UNIVERSITY OF CALIFORNIA

RICHMOND BAY CAMPUS Long Range Development Plan

Draft

April 2014

Berkeley
UNIVERSITY OF CALIFORNIA

BERKELEY LAB
Lawrence Berkeley National Laboratory

FOREWORD

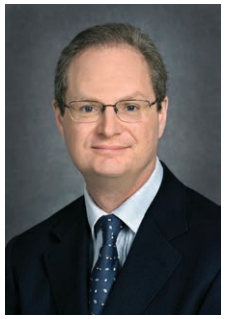
Science is about understanding the world around us. Together, we must use that knowledge to make the world a healthier and more prosperous place.

Lawrence Berkeley National Laboratory and the University of California, Berkeley have for decades pushed the boundaries of knowledge in fundamental and applied sciences related to energy, health, and environment. We educate the scholars of tomorrow, and provide them with the most advanced research support in a highly collaborative environment.

We are grateful to the City of Richmond leadership and to the many community members who attended meetings that have been part of the science and rigor of our land use planning. The result of our work together is this Richmond Bay Campus Long Range Development Plan. It is foundational for our future together on this site, in this community, and solidly supports our loftiest goals.

The unique partnership between UC Berkeley and the Berkeley Lab, extending over 80 years, needs room to grow. While we continue to rejuvenate our Berkeley campuses, our preferred site to grow together is along the shoreline in Richmond, with its natural beauty in the warmly welcoming Richmond community. The site is a diamond in the rough, due in part to its legacy of heavy industrial use. With implementation of this Long Range Development Plan, including an attractive open campus, multi-modal access, and preserved natural areas, we hope to see this diamond shine.

Here, we put forward a proposal that will transform the site into one that is at once in harmony with the Bay Area ecosystem, a source of knowledge creation for the country, and an engine of economic growth locally and regionally. Like the best of UC Berkeley, Berkeley Lab, and Richmond today, our future must be responsible, beautiful, forward-looking, inclusive and inspiring. We believe that re-developing the Richmond properties as set forth here will help us secure that future.



A. Paul Alivisatos, Director
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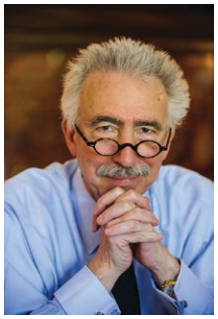

Nicholas B. Dirks, Chancellor
University of California, Berkeley

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1 INTRODUCTION

The University of California, Berkeley and the University of California at the Lawrence Berkeley National Laboratory (LBNL) propose to establish a new research campus – the Richmond Bay Campus – in Richmond, California. The purpose of the proposed campus is to build upon the University's record of accomplishment in providing long-term societal benefits through discovery and the advancement of knowledge. UC Berkeley and LBNL's goals for the Richmond Bay Campus are that it will:

1. Advance LBNL and UC Berkeley's tradition of world class science by expanding their strong partnership to the cooperative development of the new campus, in order to augment accomplishments and contributions of both institutions in the fields of human health, the economy, energy, and the environment.

2. Create a premiere research campus as a base for building partnerships on a physically attractive and open site supporting and complementing the teaching, research, and public service programs of UC Berkeley and LBNL.

3. Provide sufficient research, education, and support expansion space to foster synergy and collaboration within and across disciplines and institutions in both the public and private sectors.

4. Catalyze new discoveries, economic revitalization, and community vibrancy by facilitating inspiration along the full spectrum of the research and development enterprise and fostering connectivity with the surrounding community.

Opposite page: View over the Richmond Bay Campus site and the Richmond South Shoreline to the San Francisco Bay, San Francisco, the Golden Gate Bridge, and Marin County.

1 INTRODUCTION

The University of California (UC, the University) was founded in 1868 as a public, state-supported land grant institution. The State Constitution established UC as a public trust to be administered under the authority of an independent governing board, the Regents of the University of California. The University maintains ten campuses and oversees one national laboratory, the Lawrence Berkeley National Laboratory. The University's mission is research, teaching, and public service.

UC Berkeley is a flagship campus of the University of California system. It delivers programs of instruction, research and public service of exceptional quality and today educates more than 35,000 students each year from California and across the globe; twenty two faculty members in science, economics, and literature have won the Nobel Prize. UC Berkeley's central campus features an outstanding ensemble of new and historic buildings in a park-like setting along two forks of Berkeley's Strawberry Creek.

LBNL is a federally funded research and development center operated and managed by the University of California Regents under contract with the US Department of Energy (DOE). The research, service, and training work conducted at LBNL are within the University's mission. As the LBNL Management and Operating (M&O) contractor, the University is responsible for providing the intellectual leadership and management expertise necessary and appropriate to manage, operate, and staff the Laboratory; accomplishing the missions and activities assigned and funded by DOE to the Laboratory; administering the DOE UC Prime Contract; and providing University oversight of contract compliance and performance. "LBNL", as used within this document, refers to both the national federally funded research and development center named the Lawrence Berkeley National Laboratory and to the University of California in its role as the M&O contractor of the Lawrence Berkeley National Laboratory.

The mission of the DOE is to ensure America's security and prosperity by addressing energy and environmental challenges through transformative science and technology solutions. LBNL conducts unclassified research across a wide range of disciplines to deliver science-based solutions to problems of national significance, with a strong emphasis on energy and environmental research. LBNL is the nation's first national laboratory, established on the UC Berkeley campus in 1931; since that time, it has been associated with thirteen Nobel prizes. Nobel laureates at LBNL, including George Smoot, Steven Chu, Melvin Calvin, Ernest Orlando Lawrence, and Saul Perlmutter have held positions on the UC Berkeley faculty. The main LBNL site is located on land owned by the University adjoining the UC Berkeley campus. LBNL scientific research and operational units are also located in leased spaces in a variety of East Bay cities.

Co-location of UC Berkeley and LBNL programs at the Richmond Bay Campus will benefit both institutions and their research. The histories of UC Berkeley and LBNL have been intertwined since the founding of LBNL by Ernest Orlando Lawrence, and both have richly benefited from co-location and synergies at their existing sites in Berkeley. Hundreds of UC Berkeley faculty members hold joint appointments at LBNL; and many UC Berkeley undergraduate and graduate students conduct research at LBNL as part of their degree programs. The partnership helps both institutions recruit and retain top students and scientists from around the world. Development of the Richmond Bay Campus will further build that synergistic relationship for the benefit of LBNL, UC Berkeley, the local community, and the nation.

While LBNL and UC Berkeley have a close existing partnership, they are distinct administrative entities of the University. Upon determination by the Regents to approve the 2014 Long Range Development Plan and certify the associated Environmental Impact Report, UC Berkeley and LBNL are expected to establish a joint committee to oversee operations at the site. The committee will advise the LBNL Director and the UC Berkeley Chancellor on strategic and operational matters. However, UC Berkeley will continue to have ultimate administrative control of, and responsibility for, the Richmond properties (see also the Implementation section).

The Richmond Bay Campus properties will continue to be owned by the University while some of the facilities developed on the site will be used by LBNL to accomplish the missions and activities assigned and funded by DOE. Since it will be a joint use campus, some of the existing buildings as well as new buildings on the site will be occupied by UC Berkeley teaching and research programs. In addition to compliance with LRDP policies, design

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and construction of an individual facility will comply with appropriate legal and regulatory requirements according to its funding source. The laws, regulations, and policies that will apply to the operation of an individual facility will depend on the organization occupying the facility. It is expected that facilities occupied by LBNL programs or UC Berkeley programs will be maintained and operated by LBNL or UC Berkeley, respectively. New facilities developed by private sector entities will be subject to operational oversight by either LBNL or UC Berkeley, as determined by the LBNL Director and the UC Berkeley Chancellor with advice from the joint operating committee.

ROLE OF THE LONG RANGE DEVELOPMENT PLAN

A Long Range Development Plan (LRDP) is defined as a "physical development and land use plan to meet the academic and institutional objectives for a particular campus or medical center of public higher education" (Public Resources Code of the State of California Section 21080.09). It is a comprehensive document that establishes the land use patterns and relevant policies to guide the implementation of facilities and infrastructure development. This LRDP establishes overarching goals and strategies to guide the long-term development of the Richmond Bay Campus through the year 2050, and:

- establishes a framework to achieve development goals for the University's Richmond properties identified by UC Berkeley in its 2002 RFS working paper, chiefly: develop the properties to create a premiere research facility supporting and complementing teaching, research, and public service programs of the University.
- communicates a vision of the Richmond Bay Campus as a physically attractive open site where sensitive natural resources are preserved and the local communities are enriched by the research and development enterprise.
- underpins entitlement of up to 5.4 million gross square feet of research, education, and support space capacity and related utility and transportation infrastructure.
- identifies the need for transportation improvements that connect the campus locally, regionally, and to LBNL and UC Berkeley.
- promotes the achievement of ambitious sustainability goals in a manner that is transparent, uses resources efficiently, and cultivates a living laboratory.
- guides campus development in a fiscally responsible manner which leverages capital investment to address existing legacy brownfield conditions in accordance with sustainable land use best practices.

This Richmond Bay Campus LRDP is accompanied by environmental review as required by the California Environmental Quality Act (CEQA). Environmental review includes descriptions of the site and analysis of potential impacts that could result from the development program identified in this LRDP. The environmental impact analyses are based primarily on the 2014 LRDP Land Use Plan and an illustrative development scenario (IDS). The IDS is a conceptual portrayal of the Richmond Bay Campus at full implementation of this 2014 LRDP consistent with its goals, campus program and population projections, and Land Use Plan.

A Physical Design Framework (PDF) document is being prepared as a companion to this LRDP. The PDF articulates in more detail the vision for the physical form of the campus and serves as a foundation for the specific planning and design of future projects. The PDF will augment the design guidance presented in this LRDP with additional details to guide the design and architecture of the campus.

Development projects at the Richmond Bay Campus must be consistent with the Land Use Plan and policies set forth in this LRDP and advance the achievement of the Scientific, Community, and Facilities Visions as stated herein. The LRDP does not commit the university to any specific project, but rather provides the strategic framework for decisions on those projects.

Three community workshops were held at the Richmond Civic Center in 2012 to inform and engage community members.

PROCESS

This LRDP has been prepared with the participation of scientists, faculty, and staff from UC Berkeley and LBNL, in parallel with numerous meetings with City of Richmond staff, stakeholders, and the broader community. Individual interviews, group meetings, and visioning sessions were very important in identifying a program and vision for the site, as well as key facility and campus amenities.

Initial planning for the Richmond Bay Campus began in 2011, when LBNL solicited qualifications from candidate sites on which to build a second campus. UC Berkeley submitted a response proposing the Richmond site. Since LBNL's identification of the Richmond properties as the preferred site in 2012, planning efforts have included workshops with UC Berkeley and LBNL faculty and staff. Four workshops focused on transportation, campus character, utilities, and sustainability resulted in the identification of principles to guide Richmond Bay Campus planning and development. Community workshops in 2012 and 2013 focused on the science envisioned for the new campus, architectural and site character, and the Long Range Development Plan.

A list of those involved in the preparation of this document is included in the Acknowledgements section of the Appendices.

ORGANIZATION OF THE DOCUMENT

This LRDP is organized in three sections:

Planning Context

This section provides the context for the project, including descriptions of the need for the new campus and the character and conditions surrounding the site.

Vision

This section articulates the nature of the scientific research to be conducted at the Richmond Bay Campus and the anticipated symbiotic relationship between LBNL, UC Berkeley, and the City of Richmond. It also introduces the physical design vision, intended to realize a campus plan that models sustainability while fostering collaboration and innovation.

Plan Elements

Each element of this LRDP generally summarizes the context and the planning framework, and defines the overarching and specific sub-policies UC Berkeley and LBNL will employ to meet their long-term facilities needs and support their daily operations. The following elements appear in this section:

- Land Use
- Access, Circulation and Parking
- Open Space and Landscape
- Utilities and Infrastructure
- Sustainability
- Safety and Preparedness
- Implementation

2 PLANNING CONTEXT

The Richmond Bay Campus will occupy a remarkable 134-acre site located in the City of Richmond, approximately eight miles from the UC Berkeley campus and the LBNL main site in the Berkeley hills. The waterfront site along Richmond's South Shoreline offers unique opportunities to create a special research and development environment that will support team science, act as a catalyst for related development on nearby properties, and be a key element in the ongoing revitalization of the Richmond waterfront.

Opposite page: View southeast from the San Francisco Bay Trail to the Berkeley hills.

