickle bar mower so that it does not damage native herbaceous groundcovers; flail mowers should not be used. The timing of cutting is critical and should occur when the majority of weeds are in the early to mid-flowering stage; subsequent cuttings will be necessary for weeds that re-flower. Initial mowing for weed control should be performed as early as possible in March prior to bird nesting and territory

establishment. Allow patches of Douglas' baccharis and existing native shrubs to remain but mow recruiting coyote brush as a means of confining coyote brush to existing locations and maintaining grassland habitat.

RMP MM 3. Plant native perennial grasses and low-growing herbaceous species (see Table A.3) that are capable of tolerating regular mowing activity and have low nutrient and water requirements. In addition to planting native perennial grasses and low-growing herbaceous species throughout the Grassland et al area, supplemental container plantings and/or seeding shall also be interspersed throughout the Grassland in order to create seed sources of desirable species. Areas disturbed for construction of underground utilities, etc. should be planted as soon as possible prior to the next rainy season.

RMP MM 4. Adjacent to trails or in other areas subject to disturbance, protect areas undergoing planting until vegetation is established. As appropriate, place low fencing and signs informing people of ongoing revegetation efforts around the planted areas.

Table A.1 Performance Standards for Grassland, Ruderal, and Coyote Brush Scrub-Grassland Habitats.

RMP Goal 1: Maintain open space areas; protect and enhance the grassland, ruderal, and coyote brush scrub-grassland areas through eliminating highly invasive weeds, controlling lower priority weeds, promoting the abundance and diversity of native plant species through phased revegetation, and preventing unauthorized trail development.

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
RMP PS 1. Priority 1 weeds	Eliminate on terrace	Year 3 and annually thereafter	No priority 1 weeds surviving to reproduction each year	Continue weed monitoring and control
			Priority 1 weeds reproducing on site	Increase frequency of monitoring and weed control; consider alternative control methods
RMP PS 2. Priority 2 and 3 weeds	Reduce weedy annual grassland seedset	Year 1 and annually thereafter	Annual grassland cut before developing seed	Continue mowing program
			Annual grassland allowed to develop seed	Change mowing schedule

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
RMP PS 3. Native plant species diversity in Phase 1 grassland, ruderal, and coyote brush scrub-grassland areas	8 native plant species appropriate for habitat established in planted areas to comprise 40% cover within grassland, ruderal, and coyote brush scrub-grassland areas	Year 3--two years after planting**	6 or more native plant species established comprising ≥ 10% cover and evidence of natural recruitment present	Continue monitoring
			Fewer than 6 native plant species or < 10% cover of native species, or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
		Year 5	6 or more native plant species established comprising ≥ 25% cover and evidence of natural recruitment present	Continue monitoring
			Fewer than 6 native plant species or < 25% cover of native species or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
		Year 7 and every 5 years thereafter **	8 or more native plant species established comprising ≥ 40% cover and evidence of natural recruitment present	Continue monitoring

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
			Fewer than 8 native plant species or < 40% cover of native species, or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
RMP PS 4. Native plant diversity in Phase 2 and Phase 3 grassland, ruderal, and coyote brush scrub-grassland areas	Same criteria as for Phase 1 as adjusted by SAC.	Same criteria as for Phase 1 as adjusted by SAC.	Same criteria as for Phase 1 as adjusted by SAC.	Same criteria as for Phase 1 as adjusted by SAC.
RMP PS 5. Protection of revegetation in progress	No disturbance to revegetation plantings	Ongoing until revegetation is successful	Plantings undisturbed	Continue monitoring until revegetation is successful
			Plantings disturbed (plants broken, trampled, dislodged, removed)	Install signs or low fencing as appropriate

Notes: *Unless otherwise specified, year refers to the number of years following the date that the CLRDP is certified by the Coastal Commission. Standard must be met by year indicated.

**See Table A.12 for Timing Guidelines.

Table A.2 Known Non-Native Weeds on the Marine Science Campus

Common Name	*Scientific Name*	*Priority Rating* for Removal*
Italian thistle	*Carduus pycnocephalus*	1
Ice plant	*Carpobrotus edulis*	1
Bull thistle	*Cirsium vulgare*	1
Poison hemlock	*Conium maculatum*	1
Pampas grass	*Cortaderia jubata*	1
Cape ivy	*Delairea odorata*	1
French broom	*Genista monspessulana*	1
Wild oat	*Avena barbata*	2
Oat	*Avena fatua*	2
Common mustard	*Brassica rapa*	2
Rescue grass	*Bromus catharticus*	2
Ripgut brome	*Bromus diandrus*	2
Soft chess	*Bromus hordeaceus*	2
Bermuda grass	*Cynodon dactylon*	2
Black mustard	*Hirschfeldia incana*	2
Velvet grass	*Holcus lanatus*	2
Farmer's foxtail	*Hordeum murinum* ssp. *leporinum*	2
Prickly lettuce	*Lactuca serriola*	2
Wild lettuce	*Lactuca virosa*	2
Italian ryegrass	*Lolium multiflorum*	2
Perennial ryegrass	*Lolium perenne*	2
Mallow	*Malva parviflora*	2
Sourgrass	*Oxalis pes-caprae*	2
Bristly ox-tongue	*Picris echioides*	2
Rabbitsfoot grass	*Polypogon monspeliensis*	2
Wild radish	*Raphanus sativus*	2
Curly dock	*Rumex crispus*	2
Prickly sow thistle	*Sonchus asper*	2
Sow thistle	*Sonchus oleraceus*	2
Scarlet pimpernel	*Anagallis arvensis*	3
Pineapple weed	*Chamomilla suaveolens*	3
Lambs quarters	*Chenopodium album*	3
Nettle-leaved goosefoot	*Chenopodium murale*	3
Brass buttons	*Cotula coronopifolia*	3
Filaree	*Erodium moschatum*	3
Cut-leaved geranium	*Geranium dissectum*	3
Rough cat's ear	*Hypochaeris radicata*	3
Loosestrife	*Lythrum hyssopifolium*	3
Bur clover	*Medicago polymorpha*	3
Cut-leaved plantain	*Plantago coronopus*	3
English plantain	*Plantago lanceolata*	3
Annual bluegrass	*Poa annua*	3

Common Name	*Scientific Name*	*Priority Rating* for Removal*
Common knotweed	*Polygonum arenastrum*	3
Sheep sorrel	*Rumux acetosella*	3
Common groundsel	*Senecio vulgaris*	3
Chickweed	*Stellaria media*	3
Rattail fescue	*Vulpia myuros*	3
Panic veldtgrass	*Ehrharta*	3

Notes: *Priority rating:

1. High priority. These weeds are capable of invading and out-competing native plants in established plant communities. They are typically perennial or biennial.
2. Medium priority. These weeds are mostly biennial or annual. They are typically less invasive and smaller in stature than priority 1 weeds.
3. Low priority. These weeds are mostly annuals that are low in stature. While many can effectively compete with native plants once they are established, they typically do not aggressively push out native plants. Most are commonly associated with native and non-native grasses and forbs in grasslands.

Source: Modified from JGA and EH 1998; L. Goodhue 2002.

*Table A.3 Possible Revegetation Species**

Common Name	*Scientific Name*	*Grassland/ Erosion Control*	*Coastal Bluff*	*Wetland/ Riparian*	*Wildlife Corridor*	*Upland Buffer*	*Coastal Scrub*
Trees							
California box elder	*Acer negundo* var. *californicum*			x			
California buckeye	*Aesculus californica*				x	x	
Monterey cypress	*Cupressus macrocarpa*				x	x	
Coast live oak	*Quercus agrifolia*				x	x	
Arroyo willow	*Salix lasiolepis*			x			
Shrubs and Subshrubs							
California sagebrush	*Artemisia californica*		x		x	x	x
Mugwort	*Artemisia douglasiana*		x	x			
Douglas' baccharis	*Baccharis douglasii*			x			
Coyote brush	*Baccharis pilularis*		x		x	x	x
Seaside daisy	*Erigeron glaucus*		x			x	
Coast buckwheat	*Eriogonum latifolium*		x			x	x
Lizardtail	*Eriophyllum staechadifolium*		x			x	x
Oceanspray	*Holodiscus discolor*				x	x	x
Deerweed	*Lotus scoparius*			x			x

Common Name	*Scientific Name*	*Grassland/ Erosion Control*	*Coastal Bluff*	*Wetland/ Riparian*	*Wildlife Corridor*	*Upland Buffer*	*Coastal Scrub*
Yellow bush lupine	*Lupinus arboreus*		x		x	x	
Bush monkeyflower	*Mimulus aurantiacus*		x		x	x	x
Wax myrtle	*Myrica californica*				x		x
Coffeeberry	*Rhamnus californica*				x		x
California wild rose	*Rosa californica*	x		x		x	x
California blackberry	*Rubus ursinus*			x		x	x
Red elderberry	*Sambucus racemosa* var. *racemosa*			x	x	x	x
Forbs							
Yarrow	*Achillea millefolium*		x	x		x	x
Sea pink	*Armeria maritima*		x				
Fat hen	*Atriplex triangularis*			x			
Sun cup	*Camissonia ovata*	x					
Soap plant	*Chlorogalum pomeridianum*	x					x
Sea lettuce	*Dudleya farinosa*		x				
Cow parsnip	*Heracleum lanatum*		x			x	
Coast trefoil	*Lotus formosissimus*	x		x			
Sky lupine	*Lupinus nanus*	x	x		x	x	
Wild cucumber	*Marah fabaceus*					x	
Pacific oenanthe	*Oenanthe sarmentosa*			x			
California polypody	*Polypodium californicum*					x	x
Pacific silverweed	*Potentilla anserina* ssp. *pacifica*			x			
California buttercup, coastal form	*Ranunculus californicus*	x		x		x	
Pacific sanicle	*Sanicula crassicaulis*				x		x
California bee plant	*Scrophularia californica*			x			x
Blue-eyed grass	*Sisyrinchium bellum*	x		x			
Coast hedge nettle	*Stachys bullata*			x			
Rushes/Sedges							
Slough sedge	*Carex obnupta*			x			
Baltic rush	*Juncus balticus*			x			
Western rush	*Juncus occidentalis*			x			
Common rush	*Juncus patens*			x			

Common Name	*Scientific Name*	*Grassland/ Erosion Control*	*Coastal Bluff*	*Wetland/ Riparian*	*Wildlife Corridor*	*Upland Buffer*	*Coastal Scrub*
Brown-headed rush	*Juncus phaeocephalus*			x			
Three-square	*Scirpus americanus*			x			
California tule	*Scirpus californicus*			x			
Low club rush	*Scirpus cernuus*			x			
Grasses							
Bent grass	*Agrostis pallens*	x	x	x	x	x	
California brome	*Bromus carinatus*	x		x	x	x	x
California oatgrass	*Danthonia californica*	x		x			x
Tufted hairgrass	*Deschampsia cespitosa*	x		x			
Saltgrass	*Distichlis spicata*		x				
Western ryegrass	*Elymus glaucus*				x		
Meadow barley	*Hordeum brachyantherum*			x			
Creeping wildrye	*Leymus triticoides*			x	x	x	
Foothill needlegrass	*Nassella lepida*	x			x	x	
Purple needlegrass	*Nassella pulchra*	x	x		x	x	x

Notes: * The precise species palette for specific habitats within these general areas must be determined by a qualified revegetation specialist or botanist. Except for Monterey cypress, locally collected seed, cuttings, and/or other propagules must be used for revegetation. Materials should be collected from coastal habitats located within approximately one mile of the site that are also located seaward of Highway 1 (Morgan 2002).

Source: Modified from JGA and EH (1998), Morgan (2002).

A.3.2 Coastal Bluffs

Description

The coastal bluff vegetation occurs in two phases, mixed phase and ice plant phase, in a narrow zone along the top of bluff at the terrace's southern end (Figure A-4). Its width varies from 10 to 40 feet from the edge of the bluff. It is exposed to salt spray and ocean winds.

The mixed phase is south of the main LML buildings. It includes scattered prostrate or small coyote brush shrubs but is dominated by a mixture of native and non-native grasses and herbs. The perennial grass creeping wild rye (*Leymus triticoides*) is the most abundant native species; other natives include the herbaceous perennials lizard tail (*Eriophyllum staechadifolium*), coast buckwheat (*Eriogonum latifolium*), seaside daisy (*Erigeron glaucus*), yarrow *(Achillea millefolium*) and sea lettuce (*Dudleya caespitosa*). The history of these species is unclear; they may be indigenous to the site or may have established

from native plant garden seed dispersal. The non-native wild radish, Bermuda-buttercup, Cretan lavatera, and ripgut grass are abundant also.

The ice plant (*Carpobrotus edulis*) phase occurs to the east of the mixed phase, extending to the eastern boundary of site by the De Anza Mobile Home Park. It is a highly degraded, essentially ruderal assemblage overwhelmingly dominated by non-native ice plant; ripgut grass and poison hemlock are also abundant.

Protection and Enhancement Management Measures for Coastal Bluffs

The management focus here will be to protect the coastal bluffs and the areas within 100 feet of the top edge of the coastal bluffs from adjacent trail disturbance, remove highly invasive weeds, replant bare areas with native plant species, and increase the extent of the area of coastal bluff vegetation (see Coastal Bluff area identified in Figure A-4). Performance standards for these management measures are shown in Table A.4. Non-native weeds are identified in Table A.2, and classified there as high, medium, and low priority for removal. Table A.3 identifies appropriate species for the planting described in these management measures.

RMP MM 5. Remove high priority weeds (see Table A.2) using appropriate methods. Weeds should be removed prior to seedset.

RMP MM 6. Replant bare areas with appropriate native species adapted to salt spray and desiccating winds (see Table A.3). Use smaller, more prostrate and salt-adapted species closest to bluff edge (e.g., lizard tail, coast eriogonum, yarrow, seaside daisy, California sage).

RMP MM 7. Expand coastal bluff vegetation in areas within 100 feet of the bluff edge by removing existing weedy vegetation and replanting with appropriate native species. Protect areas undergoing planting until vegetation is established. As appropriate, place low fencing and signs informing people of ongoing revegetation efforts around the planted areas.

RMP MM 8. Post informational signs along blufftop trails advising users to stay on the path and informing people of the sensitive nature of the coastal bluff.

Table A.4. Performance Standards for Coastal Bluffs.

RMP Goal 2: Protect and enhance the coastal bluff areas through eliminating highly invasive weeds, promoting the abundance and diversity of native plant species through small-scale plantings, preventing unauthorized trail development, and increasing the extent of coastal bluff vegetation.

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
RMP PS 6. Priority 1 weeds except iceplant	Eliminate on coastal bluff	Year 3 and annually thereafter	No priority 1 weeds surviving to reproduction	Continue weed monitoring and control
			Priority 1 weeds reproducing on site	Increase frequency of monitoring and weed control; consider alternative control methods
RMP PS 7. Iceplant removal	Eliminate on coastal bluff	Prior to first rainy season following initiation of construction for first development project in Lower Terrace development zone	No iceplant on coastal bluff	Continue monitoring and control
			Iceplant growing on coastal bluff	Increase frequency of monitoring and weed control; consider alternative control methods
RMP PS 8. Native plant revegetation	8 native plant species appropriate for habitat established in bluff areas to comprise 40% cover within planted areas	2 years after planting**	4 or more native plant species established comprising ≥ 20% cover within bluff areas, and evidence of natural recruitment present	Continue monitoring
			Fewer than 4 native plant species or < 20% cover of native species in bluff areas or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
		5 years after planting**	4 or more native plant species established comprising ≥ 40% cover within bluff areas and evidence of natural recruitment present	Continue monitoring
			Fewer than 4 native plant species or < 40% cover of native species in bluff areas or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
		10 years after planting** and every 5 years thereafter	8 or more native plant species established comprising ≥ 40% cover within bluff areas and evidence of natural recruitment present	Continue monitoring
			Fewer than 8 native plant species or < 40% cover of native species in bluff areas or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
RMP PS 9. Protection of coastal bluff vegetation	No disturbance to coastal bluff vegetation	Ongoing	Vegetation undisturbed	Continue monitoring
			Vegetation disturbed (plants broken, trampled, dislodged, removed)	Install additional signs or low fencing as appropriate

Notes: *Unless otherwise specified, year refers to the number of years following the date that the CLRDP is certified by the Coastal Commission. Standard must be met by year indicated.

**See Table A.12 for Timing Guidelines.

A.3.3 Wetlands

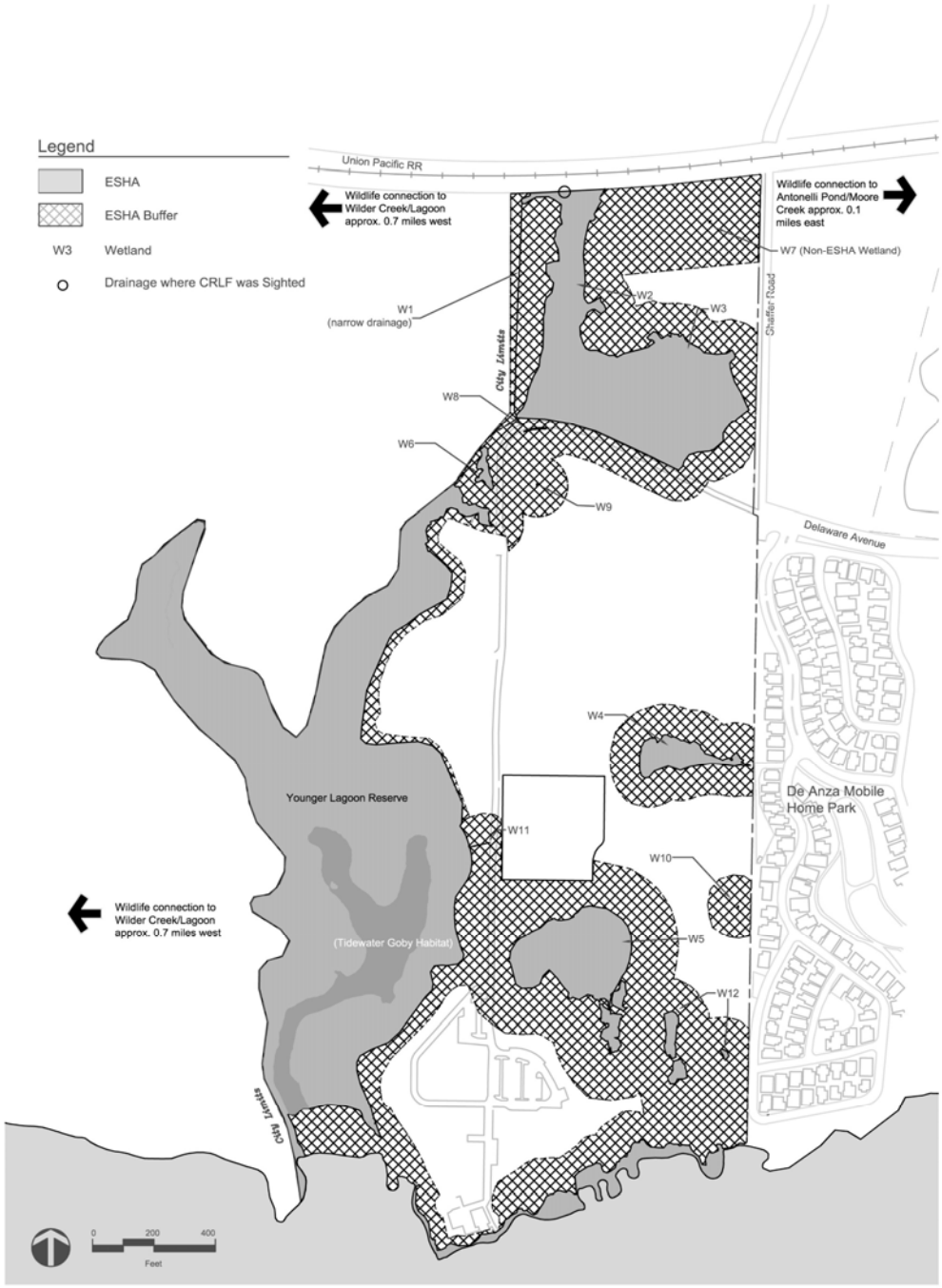
Description

Twelve wetland areas have been delineated on the terrace portion of the site (Figure A-5) (HBG 2006) based on the wetland definition contained in the Coastal Act and the Coastal Commission's Regulations. These wetlands support six vegetation types (seasonal ponds, freshwater marsh-coastal terrace, willow herb-Douglas' baccharis, moist meadow, willow riparian forest, and annual grassland) (Figure A-4) (EcoSystems West 2002). In addition, some wetland indicator species, such as Italian ryegrass and Douglas' baccharis are patchily distributed in upland areas (Huffman-Broadway Group, Inc. 2004). The wetland areas and the various vegetation types are described below.

Wetland Areas

The twelve wetland areas represent the understanding of wetland distribution on the study site as of CLRDP certification (Figure A-5) (HBG 2006). W1 is the drainage channel along the northwestern boundary of the property (0.14 acres). W2 is a flatter wetland swale in the northwestern portion of the property. It connects with W1 at its northern and southern ends. W3 is a large ponded area adjacent to the entrance to the site at the intersection of Delaware Avenue and Shaffer Road. W2 and W3 are 4.57 acres. W4 is the seasonal wetland swale in the eastern portion of the site (0.42 acres). W5 is a seasonal pond in the depressional area immediately south of the NOAA building (2.21 acres). W6 is an isolated wetland complex just north of the CDFG building (0.09 acres). Wetland W7 is approximately 43 square feet and is located in the northeast corner of the site approximately 150 feet south of the northern property line. W8 is an isolated wetland immediately south of Delaware Avenue Extension (0.01 acres). W9 is an isolated wetland approximately 200 feet south southeast of the road bend where Delaware Avenue Extension turns south to become McAllister Way (87 square feet). W10 is an isolated wetland south of the DeAnza drainage adjacent to the eastern property boundary (four square feet). W11 is a drainage channel that extends westward from McAllister Way (115 square feet). W12 is a complex of wetlands south and east of the seasonal pond (W5) (0.21 acres). Other than wetland W7, all other wetlands qualify as ESHAs and together have a total acreage of 7.65 acres. Each of these is described in more detail below.

In addition to finding wetlands that qualified as ESHA on the Marine Science Campus, the Huffman-Broadway Group found one area that qualified as wetland but that did not qualify as ESHA. This is designated as Wetland W7 in Figure A.5. Wetland W7 was determined to have no plant or animal life or habitat that was either rare or especially valuable because of its role in the ecosystem.



John Gilchrist & Associates ENVIRONMENTAL CONSULTANTS	Resource Management Plan Marine Science Campus Coastal Long Range Development Plan WETLANDS, ESHA, AND BUFFER	FIGURE A5

Wetland W1

W1 and W2 both receive water from the culvert beneath the berm at the railroad tracks near the northwestern corner of the Campus. A small bermed area separates the wetland from the adjacent agricultural lands to the west. Water flows in a north to south direction along the northwestern property boundary, then veers to the southwest before discharging to the eastern arm of Younger Lagoon. W1 was originally a drainage channel constructed to prevent inundation and allow agricultural cultivation in the northern portion of property. At present, it provides a major source of freshwater to Younger Lagoon. Sediment accumulation along portions of the channel has caused small ponds to form in some areas.

W1 is dominated by arroyo willow (*Salix lasiolepis)*, willow-herb (*Epilobium ciliatum* ssp. *watsonii)*, and the non-native curly dock (*Rumex crispus*) that are scattered along its length. A non-native weeping willow (*Salix babylonica*) and the weedy invasive pampas grass also grow in W1. Poison hemlock grows along its upper banks.

Wetland W1 and adjacent upland habitat provide an opportunity for wildlife to travel between Younger Lagoon and Antonelli Pond/Moore Creek (and along the railroad tracks to the west more generally), but its value is currently limited due to its minimal vegetative cover. A variety of bird species have been observed foraging along W1. A large number of Pacific tree frogs also occur there.

Wetland W2

W2 shares water sources with W1 and also receives sheetflow from upland areas to the east. Historical aerial photographs show that W2 previously included a man-made drainage ditch feature but active management of the ditch apparently stopped in the early 1980s. The channel gradually filled in with sediment so W2 no longer contains a clearly defined bed and banks, making it difficult to define its lateral boundaries. As delineated in 2001, it diverges from its origin near the culvert into two narrow bands, one extending south to just north of Delaware Avenue Extension and the other extending west and east along the northern Campus boundary. The Delaware Avenue Extension road grade promotes flooding, ponding, and surface soil saturation during the wet season and through early spring. This results in some recharge of the shallow water table as well as settling of suspended solids and associated pollutants.

Wetland W2 supports both Italian ryegrass and two locations of freshwater marsh-coastal terrace habitat, one in the southwest corner and the other in the northwest corner (see below). This habitat contains California tule (*Scirpus californicus)*, water smartweed (*Polygonum punctatum)*, willow-herb, and arroyo willow. The non-native grassland in W2 is not sharply distinct in species composition from the adjacent upland. The lowest portion of the area is overwhelmingly dominated by Italian ryegrass. Several large patches of the non-native herb green dock (*Rumex conglomeratus*) occur in the northern portion of the site, along with two patches of Douglas' baccharis at the margin of the wetland.

Wildlife habitat in W2 includes seasonal aquatic habitat in areas of ponded water. Three sub-adult California red-legged frogs were sighted in a small pond in the northwest corner of W2 in 1997 (Mori 1997) (see below). In addition a single CRLF was observed in the same pond in 2002 (EcoSystems

West 2002) Pacific tree frogs also use the seasonal wetland habitat, as may aquatic invertebrates which then can serve as prey for amphibians, reptiles, birds, and small mammals. Overall habitat value of this wetland was low as of CLRDP certification (JGA and EH 1997; EcoSystems West in prep).

Wetland W3

Just north of Delaware Avenue Extension and east of the southern boundary of W2, is the area called Wetland W3. It is slightly lower in elevation than its surroundings so water ponds after significant rainfall. It receives overland flow from adjacent areas to the north and west; historical aerial photos indicate it was once part of a larger drainage that flowed from west to east and eventually discharged into Antonelli Pond. This drainage pattern was altered by agricultural activities and installation of the Campus access road.

Mapped as the non-native grassland vegetation type, W3 is not sharply distinct in species composition from the surrounding areas except that it contains algal mats, reflecting the seasonally flooded condition. The vegetation is otherwise overwhelmingly dominated by Italian ryegrass with scattered patches of curly dock. Its overall wildlife habitat value was low as of CLRDP certification.

Wetland W4

A seasonal drainage swale that originates in the central part of the Campus terrace area, approximately 300 feet northeast of the NOAA parking lot, is identified as Wetland W4. During rainfall events, water accumulates in the upper portion of the swale and then flows eastward to a corrugated metal pipe culvert near the eastern Campus boundary. Historical aerial photos indicate this was once part of a continuous drainage that flowed to Natural Bridges Lagoon until an underground culvert was installed to accommodate construction of De Anza Mobile Home Park. The upper portion of the remnant swale has been disturbed by agricultural plowing, leaving no clearly defined channel, but a clearly defined drainage way does exist in the lower portion of the swale. The wetland functions to improve water quality through settling of suspended solids and associated pollutants while ponded.

The upper portion of the swale is dominated by hydrophytic species, such as willow-herb, Douglas' baccharis, non-native annual rabbitsfoot grass (*Polypogon monspeliensis*) and curly dock. The central portion is not sharply distinct in species composition from the adjacent upland non-native grassland. The lower portion of the drainage is dominated by Italian ryegrass with scattered curly dock and wild radish.

The area appeared to have very low biotic value as of CLRDP certification. It may provide suitable habitat for wetland-dependent wildlife species during the wet season, but it had a relatively short inundation period. It lacked benthic invertebrates and amphibians, and had only limited native vegetation.

Wetland W5

This wetland is a seasonal pond that forms in a modest topographic depression in the southern portion of the terrace immediately south of the NOAA building and is the wettest portion of the terrace site. Historical aerial photos show this wetland has been a persistent feature since at least the 1950s. The length and depth of ponding depends on rainfall, ranging from two to five months in duration and several inches to 16 inches in depth. The pond may aid in peak flow reduction and does provide water quality buffering through settling of suspended solids and associated pollutants. In the early 1900s, a small channel was excavated to drain water from the pond to the ocean bluffs, but after this ditch ceased to be maintained, it rapidly filled in with sediment, limiting drainage to the ocean from the ponded area. The channel exhibited wetland characteristics in 1993 but by 2002 the channel had disappeared except for a linear wetland corridor extending south approximately 200 feet. A storm drain outlet was constructed from the NOAA site near the pond's northern end to allow water to flow into the pond when the NOAA underground detention/percolation system reaches capacity. A pre-existing outlet near McAllister Way acts as a hydrologic control and limits lateral expansion of surface water within the pond.

W5 is characterized by the seasonal pond vegetation type (see below). Sedges, broad-leaved cattail (*Typha latifolia*), pale spikerush *(Eleocharis macrostachya)*, and pickleweed (*Salicornia virginica)* occur in the wetter areas, with Douglas' baccharis and Italian ryegrass dominating the transitional areas that merge with the surrounding non-native grassland habitat.

The pond has good wildlife value in spite of the abundance of non-native plant species. The pond supports many aquatic and benthic invertebrate species, which provide a food base for amphibians, reptiles, and birds. Pacific tree frogs have been observed at the pond. The open water provides an area for migratory waterfowl and shorebirds to rest. Small mammals forage on seeds and grains, and are prey for foraging raptors such as the northern harriers. The pond is used for birdwatching.

Wetland W6

W6 is a small isolated wetland complex, occupying a low-lying area in the northwestern portion of the site north of the CDFG building along the western edge of McAllister Way. This area may have been used to retain irrigation water when the area was farmed. A partial berm that prevents the area from draining into the adjacent stream habitat of YLR is still visible. Although the area mapped as Wetland W6 includes only moist meadow habitat, other wetland vegetation types (freshwater marsh-coastal terrace, central coast arroyo willow riparian forest) occur nearby, separated by non-native grassland. These areas are treated together for purposes of this RMP. The marsh can contain open water through mid-May or later, and the moist meadow retains moisture much later in the season than the non-native grassland habitat.

This wetland is valuable wildlife habitat. It and the adjacent upland habitat facilitate wildlife movement between YLR and Antonelli Pond/Moore Creek (as well as upcoast along the railroad track corridor), and the arroyo willow offers screening and escape cover.

Wetland W7

W7 is a small isolated wetland located in the northeast corner of the Campus about 150 feet south of the northern Campus property line at the railroad right-of-way. Wetland W7 was mapped at 43 square feet at the time of CLRDP certification.

Wetland W8

This seasonal wetland just south of Delaware Avenue Extension occupies a low-lying area immediately adjacent to roadbed. The vegetation consists of non-native grassland, and the area is subject to (and probably formed by) periodic disturbance by passing vehicles whose tires leave the paved roadbed. The depressional area supports wetland hydrologic conditions during the rainy season, particularly within the tire ruts, but is hydrologically isolated from other wetlands on the site due to the presence of Delaware Avenue Extension. This wetland is not subject to Section 404 of the Clean Water Act because of its hydrologic isolation, but is subject to California Coastal Act protection policies because hydrology and soil criteria are met.

Wetland W9

W9 is a small isolated wetland located northeast of the California Department of Fish and Game facility approximately 200 feet south southeast of the road bend where Delaware Avenue Extension turns south to become McAllister Way. Wetland W9 was mapped at 87 square feet at the time of CLRDP certification.

Wetland W10

W10 is a small isolated wetland located south of the DeAnza drainage adjacent to the Campus's eastern boundary. Wetland W10 was mapped at four square feet at the time of CLRDP certification.

Wetland W11

W11 is a small drainage extending east from McAllister Way into Younger Lagoon Reserve. Wetland W11 was mapped at 115 square feet at the time of CLRDP Certification.

Wetland W12

W12 is a complex of wetlands immediately south and east the seasonal pond (W5) and is similar in characteristics to the southern reaches of W5, which formed around the small channel that was dug long ago to drain water from W5. Wetland W12 was mapped at 0.21 acres at the time of CLRDP certification.

Wetland Vegetation Types

EcoSystems West (2002) described five wetland vegetation types on the terrace site based on vegetation characteristics (Figure A-4). These include the seasonal pond, freshwater marsh-coastal terrace, herb community dominated by willow-herb and Douglas' baccharis, moist meadow, and central coast arroyo willow riparian forest. EcoSystems West (2002) characterized Italian ryegrass (*Lolium multiflorum)* as an upland vegetation type. However, at the time that the U.S. Fish and

Wildlife Service (USFWS) issued its 1988 list of species that grow in wetlands, Italian ryegrass was considered synonymous with perennial ryegrass (*L. perenne*), a hydrophyte with a wetland designation of "FAC" (equally likely to occur in uplands or wetlands). Although the 1996 USFWS list does not include Italian ryegrass and the latter is now considered by many to be a separate species, in California it occurs in the same habitat conditions as its congener. At Terrace Point, Italian ryegrass grows in areas that are continuously inundated for months and in areas with upland hydrology and should be considered a FAC species (Huffman-Broadway Group, Inc. 2004).

The first wetland vegetation type is the seasonal pond type, located within the grasslands south of the NOAA building in the southwestern portion of the terrace (Wetland W5). Patches of prairie bulrush (*Scirpus maritimus)* dominate the central pond, along with smaller dense patches of pale spike-rush. Scattered on the pond bed are patches of the coastal salt marsh species pickleweed and non-native brass buttons (*Cotula coronopifolia*), swamp grass (*Crypsis schoenoides*), and biennial sagewort *(Artemisia biennis*). An annual native herb, water starwort (*Callitriche marginata*), is abundant along the pond margins, where the vegetation is not otherwise sharply distinct from that of the adjacent non-native grassland. Douglas' baccharis and Italian ryegrass also grow in the transitional areas.

The second vegetation type, freshwater marsh-coastal terrace habitat, is found in three areas. The first is near the western boundary of the site, just north of the sharp curve where Delaware Avenue Extension curves to the south near the southwest corner of Wetland W2. The marsh is in a small topographic depression, dominated by a dense patch of California tule in the center. Water smartweed and willow-herb occur around the edges, along with a small arroyo willow.

The second area of freshwater marsh-coastal terrace is just south of the railroad tracks in the northwestern corner of the property, at the northwest end of Wetland W2 at its intersection with W1, and may extend onto the railroad right-of-way. Dominated by a large arroyo willow in the center, the marsh also supports a dense colony of broad-leaved cattail, floating marsh-pennywort (*Hydrocotyle ranunculoides*), water smartweed, willow-herb, and prairie bulrush. Saltgrass (*Distichlis spicata*) occurs in dense patches along the marsh margins.

The third location of freshwater marsh-coastal terrace is in the small wetland complex in the northwestern area of the terrace north of the CDFG building. Prairie bulrush and willow-herb grow along the margins of the marsh, which can have open water as late as May. The marsh drains into the eastern arm of Younger Lagoon. Willow-herb, prairie bulrush, and tall cyperus (*Cyperus eragrostis*) are the dominant species in the drainage way.

The third wetland vegetation type is the herb community dominated by willow-herb and Douglas' baccharis. Although these species occur elsewhere on the property, only a small area in the east-portion of the site (Wetland W4) supports this specialized vegetation type. Non-native cut-leaved geranium and bristly ox-tongue are also abundant.

The fourth wetland vegetation type is the moist meadow habitat. It occurs at the northern end of the wetland complex known as W6, to the north of the freshwater marsh-coastal terrace from which it is separated by an area of non-native grassland. The moist meadow intergrades with the non-grassland habitat, but is floristically distinct and its soil retains moisture until relatively late in the

season. It is dominated by the non-native velvet grass (*Holcus lanatus*), a perennial that indicates at least seasonally moist conditions. The native Pacific silverweed (*Potentilla anserina* ssp. *pacifica*) is an abundant associate. Other species include willow-herb and the non-native cut-leaved geranium, wild radish (*Raphanus sativa*), prickly sow-thistle (*Sonchus asper*) and bristly ox-tongue.

The fifth wetland habitat type is central coast arroyo willow riparian forest. This habitat is found in only one location on the terrace, although it is abundant in YLR. Along with the freshwater marsh-coastal terrace and moist meadow habitats, the arroyo willow riparian forest is found near Wetland W6. It occurs in one small patch at the southeast end of the freshwater marsh-coastal terrace. It is dominated by arroyo willow with no other arborescent species present and little understory.

Grassland dominated by Italian ryegrass constitutes a sixth wetland habitat type. This habitat is a significant part of the vegetation in wetlands W2, W3, W4, W5, W8, W9, W10, and W12.

Protection and Enhancement Management Measures for Wetlands

Management of the wetlands applies to all of the wetlands except for W7; W7 is addressed in the wildlife corridor management measures below. Management measures focus on weed control, shifting species composition to native species, and enhancement of wetlands W1 and W2. Performance standards for these management measures are shown in Table A.5. Table A.2 lists the non-native weeds (classified there as high, medium, and low priority for removal) identified for removal, and Table A.3 identifies appropriate species for the planting, as described in these management measures.

RMP MM 9. Restore, consolidate, expand, and enhance wetlands on the northern part of the site (i.e., north of the Campus access road) to restore historic functional values lost during decades of agricultural use. The restoration program will include integrating the hydrology of Wetlands W1 and W2 to create a consolidated north-south area for wildlife movement to YLR. Hydrological surveys will be conducted by a qualified hydrologist to establish the elevations appropriate for optimizing expected wetland functioning. The area will be graded to provide a natural channel profile and gradient between the culvert at the Union Pacific Railroad tracks and the culvert outlet to Younger Lagoon on the west property line. The area west of the combined W1/W2 hydrologic corridor shall be restored as functioning wetland upland/transitional habitat, as shall buffer areas to the east. Maintain the CRLF potential habitat at the northern end of W-2.

RMP MM 10. Establish a new vegetation framework for wetlands W1, W2, and W6 by planting and/or seeding appropriate native grass and herb wetland species (see Table A.3) to enhance habitat connectivity between these wetlands and YLR. Plant arroyo willow cuttings along the new riparian corridor and along the property line to enhance the wetland and encourage wildlife movement. Plant appropriate wet meadow species in the remainder of the wetland.

RMP MM 11. Remove high priority weeds (see Table A.2) in all wetlands, using appropriate methods. Weeds should be removed prior to seedset.

RMP MM 12. Control low and medium priority weedy invasive annual grasses and herbs (see Table A.2) by mowing at least three times through spring and summer. Mowing is intended to remove the seed of non-native grasses and reduce the seedbank over time. Mowing within wetland areas shall only occur in wetland areas that are dominated by non-natives and only as part of an approved restoration plan. Mowing should be timed to prevent annual species seedset. Mowing should be performed with a rotary or sickle bar mower so that it does not damage native herbaceous groundcovers; flail mowers should not be used. The timing of cutting is critical and should occur when the majority of weeds are in the early to mid-flowering stage; subsequent cuttings will be necessary for weeds that re-flower. Initial mowing for weed control should be performed as early as possible in March prior to bird nesting and territory establishment. Allow patches of native species to remain.

RMP MM 13. Revegetate weeded or bare areas of wetlands with appropriate native grass, herb, and/or shrub species (see Table A.3).

RMP MM 14. Protect wetlands from physical human disturbance by appropriately siting and designing trails and other development, and by limiting unauthorized access into the wetland habitat.

RMP MM 15. Minimize changes to existing drainage patterns in open space areas, except for the changes recommended for W1 and W2 above, and except for changes that will enhance wetland function.

Table A.5. Performance Standards for Wetlands

RMP Goal 3: Protect and enhance 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 CLRDP Drainage Concept Plan, and controlling access by humans and non-native animals.

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
RMP PS 10. Wetland 2 - flow diversion from Wetland 1	Wetland functioning as expected per design	1, 2, and 3 years after diversion completed	Wetland functioning as expected	Continue monitoring
			Wetland not functioning as expected	Develop and implement plans to correct functioning; continue monitoring
RMP PS 11. Combined Wetland W1/W2 – creation of willow riparian corridor along new channel	3 native plant species appropriate for habitat established in planted areas to comprise 50% cover	3 years after planting**	3 or more native plant species established comprising ≥ 20% cover within planted areas and evidence of natural recruitment present	Continue monitoring

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
and restoration plantings west and east of the combined W1/W2 hydrologic corridor			Fewer than 3 native plant species or < 20% cover of native species established within planted areas or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
		10 years after planting** and every 5 years thereafter	3 or more native plant species established comprising ≥ 50% cover within planted areas and evidence of natural recruitment present	Continue monitoring
			Fewer than 3 native plant species or < 50% cover of native species established within planted areas or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
RMP PS 12. Priority 1 weeds	Eliminate in wetlands	Year 3 and annually thereafter	No priority 1 weeds surviving to reproduction	Continue weed monitoring and removal as necessary
			Priority 1 weeds reproducing on site	Increase frequency of monitoring and weed removal efforts; consider alternative control methods
RMP PS 13. Priority 2 and 3 weeds	Reduce weedy annual grassland seedset	Year 1 and annually thereafter	Annual grassland cut before developing seed	Continue mowing program
			Annual grassland allowed to develop seed	Change mowing schedule to prevent seedset
RMP PS 14. Native plant revegetation	4 native plant species appropriate for habitat established in planted areas to comprise 40% cover within planted areas	2 years after planting**	4 or more native plant species established comprising ≥ 20% cover within planted areas and evidence of natural recruitment present	Continue monitoring

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
			Fewer than 4 native plant species or < 20% cover of native species established in planted areas or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
		5 years after planting** and every 5 years thereafter	4 or more native plant species established comprising ≥ 40% cover within planted areas and evidence of natural recruitment present	Continue monitoring
			Fewer than 4 native plant species or < 40% cover of native species established in planted areas or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
RMP PS 15. Protection of revegetation in progress	No disturbance to revegetation plantings	Ongoing until revegetation is successful	Plantings undisturbed	Continue monitoring until revegetation is successful
			Plantings disturbed (plants broken, trampled, dislodged, removed)	Determine cause; develop appropriate solution

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
RMP PS 16. Protection of wetlands	No unauthorized human disturbance to wetlands	Ongoing	Wetlands undisturbed	Continue monitoring
			Vegetation disturbed (plants broken, dislodged, trampled, removed); soils disturbed or compacted; other signs of trespass present	Install additional signs or low fencing as appropriate
RMP PS 17. Minimize anthropogenic changes to existing surface drainage patterns in open space areas (except for W1/W2 hydrologic integration)	Minimal changes to surface topography from management activities; no changes to surface topography due to unauthorized activities	Ongoing	Wetlands undisturbed	Continue monitoring
			Substantial changes to surface topography and/or drainage patterns evident	Determine cause; correct as necessary

Notes: *Unless otherwise specified, year refers to the number of years following the date that the CLRDP is certified by the Coastal Commission. Standard must be met by year indicated.

**See Table A.12 for Timing Guidelines.

A.3.4 Wetland Buffers

Description

With implementation of the planned enhancement measures, 100 feet is the appropriate buffer for most wetland areas (Figure A-5). The purpose of the buffer areas is to protect the wetlands from adverse impacts due to noise, human intrusion, activities, lighting, predation, invasion by non-native plant species, sedimentation, and urban runoff. Buffers do not constitute a specific habitat type in themselves and at the time of CLRDP certification they included mostly non-native grassland, coyote brush scrub-grassland, and ruderal vegetation types. Their principal function will be to protect the sensitive areas from disturbance.

The W1, W2, W3, W6, W8, and W9 wetlands share a buffer area due to their close proximity. At the time of CLRDP certification, Delaware Avenue Extension passed through this buffer area. With implementation of the CLRDP, Delaware Avenue Extension is to be abandoned (except for a public access trail) and this area restored to a habitat/buffer function. The general roadbed elevation is intended to be retained (albeit recontoured to look as natural as possible) to ensure continued hydrologic functionality of the wetland areas. Wetland W4 buffer includes the adjacent pedestrian and bicycle path along the eastern property boundary. Wetland W5, the seasonal pond, lies adjacent to existing and proposed development areas (Figure A-5). It requires screening from the lights and

cars associated with the existing NOAA building and McAllister Way. Some screening from the NOAA building will be provided by landscaping adjacent to the building itself. The buffer at W5 is 150 feet given the enhanced sensitivity of this resource, except for the "finger" of it extending to the south where a 100-foot buffer has been deemed sufficient for this finger area (only). Wetland W5 needs additional berming to provide screening and noise attenuation due to its enhanced sensitivity. Wetland W7 is contained within the wildlife corridor buffer along the northern boundary of the site and discussed within that section of the RMP (see section below). Wetlands W9,~~and~~ W10, W11, and W12 have a 100-foot buffer around them.

Protection and Enhancement Management Measures for Wetland Buffers

Management of particular buffer areas (see Figure A-5) focuses on effective protection of associated habitats using natural features complementary to the overall habitat. Performance standards for these management measures are presented in Table A.6. Table A.2 lists the non-native weeds (classified there as high, medium, and low priority for removal) identified for removal, and Table A.3 identifies appropriate species for the planting, as described in these management measures.

RMP MM 16. Construct a new main campus access street that avoids wetlands and buffer areas and diverts traffic from the existing (at the time of CLRDP certification) campus access road extending between the Delaware Avenue/Shaffer Road intersection to the CDFG facility. Abandon this portion of the former campus access road and remove the majority of the existing pavement along this alignment except for a curvilinear portion of it to remain as a public access pathway. Retain the general roadbed grade (with some edge modifications to make it look more natural) to maintain the existing wetland hydrology and replant disturbed areas with appropriate wetland and wetland buffer plant species.

RMP MM 17. Remove high priority weeds (see Table A.2) using appropriate methods. Weeds should be removed prior to seedset.