INSTITUTIONAL CONTEXT

UC Berkeley's core campus is located on approximately 180 acres of land owned by the Regents of the University of California in Berkeley, California. In 1950 UC Berkeley purchased and currently administers the University-owned parcels in Richmond, California that became the Richmond Field Station to facilitate large-scale research conducted by faculty and students in the College of Engineering. The property currently accommodates a wide range of research and resource conservation values.

Since the mid-1980s the Berkeley campus has explored ways to broaden and intensify usage of the Richmond Field Station including drafting a master plan in 1993 which was never formally adopted. In 2002 a committee of faculty and staff convened to identify potential future programs for the site and establish a set of principles for its development. The study concluded that UC Berkeley's Richmond property…

> …is the principal land resource available to the UC Berkeley campus to help meet its long-range demand for additional research space. The site's assets, particularly its accessibility to the greater Bay Area, attractive bayside setting, natural habitat areas and proximity to private and governmental R&D development in the Richmond South Shoreline, coupled with its significant development capacity, provide the University with the opportunity to create a premiere research facility supporting and complementing teaching, research and public service programs of the UC Berkeley campus… The research campus should be incorporated as seamlessly as possible into the fabric of the UC Berkeley campus as its major property asset and as an early option for expansion of programs, primarily in the areas of research and public service. It must be viewed as an integral, complementary component of the UC Berkeley campus, and should include as broad an array of disciplines as is feasible and desirable.

In 2007, UC Berkeley acquired the 3200 Regatta parcel adjacent to the Richmond Field Station. The warehouse building on this parcel houses the UC Berkeley museum and research collections as well as spaces leased to private businesses.

LBNL is located on approximately 200 acres of land owned by the Regents of the University of California in the cities of Berkeley and Oakland in the hill area adjacent to the UC Berkeley campus. Elevations on the site range from 500 to 1,000 feet above sea level. The hillside site, comprised of numerous steep slopes and isolated level areas, constrains development in clusters of facilities serving synergistic programs. The varied topography of the site makes access between facilities challenging. There are approximately 1.6 million square feet of scientific, administrative, and operations building space on the main campus.

Interaction between LBNL and UC Berkeley is greatly facilitated by close proximity. Each has an LRDP to guide development at their main campus sites, and the institutions share land boundaries; staff, faculty and students collaborate closely, travelling easily between the two sites or gathering in the vicinity. Research programs from both institutions co-occupy more than fifteen buildings on the UC Berkeley campus.

LBNL also occupies leased space in locations around the Bay Area to accommodate growing programs, resulting in more than 20% of the Lab employees presently working in off-site space, dispersing resources and constraining opportunities for synergy and collaboration.

In 2010 Laboratory Director Alivisatos announced a new initiative to consolidate LBNL bioscience programs located in geographically dispersed leased facilities and provide space to expand other existing and future programs on a second LBNL site. In January 2011 LBNL issued a Request for Qualifications (RFQ) for the purpose of identifying a short list of properties that best met a set of seventeen attributes desirable for a second site.

LBNL's RFQ listed a need for a site that could accommodate up to 2 million square feet (SF) of research and operational facilities for consolidation of

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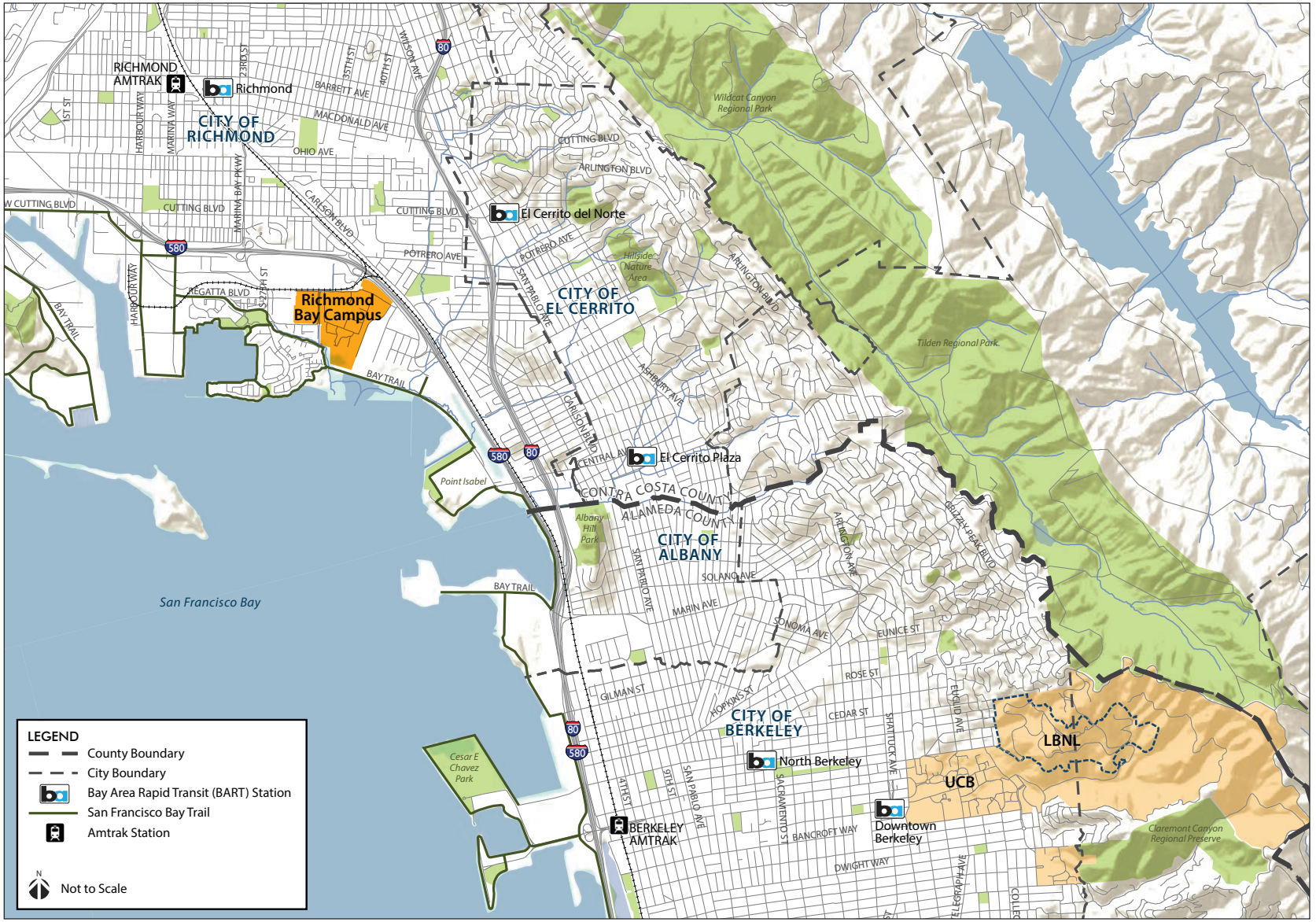
Figure 2.1: *Site Location*



programs in leased facilities, future expansion of its programs at the main site, and to house programs from synergistic public and private entities compatible with LBNL's mission.

Over twenty submittals were received in response to the RFQ and a short list of six sites was identified for further evaluation, including UC Berkeley's submittal for the upland portion of the Richmond Field Station and the Regatta property. In January 2012 LBNL identified these University of California Richmond properties as the preferred location for a second LBNL site. Primary reasons for identifying the Richmond properties as the preferred site included the ability to co-develop the campus with UC Berkeley, the welcoming community of Richmond, and the long-term control of land for expansion as needed. In total, the upland portions of the Richmond Field Station plus the 3200 Regatta parcel constitute approximately 134 acres. These acres comprise the Richmond Bay Campus and are the subject of the Richmond Bay Campus LRDP.

The development goals for the Richmond properties identified by UC Berkeley in its 2002 RFS working paper require a significant amount of space in addition to LBNL's 2 million SF of capacity. The Richmond Bay Campus has a total capacity for approximately 5.4 million SF of building space - well within the density limits of what is allowed for owners of adjacent properties subject to the City of Richmond zoning restrictions. It is projected that 650,000 SF of existing facilities will remain on site with 4.75 million SF of capacity available for new UC Berkeley and LBNL building space.

RICHMOND SOUTH SHORELINE AREA CONTEXT

The proposed Richmond Bay Campus site is located on UC Berkeley-administered property fronting the San Francisco Bay in the South Shoreline Area of the City of Richmond (see Figure 2.2). Richmond has a population of over 100,000 in an area of 34 square miles and over 32 miles of shoreline. The City is well known for its role in the World War II home front effort as it was the location of four Kaiser shipyards, the most productive in the nation, and launched 747 ships during the war. Tens of thousands of workers came from all over the United States to work in these wartime industries. During that period the City, particularly the downtown, was a thriving, bustling place. Following the war, many who had come for the war effort stayed, but employment declined precipitously. In recent years, success in redeveloping portions of the waterfront, the Civic Center, and other parts of the City points to a revitalization of Richmond. Developing the Richmond Bay Campus will be an important and continuing part of this revitalization.

The South Shoreline Area is located at the southernmost edge of the city between Interstate 580 (I-580) and the San Francisco Bay. Historically, this area was the site of a variety of manufacturing and industrial uses, a number of which remain. These manufacturing and industrial uses were largely insensitive to the ecology of their bayfront properties. The grasslands on the Richmond Bay Campus site are, therefore, a rare example of the original landscape; but the site also reflects its manufacturing legacy in contaminants found in soils and groundwater to this day.

In recent years, westerly portions of the city's southern waterfront have been revitalized. The Ford Assembly Building, in particular, is a success story. Formerly the Ford Motor Company Assembly Plant, the largest Ford plant built on the west coast, the building was converted to wartime production use during World War II. Now part of the Rosie the Riveter World War II Home Front National Historical Park, it has been completely renovated, houses businesses such as Sun Power and Mountain Hardwear, and includes a new conference center, restaurant, and a venue for special events. The National Park Service Visitor Education Center is located next to the Ford Assembly Building. In addition, waterfront parks, other restaurants, shopping centers,

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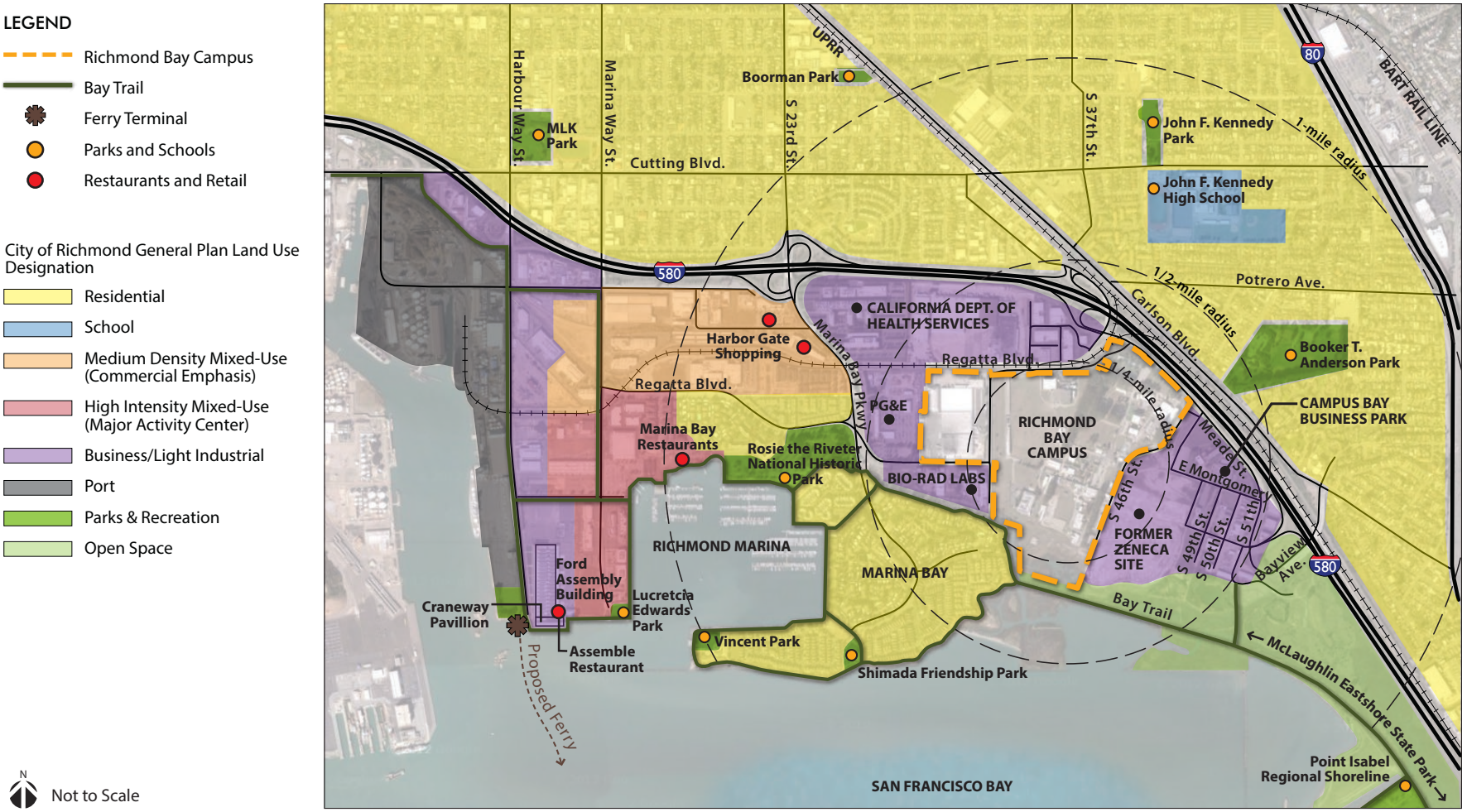
Figure 2.2: *Richmond South Shoreline Area*

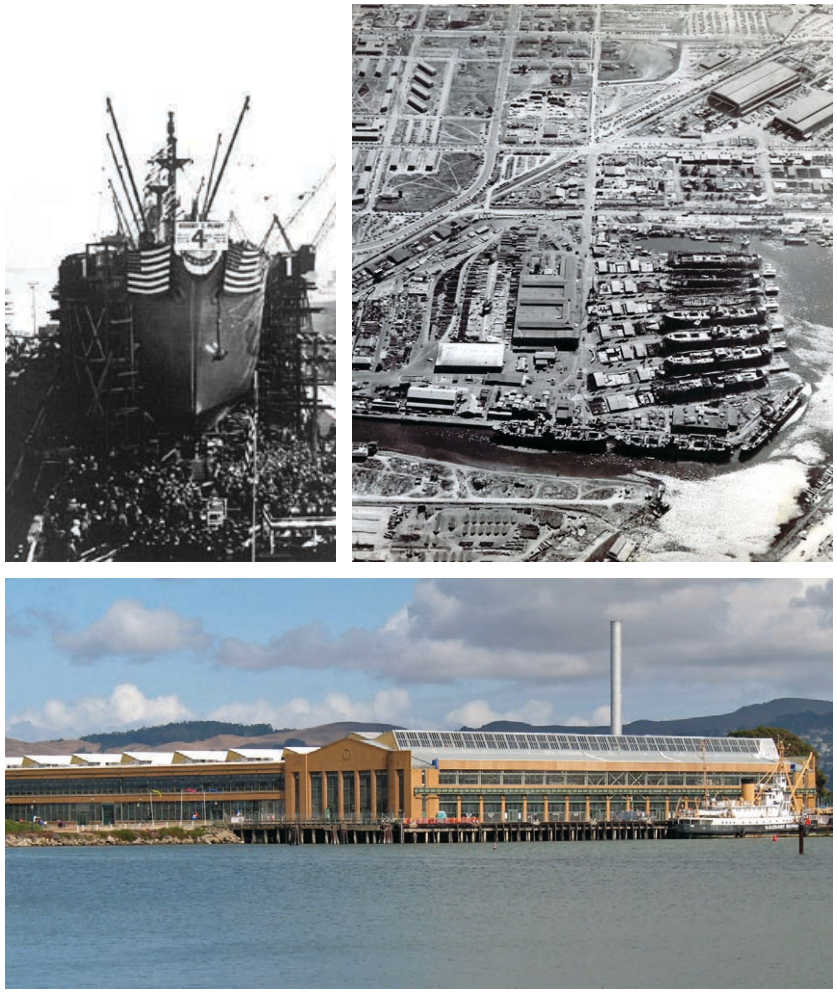


a marina, and newer residential neighborhoods have been developed in the South Shoreline Area. Land uses immediately adjacent to the Richmond Bay Campus site are industrial, office, and transport, along with the Marina Bay single- and multi-family residential neighborhood immediately to the southwest. Arterial roadways, the Union Pacific Railroad tracks, and I-580 define the northern boundaries of the site. The California Department of Health Services is located to the northwest. A Pacific Gas and Electric (PG&E) service station and Bio-Rad Laboratories, a private research equipment manufacturing company, form the site's western boundary. The adjacent property to the east is the location of former chemical production operations previously owned by Zeneca. The Campus Bay Business Park is located on part of this site adjacent to the Bayview Avenue / I-580 interchange.

Major state and regional parks, the McLaughlin Eastshore State Park and the Point Isabel Regional Shoreline, lie to the southeast of the site and extend to the southern city limits.

The City of Richmond's vision for the South Shoreline Area is to transform this currently-underutilized industrial waterfront area into a revitalized, pedestrian-oriented district which will integrate a mixture of high-intensity research, development, and commercial uses with new medium-density housing anchored by the Richmond Bay Campus. The vibrant mix of new and existing uses will harmonize with ecologically-sensitive areas, maximize bay views, and provide efficient connections to a broad range of existing and future transportation options and regional transportation routes. The City believes that new investment within the South Shoreline Area has the potential to strengthen surrounding neighborhoods, generate new community economic development opportunities, and increase the use of public transit.

The Richmond Bay Campus has the potential to be the catalyst for a nationally-recognized innovation district. Similar Bay Area districts anchored by important institutions or private firms include LBNL and UC Berkeley, UCSF Mission Bay in San Francisco, and the biotech cluster east of Highway 101 in South San Francisco.



The Kaiser shipyards (top left and right), located on the waterfront west of the Richmond Bay Campus site, were instrumental in the World War II ship building effort. The newly renovated Ford Assembly Building (bottom), was formerly a Ford Motor Company Assembly Plant that during World War II was converted to wartime production use.

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The land uses in the vicinity of the Richmond Bay Campus include (clockwise, from upper left) the Marina Bay residential community, the Bay Trail near the Richmond Bay Campus site, the Rosie the Riveter WWII Home Front National Historic Park, the adjacent vacant property formerly owned by Zeneca, and the residential community on Regatta Boulevard near Northshore Drive.

REGIONAL ACCESS CONTEXT

The site is served by relatively direct vehicular access. Two Interstate 580 freeway interchanges, Bayview Avenue and Regatta Boulevard, provide direct access via Meade Street; more indirect access can be gained from the Marina Bay Parkway/23rd Street interchange. Three BART stations are located within three miles of the site: Richmond (which also has an Amtrak station), and El Cerrito del Norte and El Cerrito Plaza (which have AC Transit and other bus system connections) (see Figure 2.1). A limited number of shuttles run between the UC Berkeley campus and the site on weekdays.

Bicycle access to the site is convenient from all directions. The San Francisco Bay Trail, a 330-mile (eventually to be 500 miles) bayfront multi-use trail that has been implemented regionally for more than the last two decades, passes along the Richmond South Shoreline Area, including along the bay frontage of the Richmond Bay Campus. The Bay Trail provides a continuous connection between the cities of Richmond, El Cerrito, Albany, Berkeley and Emeryville. Bicycle access to the City of Richmond in the easterly and northern directions is also convenient via the Bayview Avenue, Regatta Boulevard, and Marina Bay Parkway/23rd Street overpasses.

A ferry terminal is proposed for the South Shoreline Area near the Ford Assembly Building with a direct connection to and from San Francisco and commuter service projected to begin in 2015. This terminal would be less than three miles from the Richmond Bay Campus by motor vehicle or a 15-minute bicycle ride on the Bay Trail.

PHYSICAL SETTING

The proposed site of the Richmond Bay Campus is located directly south of the Regatta Boulevard / I-580 freeway interchange in the city of Richmond. The University owns four parcels here: a 109.8-acre parcel that contains the currently developed upland portion of the Richmond Field Station (RFS); a 24.0-acre developed parcel along Regatta Boulevard immediately west of the RFS, acquired in 2007 and currently referred to as the Regatta Site; and two parcels in the San Francisco Bay comprising 46.1 and 15.6 acres, respectively (see Figure 2.3). The University also has a 0.6-acre ownership interest in a portion of South 46th Street along the eastern border of the RFS. Under UC Berkeley's land use authority, LBNL and UCB propose to cooperatively develop portions of the RFS, Regatta, and South 46th Street properties, totaling approximately 134 acres, as the Richmond Bay Campus.

The Richmond Field Station has been managed by UC Berkeley since 1950, frequently accommodating research projects which could not be accommodated on the main campus. Current facilities include one of the world's largest earthquake shaking tables (see peer.berkeley.edu); test facilities for advanced transportation research; the Northern Regional Library Facility (NRLF), an archive facility of the University of California system; and a privately developed regional laboratory for the US Environmental Protection Agency (EPA). Current activities also include research and teaching in integrative biology and art practice. The Regatta site includes over 400,000 gross square feet (gsf) of warehouse space, and houses UC Berkeley archives and museum collections and some private sector tenants.

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Figure 2.3: *University of California Richmond Properties*

The existing buildings on the Richmond Bay Campus site total to over 1 million gsf of floor space. These buildings range from older buildings that are remnants of previous operations on the site to newer structures that have been purpose-built for current research activities. Appendix 1 lists all of the existing facilities on the site, and includes information on size, year built, and structural condition. With the exception of the US EPA and NRLF facilities, all of the existing buildings will be replaced as the Richmond Bay Campus is developed; existing programs housed in space to be demolished will be accommodated within other LBNL or UC Berkeley space.

The existing buildings on the Richmond Bay Campus site vary widely in age and style, as can be seen above (clockwise from upper left): the Northern Regional Library Facility (NRLF), US Environmental Protection Agency (EPA) building, Pacific Earthquake Engineering Research Center (PEER), RFS Administrative Offices (ADMIN), Regatta Building, and Transportation Sustainability Research Center (TSRC).

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Figure 2.4: *Existing Site*

LEGEND

- Property Boundary
- Disturbed Coastal Terrace Prairie
- Non Native Grassland & Mixed Ruderal Scrub
- Coastal Terrace Prairie
- Other Grasslands/Open Space
- Wetlands
- Restored Native Upland
- Surface Water
- Eucalyptus Stands
- Trees
- Existing Buildings
- **NRLF** Northern Regional Library Facility
- **EPA** US EPA Region 9 Laboratory
- **PEER** Pacific Earthquake Engineering Research Center
- **ADMIN** Richmond Field Station Administrative Office (formerly Forest Products Laboratory)
- **TSRC** Transportation Sustainability Research Center

Source: *Habitat and Wetlands Map, Current Conditions Report,* Tetra Tech, November 2008.

0 150 300 600'

CONTAMINATION INVESTIGATION AND CLEANUP

Between the mid-1800s and the late 1900s, the Richmond South Shoreline Area was home to numerous assembly and chemical manufacturing facilities, including the Kaiser Shipyards and Stauffer Chemical. The California Cap Company manufactured blasting caps, shells, and explosives on portions of the Richmond Bay Campus site from the 1870s to the 1940s. When the University of California purchased the property in 1950 it obtained space and facilities for expanding research and academic programs for a growing post-WWII student population. However, along with owning the property the University became responsible for addressing legacy contamination from industrial activities that occurred prior to UC ownership.

In 1999 the University began investigating site contamination under the oversight of the California Environmental Protection Agency's (Cal EPA's) San Francisco Bay Regional Water Quality Control Board. The main contaminants identified were metals from the California Cap Company's mercury fulminate manufacturing plant and pyrite cinder waste that originated from sulfuric acid production at the former neighboring Stauffer Chemical plant. The metals included arsenic, cadmium, copper, lead, mercury, selenium, and zinc, some of which can be toxic to humans and wildlife if ingested (eaten) or inhaled as dust. Portions of Western Stege Marsh also contained low pH (acidic) orange-stained ground water and sediments resulting from pyrite cinders disposed of in the marsh. In addition, an isolated area of polychlorinated biphenyl (PCB) contamination was found at a storm drain outfall in Meeker Slough.

UC Berkeley established a multi-year program to remove contaminants from the site. Work began in 2002 with removal of the largest areas of contaminated soil which were excavated, treated, and transported off-site to approved treatment and disposal facilities. Excavated areas were replaced with clean bay mud or clean dirt and restored with native marsh and coastal terrace prairie plants.