RMP MM 18 Control other low and medium priority weedy invasive annual grasses and herbs (see Table A.2) in buffers by mowing at least three times through spring and summer. Mowing is intended to remove the seed of non-native grasses and reduce the seedbank over time. Mowing within wetland buffer areas shall only occur in buffer areas that are dominated by non-natives and only as part of an approved restoration plan. Mowing should be timed to prevent annual species seedset. Mowing should be performed with a rotary or sickle bar mower so that it does not damage native herbaceous groundcovers; flail mowers should not be used. The timing of cutting is critical and should occur when the majority of weeds are in the early to mid-flowering stage; subsequent cuttings will be necessary for weeds that re-flower. Initial mowing for weed control should be performed as early as possible in March prior to bird nesting and territory establishment.

RMP MM 19. At Wetland W5, the seasonal pond, create a low, irregularly shaped. raised berm along the western and northern periphery (east of McAllister Way and south of the NOAA Fisheries Laboratory) where the berm is sited, sized, and vegetated with appropriate upland and buffer species to provide effective screening and noise attenuation from development in the Middle and Lower Terrace development zones and Campus streets. Avoid mature coyote brush where possible. Plant

berm with appropriate native coastal scrub herbs and shrubs (including coyote brush), using a mix of species to create native forage, cover, resting areas, and breeding sites for wildlife use (see Table A.3). Plant the buffer area along the east side of Wetland W5 with similar species to screen the wetland from the public access trail. Use dense shrubs near outer edges to maximize screening. Plant understory species to discourage establishment of undesirable weedy species as well as to minimize erosion and sedimentation. Maintain and enhance W5 hydrology, including evaluation of the need for overflow outletting of W5 water (e.g., by installing an overflow pipe through the berm) as necessary based on hydrologic and habitat analysis of the W5 water needs.

RMP MM 20. Ensure the edge of the trail adjacent to wetland W4 is vegetated to minimize sedimentation impacts to the wetland.

RMP MM 21. Revegetate westerly buffer for W4 and northerly buffer for W5 with native species where NOAA development has encroached into buffers.

RMP MM 22. For buffers located adjacent to trails or in other areas subject to disturbance, protect areas undergoing planting until vegetation is established. As appropriate, place signs informing people of ongoing revegetation efforts around the planted areas. If monitoring indicates habitat damage from continued human encroachment, low fencing, or other barriers may be required.

RMP MM 23. Post low-key signs at wetland buffer areas to inform people of the sensitive resources and allowed uses.

RMP MM 24. Minimize changes to existing surface and subsurface drainage patterns in open space and buffer areas except for those contemplated by and consistent with the CLRDP, including the Drainage Concept Plan (Appendix B).

Table A.6 Performance Standards for Wetland Buffers

RMP Goal 4: Protect wetlands from adverse impacts due to weeds, noise, human and non-native animal intrusion, lighting, predation, and sedimentation.

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
RMP PS 18. Reduce disturbance from automobile traffic	Construct new campus access road that diverts traffic between the Delaware Avenue/Shaffer Road intersection and the CDFG facility and abandon former access road (see management measures above)	See Table A.12.	Roadway realigned and former roadway improved/restored	Maintain new roadway and trail/restoration areas of former roadway thereafter

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
RMP PS 19. Priority 1 weeds	Eliminate in buffer areas	Year 3 and annually thereafter	No priority 1 weeds surviving to reproduction	Continue weed monitoring and removal as necessary
			Priority 1 weeds reproducing on site	Increase frequency of monitoring and weed removal efforts; consider alternative control methods
RMP PS 20. Priority 2 and 3 weeds	Reduce weedy annual grassland seedset	Year 1 and annually thereafter	Annual grassland cut before developing seed	Continue mowing program
			Annual grassland allowed to develop seed	Change mowing schedule
RMP PS 21. Creation of vegetated berm at periphery of the buffer for wetland W5 (seasonal pond); see also management measures above	Establish vegetated berm (note: weed removal and planting requirements for the berm shall be the same as for the remainder of the weed removal and planting performance standards specified in this table)	See Table A.12	Vegetated berm established (and weed control/planting successful per this table)	Monitor and maintain in its design state thereafter
			Vegetated berm not established (and/or weed control/planting not successful per this table)	Establish berm, and pursue remedial planting actions per this table.
RMP PS 22. Native plant revegetation	8 native plant species appropriate for habitat established to comprise 50% cover within buffer areas	2 years after planting**	4 or more native plant species established comprising ≥ 10% cover within buffer areas and evidence of natural recruitment present	Continue monitoring
			Fewer than 4 native plant species or < 10% cover of native species established in buffer areas or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
		5 years after planting**	6 or more native plant species established comprising ≥ 25% cover within buffer areas and evidence of natural recruitment present	Continue monitoring thereafter
			Fewer than 6 native plant species or < 25% cover of native species established in planted areas or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
		7 years after planting** and every 5 years thereafter	8 or more native plant species established comprising ≥ 50% cover within buffer areas and evidence of natural recruitment present	Continue monitoring thereafter
			Fewer than 8 native plant species or < 50% cover of native species established in buffer areas or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
RMP PS 23. Protection of revegetation in progress	No human disturbance to revegetation plantings	Ongoing until revegetation is successful	Plantings undisturbed	Continue monitoring until revegetation is successful

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
			Plantings disturbed (plants broken, trampled, dislodged, removed)	Install signs or low fencing as appropriate
RMP PS 24. Protection of buffer areas	No unauthorized human disturbance to buffer areas	Ongoing	Buffer areas undisturbed	Continue monitoring
			Buffer areas disturbed (plants broken, dislodged, trampled, removed); soils disturbed or compacted; other signs of damage present	Install additional signs or low fencing as appropriate
RMP PS 25. Minimize anthropogenic changes to existing surface drainage patterns (except for those contemplated by and consistent with the CLRDP, including the Drainage Concept Plan (Appendix B).	Minimal changes to surface topography from management activities; no changes to surface topography due to unauthorized activities	Ongoing	Wetlands/buffers undisturbed	Continue monitoring
			Substantial changes to surface topography and/or drainage patterns evident	Determine cause; correct as necessary

Notes: *Unless otherwise specified, year refers to the number of years following the date that the CLRDP is certified by the Coastal Commission. Standard must be met by year indicated.

**See Table A.12 for Timing Guidelines.

A.3.5 Wildlife Corridors and Wildlife Corridor Buffers

Description

The northern and northwestern margins of the terrace and the area north of Delaware Avenue Extension provide an opportunity to accommodate enhanced movement of wildlife between Moore Creek, Antonelli Pond, and Younger Lagoon, as well along the railroad corridor to the west more generally (Figure A-5). Under the CLRDP, wildlife corridors 20 feet wide will be designated along the northern boundary of the Campus (at the railroad tracks) and just south of the Upper Terrace development zone. The northernmost corridor, together with its buffer area is 300 feet wide. The

southern corridor, together with its buffer areas is 220 feet wide. The corridors together with their buffers will be enhanced with vegetation to provide better habitat cover and foraging area. These corridors and their accompanying buffer areas will connect to Wetlands W1, W2, W6, and W7 (for the northern corridor) and W2, W3, and W6 (for the southern corridor), all of which will be restored, enhanced, and maintained in open space. The approximately 50 feet of railroad right of way between the Campus boundary and the railroad tracks will also contribute to viability of the northernmost corridor.

As it now exists, the more northerly wildlife corridor and buffer crosses lower quality seasonal wetland habitat as well as non-native grassland, coyote brush scrub-grassland, and ruderal habitats. The wetland habitat is provided mostly by the channel forming Wetland W1 and by the northern and western portions of Wetland W2. The wetland habitat may serve as a movement corridor for wetland-dependent species (possibly including California red-legged frogs) traveling across the terrace. The drainage contains wetland plants along its length and often forms several shallow pools that remain intermittently in the channel after other water has dried down. Dry areas need to be maintained for terrestrial wildlife. The corridor/buffer contains many weedy species and supports minimal shrub vegetation to provide protective escape cover.

The more southern corridor/buffer extends through wetland W3 to Shaffer Road (see Figures A-3 and A-6). In both cases, the corridor/buffer area connects to similarly oriented west-east corridor areas, including wet areas, located off Campus between Shaffer Road and Antonelli Pond.

Protection and Enhancement Management Measures for Wildlife Corridors and their Buffers

Management measures for the wildlife corridor and wildlife corridor buffer areas focus on siting and designing development so that it does not interfere with wildlife passage, weed control and supplemental planting with appropriate species to provide additional protective cover and forage for wildlife, and enhancing safe passage for wildlife across Shaffer Road. Performance standards for these measures are presented in Table A.7. Table A.2 lists the non-native weeds (classified there as high, medium, and low priority for removal) identified for removal, and Table A.3 identifies appropriate species for the planting, as described in these management measures.

RMP MM 25. Remove high priority weeds (see Table A.2) along the designated wildlife corridor and wildlife corridor buffer areas, using appropriate methods. Weeds should be removed prior to seedset.

RMP MM 26. Plant appropriate native shrub and tree species along the wildlife corridor and wildlife corridor buffer areas (see Table A.3) encompassing both wetland and upland habitats as appropriate to the area. Create arroyo willow riparian thickets along the drainage by planting willow cuttings (see also recommendation in previous section for Wetland W2). In conjunction with buffer plantings, plant native upland trees and shrubs randomly spaced to approximate natural conditions along the remaining alignment. Some grassland will be retained to facilitate animal movement. Provide stratification of cover and forage to create habitat for a range of aerial and ground-dwelling wildlife species by planting appropriate native understory vegetation among the trees and shrubs.

RMP MM 27. Minimize changes to existing drainage patterns in open space areas.

RMP MM 28. Protect wildlife corridor and wildlife corridor buffer areas by appropriately siting and designing development adjacent to them, and trails that may be adjacent and/or may pass through such areas. Such development shall incorporate appropriate measures to ensure that noise, lights, and activities are effectively screened from wildlife receptors using the corridor/buffer areas, and, in the case of trails/other development that crosses such areas, shall incorporate appropriate elements to ensure through habitat connectivity (e.g., raised boardwalks, box culvert crossings, bridges, etc.).

RMP MM 29. If Shaffer Road is improved/modified, create a safe crossing for wildlife traveling between the east and west sides of the road where the corridor/buffer areas intersect it.

Table A.7 Performance Standards for Wildlife Corridor and Wildlife Corridor Buffer Areas

RMP Goal 5: Protect and enhance the wildlife corridor and wildlife corridor buffer areas by appropriately siting and designing development adjacent to them (and trails that may be adjacent and/or may pass through them), eliminating highly invasive weeds, planting native species to provide better protective cover and visual screening for wildlife than existing vegetation, maintaining existing surface drainage patterns, and providing a safe crossing for wildlife if Shaffer Road is improved.

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
RMP PS 26. Priority 1 weeds	Eliminate in proposed wildlife corridor and wildlife corridor buffer areas	Year 3 and annually thereafter	No priority 1 weeds surviving to reproduction	Continue weed monitoring and removal as necessary
			Priority 1 weeds reproducing on site	Increase frequency of monitoring and weed removal efforts; consider alternative control methods
RMP PS 27. Native plant revegetation	9 native plant species appropriate for habitat established in wildlife corridor and wildlife corridor buffer areas to comprise 50% cover within planted areas	2 years after planting**	5 or more native plant species established comprising ≥ 20% cover within wildlife corridor and wildlife corridor buffer areas and evidence of natural recruitment present	Continue monitoring

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
			Fewer than 5 native plant species or < 20% cover of native species established in wildlife corridor and wildlife corridor buffer areas or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
		5 years after planting**	7 or more native plant species established comprising ≥ 50% cover within wildlife corridor and wildlife corridor buffer areas and evidence of natural recruitment present	Continue monitoring
			Fewer than 7 native plant species or < 50% cover of native species established in wildlife corridor and wildlife corridor buffer areas or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
		10 years after planting** and every 5 years thereafter	9 or more native plant species established comprising ≥ 50% cover within wildlife corridor and wildlife corridor buffer areas and evidence of natural recruitment present	Continue monitoring
			Fewer than 9 native plant species or < 50% cover of native species established in wildlife corridor and wildlife corridor buffer areas or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
RMP PS 28. Protection of revegetation in progress	No disturbance to revegetation plantings	Ongoing until revegetation is successful	Plantings undisturbed	Continue monitoring until revegetation is successful
			Plantings disturbed (plants broken, trampled, dislodged, removed)	Determine cause; develop appropriate solution
RMP PS 29. Minimize anthropogenic changes to existing surface drainage patterns in wetland areas of corridor	Minimal changes to surface topography from management activities; no changes to surface topography due to unauthorized activities	Ongoing	Wetlands undisturbed	Continue monitoring
			Substantial changes to surface topography and/or drainage patterns evident	Determine cause; correct as necessary

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
RMP PS 30 Provide safe wildlife passage across Campus trails and Shaffer Road.	Appropriate conveyance for safe wildlife passage across Campus trails and Shaffer Road in place and used by wildlife	In conjunction with Upper Terrace development and/or Shaffer Road improvements; maintained annually thereafter	Safe wildlife passage provided. No road kills, evidence of use of wildlife passage (tracks, scat)	Maintain wildlife passage improvements
			Safe wildlife passage provided. Road kills	Develop and implement a plan to more effectively encourage wildlife use of conveyance or create alternate route(s) or enhance conveyance improvements.

Notes: *Unless otherwise specified, year refers to the number of years following the date that the CLRDP is certified by the Coastal Commission. Standard must be met by year indicated.

**See Table A.12 for Timing Guidelines.

A.3.6 Younger Lagoon Reserve Buffer/Planted Berm

Description

The buffer for the YLR is outside the Reserve and generally extends 50 feet beyond the mapped boundary between YLR and the terrace (except where precluded by existing development) (Figures A-5 and A-6). It encompasses a mix of coyote brush scrub, coastal bluff scrub, and planted berm habitats. Two constructed earthen berms, separated by a narrow gap, lie just east of the southern portion of the boundary between the YLR and the terrace. The berms have been planted with a variety of native shrub, grass, and herb species and some areas support large stands of poison hemlock. Protective fencing for YLR is in place just outside the Reserve along the boundary between the terrace and YLR.

Protection and Enhancement Management Measures for the YLR Buffer/Planted Berm

The management focus for the YLR buffer and planted berm (see Figures A-5 and A-6) will be on enhancement of screening and noise attenuation between the terrace and YLR, prevention of unauthorized access to the YLR, reduction of seedset by existing weeds (primarily poison hemlock), and gradual weed removal along with revegetation with native species. Weed control/revegetation efforts will be phased to gradually reduce the geographic extent of invasive weeds over time.

Performance standards for these management measures are presented in Table A.8. Table A.2 lists the non-native weeds (classified there as high, medium, and low priority for removal) identified for removal, and Table A.3 identifies appropriate species for the planting, as described in these management measures.

RMP MM 30. Remove existing (at CLRDP certification) chain link fencing and install new solid fencing and/or additional berm along or just outside of the YLR boundary (see also Fencing Design in CLRDP Section 6.8). Plant windbreak and linear mass trees in a north-south orientation to enhance screening of terrace noise, lights, and activities from YLR (see also Landscape Design in CLRDP Section 6.5). Plant appropriate native shrub species (see Table A.3) to soften the appearance of any fencing and/or berming and to augment the screening capabilities of the fencing, berming and tree screens.

RMP MM 31. Remove high priority invasive weeds other than poison hemlock (see Table A.2) using appropriate methods. Weed removal should be coordinated with management activities in YLR and should be accomplished prior to seedset.

RMP MM 32. Remove poison hemlock in selected areas each year using appropriate methods. Weed removal should be coordinated with management activities in YLR and should be accomplished prior to seedset.

RMP MM 33. Reduce seedset in stands of poison hemlock using appropriate methods.

RMP MM 34. Plant appropriate native grasses, herbs, and shrubs (see Table A.3) in weeded and open areas of buffer.

RMP MM 35. If adjacent to trails or in other areas subject to disturbance, protect areas undergoing planting until vegetation is established. As appropriate, place low fencing and signs informing people of ongoing revegetation efforts around the planted areas.

RMP MM 36. Control/retain drainage into the small erosion gully west of the Campus access road across from the NOAA building (above YLR) and revegetate gully as necessary to reduce the potential for increased gullying and sedimentation and/or turbidity impacts to Younger Lagoon.

Table A.8 Performance Standards for YLR Buffer/Planted Berm

RMP Goal 6: Protect YLR from adverse impacts associated with terrace use by enhancing the YLR buffer area (including the berm in the lower portion of the terrace) through enhanced fencing and vegetative screening to block terrace noise, lights, activities from YLR, controlling highly invasive weeds, and replanting with native species.

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
RMP PS 31. Enhance screening of YLR from terrace development through replacing existing fencing, potentially extending the earthen berm, and planting large scale tree and smaller scale shrub and other species (see also management measures above)	Establish new fencing and/or berm and tree/vegetative screen along YLR/terrace boundary	Year 1	New fencing and/or berm and tree/vegetative screen established and amount of noise, lights, and activities audible and visible in YLR reduced.	Continue monitoring
			New fencing and/or berm and tree/vegetative established and amount of noise, lights, and activities audible and visible in YLR not reduced	Evaluate measures to enhance screening (e.g., additional vegetation) and implement them
RMP PS 32. Priority 1 weeds other than poison hemlock	Eliminate in YLR buffer/planted berm	Year 3 and annually thereafter	No priority 1 weeds surviving to reproduction	Continue weed monitoring and removal as necessary
			Priority 1 weeds reproducing on site	Increase frequency of monitoring and weed removal efforts; consider alternative control methods
RMP PS 33. Poison hemlock	Eliminate poison hemlock in YLR buffer/planted berm	Year 4	Poison hemlock area extent on berm reduced by ≥20% over baseline	Continue weed reduction program.
			Poison hemlock extent area on berm reduced by <20% over baseline	Evaluate effectiveness of weed removal efforts; consider alternative control methods

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
		Year 8	Poison hemlock area extent on berm reduced by ≥40% over baseline	Continue weed reduction program.
			Poison hemlock extent area on berm reduced by <40% over baseline	Evaluate effectiveness of weed removal efforts; consider alternative control methods
		Year 12	Poison hemlock area extent on berm reduced by ≥60% over baseline	Continue weed reduction program.
			Poison hemlock extent area on berm reduced by <60% over baseline	Evaluate effectiveness of weed removal efforts; consider alternative control methods
		Year 16	Poison hemlock area extent on berm reduced by ≥80% over baseline	Continue weed reduction program.
			Poison hemlock extent area on berm reduced by <80% over baseline	Evaluate effectiveness of weed removal efforts; consider alternative control methods
		Year 20 and thereafter	No poison hemlock surviving to reproduction	Continue weed monitoring and removal as necessary
			Poison hemlock surviving to reproduction	Evaluate effectiveness of weed removal efforts; consider alternative control methods
RMP PS 34. Native plant revegetation	4 native plant species appropriate for habitat established in	4 years after planting** and every 4 years	4 or more native plant species established in weed removal areas	Continue monitoring

Feature	*Performance Standard*	*Time Period**	*Findings*	*Action*
	poison hemlock removal areas to comprise 50% cover within YLR buffer/planted berm area	thereafter	comprising ≥ 50% cover and evidence of natural recruitment present	
			Fewer than 4 native plant species or < 50% cover of native species established or no evidence of natural recruitment present	Perform supplemental planting using different species, propagule type, and/or soil preparation methods
RMP PS 35. Protection of revegetation in progress	No human disturbance to revegetation plantings	Ongoing until revegetation is successful	Plantings undisturbed	Continue monitoring until revegetation is successful
			Plantings disturbed (plants broken, trampled, dislodged, removed)	Determine cause; develop appropriate solution
RMP PS 36. Erosion repair west of NOAA building above YLR	No erosion of slope	In conjunction with the completion of any new construction in the Middle Terrace development zone, or within 3 years of CLRDP certification, whichever comes first	No erosion occurring, vegetation establishing	Continue monitoring
			Erosion occurring, vegetation dislodged	Resolve drainage problem, repair damage to substrate and vegetation

Notes: *Unless otherwise specified, year refers to the number of years following the date that the CLRDP is certified by the Coastal Commission. Standard must be met by year indicated.

**See Table A.12 for Timing Guidelines.

A.3.7 Finger Beaches and Rocky Intertidal Areas (South of Terrace)

Description

Rocky intertidal areas and small pockets of beach, portions of which constitute ESHA, exist at the base of the coastal bluff at the southern end of the terrace (Figure A-3). These small pockets of

beach are distinct from the main beach fronting Younger Lagoon, which is not addressed here. The rocky intertidal areas are part of a series of intertidal benches along the coast, continuous with those below De Anza Mobile Home Park and within Natural Bridges State Beach. They harbor a large density and diversity of marine plants and animals.

Protection and Enhancement Management Measures for Finger Beaches and Rocky Intertidal Areas (South of Terrace)

The Campus is located entirely on the terrace above the intertidal zone and, other than drainage discharge, should not have any impacts to it (Figure A-5). No new access to this area is proposed. Aside from the drainage and stormwater measures associated with this CLRDP (e.g., the Appendix B Drainage Concept Plan, etc.) other protection or enhancement measures of the rocky intertidal habitats below the coastal bluff are not recommended at this time. Measures associated with the beach fronting Younger Lagoon are addressed elsewhere in this CLRDP.

A.3.8 Water Quality and Erosion Hazard on Terrace Habitats

Description

All terrace habitats must be protected from erosion and adverse impacts to water quality due to stormwater and other runoff. Surface water quality and volumes will be maintained to the maximum extent feasible through the implementation of the Drainage Concept Plan.

The drainage management elements proposed in the CLRDP will serve to protect terrace habitats. Those portions of the drainage system that are located in areas designated Open Space and Resource Protection Buffer will be managed as part of the overall natural area management per this CLRDP (see also Appendix B Drainage Concept Plan).

Protection and Enhancement Management Measures for Water Quality and Erosion Hazard on Terrace Habitats

With implementation of the Drainage Concept Plan, erosion is not expected to be a problem on the terrace. Nonetheless, some erosion may occur due to unplanned events or actions. As necessary to address erosion problems on the terrace, the following recommendations shall be implemented. Performance standards for erosion control are presented in Table A.9. Table A.2 lists the non-native weeds (classified there as high, medium, and low priority for removal) identified for removal, and Table A.3 identifies appropriate species for the planting, as described in these management measures.

RMP MM 37. If eroded areas are identified during monitoring surveys (see below), reroute drainage or use natural energy dissipators, recontour with native soil, and plant seed or plugs of native grasses and/or herbaceous groundcover (see Table A.3) as necessary for erosion control.

Table A.9 Performance Standards for Water Quality and Erosion Hazard

RMP Goal 7: Protect terrace water quality and habitats, and prevent erosion, by implementing the Drainage Concept Plan and actively addressing any erosion that occurs.

Feature	*Performance Standard*	*Time Period*	*Findings*	*Action*
RMP PS 37 Erosion control	No erosion problems in terrace habitats	Ongoing	No erosion problems	Continue monitoring
			Eroded areas developing	Repair area as appropriate as soon as weather permits; correct contributing problem

Notes: *Unless otherwise specified, year refers to the number of years following the date that the CLRDP is certified by the Coastal Commission. Standard must be met by year indicated.

**See Table A.12 for Timing Guidelines.

A.4. Resource Management for Special Status Species

A.4.1 Special-Status Wildlife Species

Wildlife surveys conducted on the terrace have focused on birds, mammals, reptiles, amphibians, and invertebrates (EcoSystems West 2002). Special-status species observed on or immediately adjacent to the terrace portion of the site are northern harrier hawks, white-tailed kites, merlin, peregrine falcon, loggerhead shrike, tricolored blackbird, black swift, and the California red-legged frog (Table A.10).

Table A.10 Special-Status Wildlife Known to Occur on the Marine Science Campus and YLR

Common Name (Scientific Name)	*Status: Federal/State**	*Observed on Terrace*	*Observed in YLR*
Amphibians			
California Red-legged Frog (*Rana aurora draytonii*)	T/SC	potential habitat***	potential habitat
Fish			
Tidewater Goby (*Eucyclogobius newberryi)*	E/SC		x
Birds			
California Yellow Warbler (*Dendroica petechia brewsteri*)	--/SC		x
Willow Flycatcher (*Empidonax traillii*)	--/E		x

Common Name (Scientific Name)	*Status: Federal/State**	*Observed on Terrace*	*Observed in YLR*
Yellow-breasted Chat (*Icteria virens*)	--/SC		x
Saltmarsh Common Yellowthroat (*Geothlypis trichas sinuosa*)	--/SC		x****
Bank Swallow (*Riparia riparia*)	--/T		x
Black Swift (*Cypseloides niger)*	P/SC	x	x
California Horned Lark (*Eremophila alpestris actia*)	--/SC		x
Double-crested Cormorant (*Phalacrocorax auritus*)	--/SC		x
Brown Pelican (*Pelecanus occidentalis*)	E/E		x
Great Blue Heron (*Ardea herodias*)	--/SC		x
Western Snowy Plover (*Charadrius alexandrinus nivosus*)	T/SC		x
California Gull (*Larus californicus*)	--/SC		x
Loggerhead Shrike (*Lanius ludovicianus*)	P,SC/SC	x	x
Tricolored Blackbird (*Agelaius tricolor*)	P,SC/SC	x	x
Northern Harrier (*Circus cyaneus*)	--/SC	x	x
Sharp-shinned Hawk (*Accipiter striatus*)	--/SC		x
Cooper's Hawk (*Accipiter cooperi*)	--/SC		x
White-tailed Kite (*Elanus leucurus*)	P/FP	x	x
Peregrine Falcon (*Falco peregrinus*)	P/E	x	x
Merlin (*Falco columbarius)*	--/SC	x	x
Burrowing Owl (*Athene cunicularia hypugea*)	P,SC/SC	x	
Long-eared Owl (*Asio otus*)	--/SC		x
Short-eared Owl (*Asio flammeus*)	--/SC		x
Mammals			
Western Red Bat (*Lasiurus blossevillii*)	--/**		potential habitat
San Francisco Dusky-footed Woodrat *(Neotoma fuscipes annectens)*	SC/SC		potential habitat

Notes: ***** Status:

Federal:
E = Endangered
T = Threatened
SC = Species of Concern; taxa which are under review, and for which sufficient biological information exists to support a proposal to list as an endangered or threatened species
P = Protected as a Migratory Nongame Bird of Management Concern
State of California:
E = Endangered
T = Threatened
SC = CDFG Species of Special Concern
FP = Fully Protected

** =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 CA or taxa that are closely associated with a habitat that is declining in CA

***California red-legged frog sighting was at the northern Campus boundary adjacent to the railroad corridor.

****Showed nesting behavior in spring 2001.

Source: Modified from EcoSystems West (2002)

Special-Status Bird Species

A number of special-status bird species have been observed on or flying across the site (see Table A.10). A pair of mature northern harriers was observed foraging regularly across the terrace during 2000-01 surveys (EcoSystems West 2002) and has been seen repeatedly over many years (Fusari 2002). Based on observations of flight patterns, they likely nest off-site. The white-tailed kite was also observed foraging on the terrace (EcoSystems West 2002). Merlin, peregrine falcon, loggerhead shrike, tricolored blackbird, and black swift have been observed flying over the terrace (Habitat Restoration Group 1994), but were not observed during the 2000-2001 surveys (EcoSystems West 2002). No special-status bird species were observed nesting or are expected to nest on the terrace portion of the site, although burrowing owls may have formerly nested on the property (Pele 1995).

California Red-legged Frog

A biotic assessment of the California red-legged frog (CRLF), a threatened species under the federal Endangered Species Act and a CDFG Species of Special Concern, was prepared as part of the development of the CLRDP (EcoSystems West 2002). It describes the results of a literature review and field surveys, and discusses the potential for CRLF use of the Campus site. It is summarized here.

CRLF use a variety of habitat types over their lifetimes. Reproductive habitat requires surface water to be present at a minimum from February to late June. Breeding adults tend to be associated with water at least two feet deep (Mori 1997). This habitat may be permanent or ephemeral freshwater sources or tidally influenced coastal marshes with low salinity levels (less than 9ppm) (EcoSystems West 2002). Juvenile CRLF use sites with shallow water and limited shoreline or emergent vegetation and may need a mix of vegetated and open areas (Jennings and Hayes 1988). Adults

usually stay within a few feet of surface water areas during the 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 (Bulger 1999).

In 1997, three sub-adult CRLF were sighted in a wetland along the northern Campus boundary adjacent to the railroad tracks (Mori 1997) (Wetland W2, Figure A-4). Other surveys conducted by the Habitat Restoration Group (1993; 1994), Mori (1998), Bulger (1997), and EcoSystems West surveys in 2000 and 2001 have not found CRLF on or immediately adjacent to the site. However in 2002, EcoSystems West did observe a single young adult CRLF in the same pond. Movement onto or across the project site is most likely to occur at or along the northern margin of the property. Northern wetlands W2 and W6 may provide temporary hydration points for CRLF during winter movements. Other site wetlands have far less potential for use by CRLF due to barriers to movement, short duration of ponding, poor vegetative cover. These portions of the site are also not located between two suitable aquatic habitats (EcoSystems West 2002). Historical off-site CRLF sighting locations include Antonelli Pond and Natural Bridges State Park to the east, although bullfrogs are now prevalent in these locations and there have been no recent sightings of CRLF as of CLRDP certification. CRLF historically and presently breed at Wilder Ranch State Park and several coastal agricultural ponds to the west, and at the UCSC Arboretum to the north.

In summary, the terrace provides potential non-reproductive habitat for CRLF in wetlands in the northern portion of the site. The north wetlands offer hydration, vegetative cover, and foraging habitat. The possibility of CRLF on other portions of the site is considered to be unlikely.

Other Special-Status Species

In addition to CRLF and the special-status bird species identified, the Marine Science Campus also provides habitat for Tidewater Goby, an endangered species under the federal Endangered Species Act and a CDFG Species of Special Concern. Goby have been observed in the brackish water of Younger Lagoon.

A.4.2 Protection and Enhancement Management Measures for Special Status Wildlife Species

Management of special-status wildlife species focuses on protection and enhancement of their habitats and on protection from non-native predators and disturbance. Protection and enhancement of the special-status species habitats are described in the preceding sections of this RMP; additional restoration or enhancement measures are not recommended at this time. Management measures for protection of the special-status wildlife themselves are described below; associated performance standards are described in Table A.11.

RMP MM 38. Develop and implement a program for control of non-native wildlife and feral animals.

RMP MM 39. Prohibit domestic pets (dogs and cats) on site.

RMP MM 40. Protect wetlands from unauthorized physical human disturbance

RMP MM 41. Protect the pond in Wetland W2 where CRLF have been observed, by maintaining topography, hydrology, and vegetation in a manner designed to suit CRLF .

RMP MM 42. Avoid the use of rodenticides; where such use cannot be avoided, then minimize such use consistent with the maximum protection of special-status species. Rodenticide use shall be prohibited outside of developed areas within development zones.

Table A.11 Performance Standards for Special-Status Wildlife Species

RMP Goal 8: Protect special-status wildlife species through protection and enhancement of wetland habitats (for CRLF) and grassland/scrub-grassland habitats (for special-status bird species), and through protection from non-native predators.

Feature	*Performance Standard*	*Time Period*	*Findings*	*Action*
RMP PS 38. Control of non-native wildlife and feral animals	Non-native wildlife and feral animals not evident on site (observations, tracks, scat)	Ongoing	Non-native wildlife or feral animals not evident on site	Continue monitoring
			Non-native wildlife or feral animals evident on site	Remove according to control program
RMP PS 39. Control of domestic pets	No domestic dogs or cats on site	Ongoing	No domestic dogs or cats on site	Continue monitoring
			Domestic dog or cat observed on site	Notify owner, remove animal
RMP PS 40.	Where rodenticide use cannot be avoided, it is applied in a manner most protective of special status species	Ongoing	Special-status species unaffected by use of rodenticide	Continue monitoring
			Special-status species affected by use of rodenticide	Modify rodenticide use practices so that there is no effect on special-status species

A.5. Long Term Resource Management and Maintenance

A.5.1 Guidelines for Long-Term Maintenance

A specific long-term maintenance program shall be implemented to address maintenance of the Campus habitats, including but not limited to areas subject to specific protection and enhancement measures described above. The objective of the long-term maintenance program will be to ensure the long-term protection of the natural resources of the Campus. A component of this objective is to assist in meeting the performance standards for specific management measures described above. Specifically, the program will address the control of invasive exotic plant species, maintenance of vegetation, maintenance of protection measures, control of non-native wildlife and feral animals, and stormwater management maintenance. The program will incorporate appropriate elements of the measures detailed above, and the following additional guidelines (see also RMP Implementation section that follows).

Revegetated Areas

Areas that have been revegetated will require specific follow-up maintenance.

RMP MM 43 As appropriate, develop a maintenance program as part of planting plans to implement the revegetation measures outlined for protection and enhancement of terrace habitats.

Terrace Habitats and Open Space Areas (i.e., Non-Development Zone Areas) of the Campus

RMP MM 44. Identify a UC official with overall management/maintenance responsibility for open space and habitat areas.

RMP MM 45. Perform all maintenance and management efforts to assist the development of habitat, and disturb it as little as possible when performing necessary tasks.

RMP MM 46. Control weeds as described above under protection and enhancement of terrace habitats.

RMP MM 47. Prune trees and shrubs only as required for safety or tree structural reasons. There should be no pruning to "tidy up" as irregular and random plant growth is desirable for wildlife value.

RMP MM 48. Treat insect pests only if more than 15% of the trees or shrubs in a given area show significant damage, at which time an appropriate Integrated Pest Management (IPM) plan or alternative should be implemented and the use of appropriate biological controls maximized.

RMP MM 49. Remove and properly dispose of non-organic debris off-site. Leave organic debris from existing vegetation in place to increase wildlife habitat and add organic matter to soil.

RMP MM 50. Maintain sensitive habitat protection measures including fences, signs, trails, overlooks, berms, and screening plantings on an on-going basis.

RMP MM 51. Control non-native animals on site as outlined above under protection and enhancement of sensitive species and habitats. Prohibit domestic pets (dogs and cats) on the site, including on-site residence facilities.

RMP MM 52. Maintain stormwater management systems per the Drainage Concept Plan.

RMP MM 53. Coordinate maintenance efforts for the terrace habitats and YLR wherever possible.

A.5.2 Guidelines for Long-Term Monitoring

The purpose of the long-term monitoring program is to evaluate the integrity and functioning of Campus natural areas outside of development zones, including but not limited to areas subject to specific protection and enhancement measures described above. The monitoring program will include elements outlined above to assess progress toward meeting the performance standards for specific management measures as well as the following additional guidelines (see also RMP Implementation section that follows).

Revegetated Areas

Monitoring of the revegetated areas is expected to be performed by a revegetation contractor during the initial establishment period. When successfully established, the revegetated areas may be monitored as part of the overall habitat.

RMP MM 54. As part of specific planting plans and specifications to implement revegetation elements, develop a long-term monitoring program. As necessary, prepare detailed success criteria for revegetation plantings based on performance standards outlined above.

RMP MM 55. Perform annual monitoring according to a defined schedule to assess progress toward meeting success criteria and performance standards.

Terrace Habitats and Open Space Areas (i.e., Non-Development Zone Areas) of the Campus

RMP MM 56. Monitor all terrace habitats for highly invasive priority 1 weed species and potential problematic invasion by priority 2 or 3 species (see Table A.2) on a monthly basis from February through August. Implement weed control measures as required to prevent seedset by these species. This task should be overseen by the site manager or UC staff familiar with weed species.

RMP MM 57. Assess the adequacy of vegetation screening in buffers and the wildlife corridors once a year in the spring or summer. This should be performed by the site manager or UC staff. If necessary, perform supplemental planting in the fall. If human disturbance of sensitive areas is evident, protect areas with fencing/barriers per CLRDP parameters.

RMP MM 58. Monitor the physical integrity of protective berms each fall prior to onset of winter rains. This should be performed by the site manager or UC staff. Repair as necessary.

RMP MM 59. Qualitatively monitor overall terrace habitats every five years in the spring. Visually estimate vegetative percent cover, dominant species, presence of native plant species, and wildlife use to document habitat conditions over time. This should be done by a qualified biologist.

RMP MM 60. Photo-document each habitat area at least once every year from the same vantage point and direction. These photographs will augment the qualitative monitoring of terrace habitats. This should be done by a qualified biologist.

RMP MM 61. Conduct surveys of wetland habitats and surface water patterns after significant storm events to check the integrity of wetland habitats, identify obvious contamination of wetland habitats from urban runoff, identify erosion problems, etc. This should be performed by the site manager or UC staff.

RMP MM 62. Prepare a monitoring schedule.

RMP MM 63. Maintain an annual monitoring log to document management activities performed during the year. This will facilitate consistent management over time. The log should include a description of what management activities were performed and when, problems noted, and remedial measures taken.

A.6. Implementation of the RMP

A.6.1 Specific Resource Plans Required

The RMP provides a fairly broad outline with general recommendations and specific guidelines for resource protection, enhancement, and management on the Marine Science Campus site. The intent is that the Scientific Advisory Committee (SAC) uses the RMP as the initial framework for development of more detailed and specific resource plans for RMP implementation. These may be adapted to address the current physical and ecological conditions, current understanding of biological and ecological processes, and current approaches to habitat revegetation, restoration, and enhancement, provided that the overall intent of the RMP is carried out, including the level of resource protection and the timing guidelines. For example, the RMP performance standards provide suggestions for standards of biodiversity and vegetative cover, but these might be altered in a detailed plan based on new research or revegetation experience at this site. Adjustments to the performance standards that are more protective of the resources and more responsive to the site conditions based on management experience over time are encouraged.

Therefore, implementation of the requirements of this RMP shall be based on more detailed resource plans. Some of these more detailed resource plans will be developed during the course of projects that emanate from the CLRDP building program that require certain mitigations and capital improvements as part of them, but others may be developed irrespective of the building program (see also Approvals section below). Implementation of the RMP shall be guided by the SAC composed of three to four native restoration professionals and academicians appointed by the UCSC Chancellor and selected in consultation with the Executive Director of the California Coastal

Commission. This committee shall meet on an annual basis at a minimum (more frequently as needed), and provide overall direction for resource plan preparation, revegetation installation, long-term maintenance and monitoring.

Specific Resource Plans shall be prepared per IM 3.2.10 by a qualified restoration ecologist under the guidance of the SAC, and will follow the guidelines below, as appropriate:

1. A baseline assessment, including photographs, of the current physical and ecological condition of the proposed restoration, enhancement, and/or management site area. As appropriate, this may be based on available historical information or include current surveys addressing wetland delineation (conducted according to the definitions in the Coastal Act and the Coastal Commission's Regulations), a description and map showing the area and distribution of vegetation types, and a map showing the distribution and abundance of sensitive species, if any. Existing vegetation, wetlands, and sensitive species shall be depicted on a map that includes the footprint of the proposed site area.

2. A description of the goals of the resource plan, including, as appropriate, topography, hydrology, vegetation, sensitive species, and wildlife usage.

3. A description of planned site area preparation and invasive plant removal.

4. A planting plan including the planting palette (seed mix and container plants), planting design, source of plant material, plant installation, erosion control, irrigation, and remediation. Except for the planting of Monterey cypress, the planting palette shall be made up exclusively of native taxa that are appropriate to the habitat and region. Seed and/or vegetative propagules shall be obtained from local natural habitats so as to protect the genetic makeup of natural populations. Horticultural varieties shall not be used. Materials should be collected from coastal habitats that are located within approximately one mile of the Marine Science Campus and seaward of Highway 1 (Morgan 2002).

5. A plan for documenting and reporting the physical and biological "as built" condition of the site area within 30 days of completion of the initial plan implementation activities. This simple report will describe the field implementation of the approved resource plan in narrative and photographs, and report any problems in the implementation and their resolution.

6. A plan for interim monitoring and maintenance, including:

    a. A schedule.

    b. Interim performance standards keyed to final success criteria (#7, below).

    c. A description of field activities, including monitoring studies (#8, below).

    d. The monitoring period.

e. Provision for submission of annual reports of monitoring results to the Planning Director for the duration of the required monitoring period, beginning the first year after submission of the "as-built" report. Each report shall be cumulative and shall summarize all previous results. Each report shall document the condition of the site area with photographs taken from the same fixed points in the same directions. Each report shall also include a "Performance Evaluation" section where information and results from the monitoring program are used to evaluate the status of the project in relation to the interim performance standards and final success criteria. To allow for an adaptive approach to management, each report shall also include a "Recommendations" section to address changes that may be necessary in light of study results or other new findings.

7. Final success criteria for each habitat type, including, as appropriate:

   a. Species diversity, including total number of taxa, number of native taxa, and number of invasive non-native taxa.

   b. Vegetation coverage, including total vegetation, native vegetation, invasive non-native taxa, and dominant species.

   c. Wildlife usage.

   d. Erosion control and functional hydrology.

   e. Control of invasive non-native plant taxa.

   f. Maintenance of suitable habitat, and presence/abundance, for sensitive species or other individual "target" species.

   g. A requirement that success be determined after a period of at least three years wherein the study site has been subject to no remediation or maintenance activities other than weeding.

8. The method by which "success" will be judged, including, as appropriate:

   a. Type of comparison. Possibilities include comparing a census of the site area to a fixed standard derived from literature or observations of natural habitats, comparing a census of the site area to a sample from a reference site, comparing a sample from the site area to a fixed standard, or comparing a sample from the site area to a sample from a reference site.

   b. Identification and description, including photographs, of any reference sites that will be used.

   c. Test of similarity. This could simply be determining whether the result of a census was above a predetermined threshold. Generally, it will entail a one- or two-sample t-test.

   d. The field sampling design to be employed, including a description of the randomized placement of sampling units and the planned sample size.

   e. Detailed field methods; not simply a citation of a publication or standard methodology.

f. Specification of the maximum allowable difference between the restoration value and the reference value for each success criterion.

g. Where a statistical test will be employed, a statistical power analysis to document that the planned sample size will provide adequate statistical power to detect the maximum allowable difference. Generally, sampling should be conducted with sufficient replication to provide 90% power with alpha=0.10 to detect the maximum allowable difference. This analysis will require an estimate of the sample variance based on the literature or a preliminary sample of a reference site.

h. A statement that final monitoring for success will occur after at least 3 years with no remediation or maintenance activities other than weeding.

9. Monitoring study design for each habitat type, including, as appropriate:

a. Goals and objectives of the study.

b. Field sampling design.

c. Study sites, including experimental/revegetation sites and reference sites.

d. Field methods, including specific field sampling techniques to be employed. Photomonitoring of experimental/revegetation sites and reference sites shall be included.

e. Data analysis methods, including descriptive and inferential statistics with specified acceptable variance and significance levels to examine sample size, univariate and multivariate comparisons, and/or other parameters as appropriate and necessary to assess progress toward and meeting of success criteria.

f. Presentation of results.

g. Assessment of progress toward meeting success criteria.

h. Recommendations.

i. Monitoring study report content and schedule.

10. Provision for submission of a final monitoring report to the UCSC Planning Director and Scientific Advisory Committee at the end of the final monitoring period. The final report must be prepared by a qualified restoration ecologist. The report must evaluate whether the site area conforms to the goals and success criteria set forth in the approved final resource plan.

11. Provision for possible further action. If the final report indicates that the project has been unsuccessful, in part or in whole, based on the approved success criteria, then the final report shall identify remediation measures to be implemented to compensate for those portions of the original plan that did not meet the approved success criteria.

A.6.2 CLRDP Approvals Required

Implementation of the provisions of this RMP is intended to proceed both independently of specific CLRDP building projects and in tandem with them, with significant overlap. In other words, some of RMP requirements are tied to specific CLRDP building program projects; others are tied to specific dates following CLRDP certification, yet others are ongoing, and some are combinations of all of these. As a result, it is important that it be procedurally clear how each of these requirements is to be accounted for. Toward this end, and since many of the RMP requirements are not project specific, the University shall comply with all of the following requirements:

1. Within one year after the date that the Coastal Commission has certified the CLRDP, the University shall have initiated all RMP requirements timed to the first year pursuant to an effective CLRDP development project authorization. In the event that such requirements have not been so initiated, then new development pursuant to the CLRDP shall be prohibited until they are.

2. Within subsequent years after the date that the Coastal Commission has certified the CLRDP up to twenty years following certification (i.e., within 2 years, 3 years, 4 years, …, 20 years), the University shall have initiated all RMP requirements timed to each subsequent year pursuant to an effective CLRDP development project authorization. In the event that such requirements have not been so initiated by the year required (in any specific subsequent year case), then new development pursuant to the CLRDP shall be prohibited until they are.

3. Within twenty-one years after the date that the Coastal Commission has certified the CLRDP, the University shall have initiated all RMP requirements that are ongoing after 20 years pursuant to an effective CLRDP development project authorization. In the event that such requirements have not been so initiated, then new development pursuant to the CLRDP shall be prohibited until they are.

Note that it is possible that in the place of an individual authorization (or possibly multiple authorizations) for each year post-certification, the University may choose to pursue an authorization that covers overall implementation of the RMP. In any case, each authorization shall clearly specify which goals, management measures, performance standards, and other requirements of this RMP are being implemented pursuant to that authorization.

A.6.3 Project Timing

Overall timing guidelines for implementation of management measures, performance standards, and other requirements of this RMP is provided in Table A.12.

A.6.4 Annual Resource Management Report

The University shall prepare an annual resource management report that shall, at a minimum, include:

1. An evaluation of the implementation of this Resource Management Plan with respect to its goals, management measures, and performance standards.

2. Any monitoring and/or other related information applicable to other specific CLRDP resource management project authorizations,

3. Recommendations for any modifications to ongoing resource management projects that are necessary in order to achieve CLRDP objectives and/or to meet CLRDP requirements, including those identified in this Resource Management Plan.