In 2005, after completion of removal of the major source areas, investigation and remediation oversight was transferred to the California EPA's Department of Toxic Substances Control (DTSC). DTSC required additional soil and groundwater sampling of the upland portions of the site in addition to requiring the owner of the neighboring former Stauffer Chemical site to investigate and cleanup areas of groundwater contamination at the property boundary. In 2008 the California Department of Public Health and the Federal Agency for Toxic Substances Control and Disease Registry completed a Public Health Assessment for the Richmond Field Station and determined the site to be safe for normal activities.

Based on the investigations completed through fall 2012, UC Berkeley has prepared a Removal Action Workplan (RAW) under Health and Safety Code Section 25365.1(h)(1) which describes cleanup actions and land use controls that address the remaining soil contamination in developable portions of the Richmond Bay Campus within the RFS site and groundwater contamination beneath the RFS site. The RAW is proposed for approval by DTSC in 2014 subsequent to a public review process. Areas requiring additional cleanup action under the proposed RAW (see Figure 2.5) include the following:

- Soil contamination: Mercury contamination in the former mercury fulminate plant area and soil around former transformer locations which have low-level PCB contamination.
- Groundwater contamination: Carbon tetrachloride (CT) in the northwest uplands.

In addition, under the proposed RAW, monitoring, assessment, and management of contaminated soil and groundwater at the site will be conducted in accordance with land use controls. A deed restriction will limit the types of groundwater and land uses allowable at the RFS portion of the Richmond Bay Campus, and a soil management plan (SMP) will govern redevelopment activities in a manner which protects public health and protects against environmental hazards. The SMP will provide a framework to assure that soil management is conducted in a manner which is safe to the RFS community and that soils are disposed of off site or re-used on site in accordance with the requirements of DTSC and other agencies as applicable. The remedy for TCE-impacted groundwater originating from the former Stauffer chemical site is subject to the Zeneca Site Investigation and Remediation Order.

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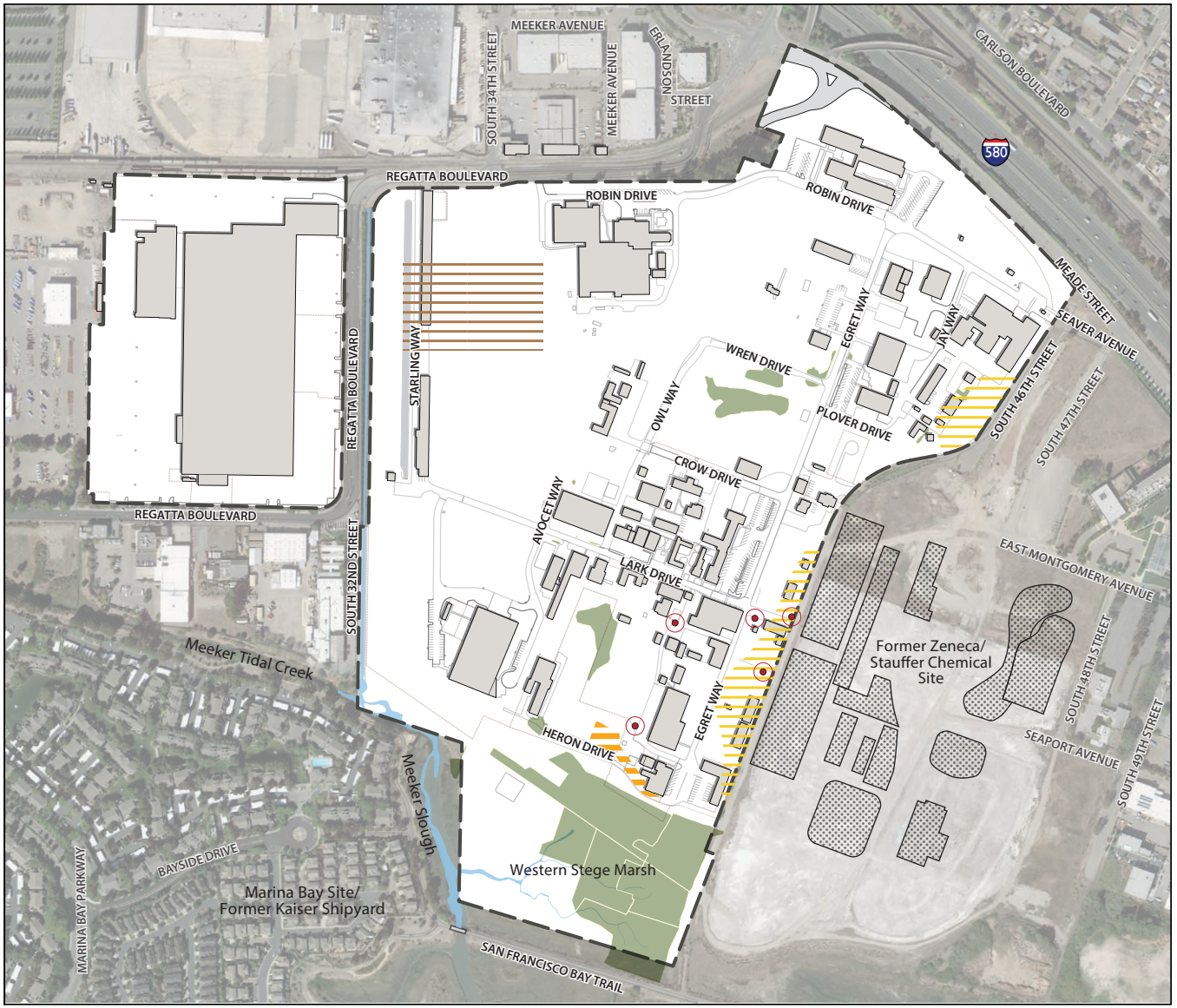
Figure 2.5: *Cleanup Actions*

LEGEND

- Property Boundary
- Existing Buildings
- Historical Manufacturing Area on Former Zeneca/Stauffer Chemical Site
- Completed Remediation
- Proposed Removal Action: Mercury Fulminate Area
- Proposed Removal Action: PCB Areas
- Approximate Evaluation Area for Treatment of Carbon Tetratchloride (CT)
- Approximate Evaluation Area for Treatment of Trichloroethylene (TCE)

Cleanup Actions Source: *Removal Action Workplan,* Tetra Tech, 2013.

Former Zeneca/Stauffer Chemical Site Historical Information Source: *Current Conditions Report, Lot 3, 1200 South 47th Street, Campus Bay, Richmond, California,* LFR Levin Fricke, July 29, 2005.



NATURAL FEATURES

Its waterfront location and natural features give the Richmond Bay Campus a distinctive character. The site and adjacent waterway feature natural areas prized for their aesthetic, research, and habitat value, including coastal terrace prairie grasslands, Western Stege Marsh, and Meeker Slough (see Figure 2.4).

Perennial grasslands once dominated the California landscape, but the introduction of cattle, development, and competitive non-native species severely challenged the native grassland communities. A remnant of the original coastal grasslands, known as coastal terrace prairie, exists on the University's Richmond properties. These grassland areas are among the few remaining coastal terrace prairie on lowland clay soils in the greater East Bay region. The grasslands provide habitat for small species of reptiles and amphibians, as well as seed- and insect-eating mammals and birds. UC Berkeley students and faculty have long studied these resources, which provide unique opportunities for field research.

The Western Stege Marsh is located at the southern edge of the site and consists of approximately nine acres of waterlogged land including mudflats and tidal wetlands. Meeker Slough is the continuation of Meeker Tidal Creek, which flows from the west and bends southward at Western Stege Marsh where it drains to San Francisco Bay. UC Berkeley has completed extensive remediation and restoration of the Western Stege Marsh and monitoring of these natural areas continues. Western Stege Marsh and Meeker Slough provide nesting and foraging habitat for a number of birds and shorebirds, as well as foraging and drinking areas for bats. This tidal marsh is also known habitat for the special-status California Clapper Rail (Rallus longirostris obsoletus), which is a medium-sized bird that rarely flies.

The Richmond Bay Campus site has five stands of tall eucalyptus trees and a total of approximately 1,300 trees. The stands were planted as wind breaks and blast mitigation by the California Cap Company. While not native, the eucalyptus trees serve as a visual landmark on the site. The largest stand of eucalyptus provides habitat for raptors and wintering monarch butterflies. The eucalyptus trees also conflict with other biological values, are prone to limb breakage, and are a fire hazard.

The coastal terrace prairie in the central part of the campus is a rare and valuable ecosystem (top). Meeker Slough (bottom), at the southern end of the campus, is a productive estuarine habitat, attracting numerous birds and bats.

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CLIMATE

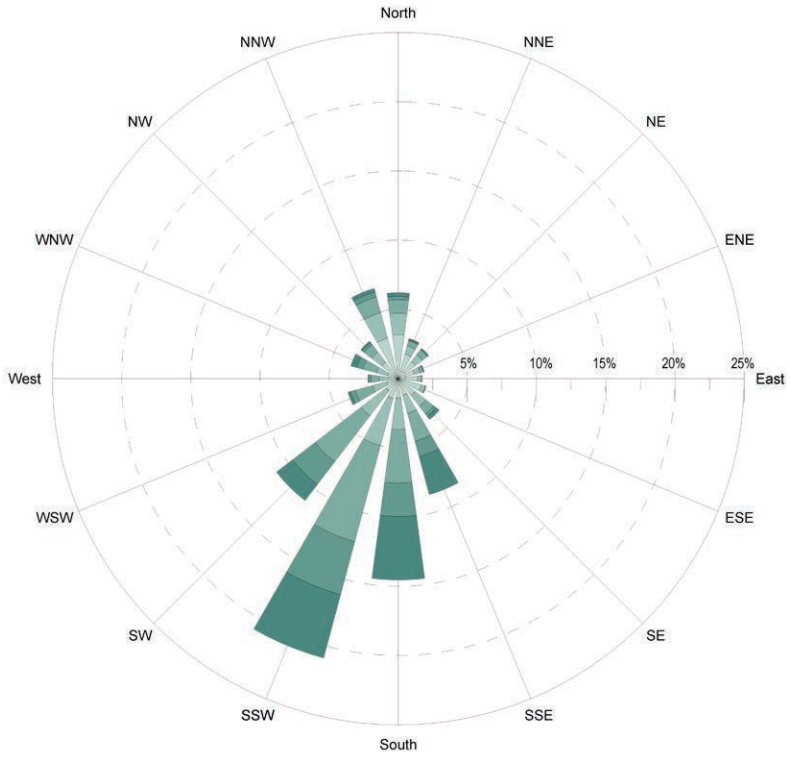
The Richmond South Shoreline Area enjoys a very mild Mediterranean climate year-round. The temperature is slightly warmer than in the coastal areas of San Francisco, the Peninsula, and Marin County. It is, however, more temperate than areas further inland. The average highs range from 57 to 73°F and the lows between 43 and 56°F year-round. September is, on average, the warmest month and January is, on average, the coldest month. The highest recorded temperature in Richmond was 107°F in September 1971 while the coldest was 24°F in January 1990.

The average annual wind speed is 6 to 9 miles per hour primarily from the direction of the San Francisco Bay (see Figure 2.6). It is generally windier from March through August than in other months and the strongest winds typically occur in June.

The rainy season typically begins in late October and ends in April with some showers in May. Most of the rain occurs during stronger storms in November through March when rainfall is usually three to five inches per month. Most precipitation occurs during January and February. Seasonal wetlands are known to occur throughout the Richmond Bay Campus site during the rainy season. The area experiences no snowfall but has brief hail storms annually during the coldest months.

The City of Richmond experiences sunshine more than 80% of the daylit hours during seven months out of the year and there are ten months where 60% or more of the daylit hours experience sunshine. December and January are the darkest months with about 45% average brightness. The South Shoreline Area and the ridges of the East Bay hills experience more fog than do the northern areas of Richmond. Morning humidity is 75% to 92% year round. Afternoon humidity ranges from 20-40% May through October (the summer months) and from 40-70% during the winter.