The annual resource management report shall be prepared following the end of each year post-CLRDP certification (e.g., for the 3rd year post CLRDP certification, following the 3 year anniversary) and the report completed by the mid-year point of the following year post-CLRDP certification (e.g., in the same example, by 6 months after the 3 year anniversary) to allow any necessary changes to be implemented as soon as possible. The University shall timely pursue all necessary development authorizations pursuant to this CLRDP to implement identified changes prior to the end of the next year post-CLRDP certification (e.g., again in the same example, by the 4 year anniversary). The UCSC Planning Director shall maintain the annual resource management reports as components of the overall annual written CLRDP monitoring report for any particular years (see Chapter 8) and they shall be available for public review.

A.6.5 Responsibilities

UCSC officials representing the University of California shall have overall management responsibility for the terrace natural areas. Funding responsibility for implementation of the RMP lies with UCSC and the UC Regents. Funds are expected to be derived from proposed development at the Marine Science Campus site, and other monies as available.

*Table A.12 Timing Guidelines for Implementation of Protection and Enhancement Management Measures on the Terrace**

Management Measure	*Year** or Other Time Frame*																			
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20***
Grassland, Ruderal, and Coyote Brush Scrub-Grassland Habitats																				
RMP MM 1 (Priority 1 weed removal)	x	x																		
RMP MM 2 (Priority 2 and 3 weed control)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
RMP MM 3 (Revegetation planting)	x	x			x					x					x					x
	For areas disturbed by construction activities, as soon as possible in fall/winter																			
RMP MM 4 (Protection of planted areas)	Until vegetation is established																			
Coastal Bluffs																				
RMP MM 5 (Priority 1 weed removal, except iceplant)	x	x																		
RMP MM 5 (Iceplant removal)	Prior to first rainy season following initiation of construction for first development project in Lower Terrace development zone or sooner, if IM 3.2.10 process dictates otherwise																			
RMP MM 6 (Revegetation planting – bare areas)	Prior to first rainy season following initiation of construction for first development project in Lower Terrace development zone or sooner, if IM 3.2.10 process dictates otherwise																			
RMP MM 7 (Revegetation planting -- inland from trail)	Prior to first rainy season following initiation of construction for first development project in Lower Terrace development zone or sooner, if IM 3.2.10 process dictates otherwise																			
RMP MM 8 (Post informational signage)	x	x																		
Wetlands																				
RMP MMs 9 & 10 (Wetland restoration)	When drainage improvements for the first development project north of Delaware Avenue Extension are constructed or sooner, if IM 3.2.10 process dictates otherwise																			
RMP MM 11 (Priority 1 weed removal)	x	x																		
RMP MM 12 (Priority 2 and 3 weed control)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
RMP MM 13 (Revegetation planting)	Prior to first rainy season following wetland W2 flow diversion																			
RMP MM 14 (Protect wetlands from disturbance)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
RMP MM 15 (Minimize changes to drainage	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Management Measure	*Year** or Other Time Frame*																			
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20***
patterns)																				
Wetland Buffers																				
RMP MM 16 (Construct new Campus access road/restore abandoned road area)	Upon completion of any new building construction in the Middle Terrace, or when the first 10% (square footage) of Campus development under the CLRDP is completed, whichever comes first																			
RMP MM 17 (Priority 1 weed removal)	x	x																		
RMP MM 18 (Priority 2 and 3 weed control)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
RMP MM 19 (Create berm at wetland W5 buffer)	Upon completion of any new construction in the Middle Terrace, or when the first 10% (square footage) of Campus development under the CLRDP is completed, whichever comes first																			
RMP MM 19 (Berm planting in W5 buffer)	Prior to first rainy season following creation of berm																			
RMP MM 20 (Vegetation of trail edge at wetland W4)	x	x																		
RMP MM 21 (Revegetation planting in W4 and W5 buffers)	x	x																		
RMP MM 22 (Protection of revegetated areas)	Until vegetation is established																			
RMP MM 23 (Post informational signage)	x	x																		
RMP MM 24 (Minimize changes to drainage patterns)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Wildlife Corridors and Wildlife Corridor Buffers																				
RMP MM 25 (Priority 1 weed removal)	x	x																		
RMP MM 26 (Revegetation planting)	When drainage improvements for the first development project north of Delaware Avenue Extension are constructed or sooner, if IM 3.2.10 process dictates otherwise																			
RMP MM 27 (Minimize changes to drainage patterns)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
RMP MM 28 (Protect wildlife corridors/buffers)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
RMP MM 29 (Safe wildlife conveyance across Shaffer Road)	When improvements and/or modifications to Shaffer Road are constructed (in areas where the corridor/buffer areas intersect the improvements)																			

Management Measure	*Year** or Other Time Frame*																			
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20***
Younger Lagoon Reserve Buffer/Planted Berm																				
RMP MM 30 (Enhance YLR screening along its eastern edge)	x	x																		
RMP MM 31 (Priority 1 weed removal (except poison hemlock))	x	x																		
RMP MM 32 (Poison hemlock removal)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
RMP MM 33 (Poison hemlock seedset reduction)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
RMP MM 34 (Revegetation planting in weeded areas)	Prior to first rainy season following creation of open (weeded) areas																			
RMP MM 35 (Protection of revegetated areas)	Until vegetation is established																			
RMP MM 36 (Repair of erosion gully west of NOAA)	Upon completion of any new construction in the Middle Terrace, or when the first 10% (square footage) of Campus development under the CLRDP is completed, or within 3 years of CLRDP certification, whichever comes first																			
Finger Beaches and Rocky Intertidal Areas (South of Terrace)	No management measures recommended																			
Water Quality and Erosion Hazard on Terrace Habitats																				
RMP MM 37 (Erosion control)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Special-Status Wildlife Species																				
RMP MM 38 (Control of non-native wildlife and feral animals)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
RMP MM 39 (Prohibit domestic pets)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
RMP MM 40 (Prohibit unauthorized access)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
RMP MM 41 (Protect pond)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
RMP MM 42 (Avoid the use of rodenticides, and protect species)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Notes: *Note that the RMP's performance standards, and the RMP's management measures relating to long-term monitoring and maintenance, also include implementation and timing requirements. The timing guidelines of Table A.12 must be understood in relation to, and considered in tandem with, these other

RMP implementation and timing requirements, In addition, the timing guidelines of Table A.12 may be adjusted in specific resource plans consistent with the overall approach articulated in Implementation Measure 3.2.10.
**Note that year refers to the number of years following the date that the CLRDP is certified by the Coastal Commission.

*** Note that this table stops at year 20, but that obligations pursuant to the RMP are ongoing past year 20 (see also comment for *).

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Appendix B. Drainage Concept Plan

The purpose of this drainage concept plan is to outline parameters for collecting, filtering, and treating stormwater and other runoff at the Marine Science Campus. The approach is a hybrid that combines natural Best-Management-Practice (BMP) features such as vegetated filter strips, vegetated swales, and vegetated stormwater basins with conventional BMP features such as engineered stormwater treatment systems and oil and grease traps, into a drainage management system that captures, detains, filters, and treats stormwater and other runoff. Cleansed runoff that doesn't naturally percolate through the natural BMPs would then be directed to wetland and open space areas of the Campus to benefit wetland and other hydrologic functions. During periods of unusually heavy storm activity, stormwater basins could hold standing water for as long as 10 days, but since most storm events in the Santa Cruz area occur from October through April, it is expected that basins will be dry by May. BMP features will be vegetated with native perennial grasses and other appropriate plant species, which will be maintained periodically, and when necessary, sediment buildup will be removed from those components of the system located within development zones. Further, the design intent shall minimize (and to the maximum extent feasible eliminate) the need for sediment removal or disruptive maintenance outside of development zones. All maintenance and repair activities, except emergency repairs during storm events, will occur during dry months when strips, swales, and basins are free of standing water.

B.1 Introduction

This drainage concept plan for the Marine Science Campus provides: 1) a description of existing conditions at the time of CLRDP certification, 2) a set of performance standards and BMPs that will guide future work by a civil engineer to develop site-specific drainage plans, 3) a description of the methods to be used in the design of Campus drainage systems, 4) monitoring, maintenance, and water quality performance standards for ensuring that the drainage system is functioning as intended, and 5) credible evidence that the performance standards are achievable using the proposed methods.

This plan is referred to as a "concept plan" because it provides the basic parameters for the drainage systems to be used on the Campus, but it doesn't provide specific plans and designs for their construction. Rather, it provides the framework for guiding the development of specific drainage plans and designs as part of future projects under the CLRDP, including providing specific BMP and other requirements that must be included in such future projects. In that sense, not all aspects of this plan are prescriptive; some are just illustrative or give guidance for future specific designs. For example, in matters regarding the layout of drainage features for specific buildings or groups of buildings, this plan is intended only to provide guidance to planners and engineers that will work in the future to develop project-specific plans and designs for a specific construction plan. Similarly, regarding the sizing and ultimate location of vegetated stormwater basins, this plan makes gross assumptions about total future impervious area. The actual sizing and location of these basins will depend on the amount of unimproved area retained around buildings, the ability to make use of such area for the drainage system components identified herein, the degree to which programmed space is

provided in one or two story buildings, technical considerations (e.g., site-specific infiltration rates, BMP design considerations, etc.), the amount of drainage to be contained (including actual areas of pervious and impervious coverage associated with development under this CLRDP), the degree to which areas outside of the four Campus development zones can be avoided and drainage still be made to meet water quality objectives, and other CLRDP requirements that also apply (i.e., natural resource protection, view protection, etc.). The way in which these other CLRDP factors affect any specific drainage proposal will only be known when specific development proposals come forward for proposed development of one or more portions of the Marine Science Campus.

This plan is intended, however, to be prescriptive in many other respects. For example, twelve specific BMPs are prescribed herein and those BMPs are required elements of any project-specific plans and designs. Likewise, standards for maintaining clean (i.e., in compliance with CLRDP water quality standards) stormwater flows to important habitat areas, groundwater recharge, and water quality are binding and required elements of future site-specific drainage plans. Finally, there are certain drainage improvements that serve as infrastructure for the entire site and are not tied to an individual CLRDP building program project but rather are required as part of overall Campus development (see also CLRDP Chapter 9).

It is also noted here that at the time of CLRDP certification, UCSC was in the process of developing a campus-wide Stormwater Management Plan (which was to address the Main UCSC Campus and the Marine Science Campus) in compliance with state Phase II Stormwater regulations, and this plan was to be submitted to the Regional Water Quality Control Board and updated annually. To the extent that this campus-wide plan requires stormwater management design standards or measures that are more protective of resources and water quality than those identified in this CLRDP Drainage Concept Plan, the more protective measures may be applied to development implemented under the CLRDP provided such measures are otherwise consistent with the CLRDP.

Urban runoff (non-point source pollution) is recognized as one of the leading causes of water quality impairment in the United States. Runoff from the Marine Science Campus development will drain to wetlands, Younger Lagoon and the Monterey Bay National Marine Sanctuary. Given the ecological importance of these waters, runoff water quantity and quality from proposed Campus development has been made a critical component in the site design. This drainage concept plan has been designed to address these issues.

This document is divided into six sections. The first section introduces the drainage concept plan. The second sets forth the methodology and data sources used in development of the plan. The third section describes hydrological conditions on the Marine Science Campus existing at the time of CLRDP certification. The fourth section identifies parameters for CLRDP-approved development conditions and identifies a series of remedial drainage projects to be undertaken shortly after CLRDP certification. The fifth section discusses the phasing of drainage improvements on the Marine Science Campus. Finally, the sixth section outlines monitoring and maintenance activities and requirements for the Campus drainage system.

B.2 Methods of Analysis

The purpose of this section is to set forth the methodology and data sources used in development of this concept plan.

B.2.1 Runoff Rate and Volume Calculations

The Rational Method was selected as the technique for determining flow rates and volumes. Precipitation intensities and runoff coefficients were derived from Santa Cruz County Drainage Design Data. Time of concentration data was derived using the SCS TR20 Lag method. Use of the County of Santa Cruz's Tc nomograph was considered, but this methodology was dropped in favor of the TR20 Lag method. This is because the County's Tc nomograph is not well suited to simulate the actual conditions of the Marine Science Campus site. Unlike the turf conditions that are well suited to the County Tc nomograph, the Marine Science Campus grasslands are characterized by heavy rodent use, which has left the ground irregular and porous, and by tall grasses and shrubs that affect drainage.

To better simulate Tc values for the Marine Science Campus, Hydrographs for Windows software was used, which allows the selection of three possible techniques for Tc derivation (Lag, TR55 and Kirpich). The Lag method was selected because this yielded a more accurate assessment of Tc, than the nomographs. While this methodology resulted in a conservative estimate of pre- and post-CLRDP development flows, this is appropriate given the importance of protecting Younger Lagoon Reserve and other resource areas from the impacts of stormwater and other runoff discharge generated by development areas. In Basins 5 and 7 (containing the NOAA Fisheries and the CDFG facilities, respectively), a Tc default of 10 minutes was used, since these basins are small and mostly covered with hardscape. This is the minimum Tc the County recommended at the time of CLRDP certification. Peak and total flows (24 hour) were calculated for the 25-year return storm event.

B.2.2 Calculation of Detention Requirements

The Modified Rational Method was used to calculate the 25-year detention for each post-CLRDP development sub-basin. This technique uses the rational method to calculate the volume of runoff in a specified time interval. Detention is then calculated for the runoff storage volume required to reduce runoff rates to a predetermined level. Detention volumes were calculated to reduce post-development 25-year runoff rates to pre-development 25-year rates. A design engineer using the most appropriate method available at the time of design will determine the actual volume of storage required in any particular post-development sub-basin (see also Section B.4).

B.2.3 Treatment Train Sizing

The post-CLRDP drainage system is required to be a "treatment train" of BMPs in series (see Section B.4). This system, including the vegetated stormwater basins, is to be sized to meet water quality requirements for all storms up to and including the 85th percentile event (i.e., the 85th percentile, 24-hour storm event for volume and the 85th percentile, 1-hour storm event for flow), per a handout made available by the California Coastal Commission staff entitled: "85th "Percentile" Design Goal Implementation Considerations."

B.2.4 Sources of Data

A number of reports and documents were used to help determine the hydrological conditions at the site.

Basin Delineations

Existing sub-basin delineations were based on the topographic survey conducted by Baseline Surveyors in November 2001. This survey information was compared to field surveys conducted during three storm events in 2001 and 2002. Steven Davenport (Assistant Director of the Institute of Marine Sciences) provided valuable observations on the overall site drainage.

Post-CLRDP Development Drainage

Post-CLRDP development drainage was analyzed and modeled based on the CLRDP Land Use Diagram contained in Chapter 5, and other related descriptive information regarding the CLRDP building program. The post-CLRDP drainage parameters identified are thus estimates based on potential development; site-specific drainage plans will be used at the time of development for the actual design and construction of the required BMP treatment train identified in this plan.

Groundwater Conditions

Data on shallow groundwater elevations was derived from piezometers installed at the campus by Phillip Williams and Associates and Haro Kasunich and Associates. Monitoring data from these piezometers during the 94-95 winter season was provided by Steven Davenport. Groundwater flow information was provided in a memo from Peter Hudson of Environmental Science Associates (ESA) and discussions with Terry Huffman of Huffman Broadway Group (HBG).

Soils

Information on soil types at the site was taken from the Final Agricultural Suitability Study conducted in 1995 by Sage Associates.

Related Reports

Various drainage reports and miscellaneous data were produced in the past for the Marine Science Campus. These reports were used as background information to increase the overall knowledge of the site and include:

- In 1993 H.T. Harvey & Associates produced a report on hydrology and water quality for a Long Marine Lab EIR. This report predates many of the buildings and improvements now on the site.

- Strelow Consulting produced a draft EIR for the Santa Cruz Coastal Marine Research Center in 1997. This report also predates many of the buildings and improvements now on the site.

- Drainage information for the CDFG Oiled Seabird Facility was obtained from reports by Nelson Engineering and Ifland Engineers Inc.

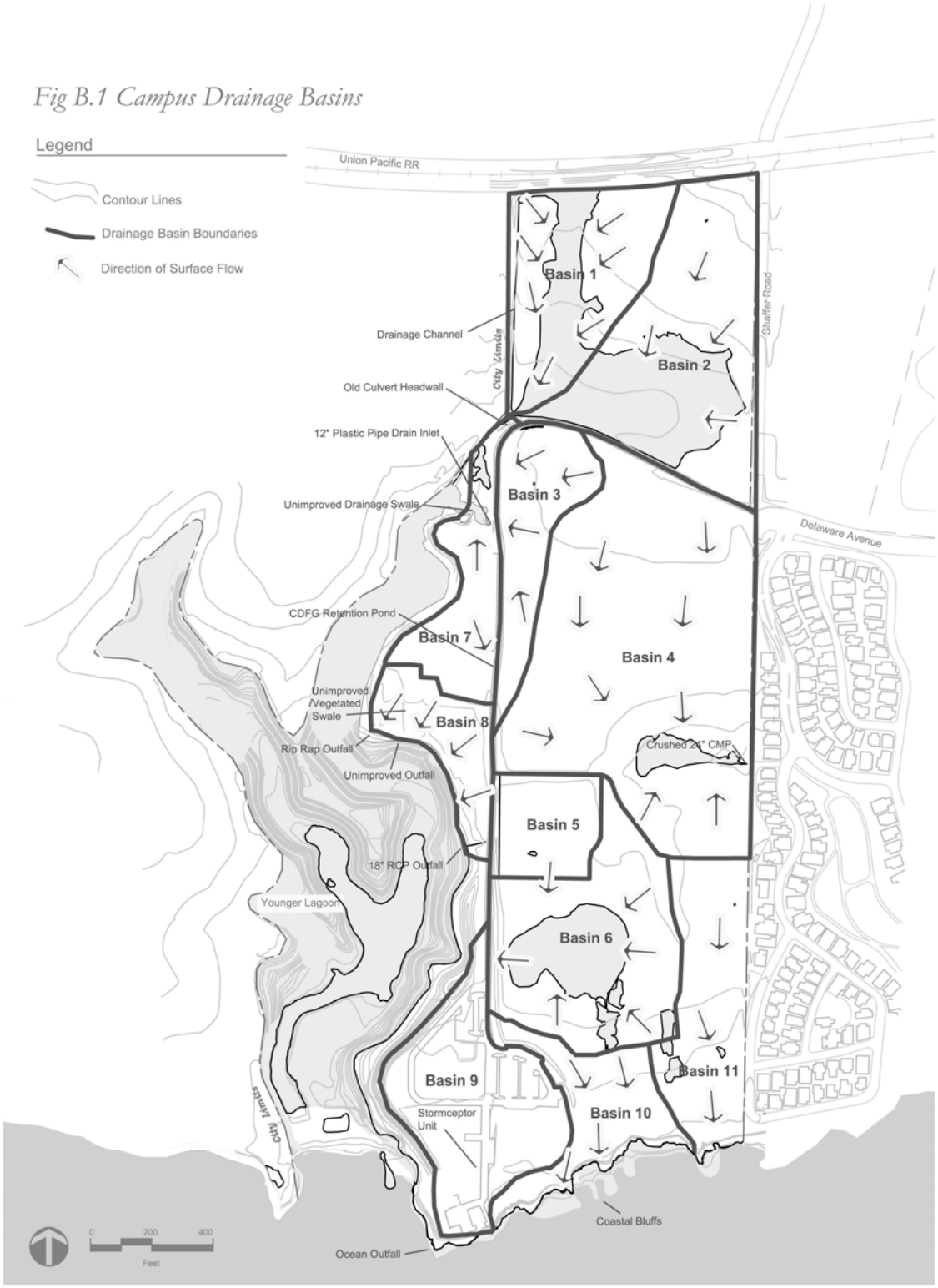
B.3 Pre-CLRDP Development Conditions

The purpose of this section is to describe hydrological conditions on the Marine Science Campus at the time of CLRDP certification. The first subsection provides a description of drainage basins on the site at that time, and the second subsection estimates associated total volumes and peak runoff rates for the drainage basins.

B.3.1 Description of Campus Drainage Basins

The purpose of this section is to describe existing drainage conditions on the Marine Science Campus at the time of CLRDP certification. The Marine Science Campus consists of 11 drainage basins. Delineation of these basins was based on the topographic survey conducted by Baseline Surveyors in November 2001. This survey information was supplemented by field surveys conducted during three storm events in 2001 and 2002 and by interviews with Steven Davenport, who provided observations on the overall site drainage. Each of the drainage basins is described below, and Figure B-1 shows their location on the Marine Science Campus.

Fig B.1 Campus Drainage Basins



Basins 1 and 2

General Description

Basins 1 and 2 are located north of Delaware Avenue Extension and cover approximately 16 acres with an average slope of 1 percent. These basins, both of which were undeveloped pre-CLRDP, are divided by a grade break that bisects the area from the northeast corner to the southwest corner. Delaware Avenue Extension demarcates the southern boundary of this zone. Basin 1 covers 7.7 acres on the west side of the upper campus. Basin 2 covers 8.17 acres in the eastern section of the upper campus.

Hydrologic Conditions

The soils in these basins are primarily Elkhorn sandy loam (SCS soil type B) and Watsonville loam (SCS soil type D). Both basins have good cover conditions provided by healthy grass growth. Coyote Brush provides additional cover in the upper and eastern sections of both basins. The soil surface features numerous small, shallow depressions and rodent burrows, which provide runoff storage and some infiltration during rain events. Wetland areas are prominent hydrological features in these basins.

Stormwater runoff from these two basins moves via overland flow in a southwest direction. Basin 1 drains predominantly to a drainage along the western boundary of the site. This channel diverts water from its historical route through Basin 1, which is a linear wetland approximately 50 feet to the east of the channel. Runoff from Basin 2 flows towards Delaware Avenue Extension, which acts as a dam to help create a wet area north of the road. Flows then travel along a grassy swale that parallels the road and join with runoff from Basin 1 at a drainage located at the point where the Delaware Avenue Extension turns to the south into McAllister Way near the Campus property boundary at the City limit line. Approximately 100 feet downstream of this point the channel was once bridged by a farm access road that incorporated a three-barrel corrugated metal pipe culvert system. However, this crossing no longer exists and all that remains of this structure are two concrete headwalls. The drainage conveys runoff from the upper area to the northeast arm of Younger Lagoon through a heavily vegetated riparian area located to the northwest of the CDFG facility. Wetlands W1, W2, W3, and W7 are located within Basins 1 and 2.

Pre-CLRDP Erosion Problems

Drainage discharges in Basins 1 and 2 were free of significant erosion problems at the time of CLRDP certification.

Fig. B.2 View of Basin 1 from Delaware Avenue Ext.

Fig. B.3 View of Basin 2 from Delaware Avenue Ext.

Fig. B.4 Swale along Delaware Avenue Ext.

Fig B.5 Confluence of Basins 1 and 2

Fig. B.6 Concrete headwalls in drainage

Fig. B.7 Wetland riparian area above Younger Lagoon

Basin 3

General Description

Basin 3 is a small (2.9 acres) crescent shaped undeveloped basin with a 0.5 percent slope (see Figure B-1). 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 that separates it from Basin 4.