Figure 2.6: *Wind Conditions*



Wind Speed Categories (meters per second)

- > 0.5 - 2
- > 2 - 4
- > 4 - 6
- > 6 - 9
- > 9 - 11
- > 11

NOTES:
1) Orientation of wind rose is the same as the Richmond Bay Campus plans in this document
2) A wind rose is a graphical representation of the frequency of occurrence of wind speed ranges coming out of a given direction. Spikes indicate percent of time wind is blowing FROM the listed direction.
3) Average wind speed: 3.04 miles per hour
4) Maximum wind speed: 34.9 miles per hour ("maximum" represents greatest of the hourly averages; i.e., not a true wind gust)

Source: Bay Area Air Quality Management District (BAAQMD). Data from monitoring site at Richmond Field Station, 2000-2005.

TOPOGRAPHY AND VIEWS

The Richmond Bay Campus site is nearly level, as shown in Figure 2.7, with a grade difference of 20 feet from the high point near Meade Street to the lowest areas near the Western Stege Marsh. The terrain also slopes downward from east to west with the same 20 feet grade difference as north to south. The site's elevation is above the nearby freeway but is similar to adjoining properties in the South Shoreline Area. The gentle slope of the site allows gravity flow of all storm drainage ultimately to Meeker Slough. An existing City of Richmond storm drain channel adjoining Regatta Boulevard carries storm water from the watershed area north of the site, and from the western portions of the campus, into Meeker Tidal Creek. Meeker Tidal Creek is tidally influenced and discharges to Meeker Slough on City of Richmond property to the west of Western Stege Marsh.

Off-site distant views from the campus are possible in nearly 360 degrees of orientation. To the west Mount Tamalpais and the Marin Headlands are visible; to the southwest the San Francisco skyline, Treasure Island, and Bay Bridge can be seen; and to the east and north are the hills above Oakland, Berkeley and El Cerrito. The low-lying and flat nature of the site, however, means that views of San Francisco Bay, the waterfront, and marshes are best experienced from viewpoints close to the marsh.

The Richmond Bay Campus commands dramatic views from East Bay to Marin. From the south, the views are over Western Stege Marsh to the San Francisco Bay and the San Francisco skyline (above). From the NRLF building (below), the view west spans from Angel Island to Marin County, including Mount Tamalpais.

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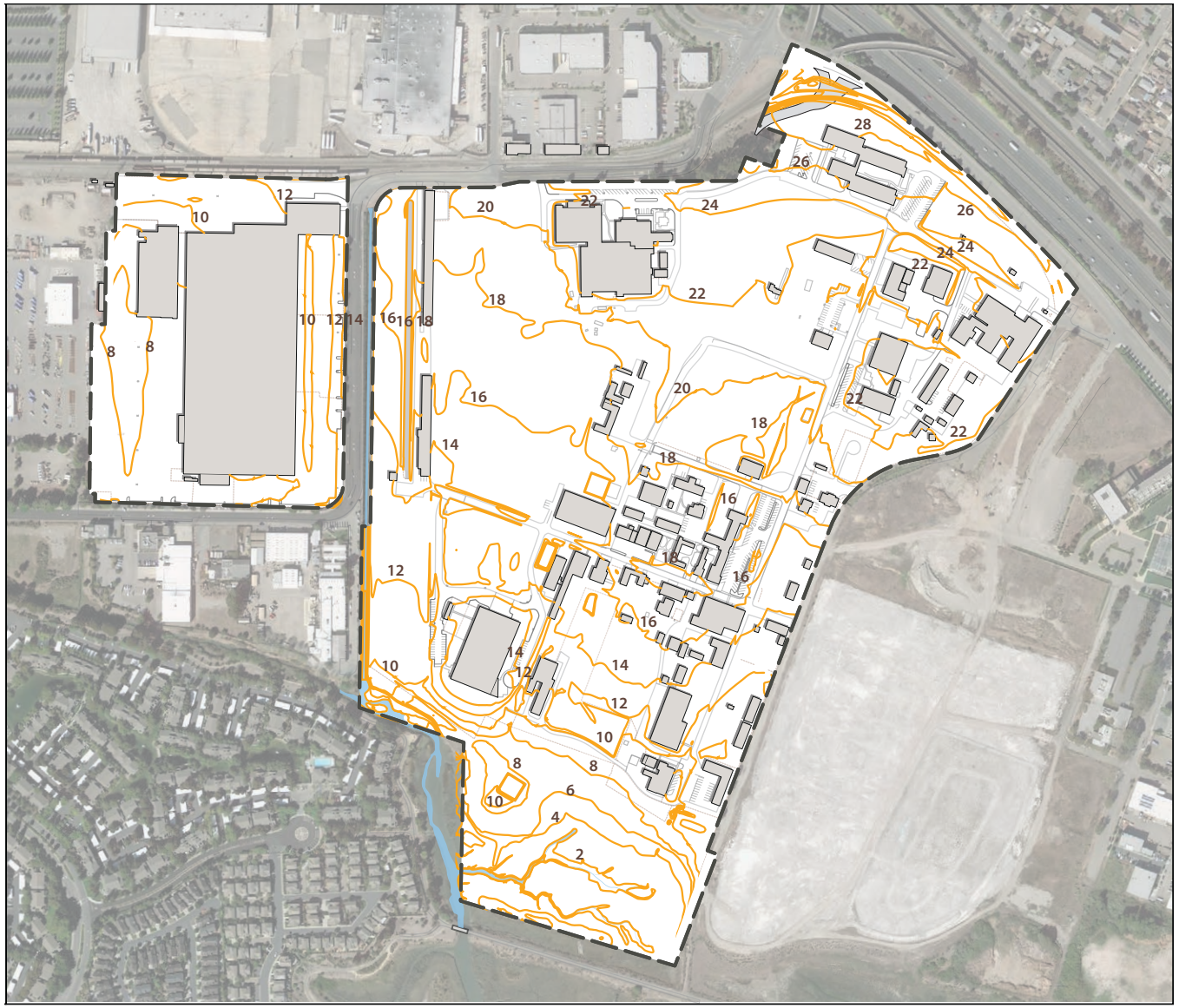
Figure 2.7: *Site Topography*

LEGEND

Property Boundary

18 Elevation Contour Line (feet)

NOTE: Elevations relate to the Sea Level Datum of 1929 (NGVD 29).



0 150 300 600'

SEA LEVEL RISE

Water levels in the San Francisco Bay have risen nearly eight inches over the past century. Climate change is expected to increase the rate of sea level rise globally over the next century. The San Francisco Bay Conservation and Development Commission (BCDC) has regulatory authority over development along the shoreline. BCDC's sea level rise guidance is based on a projected increase in sea level of 16" by year 2050 and 55" by year 2100 (BCDC, 2009) [1].

The Western Stege Marsh and the transition area just north of the marsh were historically intertidal mudflats. Offshore breakwaters constructed in the 1930s and the rerouting of Meeker Creek from further west to its current location resulted in soil deposition and transition of the mudflats to the tidal marshland which exists today. The 1959 construction of the embankment which now supports the Bay Trail includes a bridge over Meeker Slough where tidal and storm drain waters connect the marsh and the bay.

The Mean Higher High Water (MHHW) for 2013 shown on the +3.4' elevation contour[2] in Figure 2.8 is the arithmetic average of the elevations of the highest water levels commonly observable over a 19-year period on the Richmond shoreline. The lowest elevation marsh vegetation bands exist within this area. The MHHW for 2100 is projected to be 4.5' higher than in 2013 and correspond to the +7.9' elevation contour. This area is also shown on Figure 2.8 and illustrates higher elevation transgression area for marsh vegetation.

The transitional upland and developed areas may be currently at risk of inundation from San Francisco Bay storm surge and wind-driven waves. The Federal Emergency Management Agency (FEMA) maps the current extent of potential for extreme flooding as part of the National Flood Insurance Program.

The 2009 FEMA Flood Insurance Rate Map (FIRM) indicates a Base Flood Elevation of +6.2' (shown as +9.0' NAVD on the map) during a 100-year event[3]. The FIRM also indicates that the RFS transition and developed areas may currently be subject to an additional hazard from storm waves up to approximately the +11' elevation contour. Figure 2.8 shows the inundation flood limit indicated on the FEMA FIRM.

The severity of inundation flooding is highly dependent on the condition of the fronting shore. The 4.8' difference between the base flood elevation and the inundation flood limit indicates that FEMA did not consider the offshore breakwaters and Bay Trail embankment to be reliable wave sheltering structures during development of the 2009 FIRM. However, the water level in Western Stege Marsh typically approximates the San Francisco Bay still water level, even during conditions of high winds and tall waves on the bay. This indicates that these structures effectively shelter the site from waves and the tidal marsh vegetation dissipates surge to effectively minimize the extent of water inundation.

Sea level rise will increase the extent of the flood hazard. With a 55" sea level rise, a projection for the year 2100 100-year event inundation flood limit would include the current Base Flood Elevation of +6.2' plus 4.5' sea level rise amounting to +10.7' at a minimum. With an allowance for wave run-up and wind setup during 100-year event conditions, the year 2100 inundation flood limit is shown on Figure 2.8 at the +12.5' elevation contour.

1 The sea level rise values used by BCDC are consistent with the State of California's Ocean Protection Council interim guidance (OPC, 2011). The guidance was targeted towards state agencies and non-state entities implementing projects or programs funded by the state or on state property. The Richmond Bay Campus LRDP applies the BCDC and OPC guidance of a 55" sea level rise by 2100 for development planning purposes.

2 All elevations are referenced to NGVD (National Geodetic Vertical Datum of 1929) unless indicated otherwise. NGVD elevation = NAVD (North American Vertical Datum of 1988) minus 2.8' at the RFS.

3 A 100-year event is defined as the flood that has a one percent chance of occurring in any year and is likely to occur or be exceeded in a 100-year period.

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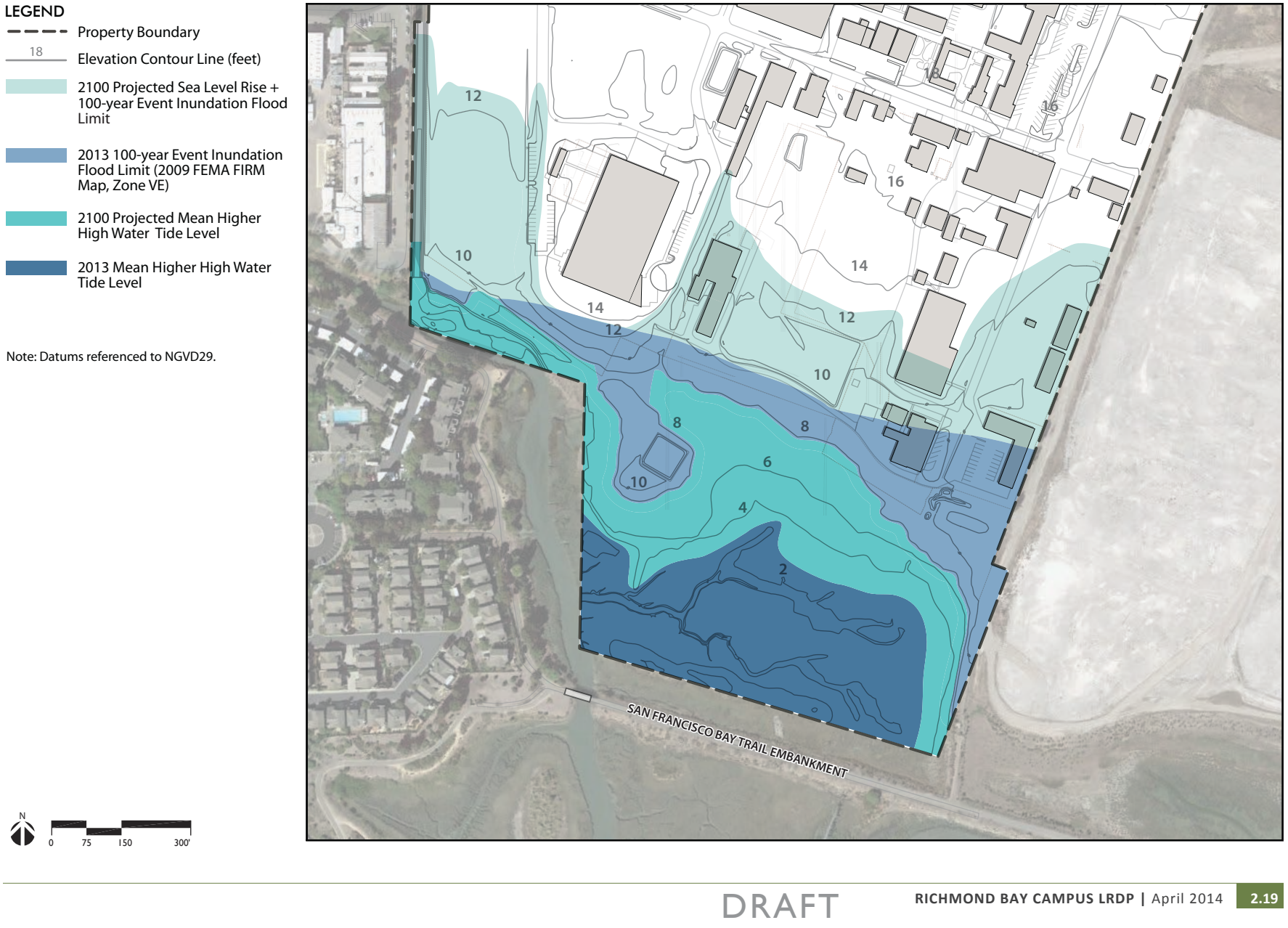
Figure 2.8: *Sea Level Rise*



SITE INFRASTRUCTURE

Roadways

The main entrance to the existing Richmond Field Station is located off of South 46th Street at Seaver Avenue (see Figure 2.9). The Field Station is fenced and features no other public entry points, although there are other locked gate locations for security, maintenance, and project uses. The Regatta property may be accessed from locations along Regatta Boulevard, some of which are fenced and secured by the tenant.

South 46th Street runs along the eastern boundary of the Richmond Bay Campus but is in poor condition and ends before it reaches the southern border of the site. Meade Street and Regatta Boulevard form the northern boundary of the Field Station. Regatta Boulevard also runs north-south through the site, and east-west at the southern end of the Regatta property boundary. The Meade Street bypass, built partially on the Richmond Bay Campus between Regatta Boulevard and Meade Street, routes traffic to the south of active railroad tracks. The bypass is expected to be in place until approximately 2022 before which time the Bradley Moody Underpass project is scheduled to provide an alternate route into and out of the Marina Bay area without crossing railroad tracks.

The road network within the Richmond Field Station is a remnant of a grid of roads on this and adjoining sites which was built during the site's industrial manufacturing history. Many roads lack curbs or gutters and there are few sidewalks on the site. Two internal north-south roadways – Egret Way and Owl Way – run parallel to the southern portion of South 46th Street. The east-west streets include Robin Drive in the north; Wren, Crow, and Lark Drives in the center; and Heron Drive at the southern end of the site. Today, vehicles are allowed to access nearly all parts of the site. Parking is distributed throughout the Field Station in small surface lots, generally adjoining buildings.

Utilities

The existing utilities services are provided by local utility companies and the City of Richmond. East Bay Municipal Utility District (EBMUD) provides water to the site; the Richmond Municipal Sewer District provides storm and sanitary sewer infrastructure; electrical power and natural gas are provided by Pacific Gas & Electric (PG&E); and AT&T is the telecommunications provider. In general, utility mains follow Regatta Boulevard, Meade Street, and South 46th Street. On the site, utility corridors run primarily in a north-south orientation along or parallel to existing road alignments including Egret Way and Lark Drive. On-site stormwater drainage flows north to south by way of open swales, culverts, and sheet flow into drains. Existing site utility infrastructure is sized to meet the current needs.

Many of the existing roads lack curbs, gutters and sidewalks.

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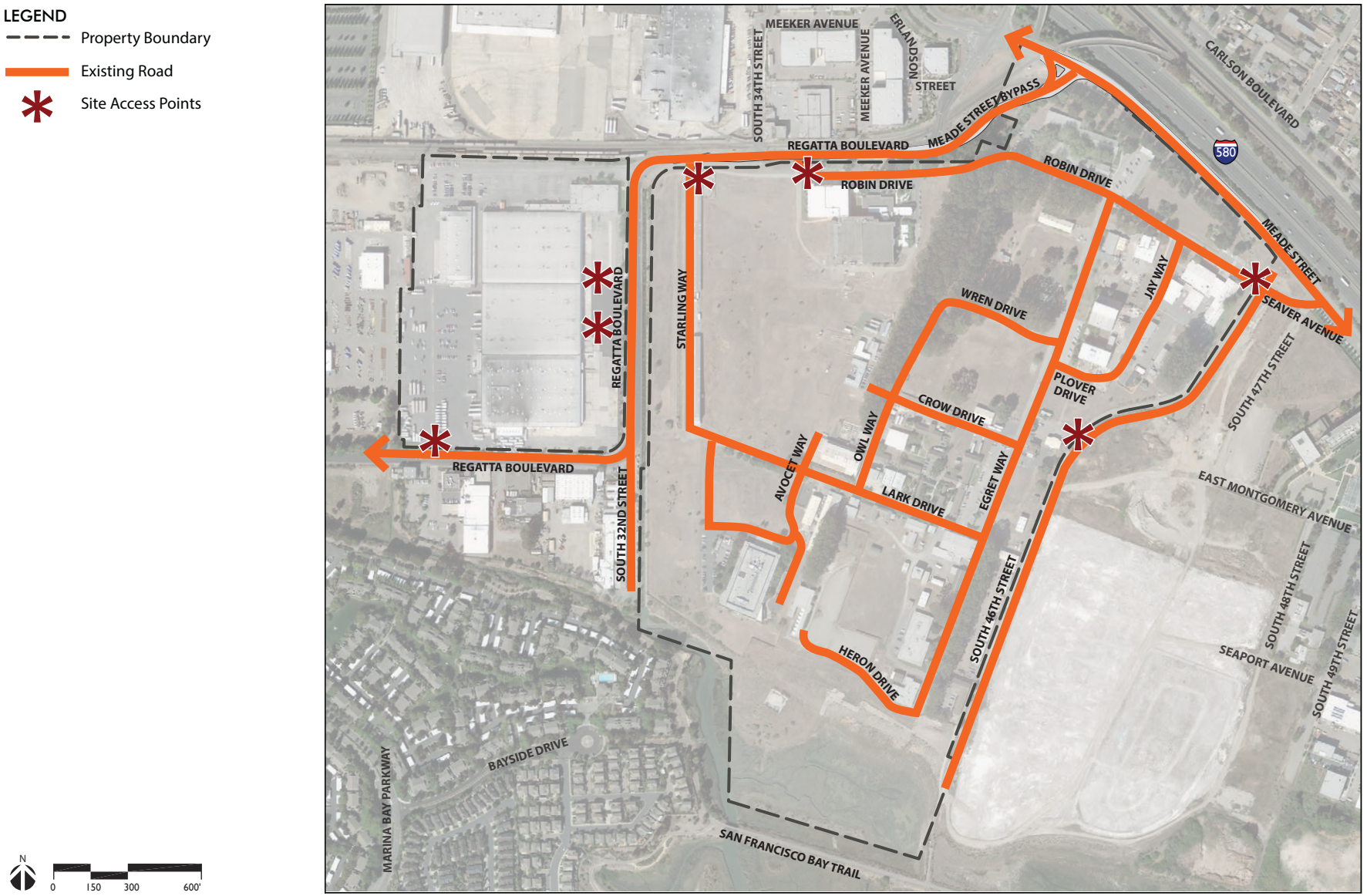
Figure 2.9: *Existing Road Network*



3 VISION

The Richmond Bay Campus is a partnership between the University of California, Berkeley and the University of California at Lawrence Berkeley National Laboratory to create a state-of-the-art, inspirational, and sustainable place to produce world-class collaborative science for healthy living and sustainable communities. The discussion that follows elaborates upon this vision.

Opposite page: Illustrative rendering of the Richmond Bay Campus looking southwest towards the San Francisco Bay.

SCIENCE

The scientific vision for the Richmond Bay Campus is focused on the development of solutions for 21st century challenges in the areas of energy, the environment, health, and the global economy.

In the near term, existing programs at the site in sustainable transportation and earthquake engineering, among others, will continue; the site will also continue to house important collections of the University library and UC Berkeley museums. New programs under consideration may establish the campus as a hub of joint research in advanced manufacturing, bioscience, and energy storage. In addition, the programs at the Richmond Bay Campus will maintain a close connection to the research conducted on the main campuses of LBNL and UC Berkeley. The Richmond Bay Campus will strengthen opportunities for partnerships with private industry.

In the longer term, research conducted at the Richmond Bay Campus may also span energy and environmental technology development, computing sciences, material sciences, chemical sciences, ecological, climate, and earth systems sciences, and other research disciplines at the core of UC Berkeley and LBNL programs, including scientific user facilities. Partnerships with other public or private entities at the Richmond Bay Campus in such synergistic research areas are anticipated and will further expand the ability of LBNL and UC Berkeley to help turn scientific discovery into tangible solutions and economic well-being. UC Berkeley expects that student research and teaching programs will also occur at the site, as part of the educational mission of the University.

Interdisciplinary collaboration or “team science” has been the foundation of the success that both LBNL and UC Berkeley have enjoyed in producing innovative research and technology in a broad array of disciplines. Development of the Richmond Bay Campus will provide opportunities for researchers, students, and staff to interact in meaningful ways on a daily basis: within laboratories and conference rooms, in building corridors and courtyards, and in outdoor preserved natural areas, recreation, and event spaces. The new site and facilities environment will support collaboration on many levels.

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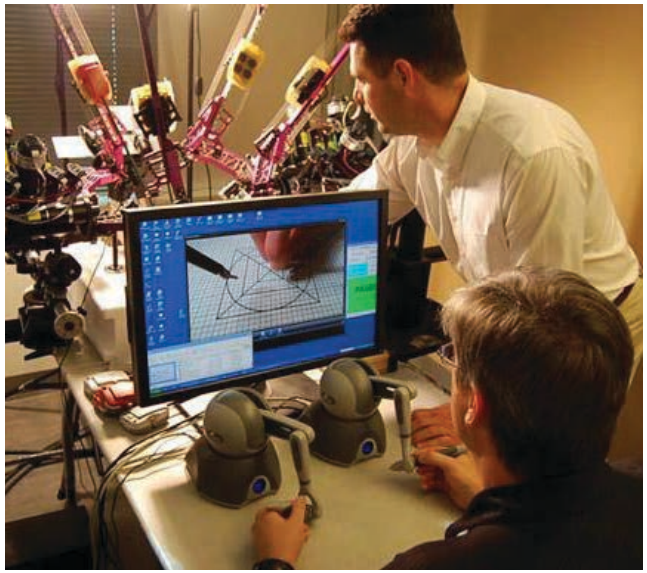

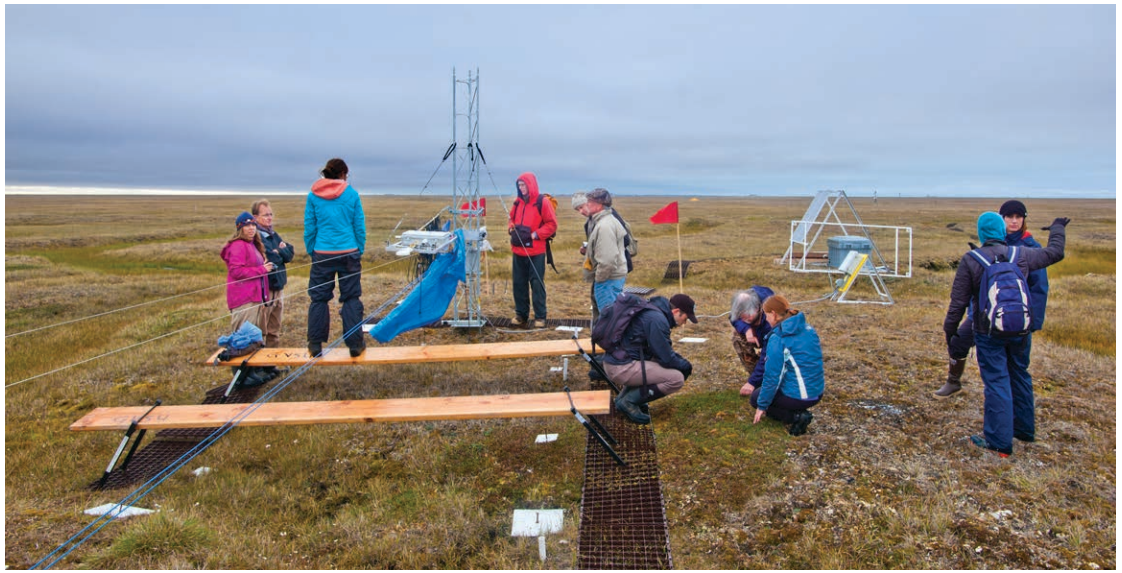

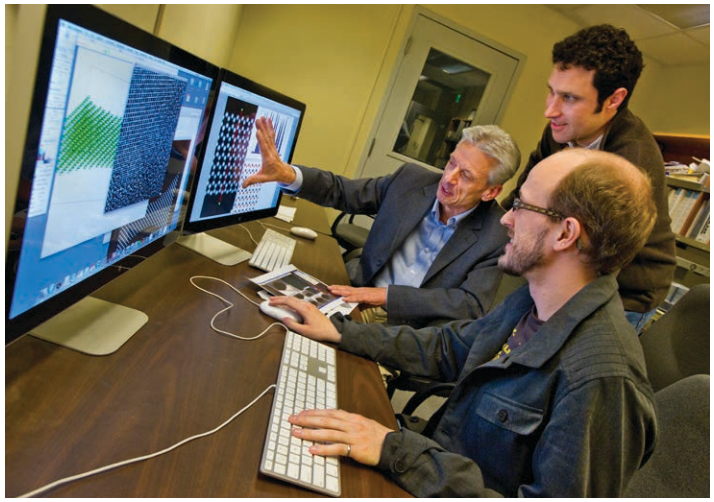

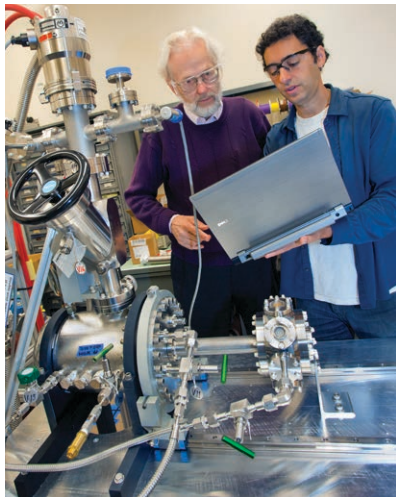

Scientists at UC Berkeley and LBNL are actively engaged in innovative science in numerous disciplines.