Hydrologic Condition

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. Wetlands W8 and W9 are located within Basin 3 near Delaware Avenue Extension.

Stormwater runoff from Basin 3 flows southwest towards a small overgrown drain inlet on McAllister Way (opposite the CDFG building). This inlet empties into a 12" plastic pipe that crosses McAllister Way and discharges to a small swale. This swale is a tributary to the same drainage that serves Basins 1 and 2, which in turn flows to the upper end of Younger Lagoon Reserve.

Pre-CLRDP Erosion Problems

Drainage discharge in Basin 3 was free of significant erosion problems at the time of CLRDP certification.

Fig. B.8 Basin 3 from McAllister Way

Fig.B.9 Drain Inlet for Basin 3

Basin 4

General Description

Basin 4 is the largest basin on the site at 17.87 acres and has a slope of 1 percent (see Figure B-1). The eastern side of the basin runs along the De Anza Mobile Home Park wall. Delaware Avenue Extension demarcates the northern edge of the basin. The western perimeter is primarily the edge of Basin 3, with a small section in the southwest corner being bounded by McAllister Way. The southern edge of Basin 4 is defined by the northern limits of Basins 5, 6 and 11.

Hydrologic Conditions

Basin 4 is primarily underlain by Elkhorn sandy loam soil. However, an area of Watsonville loam is found surrounding wetland W4 in the southeast corner of the basin. The soil surface is scattered with small depressions, which provide additional retention and detention of stormwater. The cover conditions in this basin are good with a mix of healthy grass and Coyote Brush.

This basin drains by overland flow towards wetland W4. A crushed 24" corrugated metal pipe (CMP) is located at the eastern end of this wetland and connects it to hydrologic features within De Anza Mobile Home Park (likely to the main pond located in the De Anza Mobile Home Park). The CMP pipe is located below grade and has sustained damage that restricts the opening to approximately 12".

Pre-CLRDP Erosion Problems

Drainage discharge in Basin 4 was free of significant erosion problems at the time of CLRDP certification.

Fig. B.10 View of Basin 4 from the De Anza Mobile Home Park Wall

Basin 5

General description

Basin 5 covers approximately 1.8 acres and incorporates the NOAA Fisheries building (see Figure B-1). The northern edge of the basin is bounded by Basin 4. The west side of the basin is defined by a drainage swale that runs along the east side of McAllister Way. The southern and eastern edges are adjacent to Basin 6. The basin has a 2 percent slope and drains to an engineered percolation system located to the south of the NOAA Fisheries building.

Hydrologic condition

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. As such, the cover condition is rated as poor to fair.

The drainage system for Basin 5 and the NOAA facility consists of an underground percolation system and retention chamber located south of the NOAA building. Overflows from this system discharge into the large seasonal pond (wetland W5) located in Basin 6. A grassy swale that has been narrowed to a drainage ditch by NOAA contractors and an 18" reinforced concrete pipe under McAllister Way are located west of the NOAA building. These facilities are designed to route flows from neighboring Basin 6 to Younger Lagoon Reserve. 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.

Pre-CLRDP Erosion Problems

Drainage discharge in Basin 5 was free of significant erosion problems at the time of CLRDP certification.

Basin 6

General description

Basin 6 is located south of the NOAA facility and covers 7.72 acres with a 2 percent slope (see Figure B-1). This basin features a large central wetland area commonly referred to as the seasonal pond (wetland W5). The north end of the basin is adjacent to Basin 5. McAllister Way demarcates the western edge of the basin. The northern border of Basin 10 marks the southern limit of Basin 6. Basin 11 runs along the eastern flank of the basin.

Hydrologic conditions

This basin is almost completely comprised of Watsonville loam soil (with the exception of a small area around the perimeter of Basin 5). The seasonal pond dominates the hydrology of this basin, acting as a detention/retention area. The soil surface is generally uniform, with some shallow depressed areas. Cover conditions are good, with a mix of healthy grasses, Coyote Brush (along the northern edge) and wetland plant species in the seasonal pond.

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 the former swale modified to a narrow ditch located adjacent to Basin 5 and the NOAA facility, and then flows through an 18" reinforced concrete pipe to Basin 8. From this point it discharges into Younger Lagoon Reserve. In the past, a drainage ditch appears to have been graded from the seasonal pond south to the coastal bluff. This ditch is almost completely filled in now and no longer functions to drain the basin.

Pre-CLRDP Erosion Problems

Stormwater that flows from Basin 6 into Basin 8 and Younger Lagoon Reserve has caused problems in Basin 8, and these problems are discussed in the Basin 8 section.

Fig. B.11 View of Basin 6 and NOAA building

Basin 7

General Description

This basin is located west of McAllister Way and occupies 2.41 acres with a gentle slope of 0.5 percent (see Figure B-1). Younger Lagoon Reserve represents the western edge of this basin, with Basin 8 marking the southern edge. This basin contains the CDFG building and a portion of the Avian Facility.

Hydrologic Condition

Except for the mostly undisturbed area extending north of the CDFG facility that forms the connection between the upper terrace portion of the Campus and the eastern arm of Younger Lagoon, this basin is almost completely covered by buildings or gravel, and the soils beneath these

features are Elkhorn sandy loam. With the exception of a small, planted strip along the edge of McAllister way, there is very little vegetation south of the CDFG facility. A small retention pond is located at the southeast corner of the CDFG 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 Younger Lagoon Reserve.

Runoff from the west side of the CDFG 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 CDFG building are routed to the small retention pond via a series of small drain inlets between the CDFG building and McAllister Way. The Avian Facility drains by overland flow through swales in Basin 8, where it discharges into Younger Lagoon Reserve. Wetland W6 is located in the northern portion of Basin 7 north of the CDFG facility.

Existing Erosion Problems

Drainage discharge in Basin 7 was free of significant erosion problems at the time of CLRDP certification.

Fig. B.12 CDFG Swale

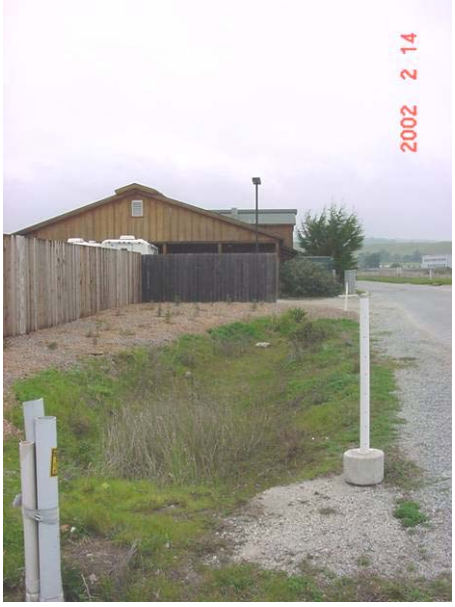


Fig. B.13 CDFG Retention Pond

Fig. B.14 Southern Section of Basin 7 from McAllister Way

Basin 8

General Description

Basin 8 is located directly south of Basin 7 and covers 2.96 acres with a 2 percent slope (see Figure B-1). The basin is partially developed with an assortment of greenhouses (some without roofs and/or abandoned) and other small buildings, including a portion of the Avian Facility. This basin is a primary discharge point for stormwater from the Marine Science Campus flowing into Younger Lagoon Reserve.

Hydrologic Condition

The soil in this basin is Elkhorn sandy loam. There is sparse vegetation around the greenhouses and other buildings. Overall, cover conditions are fair.

There are three discharge points into Younger Lagoon Reserve in Basin 8. 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 located 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 Younger Lagoon Reserve. The third discharge point is an 18" reinforced concrete pipe that discharges into a gully leading to the Lagoon.

Drainage from the western portion of this basin flows to the first discharge point described above. Drainage from eastern portion of this basin flows to the second discharge point. Drainage from the southern portion of this basin flows to the third discharge point. Wetland W11 is located in Basin 8 adjacent to the eastern boundary of YLR.

Pre-CLRDP Erosion Problems

Each of the existing discharge points to Younger Lagoon Reserve in Basin 8 requires some level of attention at the time of CLRDP certification. 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. Nonetheless, this area should be monitored to ensure stability.

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 will 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 erosion and deposition problems in and adjacent to Younger Lagoon Reserve. The existing gully and deposits appear to have been created in large part before development of the Marine Science Campus. This problem requires immediate attention.

Fig. B.15 Basin 8 Viewed from the South

Basin 9

General Description

Basin 9 is a 6.4-acre area that contains the original Long Marine Lab, Ocean Health, and Seymour Center facilities (see Figure B-1). 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 Younger Lagoon Reserve. 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.

Hydrologic Condition

Basin 9 is situated on top of Watsonville loam soils. This basin does not discharge directly to surface waters, but instead discharges to the seawater system discharge via a Stormceptor™ unit located below the old Long Marine Lab buildings. A small detention pond located 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 has adequate capacity for the existing flows (seawater and stormwater), but has limited extra flow capacity.

Pre-CLRDP Erosion Problems

Drainage discharge in Basin 9 is free of significant erosion problems.

Fig. B.16 View of Basin 9 from McAllister Way

Basins 10 and 11

General Description

These two basins are located on the southern end of the site and cover 4.0 and 4.7 acres respectively (see Figure B-1). Basin 10 is bounded by Basin 9 on the west, Basin 6 on the north, Basin 11 on the east, and the coastal cliff on the south. The east side of Basin 11 is located along the De Anza Mobile Home Park wall, with the west side along the eastern boundaries of Basins 6 and 10. A small section of coastal bluff makes up the southern end of this basin. In both basins, the slope increases from 1 percent to 2 percent approximately 300 feet from the coastal bluff.

Hydrologic Conditions

The soil in these basins is Watsonville loam and with 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. Wetlands W10 and W12 are located in Basin 11 adjacent to the eastern property boundary of the Campus.

Pre-CLRDP Erosion Problems

Drainage from Basins 10 and 11 cause minor erosion and gullying at various points over the cliff.

Fig. B.17 View of Basins 10 and 11 from trail along coastal bluff

B.3.2 Pre-CLRDP Runoff Peak Rates and Volumes

For the purposes of identifying runoff rates and volumes for drainage basins, all undeveloped (at the time of CLRDP certification) drainage basins (Basins 1 through 4, 6, 10, and 11) were assigned a runoff coefficient (C Factor) of 0.15 (i.e., grassland state). In addition, Basins 7 and 8 were assigned a C Factor of 0.15 to mitigate for the increased flow rates caused by the current level of development in these basins. Basins 7 and 8 contain the CDFG and Avian facilities, and the leased greenhouses.

Drainage basins that were largely developed (Basins 5 and 9) at the time of CLRDP certification were assigned a C Factor of 0.70 (i.e., commercial/light industrial development state). Basin 5 contains the NOAA Fisheries facility, which is a federal in-holding not directly subject to the Marine Science Campus CLRDP. Nonetheless, the ultimate design of the outfall that serves NOAA, which is located in Basin 8, will need to be able to handle the anticipated flows from this basin. Finally, Basin 9 contains the Long Marine Laboratory facilities, including the Seymour Marine Discovery Center.

Storm Event Assumptions and Methodology

Peak flow rates and volumes for pre-CLRDP conditions in each basin were calculated for the 25-year return storm event. These events represent storms with a probability of occurrence in any single year of 4 to 50 percent. As such, they provide a reasonable assessment of basin runoff hydrology during both frequent and infrequent storm events.

To determine the peak and total runoff for each basin, the Rational Method was selected, since it is a straightforward technique and is suitable for the size of the campus site. The Rational Method requires four parameters to determine runoff rates: area, time of concentration, rainfall intensity and a runoff coefficient. Basin areas were determined using CAD drawings of the basins. To determine the rainfall intensity for the design storms, Santa Cruz County intensity duration frequency (IDF) curves were utilized (IDF data is included in Figure B.23). Time of

concentration data for each basin was determined using the SCS TR20 Lag method. The runoff coefficients for the pre-CLRDP development conditions were based on commonly accepted values for the specified conditions. Critical parameters for each basin are summarized in Figure B.18 below.

Fig. B.18 Summary of Critical Parameters by Basin

Basin	*Area (acres)*	*Basin Slope (percent)*	*C factor*
1	7.70	1.3	0.15
2	8.17	1.3	0.15
3	2.89	0.5	0.15
4	17.87	1.0	0.15
5	1.88	2.0	0.7
6	7.72	2.0	0.15
7	2.41	0.5	0.15
8	2.96	2.0	0.15
9	6.40	2.0	0.7
10	4.00	1.0	0.15
11	4.67	1.0	0.15

Source: Ketley and Associates

Peak Flow Rates and Total Runoff Calculations

Figure B.19 below summarizes pre-CLRDP peak and total flows by basin for the 25-year storm event.

Fig. B.19 Estimated Pre-CLRDP Peak and Total Flows by Basin

	25-Year Event	
Basin	*Peak (CFS)*	*Total (CF 24 Hrs)*
1	1.66	25,946
2	1.13	27,530
3	0.43	9,738
4	2.48	60,215
5	3.05	29,563
6	1.68	26,283
7	0.72	8,121
8	1.03	8,121
9	7.57	73,322
10	0.68	13,478
11	0.72	15,736

Source: Ketley and Associates

B.4 Post-CLRDP Development Runoff Design Parameters

The purpose of this section is to identify required components of all Campus drainage systems, including a subset of drainage improvement projects that need to occur separate from other CLRDP development. This information will be used to guide the development of future project-specific drainage improvement plans. There are three overlapping general objectives that form the basis for the development of such Campus drainage systems: 1) maintaining peak and clean runoff (i.e., in compliance with CLRDP water quality standards) flows to important water bodies (such as Younger Lagoon and the terrace wetlands), 2) maintaining natural infiltration to the maximum extent possible, and 3) meeting CLRDP identified water quality standards. Each of these objectives is discussed individually in the following subsections. Together, the end result are CLRDP prescriptions for development of a comprehensive BMP treatment train system design for the Campus that accommodates all three objectives, and the parameters for a subset of necessary Campus drainage improvement projects.

B.4.1 Designing to Maintain Peak Stormwater Flows

Post-CLRDP peak stormwater flows shall be maintained at pre-CLRDP levels up to the 25-year storm event to the maximum extent feasible, provided accommodating such flows does not result in inappropriate drainage system design that may conflict with other CLRDP provisions (e.g., protecting open spaces, protecting public views, etc.). Approaches to achieve such flow attenuation include maximizing infiltration (both in site layout and in BMP design), maximizing pervious areas (including through the use of porous pavements and the like), and manipulating stormwater release rates (e.g., V-notch weirs or outlets in series at stormwater basin discharges).

B.4.2 Designing to Maintain Water Quality Protection

The protection of water quality and those resources dependant on clean water are regulated by a number of agencies including the California Environmental Protection Agency through the State Water Resources Control Board (SWRCB) and the Resources Agency through the Coastal Commission (CCC) and Department of Fish and Game (CDFG). These agencies have developed California's Management Measures for Polluted Runoff (CMMPR). These documents list a series of technology based management measures that were originally identified in the Section 6217 (g) ("g guidance") of the Coastal Zone Act Reauthorization Amendments (CZARA). In addition, the State Regional Water Quality Control Boards (RWQCB) have developed Basin Plans that identify specific water quality objectives and standards that apply; for the Marine Science Campus, the Central Coast Basin Plan includes operative guidance in this respect.

Sizing Drainage System Components for 85th Percentile Storm Events

The Marine Science Campus drainage concept plan has been designed to meet the New Development Management Measures set forth in the CMMPR, the g guidance (4-12) parameters, and the Basin Plan objectives, and to filter and treat the amount of runoff from irrigation and from each and every storm and/or precipitation event up to and including the 85th percentile, 24-hour storm event (for volume-based BMPs) and the 85th percentile, 1-hour storm event (for flow-based BMPs). For the Santa Cruz Area, the 85th percentile storm is as follows:

- 85th percentile, 24-hour storm event: 24-hour depth of 0.95 inches
- 85th percentile, 1-hour storm event: Hourly precipitation of 0.17 inches per hour

All vegetated stormwater basins and other drainage system components shall be sized and designed to provide filtration and treatment of flows up to and including these 85th percentile storm requirements.

Source Control BMPs

The control of pollutants in runoff is achieved through a variety of systems commonly referred to as best management practices (BMPs). BMPs come in two main formats: Source Control BMPs that eliminate or reduce pollutants at the source and Treatment BMPs that remove pollutants from runoff by physical and/or biological processes.

The first, and oftentimes most effective, controls for limiting the pollution of drainage and stormwater runoff are the source control BMPs (also called pollution prevention BMPs). These BMPs typically involve four approaches:

- Modifying practices to limit the generation of potential pollutants.
- Elimination of pollutants by substituting nonpolluting chemicals or products or altering product use.

- Reducing the quantity and/or toxicity of pollutants generated by production processes through source reduction, waste minimization, and process modifications.

- Recycling of waste materials.

Six primary source control BMPs are prescribed by this drainage concept plan for the Marine Science Campus. These six BMPs shall be required as part of all development projects undertaken pursuant to the CLRDP and shall apply to both individual projects as well as to the Marine Science Campus as a whole. Individual project review may require that additional and/or more protective source control BMPs be applied to individual projects and project sites and/or the Campus. The six required source control BMPs are:

- Providing for appropriate storage and use of commercial and household hazardous chemicals (such as lubricants, pesticides, solvents, acids, alkalis and paints), and providing information on less-toxic alternatives.

- Providing convenient locations for recycling/disposal of commercial and household hazardous wastes, and ensuring all such wastes are recycled/disposed of.

- Controlling litter, dust/dirt, and other potential pollutants through monthly sweeping of roads, parking lots, and other paved surfaces using regenerative-air sweepers.

- Landscaping using native plants with low nutrient, water, and pesticide/rodenticide requirements (see also Resource Management Plan).

- Providing comprehensive recycling and yard waste programs, and ensuring full use of them.

- Providing water quality education (including materials and presentations) to all Campus users and visitors regarding the nature of urban runoff pollutants and means of limiting generation of same.

Source control BMPs can provide significant runoff water quality enhancement. However, given the ecological importance of receiving waters on and adjacent to the site, further stormwater controls have been selected for the Marine Campus Site. These additional pollutant controls are provided by a series of carefully selected and designed treatment BMPs.

Treatment BMPs

Six primary treatment BMPs are prescribed by this drainage concept plan for the Marine Science Campus. These six BMPs shall be required as part of all development projects undertaken pursuant to the CLRDP and shall apply to both individual projects as well as to the Marine Science Campus as a whole as applicable. These BMPs are intended to be used in series as a treatment train, but they can be used alone or in a combination that only includes a subset of the six provided water quality is protected as required in this drainage concept plan and the CLRDP as a whole and depending on

what is appropriate in any particular project (for example, where limited space makes it infeasible to accommodate BMPs in series, where drainage system volume requirements may compromise site resources, etc.). That said, each of the six treatment BMPS shall be included in each project unless a subset of them and/or a substitution (of an equally effective BMP) for one or more of them would provide equal or better water quality and other resource protection. Individual project review may require that additional and/or more protective treatment BMPs be applied to individual projects and project sites and/or the Campus. The six required treatment BMPs, generally in treatment train order, are:

- Outlets plumbed to the sanitary sewer system in contained areas subject to maintenance and servicing of heavy equipment and food service washdown, and covering of such areas;
- Containment and engineered stormwater treatment systems for parking lots, maintenance areas, laydown areas and other areas subject to vehicular-type pollutant generation;
- Oil and grease traps (e.g., for food service areas);
- Vegetated filter strips;
- Vegetated swales; and
- Vegetated stormwater basins.

By using these BMPs outlined above in a multi-component treatment system the pollutant removal performance of the drainage system should be able to meet the requirements of the CMMPR, the g guidance, the Central Coast Basin Plan, and this CLRDP, including the objectives of this drainage concept plan.

Vegetated filter strips, swales, and stormwater basins shall be designed to appear as natural as possible through the use of undulating, non-linear edges, contours, and other design elements (including screening and other vegetation at their perimeters) that help the feature fit with the surrounding landscape. Any check dams used to control the release of stormwater and/or to enhance its residence time in the treatment train shall be soil berms and/or made of natural materials (e.g., woody debris) or semi-natural materials and made to appear as natural as possible. Design elements that do not appear natural shall not be used. Low Impact Development (LID) BMP strategies and techniques shall be used in all system design (e.g., maximizing infiltration in BMP design, reducing the hydraulic connectivity of impervious surfaces, etc.). The non-forebay portions of the vegetated stormwater basins may be sited in or outside of development zones. All other drainage system components, including the forebays of the vegetated basins, must be sited within campus development zones. Any vegetated stormwater basins located outside of development zones shall be: otherwise consistent with the requirements of the CLRDP, including Chapter 5; sited and designed to minimize resource impacts; limited to the maximum degree possible; and limited to areas

designated Open Space on Figure 5.2 (in CLRDP Chapter 5) except in two instances (described in the "Vegetated Stormwater Basin" section below).

Vegetated Filter Strips

The first "natural" BMP in the campus drainage treatment system is the vegetated filter strip. A vegetated filter strip is a linear section of vegetated land (usually over 10 feet wide) with a porous soil foundation (e.g., oftentimes introduced sandy soils) that is placed parallel to a developed site and is designed mainly to treat sheet flows. Runoff flows (as sheet flow) onto the filter strip where the vegetative cover and porous soils reduce flow velocities and remove particulate contaminants through filtration and settling. Infiltration will recharge the shallow groundwater table and thereby benefit the base water flows of the site's wetlands.

The filter strips shall be seeded with an appropriate native grass species that shall be planted over porous soil areas designed to optimize the permeability and filtration potential of the strips. In some cases, soil manipulation and amendment may be necessary to achieve adequate porosity. The native grasses are typically dormant during the dry summer months and may not have sufficient vegetative growth (for sediment capture) by the beginning of the wet season. The filter strips shall be irrigated in early September, in order to ensure the grass is in a healthy condition prior to the first winter storm events.

Several methods for sizing vegetated filter strips have been described (Horner, 1988; FHWA 1989; IEP, 1991; Tollner et al, 1976). The California Stormwater Handbook (SWQTF 1993) design guidelines recommend a filter strip size of 1,000 sq. ft./acre for the Monterey Bay area. Research in western Washington State (Metro 1992) found that vegetated filter strips (using the Horner specifications) remove 80 percent of suspended solids and 50 percent of soluble zinc. For the purposes of CLRDP vegetated filter strip sizing, the 85th percentile, one-hour storm event shall be used.