COMMUNITY

The Richmond Bay Campus is envisioned as the anchor of a center for innovation in the City of Richmond South Shoreline Area, serving as a catalyst for the development of other research facilities, both public and private, on nearby properties. The City's Resolution no. 10-11, passed unanimously in February 2011, strongly encouraged the University to locate LBNL's second campus in Richmond, noting that the development proposal included "aspirations and requirements long shared and defended by the Richmond community." Richmond's General Plan envisions the City's "South Shoreline" as a vibrant and revitalized area with a mixture of high-intensity light industrial and commercial uses anchored by the research campus. Key aspects of the plan for the Richmond Bay Campus — a strong focus on enhancing the site's ecology and the promotion of local and regional road and trail connectivity — are directly supportive of the City's goals for the South Shoreline Area.

The Richmond Bay Campus will serve as a multi-faceted resource for local communities and be designed to encourage public access. On-site facilities and amenities available to the public will include meeting space, a public auditorium, dining establishments, and open space areas. Interpretive features in the landscape will describe the sensitive natural environment and could point to pilot or model innovations in sustainable systems or operations at the site. An art program, integrated with the landscape and built environment, could feature selected art installations that engage and attract viewers. In addition, building on robust programs already in place at both UC Berkeley and LBNL, educational programs such as science-related lectures and interpretive site walks are anticipated to be offered at the Richmond Bay Campus.

The Richmond Bay Campus vision is to serve as a community resource, providing jobs and educational programs. UC Berkeley and LBNL currently conduct "science theater" lectures and K-12 hands-on workshops throughout the year.

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CAMPUS PROGRAM AND POPULATION

The scientific vision summarized the LBNL and UC Berkeley near- and longer-term research focus in the areas of energy, the environment, health, and the global economy to be carried out at the Richmond Bay Campus. The local community envisions the campus as the anchor of a center for innovation and a catalyst for the development of a vibrant and revitalized area with a mixture of green technology, light industrial and commercial uses. In order to successfully achieve the scientific and community visions, development at the Richmond Bay Campus will replace much of the existing stock of aging facilities and limited infrastructure with state-of-the-art infrastructure and research buildings designed to foster multi-discipline collaborations.

Scientific discovery and the development of useful applications are accelerated when facilities consolidate advanced instrumentation with researchers from complementary disciplines. This is often accomplished by the optimization and rehabilitation of facilities which can cost-effectively be made suitable for the evolution and development of integrated scientific programs. Unfortunately, very few, if any, of the existing buildings on the site meet the stringent requirements for modern multi-disciplined research and development. In the short term some of the existing facilities may be re-purposed for support functions, such as operations offices and shops, or for light industrial research such as advanced manufacturing. It is expected that nearly all of the existing buildings will be replaced over time.

The replacement of existing facilities and construction of additional facilities at a higher site-wide density will be required to meet the demands of the next generations of scientific endeavors and accommodate growth in space needs and population. Technical challenges presented by the problems to be addressed and the scale of systems that must be understood far exceed the site's current facilities and infrastructure capabilities. New facilities, specifically designed to address major challenges of the time, will be required to meet the LBNL and UC Berkeley goals and the scientific and community visions for the Richmond Bay Campus. The University's approach to achieving these goals is the basis of the LRDP growth projections in the Plan:

- *Strengthen and expand existing research programs to sustain and grow the University's role as a national research institution.* The University's leadership in areas of emerging priority such as advanced manufacturing, earth systems sciences, carbon capture and sequestration, and biomanufacturing research, integrated with the biological research programs, will result in increased funding with requirements for increased staff levels and scientific capabilities.

- *Develop the Richmond Bay Campus as a living laboratory of sustainability to attract research and development endeavors to the site.* When the research interests and sustainable facilities operations align to create a living laboratory, the Richmond Bay Campus will be the location of choice for institutions deciding where to place new or expanding programs and facilities. Organizations with the highest sustainability standards deciding to locate at the campus will result in growth in this location which would otherwise have occurred elsewhere.

- *Expand partnerships and collaborations to enhance the University's scientific and technical base.* The University's partnerships with other universities, national laboratories, and private industry will increase staff levels in expanding programs, related disciplines, and off-shoot research groups. It is expected that synergistic research institutions and private entities will find it mutually beneficial to locate substantial research, development, and startup company facilities at the Richmond Bay Campus which are closely linked to the Bay Area economy.

- *Extend research opportunities and educational value with student exposure to private industry employers.* The ready access to student-employees will enable private industry expansion and additional facilities development to house the activities. Student research with private industry employers will add further depth and value to the educational experience. In addition, UC Berkeley and LBNL have active outreach, teaching, adult education, community school field-trip, and museum programs which may be expanded in new facilities at the site and populated by University staff and community members.

- *Replace single-purpose facilities with new facilities programmed to accommodate multiple disciplines with advanced infrastructure suitable for future scientific endeavors.* An increase in building space will result from higher density development when predominantly single-story buildings are replaced with multi-story research and development facilities. The existing plantings of eucalyptus will undergo a phased replacement with sustainable landscaping designed to complement the higher density of development.

- *Construct new scientific facilities to support future research and teaching initiatives.* UC Berkeley and LBNL are focusing on the development of an integrated scientific infrastructure that will fully enable the characterization of biological and earth systems, discover and develop flexible integrated platforms for biofuels and other valued products, and operate the data and analysis systems that will enable energy and environmental solutions. Facilities for these endeavors will demand high performance infrastructure and other advanced features that renovated space cannot provide. Tackling problems of this scale will attract whole new research groups to the Richmond Bay Campus and increase employee population.

The achievement of the scientific and community visions for the Richmond Bay Campus will result in growth of research programs, population, and occupied space. The average daily population at the campus is projected to grow from 300 in 2013 to 10,000 by 2050. This population increase of 9,700 represents an average annual growth rate of 9.9 percent over that time period. The on-site population will include research scientists, faculty, and staff from LBNL and UC Berkeley as well as other public and private entities; graduate and post-doctoral students; undergraduate students and interns; administrative staff; and operational staff.

The projected net increase in occupied building area at the Richmond Bay Campus is 4,350,000 gross square feet (gsf), from 1,050,000 gsf in 2013 to 5,400,000 gsf in 2050. This net growth projection accounts for the demolition of 750,000 gsf of building space that is unsafe or beyond its useful life. The projected annual space growth rate of 4.5% is lower than the projected population growth rate due to the greater amount of underutilized existing space which will be recapitalized or replaced with facilities which support a denser population.

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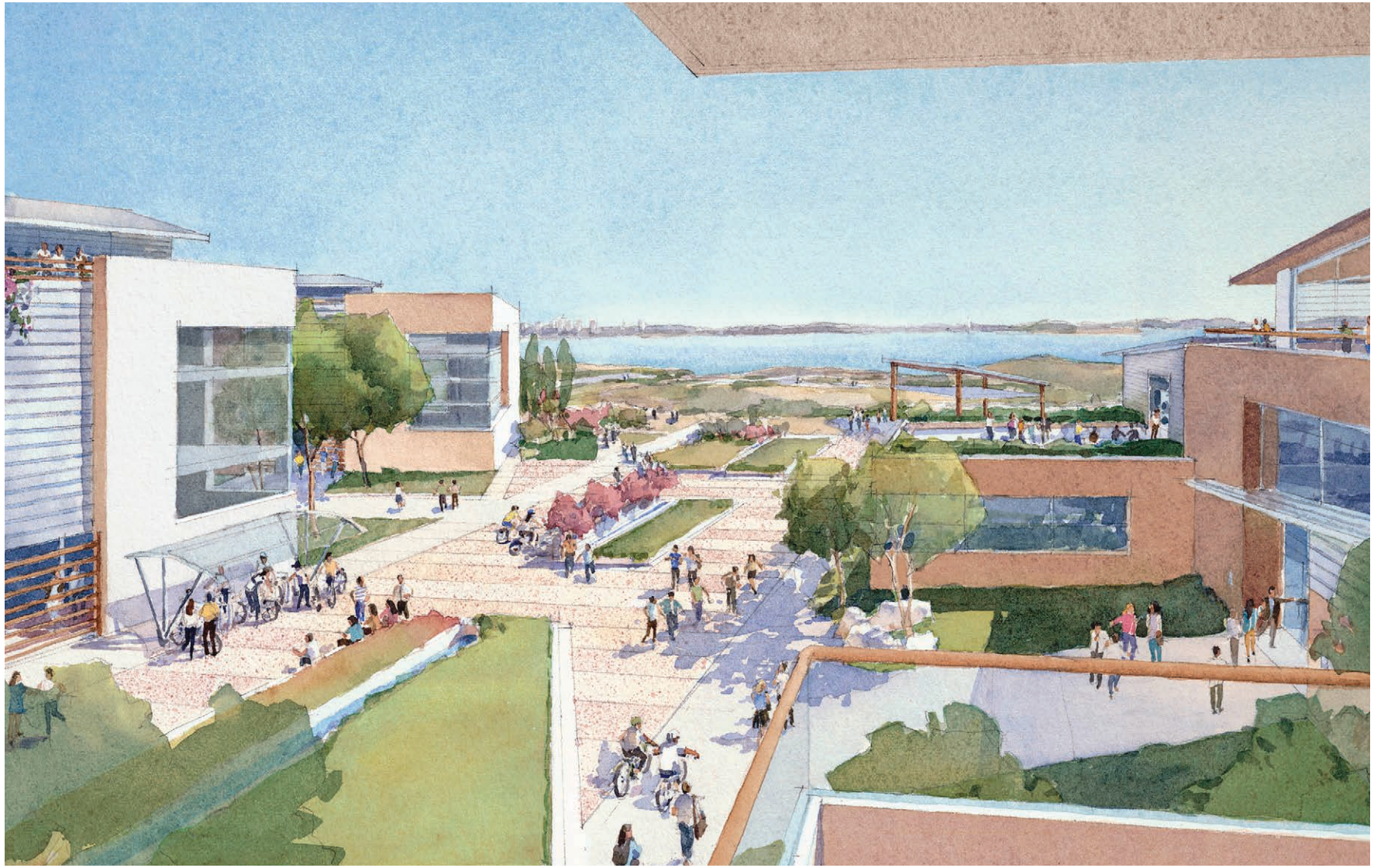

Illustrative rendering of the view across the San Francisco Bay from the buildings at the south end of the Richmond Bay Campus.

SITE AND FACILITIES

The site and facilities vision for the Richmond Bay Campus will be achieved by applying nine principles inspired by the research enterprise to be conducted, the special qualities of the site, and the City of Richmond's vision for the South Shoreline Area. These principles are the foundation for achieving the site and facilities vision to make the Richmond Bay Campus an inspirational, accessible, and sustainable place to perform world-class science.