Vegetated Swales

Vegetated swales are grass-lined channels designed to convey and filter/treat stormwater and other runoff. In addition to native grass, these swales oftentimes are planted with hydrophytic species that can provide additional treatment depending on design residence times. They are similar in shape and conveyance function to typical concrete/asphalt swales, but are generally somewhat wider and much shallower. Similar to filter strips, ensuring adequate permeability in the soil beds to enhance filtration is often necessary. The grass, other vegetation, and porous soils provide two important benefits – reduction in flow velocities and pollutant removal. Runoff velocities are reduced because the water has to travel through dense vegetative cover. Pollutant removal is by filtration of particulates through the grass and soil, by infiltration of soluble nutrients into the soil, and by biological treatment and fixing of pollutants by plant species that can improve particulate settling and uptake of dissolved contaminants (see, for example, species identified in Attachment B.1). The grass swales shall, at a minimum, be seeded with appropriate native grass species to increase the ecological and water quality value of these areas, and shall include hydrophytes as appropriate and feasible depending on expected residence times and associated hydrophytic plant viability factors. Soil beds beneath swales shall be manipulated/amended as necessary and feasible to maximize the permeability

and filtration potential of the swales. The swales shall also include ponding features where appropriate. As with the vegetated filter strips, the vegetated swales shall be irrigated in early September, to ensure sufficient vegetative growth by the beginning of the wet season.

The California Stormwater Handbook recommends the Horner method (Horner, 1988) for sizing swales for use in California. The primary criteria for this method are a two-year design storm and a grass height of 10 cm. Swale width is calculated using Manning's equation and a 2-year return storm. Swale depth is calculated using Manning's equation and a 100-year return storm. 85th percentile storm event sizing (described earlier) is also valid at the Campus. Thus, CLRDP swales are to be sized to meet both the Horner method and the 85th percentile storm method (one-hour storm for conveyance and 24 hour storm for ponding features) requirements.

Pollutant removal in swales is a function of storm water residence time and the extent of the soil/vegetation surfaces. Swale pollutant removal performance has generally been assessed for roadside ditches, which are much narrower than treatment swales. The California Stormwater Handbook suggests that pollutant removal performance in treatment swales is similar to that provided by vegetated filter strips (removal of 80 percent of suspended solids and 50 percent of soluble zinc). The g guidance indicates that swale total suspended solid (TSS) removal performance is in the 20 percent-40 percent range.

For the Marine Science Campus, providing check dams could enhance residence time in the swales. These check dams allow the ponding of runoff water, which reduces water velocity and improves the sedimentation of particulates. Using wide shallow swales maximizes the soil/vegetation surface area. With a greater surface area, the natural physical and chemical soil processes that remove pollutants are enhanced. By planting plant species capable of biological treatment, further water quality enhancement is possible (again, see Attachment B-1). Check dams shall be required within CLRDP swales as necessary to support appropriate ponding features. Check dams shall not exceed 18 inches in design depth.

Vegetated Stormwater Basins

Vegetated stormwater basins are designed to detain water for a short period of time between storms. In between storm events, those pollutants in water that remains in the detention areas are removed or reduced by infiltration, settling, and biological processes. The residence time of water in the detention area of each specific vegetated stormwater basin will be dependant on ground water elevations, soil saturation and infiltration rates. Vegetated stormwater basins located on Elkhorn sandy loam soils will tend to hold standing water for only a limited time (16-24 hours) and thus act primarily as infiltration basins due to the drainage characteristics of that soil. Elkhorn sandy loam is found in the southeast quadrant of the upper terrace and across most of the middle terrace. The northwest quadrant of the upper terrace and most of the lower terrace is underlain by Watsonville loam soils, which drain more slowly than the Elkhorn sandy loams. Following storm events, these soils tend to saturate at a depth of 8 inches below the current ground surface (PC Terry Huffman). This soil saturation and the slower drainage characteristics of the Watsonville loam will help detain water in the vegetated stormwater basins for several days following storm events. However, given the limited depths of the proposed vegetated basins, such ponding is unlikely to exist for more than

10 days following the last storm event. Since most significant storm events in this area occur from October through April, all of the vegetated stormwater basins on the campus will most likely be dry by May.

Runoff shall be directed to Campus vegetated stormwater basins through the aforementioned vegetated swales and filter strips. As with vegetated stormwater basin location, the position and alignment of these swales/strips is primarily dependent on site design and will be finalized as site-specific drainage plans are finalized.

The accepted vegetated stormwater basin design methodology for California is described in the California Stormwater Handbook. In conformance with the g guidance, the sizing of CLRDP vegetated stormwater basin shall be based on the California Stormwater Handbook and the 85th percentile storm, 24-hour event requirements. Roughly 15 percent of every vegetated stormwater basin shall be designed and designated to serve as a pretreatment forebay, within which the heaviest loads of sediment will be deposited and in which the most active maintenance is envisioned. The forebay area shall be distinguished from the remainder of the vegetated stormwater basin (through such measures as differential basin elevations, berming/lateral sills, etc.). In some cases, the forebay area may actually be made up of multiple smaller forebays in series along the perimeter of any stormwater basin. Vegetated stormwater basins shall include outlet structures designed to attenuate discharge and to look as natural as possible. The vegetated stormwater basins will be vegetated with native grass species and shall include hydrophytes as appropriate and feasible depending on expected residence times and associated hydrophytic plant viability factors (see Attachment B.1).

Vegetated stormwater basins will require a combination of grading and berming in order to provide sufficient treatment volume (see Figure B.25 for an illustrative diagram of a typical vegetated stormwater basin). Such new landform alteration will have an impact on the Campus viewshed and other site resources, and every effort shall be made to ensure that these facilities blend as seamlessly as possible into the Campus design and open space aesthetic. Vegetated stormwater basins shall be created by constructing low-profile natural berms to enclose a land area within which non-native and invasive plant species shall be removed and native grasses and other suitable native vegetation capable of enhancing water quality shall be planted consistent with the Resource Management Plan (CLRDP Appendix A). Any portions of such vegetated stormwater basins that are located outside of development zones shall be considered an integral part of the natural open space area within which restoration and management shall apply pursuant to the Resource Management Plan (CLRDP Appendix A), and within which other development is prohibited. The natural berms to be used to create the enclosed areas within the vegetated stormwater basin areas shall be no higher than 18 inches from natural grade and shall be no steeper than a three to one grade. Grading within basins shall be limited as necessary to protect aesthetics and natural area resources, while also providing for proper vegetated stormwater basin function. The berms shall include natural spillway areas designed to accommodate the release of detained runoff that exceeds the maximum capacity of the vegetated stormwater basins in a non-erosive manner. The campus stormwater basin concept has been designed to meet two specific criteria:

- Capturing and treating the 85th percentile storm event.

- Providing sufficient detention to maintain post-development flows at pre-development levels for all storms up to and including the 25-year return event.

The requirement to capture and treat the 85th percentile storm is to ensure the water quality of all stormwater discharges. The requirement that flows be kept at pre-development levels is to ensure that all downstream ecosystems continue to receive natural flows and volumes of stormwater.

Filtered and treated discharge from the vegetated stormwater basins shall be directed to Younger Lagoon and terrace wetlands in a manner that is most protective of and least intrusive to these resources. Typically this shall be accomplished by ensuring that vegetated stormwater basins discharge outside of wetland and wetland buffer areas, and the discharged water is allowed to make its way as it will within the buffer and to the wetland area as topography and vegetation dictates in order to approximate natural conditions as much as possible. To protect against erosion and/or other problems, particularly in larger storm events, discharge from vegetated stormwater basins may be directed to a vegetated swale/strip (also outside of the wetland buffers) that serves to dissipate and redirect runoff toward the buffers as attenuated sheet-type flow. The goal with such discharge means is to limit artificial manipulation of discharge to the maximum extent feasible, and to allow discharge to flow across the site as much as possible as it would have naturally absent development. Energy dissipation methods shall be used as necessary at vegetated stormwater basin outlets.

This typical vegetated stormwater basin discharge arrangement described above that disallows drainage system elements in designated Resource Protection and Resource Protection Buffer areas may not be possible for vegetated stormwater basin flows at two Campus locations. The first is in the Upper Terrace development zone where a portion of the vegetated stormwater basin itself may need to be located within the Resource Protection Buffer area and outside of the development zone. In the case it proves infeasible to locate vegetated stormwater basins outside the buffers in this Upper Terrace zone and still provide for the above-described typical drainage arrangement (see also CLRDP Chapter 5 in this respect), the same attenuated sheet flow regime shall be provided within the buffer in a manner that is least disruptive to resources. At a minimum, the basin's forebay area shall be located entirely inside the development zone and drainage components in the Resource Protection Buffer area limited; all drainage system components are prohibited in the designated Resource Protection area itself. The second location is in the northwest portion of the Middle Terrace development zone where the Campus access street is to be abandoned. In this area, the roadway elevation is going to be maintained. As a result, drainage from vegetated stormwater basins in this area can still be directed to wetland buffers areas as described, but such drainage may require a means for it to be directed from the east side of the abandoned roadbed to the west to allow adequate drainage and directing of filtered/treated waters to beneficial uses. In such an event, again the least disruptive means of conveying the drainage shall be used.

In addition, where vegetated stormwater basin drainage is directed to existing drainage discharge points, such as potentially in the southwest portion of the Middle Terrace development zone, the above-described typical drainage arrangement may not apply. In such cases, existing discharge points and related elements shall be upgraded as necessary to ensure that the new flows when coupled with

existing flows are directed to the wetland resources in the manner that is most protective of and least intrusive to Campus wetlands, including accounting for adequate flow energy dissipation.

The pollutant removal performance of vegetated stormwater basins has been studied by several agencies (e.g., Lower Colorado River Authority 1997, State of Maryland 1986, US EPA 2000, etc.). The identified pollutant removal performance of vegetated stormwater basins (for sediments, nutrients and metals) varies. For example, sediment removal efficiency in vegetated stormwater basins is a primarily a function of the volume of the basin relative to the volume of the runoff. The California Stormwater Handbook sizing methodology has been used to achieve 80 percent TSS removal rates for the design storm. The National Pollutant Removal Performance Database (US EPA 2000) reports a median removal rate of 80 percent. Metals removal in basins is by sedimentation (non-dissolved forms). The National Pollutant Removal Performance Database reports the median removal rates of 58 percent for Copper and 65 percent for Zinc. Similar removal rates have been reported for basin systems in Colorado (Article 72 Center For Watershed Protection). The Colorado basin removal rates are 57 percent for copper and 66 percent for zinc.

Engineered Stormwater Treatment Systems

Additional treatment will be provided for parking lots, outdoor maintenance and laydown areas, and other areas subject vehicular-type pollutant generation through the installation of engineered treatment systems. These devices are designed to capture oil and other contaminants that may leak from parked vehicles or spill on the ground during maintenance or equipment preparation activities. These devices will then discharge treated runoff into the above-described vegetated swale, strip, and basin system. There are a number of these engineered treatment devices on the market, with varying levels of efficiency and reliability. Device selection criteria should be based on the unit with the highest capture efficiency for hydrocarbons and other expected pollutant types depending on the activities and equipment upstream of the system. Currently available examples of engineered stormwater treatment system units include those produced by Vortechnics, Stormceptor, AquaSheild, CDS Technologies, StormTreat Systems Inc., Stormwater Management Inc., and a host of other companies in this ever-expanding field. Devices can range from fairly simple hydrocarbon collection and detention systems to elaborate high-end systems that allow for the addition of different media designed to address targeted constituent elements (e.g., Stormwater Management Inc.'s StormFilter system), and even systems that approximate stormwater treatment wetlands within the system (e.g., StormTreat Systems Inc.'s StormTreat). The systems used in any circumstance shall be chosen to address the constituent pollutants expected, and in light of the other elements of the treatment train that will be applied and their ability to address CLRDP required water quality treatment and filtration in tandem with the system chosen.

Where elements of the CLRDP required BMP treatment train are omitted due to infeasibility or other design issues, engineered systems designed to achieve the same levels of water quality treatment are likely to be necessary for a project to be able to meet CLRDP water quality standards. A high-end engineered treatment system can provide similar water quality treatment ability in a much smaller footprint, oftentimes mostly or completely below ground. To achieve similar water quality benefits, however, such high-end systems must typically incorporate enhanced filtration and treatment options such as media canisters, mini-wetlands, and their equivalent.

B.4.3 Designing to Maintain Groundwater Recharge to the Maximum Extent Practicable

As described in the preceding sections, the approach to runoff management envisioned by this Drainage Concept Plan is heavily reliant on natural-based systems, such as vegetated stormwater basins, swales, and filter strips. Unlike conventional drainage systems that use concrete pipes and impermeable detention vaults, the natural systems envisioned for the Marine Science Campus provide opportunities for runoff to infiltrate the ground and replenish groundwater supplies along the entire runoff transport route. In this way, the natural groundwater system that currently exists on the site can be maintained to the maximum extent practicable. The treatment train shall be sited and designed in such a way as to maximize infiltration of runoff to the maximum extent feasible.

B.4.4 Specific Drainage Improvement Projects

Three drainage improvement projects are to be undertaken on the Campus independent of any specific building projects. These improvement projects respond to the previously detailed Campus drainage problems described in the pre-CLRDP condition section, and they are summarized as follows:

- The 24-inch corrugated metal drainage pipe that discharges from wetland W4 into the De Anza Mobile Home Park shall be repaired and/or replaced in a manner designed to enhance wetland W4 habitat and hydrology, and designed to blend as seamlessly into the site aesthetic as possible, including provisions so that it is not visible from public viewing areas to the maximum extent possible.

- The stormwater outfall directing discharge toward Younger Lagoon Reserve in the southwestern most portion of Basin 8 (across from the NOAA Fisheries facility) shall be improved. An example of such possible improvement would be hand-excavating the shallow soil off of the bedrock out of the existing channel down the slope, reinforcing the edges of the channel with hand-placed rock, and stabilizing the existing drift logs and rock at the bottom of the slope which act as natural energy dissipaters.

- The percolation trench and berm directing discharge toward Younger Lagoon Reserve (and located to the northwest of the stormwater outfall in Basin 8) shall be improved in the short term (e.g. by reinforcing the existing berm, cleaning up the top of the existing percolation trench, and adding a small detention pond feature at the head of the percolation trench). In the longer term, this discharge point may be considered for combination with the discharge to YLR described above, or replaced with an equivalent natural system.

All projects identified above except for the project involving wetland W4 shall be sited and designed in a manner designed to enhance habitat values in Younger Lagoon Reserve and its buffer, including restoration of areas in the Reserve or the buffer area damaged by past stormwater discharge. The improvement/replacement projects shall be designed and sized to accommodate non-disruptive flows into the Reserve for at least the 100-year storm event. All project related development shall be made to blend as seamlessly into the site aesthetic as possible, including provisions so that it is not

visible from public viewing areas to the maximum extent possible. Finally, all projects above may be eliminated, modified, or replaced with equivalent or better projects as necessary to maximize wetland and other natural area function and value and to be consistent with the terms and conditions of any original coastal development permit authorizations.

B.5 Phasing of Drainage System Development

The purpose of this section is to discuss phasing of drainage improvements on the Marine Science Campus. With regard to the final design and construction of stormwater basins, these facilities are to be installed as needed to serve development in the zone under construction. During construction, the basins can serve as sediment capture ponds, as required by the State's Stormwater NPDES construction permit. At the completion of construction activities, the basins shall be cleaned, vegetated and have the necessary outlet devices installed to meet post-development flow control and water quality requirements. Likewise, the vegetated filter strips and vegetated swales discussed in this plan may be installed in conjunction with construction of specific buildings. The improvements identified above that are not tied to specific development projects shall be implemented as set forth in Chapter 9, Capital Improvement Program. Drainage improvements in any development zone shall be done in advance of development in that zone if such development would contribute to the mitigation of impacts from development in other zones.

B.6 Drainage Monitoring and Maintenance Program

The purpose of this section is to outline monitoring and maintenance activities and requirements for CLRDP source control and treatment BMPs.

B.6.1 Monitoring Source Control BMPs

The University shall undertake an annual assessment of source control BMPs on the Campus to verify that CLRDP prescribed source control BMPs are being applied on Campus, that they are being applied effectively (including to what extent minimum performance standards are met), to identify means to more effectively implement existing source control BMPs (including what measures are necessary to meet minimum performance criteria), and to identify additional source control BMP measures to ensure overall water quality measures are achieved. At a minimum, such annual evaluation shall include assessment of the Campus systems in place that provide for the following subject to the minimum performance standards to be achieved:

- That the Campus is providing adequate and convenient means for the recycling/disposal of commercial and household hazardous wastes. The performance standard to be achieved is that all commercial and household hazardous wastes that can be recycled are being recycled, and that all such wastes that cannot be recycled are being properly disposed of.

- That less toxic alternatives to commercial and household hazardous chemicals (such as lubricants, pesticides, solvents, acids, alkalis and paints) are being used where possible, and that all such chemicals are appropriately stored and sparingly used. The performance standard to be achieved is that all commercial and household hazardous chemicals are stored in a manner designed to contain all spills, that information on less-toxic alternatives has been provided to

potential Campus users, and that chemicals are used sparingly, per their intended application, and in a manner designed to minimize the potential for such chemicals to be applied outside target application areas.

- That all roads, parking lots, and other paved surfaces are being vacuum swept with a regenerative-air sweeper designed to control litter, dust, dirt, and other potential pollutants to the maximum extent feasible. The performance standard to be achieved is that all paved surfaces are vacuum swept at least one time per month and that all regenerative-air sweepers used are maintained in good working order per the manufacture's recommendations.

- That all landscaping uses native plants with low nutrient, water, and pesticide/rodenticide requirements. The performance standard to be achieved is that all Campus landscaping meets this criterion.

- That the University is providing Marine Science Campus users with convenient recycling and yard waste programs, and that Campus users are fully utilizing the University's recycling and yard waste programs. The performance standard to be achieved is that 100 percent of recyclable materials are recycled and that 100 percent of yard wastes are mulched/reused.

- That Campus users are educated regarding the nature of urban runoff pollutants and means of limiting pollutant generation. The performance standard to be achieved is that the University has developed a water quality and runoff educational program (including educational hand-outs and other materials), that that program meets current professional standards for such education programs, and that the University has provided educational materials and other educational programs (i.e., presentations, videos, etc.) to each Campus user (UCSC, Campus-affiliates, visitors, other site users, etc.).

All source control monitoring and related information shall be included as part of an annual water quality monitoring report (see below).

B.6.2 Monitoring and Maintenance for Treatment BMPs

Objectives

The objective of maintenance and water quality monitoring associated with treatment BMPs is to ensure that the integrity of the drainage system is maintained, to verify that the treatment train system is improving the quality of the water draining from the site, and to ensure that stormwater and other runoff and drainage has been adequately filtered and treated to meet CLRDP water quality objectives. The University's concept plan for monitoring treatment BMPs is two fold. First, the University will undertake a short-term monitoring program for research purposes that involves extensive testing of and reporting on the effectiveness of treatment BMPs under Central California's climatic conditions. Second, the University will undertake a long-term, compliance-oriented monitoring program that involves focused testing and reporting on the University's compliance with the CLRDP's water quality requirements. Treatment BMPs shall be repaired as necessary to

maintain the system in its design state, shall be regularly evaluated, and shall be modified: (1) if the outlet concentrations for monitored parameters are higher than the inlet concentrations; and/or (2) if the minimum acceptable water quality parameters are exceeded.

Short-Term Monitoring of Treatment BMPs for Research Purposes

There is a limited amount of data currently available regarding the performance of stormwater BMP's in the State of California. As such, most state and local agencies are asked to select or approve BMP's based on data developed in other states, where climatic conditions are often different from those in California. The installation of several different BMP's on the campus provides an ideal opportunity for performance testing of these systems under California's climatic conditions. Data generated from these studies could be used to help refine the design and selection of BMP's for use in California.

Stormwater and other runoff tends to be highly variable in nature, with significant fluctuations in pollutant loads and flow rates. As such, simple monitoring programs that don't take these factors into account can lead to erroneous conclusions regarding BMP efficiencies. To effectively assess the performance of those BMP's installed on the campus, it will be necessary to conduct a multi-year sampling program. The research-monitoring program described below should provide ample data on BMP performance under California's climatic conditions.

As each of the campus BMP treatment trains is constructed, it shall be subject to three years of research monitoring. During this three year period, water quality testing shall occur at least three times each year during storm events that are projected to exceed 0.5 inch of total precipitation. A rain gauge (e.g., a tipping bucket or comparable unit) shall be set up at the site to provide data on the actual precipitation (intensity and total precipitation) from each monitored storm event. During testing events, samples shall be collected from the treatment train's final discharge point and from a representative initial input point located at the "upstream" end of that treatment train; such points to be identified at the time of initial BMP treatment train development and/or when new inputs are directed to existing treatment trains. The purpose of this upstream and downstream monitoring is to provide data on pollutant removal across the entire BMP system.

Both time-composited samples and grab samples will be used, and different parameters analyzed for each as described below. Time-composited samples shall be collected with an automated sampler that has been pre-cleaned to allow accurate detection to at least the lowest detection limits specified. At least 16 individual samples will be collected to form each composited sample. The minimum parameters to be analyzed by time composited sampling are listed below.

- Settleable solids
- Total suspended solids
- Hardness
- Total organic carbon
- Total phosphorous
- Ortho-phosphate
- Inorganic nitrogen

- Nitrate
- Nitrite
- Ammonia nitrogen
- Copper (detection limit of 1 microgram/liter)
- Lead (detection limit of 1 microgram/liter)
- Zinc (detection limit of 1 microgram/liter)

Grab samples shall be collected at first flush, mid-storm, and storm event conclusion. Parameters that will be analyzed by grab sampling are listed below.

- Oil and grease
- TPH (detection limit of 1 nanogram/liter)
- pH
- Conductivity
- Dissolved oxygen
- Temperature
- Turbidity

A comprehensive quality assurance/quality control program shall be included in all sample collection and lab analysis. Photodocumentation of water quality testing parameters (i.e., photos of inlets and outlets, sampling equipment, sampling events, etc.) shall be part of all monitoring and water quality testing.

If any BMP treatment train does not meet all of the short-term water quality performance standards listed below by the end of the three-year research-monitoring period, the research monitoring program shall be extended for another two years for all such BMP treatment trains. This will provide additional time for the university to determine if natural causes, BMP design or source control problems are responsible for failure to meet the criteria. Data from the research-monitoring program will be provided to the California Coastal Commission and Regional Water Quality Control Board on an annual basis.

Performance Standards for Short-Term Research Monitoring

The performance standards for discharges and for each of the monitored parameters are two-fold:

First, final discharge point concentrations for each parameter (other than conductivity, hardness, and temperature – see below) shall be less than initial input point concentrations, unless ecosystem variability is responsible for the increased concentration. The performance standard to be achieved is a net reduction in pollutant loading across the treatment train in compliance with CLRDP water quality standards. If water quality testing indicates that final discharge point concentrations for any

particular parameter are equal to or more than initial input point concentrations, the University shall identify an appropriate means to reduce said concentrations and shall implement all necessary changes prior to the next storm season (i.e., by October 15th of each year). For conductivity, hardness, and temperature, initial input and final discharge point measurements shall not significantly vary from one another.

Second, the following minimum performance standard requirements shall also apply to all outlet discharge waters:

Color: Waters shall be free of coloration that causes nuisance or adversely affects receiving water body uses. Coloration attributable to materials of waste origin shall not be greater than 15 units or 10 percent above natural background color, whichever is greater.
Tastes and Odors: Waters shall not contain taste or odor producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, that cause nuisance, or that adversely affect receiving water body uses.
Floating Material: Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect receiving water body uses.
Suspended Material: Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect receiving water body uses.
Settleable Material: Waters shall not contain settleable material in concentrations that result in deposition of material that causes nuisance or adversely affects receiving water body uses.
Oil and Grease: Waters shall not contain oils, greases, waxes, or other similar materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect receiving water body uses.
Biostimulatory Substances: Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect receiving water body uses.
Sediment: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect receiving water body uses.
Turbidity: Waters shall be free of changes in turbidity that cause nuisance or adversely affect receiving water body uses. Increase in turbidity attributable to controllable water quality factors shall not exceed the following limits: (1) where natural turbidity is between 0 and 50 Jackson Turbidity Units (JTU), increases shall not exceed 20 percent; (2) where natural turbidity is greater than 50 and 100 JTU, increases shall not exceed 10 JTU; and (3) where natural turbidity is greater than 100 JTU, increases shall not exceed 10 percent.
pH: The pH value shall be between 7.0 and 8.5.
Dissolved Oxygen: Dissolved oxygen concentration shall not be reduced below 5.0 mg/l at any time. Median values shall not fall below 85 percent saturation as a result of controllable water quality conditions.
Toxicity: All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in, human, plant, animal, or aquatic life. Compliance with this objective may be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, toxicity bioassays of

appropriate duration, or other appropriate methods. Survival of aquatic life in surface waters subjected to discharge or other controllable water quality conditions shall not be less than that for the same water body in areas unaffected by the discharge.

Ammonia Nitrogen: Ammonia nitrogen concentrations shall not exceed 0.025 mg/l (as N).

Pesticides: No individual pesticide or combination of pesticides shall reach concentrations that adversely affect receiving water body uses. There shall be no increase in pesticide concentrations found in bottom sediments or aquatic life. Total identifiable chlorinated hydrocarbon pesticides shall not be present at concentrations detectable within the accuracy of professional analytical methods.

Other Organics: Waters shall not contain organic substances in concentrations greater than the following:

Methylene Blue Activated Substances	0.2 mg/l
Phenols	0.1 mg/l
PCB's	0.3 mg/l
Phthalate Esters	0.002 mg/l

Radioactivity: Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life; or result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.

Where any of the above performance standards are not met, the University shall identify a means to achieve the required performance standards, and shall implement all necessary changes prior to the next storm season (i.e., by October 15th of each year).

Long-Term, Compliance-Oriented BMP Monitoring

After the initial research-monitoring period (i.e., after three years or after five years, depending on the outcome of short-term monitoring), monitoring for any particular BMP treatment train shall transition to a compliance-oriented, long-term monitoring program. This long-term monitoring shall be conducted as follows:

Visual Observations

Visual observations of discharges from the final discharge point of each BMP treatment train shall occur during at least one storm event per month during the wet season (October 15- May 30). Visual observations are only required of discharges that occur during daylight hours and that are proceeded by at least three working days without discharges. These visual observations shall occur during the first hour of discharge from the BMP treatment train and at all locations. The university shall document the presence of any floating and suspended material, oil and grease, discolorations, turbidity, odor, and source of any pollutants. Records shall be maintained of observations, and response taken to prevent pollutants in discharges.

Sampling and Analysis

Samples shall be collected from the representative initial input point and the final discharge point of each BMP treatment train during the first hour of discharge from: (1) the first storm event of the wet season, and (2) at least one other storm event in the wet season. All BMP treatment trains on

Campus shall be sampled. Discharge sampling shall occur at the time water from the relevant BMP treatment train is released, and shall be preceded by at least three working days without discharge.

The samples shall be analyzed for:

- Total suspended solids (TSS)
- pH
- Conductivity
- Total organic carbon (TOC). Oil and grease (O&G) may be substituted for TOC;
- Problem pollutants and parameters: these include any pollutants identified and/or any parameters analyzed during the research-monitoring phase that did not meet the performance standards for short-term research monitoring by the end of the research monitoring phase. Subsequently, individual problem pollutants and parameters can be dropped from the monitoring program for a BMP treatment train if the performance standards for long term monitoring that apply to that pollutant or parameter are achieved in two consecutive storm seasons.

Performance Standards for Long-Term Monitoring

All samples collected during the long term BMP monitoring program shall comply with the following performance standards:

For TSS, pH, conductivity, TOC (or O&G), and all remaining problem pollutants and parameters (see above): (1) for conductivity, hardness, and temperature, initial input and final discharge point measurements shall not significantly vary from one another; and (2) for all others, final discharge point concentrations for each shall be less than initial input point concentrations.

Color: Waters shall be free of coloration that causes nuisance or adversely affects receiving water body uses. Coloration attributable to materials of waste origin shall not be greater than 15 units or 10 percent above natural background color, whichever is greater.
Tastes and Odors: Waters shall not contain taste or odor producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, that cause nuisance, or that adversely affect receiving water body uses.
Floating Material: Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect receiving water body uses.
Suspended Material: Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect receiving water body uses.
Settleable Material: Waters shall not contain settleable material in concentrations that result in deposition of material that causes nuisance or adversely affects receiving water body uses.

Oil and Grease: Waters shall not contain oils, greases, waxes, or other similar materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect receiving water body uses.
Biostimulatory Substances: Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect receiving water body uses.
Sediment: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect receiving water body uses.
Turbidity: Waters shall be free of changes in turbidity that cause nuisance or adversely affect receiving water body uses. Increase in turbidity attributable to controllable water quality factors shall not exceed the following limits: (1) where natural turbidity is between 0 and 50 Jackson Turbidity Units (JTU), increases shall not exceed 20 percent; (2) where natural turbidity is greater than 50 and 100 JTU, increases shall not exceed 10 JTU; and (3) where natural turbidity is greater than 100 JTU, increases shall not exceed 10 percent.
pH: The pH value shall be between 7.0 and 8.5.
Dissolved Oxygen: Dissolved oxygen concentration shall not be reduced below 5.0 mg/l at any time. Median values shall not fall below 85 percent saturation as a result of controllable water quality conditions.
Toxicity: All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in, human, plant, animal, or aquatic life. Compliance with this objective may be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, toxicity bioassays of appropriate duration, or other appropriate methods. Survival of aquatic life in surface waters subjected to discharge or other controllable water quality conditions shall not be less than that for the same water body in areas unaffected by the discharge.
Ammonia Nitrogen: Ammonia nitrogen concentrations shall not exceed 0.025 mg/l (as N).
Pesticides: No individual pesticide or combination of pesticides shall reach concentrations that adversely affect receiving water body uses. There shall be no increase in pesticide concentrations found in bottom sediments or aquatic life. Total identifiable chlorinated hydrocarbon pesticides shall not be present at concentrations detectable within the accuracy of professional analytical methods.
Other Organics: Waters shall not contain organic substances in concentrations greater than the following:

Methylene Blue Activated Substances	0.2 mg/l
Phenols	0.1 mg/l
PCB's	0.3 mg/l
Phthalate Esters	0.002 mg/l

Radioactivity: Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life; or result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.

Where any of the above performance standards are not met, the University shall identify a means to achieve the required performance standards, and shall implement all necessary changes prior to the next storm season (i.e., by October 15th of each year).

Maintenance of Treatment BMPs

The drainage facilities outlined in this concept plan will require periodic maintenance to maintain their design configuration and performance, to remove trapped materials, and in the case of the vegetated BMPs, excessive and/or inappropriate plant growth. An overview of the minimum maintenance schedule for the Marine Science Campus is provided below. Without adequate maintenance, the volume, filtering capacity and infiltration functions of the stormwater drainage facilities will diminish over time. This will affect their ability to provide flow and water quality control.

Overall System Integrity

All drainage system elements shall be permanently operated and maintained. At a minimum:

- All drainage system components (including engineered systems, filters, filter media, swales, vegetated stormwater basins, etc.) shall be inspected to determine if they need to be cleaned out and/or repaired at the following minimum frequencies: (1) between October 1st and October 15th each year; (2) between April 15th and April 30th each year; and (3) at least one time during each month that it rains between November 1st and April 1st. Clean out and repairs (if necessary) shall be done as part of these inspections provided such clean out/repair is consistent with the specific maintenance parameters described for individual system components below. At a minimum, all drainage system components must be cleaned out (subject to the parameters below) prior to the onset of the storm season, no later than October 15th of each year;

- Trash and other debris shall be removed from all system components at least once per month;

- Debris and other water pollutants removed from filter or similar device(s) during clean-out shall be contained and disposed of in a proper manner; and

- All inspection, maintenance and clean-out activities shall be documented in the annual water quality reports.

Individual System Components

In addition to the overall system integrity requirements described above, individual elements of the campus drainage system have specific maintenance requirements that also apply (and in some cases effect the manner in which the overall requirements are applied) as follows:

Engineered Treatment Systems: Maintenance of engineered treatment systems shall be per manufacturer's recommendations. If a manufacturer in any particular case provides a range of recommended maintenance schedules (for example, for more aggressive versus less aggressive

maintenance), maintenance shall be per the manufacturer's recommendations that will lead to the most water quality enhancement.

Vegetated Stormwater Basins: It is not anticipated that the stormwater basins will require significant maintenance. These basins will be developed with a forebay area, and regular and more active maintenance in this area is expected, but the rest of the basin overall should serve to function to filter and treat drainage without significant maintenance efforts over time – particularly if the forebay is managed appropriately. It is possible that some sedimentation could occur in the main basin area that could serve to limit its capacity (and thus its effectiveness at controlling and treating drainage), and such sediment may need to be removed. That said, any vegetated stormwater basin components located outside of development zones shall be designed with the intent to minimize (and to the maximum extent feasible eliminate) the need for sediment removal or disruptive maintenance. Maintenance beyond trash removal and restoration, enhancement, and management of these areas as part of the University's natural areas commitment (see Appendix A) is generally not expected to be necessary (see also specific maintenance parameters in Figure B.20 below). In any case, any allowed maintenance work within vegetated stormwater basins shall be consistent with an approved plan that, at a minimum: limits the amount of work within the basins as much as possible while still achieving CLRDP drainage requirements; is based on biotic evaluation and monitoring to ensure sensitive species are not impacted; and includes vegetation restoration measures to ensure vegetation is not unnecessarily impacted during maintenance, and that any bare areas or areas impacted by maintenance are revegetated with appropriate grasses and other plant species. Specific maintenance requirements (in addition to overall system integrity requirements above) for vegetated stormwater basins are as shown in Figure B.20 below.

Fig. B.20 Maintenance Schedule for Vegetated Stormwater Basins

Timing	*Maintenance Activity*
Annually	Forebay: Mow grass (and remove grass clippings) and remove any shrubs/saplings that significantly affect water quality performance, except for vegetation below permanent pool water line. Assess sediment buildup. Inspect for damage to inlet/outlet and side slopes.
Every 5 years or when six inches of sediment has accumulated above the forebay as-built bottom elevation, whichever comes first.	Remove sediment from trap down to as-built bottom elevation.
When sediments in the vegetated stormwater basin area outside of the forebay have reduced capacity in this area by 25 percent or more relative to the as-built design.	Remove sediments from only that portion of the vegetated stormwater basin that is (a) located within development zones, and (b) outside of the forebay. Sediment buildup within the remainder of the basin may only be removed if the original design intent has included measures to minimize the need for removal and the reduced capacity cannot be accommodated through the use of existing and/or new drainage system improvements elsewhere.

Vegetated Swales: The vegetated swales will likely require more active maintenance than the vegetated stormwater basins. These areas will require active regular mowing of the grassed areas, and may require some sediment removal over time. In any case, any maintenance work within vegetated swales shall be by and consistent with an approved plan that, at a minimum: limits the amount of work within the swales as much as possible while still achieving CLRDP drainage requirements; is based on biotic evaluation and monitoring to ensure sensitive species are not impacted; and includes vegetation restoration measures to ensure vegetation is not unnecessarily impacted during maintenance, and that any bare areas or areas impacted by maintenance are revegetated with appropriate grasses and other plant species. Specific requirements (in addition to overall system integrity requirements above) for the vegetated swales are as shown in Figure B.21 below.

Fig. B.21 Maintenance Schedule for Vegetated Swales

Timing	*Maintenance Activity*
Monthly	Mow grass outside of basin features (and remove grass clippings) to maintain a height of approximately 4 inches. Grassed areas shall be watered during exceptionally dry conditions to ensure continued grass vitality.
Between April 15th and April 30th each year	Inspect side slopes and channel base for erosion, gullies and other damage that would affect water quality performance.
Between September 1st and October 15th each year	Irrigate swale to the extent necessary to establish sufficient grass growth prior to first storm event.
Between October 1st and October 15th each year	Inspect side slopes and channel base for damage that would affect water quality performance. Reseed bare spots with appropriate native grass seed mix and/or other native plant species capable of enhancing water quality.
When sediments in the swale have reduced its depth by 25 percent or more relative to the as-built design.	Remove sediments from swale.

Vegetated Filter Strips: The filter strips may require the most amount of active maintenance of the "natural" treatment BMPs. These strips will handle relatively more inputs generally, including sheet flow, and it will be important that their design topography and cross-section is maintained and repaired as necessary over time. These areas will also require active regular mowing. In any case, any maintenance work within filter strips shall be by and consistent with an approved plan that, at a minimum: limits the amount of work within the strips as much as possible while still achieving CLRDP drainage requirements; is based on biotic evaluation and monitoring to ensure sensitive species are not impacted; and includes vegetation restoration measures to ensure vegetation is not unnecessarily impacted during maintenance, and that any bare areas or areas impacted by maintenance are revegetated with appropriate grasses. Specific requirements (in addition to overall system integrity requirements above) for the filter strips are as shown in Figure B.22 below.

Fig. B.22 Maintenance Schedule for Vegetated Filter Strips

Timing	*Maintenance Activity*
Monthly	Mow grass (and remove grass clippings) to maintain a height of approximately 4 inches. Grass shall be watered during exceptionally dry conditions to ensure continued grass vitality.
Between April 15th and April 30th each year	Inspect strip area for erosion, gullies, and other damage that would affect water quality performance.
Between September 1st and October 15th each year	Irrigate filter strips to the extent necessary to establish sufficient grass growth prior to first storm event.
Between October 1st and October 15th each year	Inspect strip area for damage that would affect water quality performance. Reseed bare spots. Irrigate to establish healthy grass growth prior to first storm event.
When the topography and/or base soils of a filter strip area have been altered enough such that it no longer supports runoff conveyance and water quality enhancement per strip design parameters	Re-grade and re-plant filter strip to design standards to ensure flow of runoff over its surface and water quality benefits.

B.6.3 Annual Water Quality Report

The University shall prepare an annual water quality report that shall, at a minimum, include:

- The results of the above Drainage Monitoring and Maintenance Program, including the assessment of source control BMP efficacy and the required monitoring and maintenance for treatment BMPs;
- The results of any individual water quality monitoring requirements emanating from individual development projects;
- Any monitoring or other related information applicable to other Campus discharges (such as NPDES requirements associated with seawater discharges); and
- Recommendations for any modifications to Campus drainage system components that are necessary to achieve CLRDP water quality performance standards.

The annual water quality report shall be prepared following each storm season (typically post-April 15th) and the report completed by mid-summer to allow any necessary changes to be implemented prior to the next storm season (i.e., by October 15th). The University shall timely pursue all necessary development authorizations pursuant to this CLRDP to implement identified changes prior to the October 15th of each year.

The Director of Campus Planning shall maintain the annual water quality reports and they shall be available for public review and shall be made readily available to researchers investigating the performance of water quality BMPs.

Figure B.23 Santa Cruz County Intensity Duration Rainfall Data (Inches of Rainfall)

	Return Storm (yrs)			
Minutes	*25*	*10*	*5*	*2*
5	3.12	2.6	2.18	1.69
10	2.32	2.01	1.69	1.31
15	1.98	1.7	1.43	1.11
20	1.68	1.5	1.26	0.98
25	1.56	1.35	1.13	0.88
30	1.44	1.25	1.05	0.81
35	1.32	1.17	0.98	0.76
40	1.22	1.1	0.92	0.72
45	1.14	1.05	0.88	0.68
50	1.10	1.0	0.84	0.65
55	1.07	0.96	0.81	0.62
60	1.03	0.93	0.78	0.60
70	0.95	0.88	0.74	0.57
80	0.90	0.82	0.69	0.53
90	0.86	0.78	0.66	0.51
100	0.83	0.75	0.63	0.49
150	0.74	0.63	0.53	0.41
200	0.68	0.55	0.46	0.36
250	0.64	0.5	0.42	0.33
300	0.60	0.46	0.39	0.30
400	0.54	0.42	0.35	0.27
600	0.41	0.34	0.29	0.22
800	0.36	0.30	0.25	0.20
1000	0.32	0.27	0.22	0.17

Figure B.24 BMP and Engineered Systems Performance Data

Data from National Pollutant Removal Performance Database

The following data is the median pollutant removal efficiencies found in 139 monitoring studies of treatment BMPs:

	Sediments	**Hydrocarbons (TPH)**	**Zinc**	**Copper**
Wet Ponds	80%	81%	66%	57%
Vegetated swales	81%	62%	71%	51%

Median Effluent Concentrations (mg/L) from 153 monitoring studies:

	Sediments	**Zinc**	**Copper**
Wet Ponds	17	30	5
Vegetated swales	14	53	10

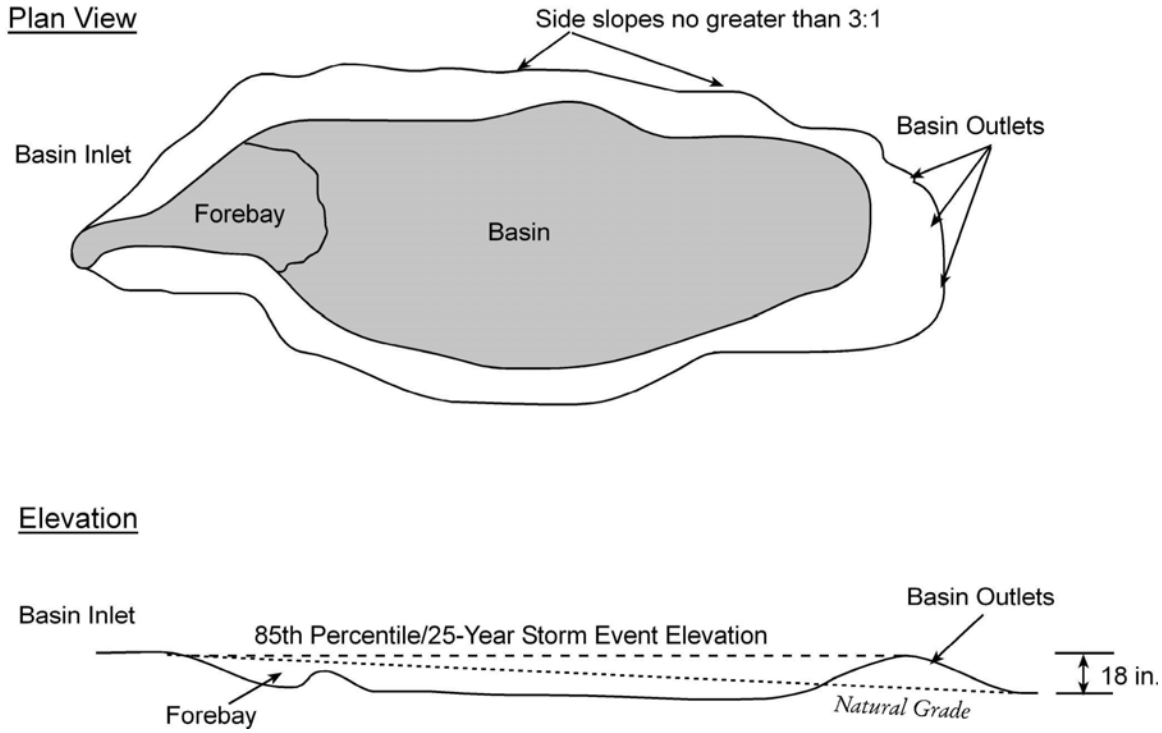
Engineered Treatment Systems
(Vortechnics Stormwater Treatment System, manufacturer published data)

Sediments	**Hydrocarbons (PAH)**	**Zinc**	**Copper**
80 % (65% at design size)	90%	N/A	N/A

Independent Test Vortechnics Stormwater Treatment System (New York)

Sediments
88%

Figure B.25 Vegetated Stormwater Basin Illustrative Diagrams



Attachment B.1 Partial Plant List

Partial list of perennial* species appropriate for use on the Marine Science Campus. Other species may be used provided that species selection is based on species' ability to provide water quality filtration and treatment consistent with the proposed hydrologic regime of any particular filter strip, swale, vegetated stormwater basin, or other planted area.

Bromus carinatus
Elymus glaucus
Elymus californicus
Leymus triticoides
Danthonia californica
Hordeum brachyantherum

*Competitive annuals may colonize planted areas and may require more active management.

With the exception of *Hordeum brachyantherum* and *Bromus carinatus* all of the species listed shall be planted as plugs. The *Hordeum* and *Bromus* shall be seeded in the fall after the first rain.

Attachment B.2 Bibliography/Sources

Bibliography

Guidance Specifying Management Measures For Sources of Non-point Pollution in Coastal Waters (EPA 840-B-92-002)

National Pollutant Removal Performance Database (Center for Watershed Protection)

National Guidance Water Quality Standards for Wetlands (EPA)

Nationwide Urban Runoff Program (EPA)

Protecting Natural Wetlands, A Guide to Stormwater Best Management Practices (EPA 843-B-96 001)

California Storm Water Best Management Practice Handbook (Storm Water Quality Task Force)

Urban Runoff Water Quality Management Plan for Monterey Bay Region (Association of Monterey Bay Area Governments)

Model Urban Runoff Program (Cities of Monterey and Santa Cruz, CCC, MBNMS AMBAG Woodward Clyde and RWQCB)

Start at the Source Design Guidance Manual for Stormwater Quality Protection (BASMAA)

Urban Hydrology for Small Watersheds (SCS Technical Release 55)

Practices in Detention of Urban Stormwater Runoff (APWA Special Report 43)

Urban Stormwater Management (APWA Special Report 49)

Santa Cruz County Storm Drainage Standards

Hydraulics and Hydrology for Stormwater Management (John E. Gribbin)

Other Sources

H.T. Harvey & Associates: In 1993 H.T. Harvey & Associates produced a report on hydrology and water quality for a Long Marine Lab EIR. This report predates many of the buildings and improvements now on the site.

Strelow Consulting: Strelow Consulting produced a draft EIR for the Santa Cruz Coastal Marine Research Center in 1997. This report also predates many of the buildings and improvements now on the site.

Nelson Engineering and Ifland Engineers Inc.: Drainage information for the Oiled Seabird Facility was obtained from reports by Nelson Engineering and Ifland Engineers Inc.

Steven Davenport: Steven Davenport provided a copy of some handwritten calculations (source UCSC engineering staff) regarding capacity in the Long Marine Lab seawater system.