Organize for Inspiration

The organization of the site and facilities will maximize opportunities for person-to-person communication and increase the likelihood of knowledge transfer, inspiration, and innovation. Gathering spaces and pedestrian pathways will be ordered so that the interactions of individuals and groups may unfold unexpectedly and dynamically. Amenities will be sited to facilitate cross-disciplinary, cross-functional communication, supporting unusual combinations of ideas that lead to creativity.

Establish an Appealing Character

Development will respect and enhance the unique character of the Richmond Bay Campus through site and facilities design that harmoniously features its natural assets including climate, grasslands, marsh, and the San Francisco Bay. Long-term development will address legacy contamination, environmental protection, sustainable land use, and building density to minimize building footprints, conserving open space and view corridors. The vision for the built environment is simple-but-elegant purpose-built architecture in an urban park setting. The character and sense-of-place will appeal to research sponsors and help establish the architectural vocabulary for redevelopment of the South Shoreline Area.

Develop the Location of Choice

The Richmond Bay Campus will promote excellence in project- and team-based research and education to become the location of choice for internationally recognized researchers. Initial development can create a critical mass of core facilities and research programs selected to attract future synergistic enterprise. The use-inspired development of the Richmond Bay Campus will facilitate the discovery of solutions for 21st century challenges to the global economy, energy, environment, and human health.

Build Resilience

Development of the Richmond Bay Campus will engender new non-traditional partnerships to build resiliency for UC Berkeley, LBNL, and the local community. LBNL, UC Berkeley, and synergistic public and private entities will cross-connect research programs in adjacent or co-occupied buildings, jointly explore emerging areas of research, and enhance capabilities with incubator facilities. The campus will be the centerpiece of a vibrant and revitalized South Shoreline Area, serving as a catalyst for additional development on nearby properties.

Create a Living Laboratory

At the Richmond Bay Campus, LBNL and UC Berkeley will cultivate a living laboratory in which operating practices and infrastructure, facilities performance monitoring data, and sustainability goals are leveraged to engage, apply, and strengthen research. Campus operations will model inclusion, healthy living, accessibility, and sustainability; and provide practical opportunity for innovation and education in sustainable design. All aspects of the site and facilities development will be responsive to the full spectrum of physical and sensory abilities to ensure human comfort for all.

Improve Accessibility

The Richmond Bay Campus will be fully accessible from the UC Berkeley and LBNL main campus sites by timely and efficient transportation modes to facilitate workforce flexibility, and will be fully integrated into the multi-modal transportation network envisioned for the South Shoreline Area. A transportation demand management (TDM) program will promote alternatives to single-occupant commuter vehicles. The campus will be open to the general public with enhanced connectivity to regional and local transit systems and bicycle and pedestrian pathways, including the San Francisco Bay Trail. The roadways will be designed for safe and efficient access for service and emergency vehicles.

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Connect with the Community

Development of the Richmond Bay Campus will respect and promote its connection to the City of Richmond in development and operations. Opportunities include coordinated planning for the South Shoreline Area, local road and trail connectivity, utilities systems expansion, transition to an open site, outreach programs in science education, skills training for jobs affiliated with the Richmond Bay Campus, an arts program, recreational facilities, and new retail to serve campus employees and local community members.

Plan for Growth

Implementation of this LRDP over a 40-year period will result in up to 5,400,000 GSF of research and development facilities, and a daily population of approximately 10,000. Growth will occur incrementally and be guided by flexible and integrated site and infrastructure planning. Phased development will ensure that improvements balance density with an attractive and sustainable environment, and convey the values of the campus as a whole.

Operate Safely, Reliably, and Responsibly

Planning and design will address all aspects of operational safety and reliability to promote a healthy, safe, and secure workplace. The Richmond Bay Campus will evolve from the current secured environment, which includes a perimeter fence and controlled access, to an open site with public access. Safety in laboratory research and support areas will focus on personnel and property protection; emergency planning, drills and exercises; self assessment and quality assurance; hazardous and radioactive materials storage, use, and waste handling; fire protection engineering; emergency response; air emissions and wastewater discharge controls; occupational health and safety; and seismic event preparation. Emergency services will continue as currently provided until safety and emergency assessments indicate the need for additional services. In the long run it may become desirable and/or necessary to house or expand emergency service equipment and personnel on the campus.

4 PLAN ELEMENTS

This section provides a general land use plan and describes the context and framework for the development of the site, facilities, and infrastructure; and the preservation of open space. It also defines the policies UC Berkeley and LBNL will employ to meet its long-term facilities needs and support its daily operations in a safe, efficient, and sustainable manner. The Plan is organized into the following elements:

- Land Use
- Access, Circulation, and Parking
- Open Space and Landscape
- Utilities and Infrastructure
- Sustainability
- Safety and Preparedness
- Implementation

These elements provide guidance to ensure that each new project contributes to a cohesive development of the site and promotes realization of the Richmond Bay Campus vision. They provide the flexibility necessary to accommodate both known and unforeseen programmatic needs yet place an emphasis on the qualitative aspects of the site's natural and built environment. The Plan embodies the University's institutional values of resource conservation and environmental stewardship guiding development of a sustainable research campus that reflects its scientific endeavors. Policies are presented within each element, along with bulleted sub-policies that indicate how the overarching policy will be implemented.

Opposite page: View of the coastal terrace prairie on the campus site.

LAND USE

Context

The Richmond Bay Campus will have a land area of approximately 134 acres. The site slopes downward from the north to south toward the bay; the highest point is approximately 28 feet above sea level. While today there is a scattering of generally small buildings and minimal infrastructure to serve them, the site has the potential to ultimately host a large and vibrant research campus. Existing site uses, open space and a mix of indoor and outdoor research and support facilities, will remain in the near term and be replaced incrementally with new development. Certain ecologically-sensitive areas of the site will remain undeveloped including the grasslands at the heart of the site as well as the bay-front marsh (see Figure 2.4 for additional existing site context).

Land uses immediately adjacent to the site are industrial, office, and transport, along with the Marina Bay single- and multi-family residential neighborhood immediately to the southwest. The California Department of Health Services is located to the northwest, a Pacific Gas and Electric (PG&E) service station forms the site's western boundary, and Bio-Rad Laboratories, a private research equipment manufacturing company, is located south of Regatta Boulevard. The adjacent property to the east is the location of former chemical production operations previously owned by Zeneca - the Campus Bay Business Park is located on part of this site. A major regional park, the Point Isabel Regional Shoreline, lies east and south of the South Shoreline Area extending to the southern city limits.

Land Use Development Framework

Development at the Richmond Bay Campus will be guided by this LRDP within an overall density that is appropriate for the site while preserving environmentally-sensitive areas. Accordingly, the Land Use Plan is comprised of two zones which form the site-wide development patterns and guide the locations of new buildings and infrastructure:

- Natural Open Space
- Research, Education, and Support

Definitions for each land use designation are provided below. Figure 4.1 illustrates the locations of these zones on the site and their relationship to the surrounding area.

Natural Open Space

The Natural Open Space land use designation applies to valuable natural areas such as the Western Stege Marsh and coastal grasslands. Activities within these areas will be limited to maintenance, field research, and education with the purpose of maintaining these resources in their natural condition. Development in this zone will be limited to minor access roads and structures, and boardwalks or pathways to facilitate maintenance, research, and education.

Approximately 25 acres within the Richmond Bay Campus will be designated Natural Open Space. Approximately fifteen of those acres are coastal terrace prairie grasslands functionally connected to the approximately ten acre Western Stege Marsh at the southern end of the site. Marshlands and mud flat parcels owned by the University south of and not included in the Richmond Bay Campus, totaling approximately 61.7 acres, will also remain in their natural condition.

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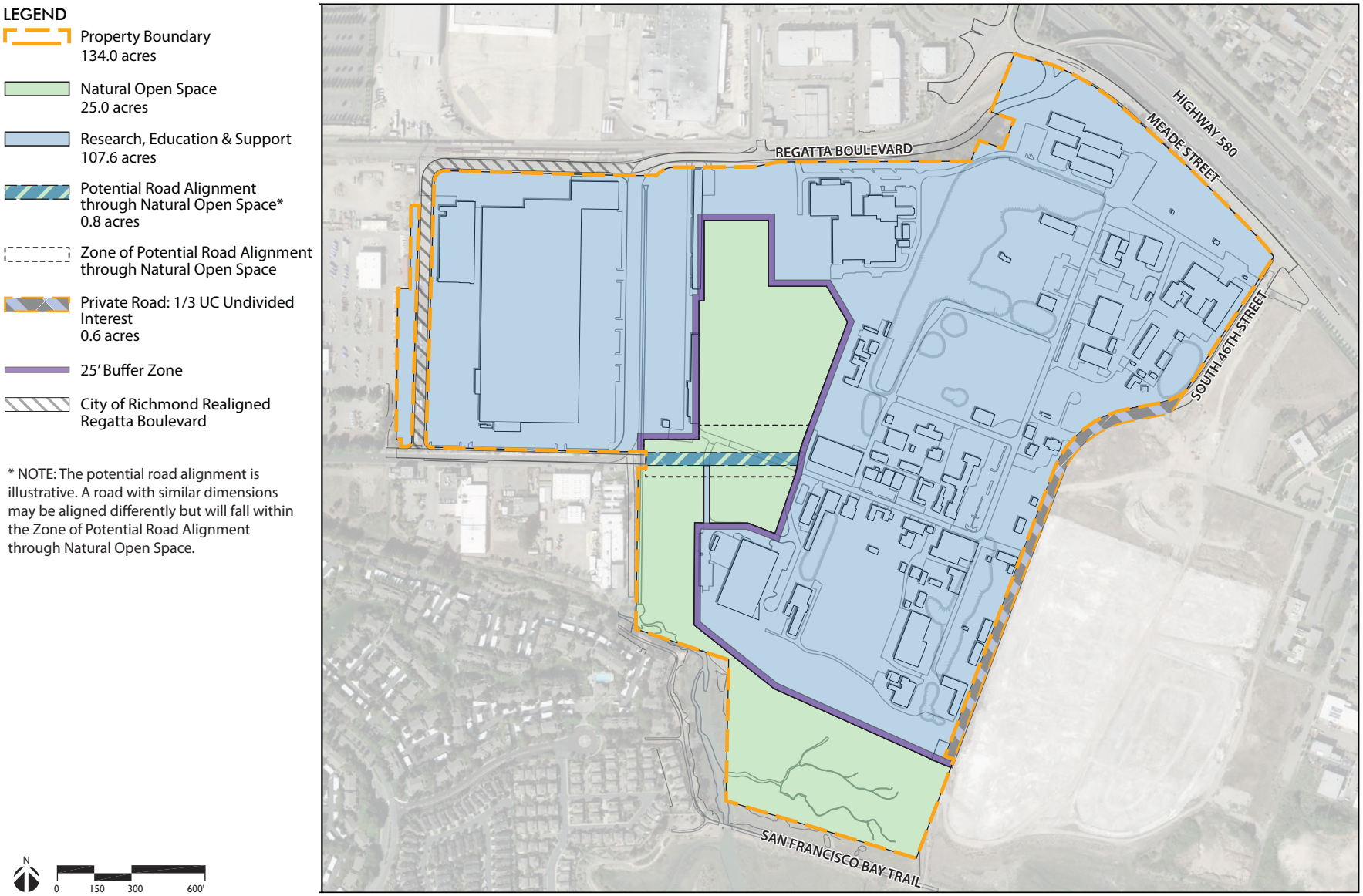
Figure 4.1: *Land Use Plan*



Research, Education, and Support

The Research, Education, and Support land use designation applies to land areas on the site that are either currently developed with facilities that will remain in their present form or be expanded, or areas that will be developed with new facilities. This land use will include 107.4 acres of the Richmond Bay Campus, which is sufficient to meet projected program needs at an appropriate density for the site. The types of facilities and activities that will be allowed in designated Research, Education and Support areas include:

- Laboratory, classroom, office, and administration buildings for researchers, faculty, postdocs, students, and non-University public and private entities.
- Product and process development space for private sector startups, small businesses, and industry counterparts that are synergistic with UC Berkeley and LBNL research areas.
- Support infrastructure and facilities for operations, transportation, utilities, renewable power generation, firefighting, security, safety, hazardous materials management, and corporation yard uses including vehicle and materials shops and storage. Support facilities for specialized research programs such as plant and animal research facilities, greenhouses, and clinical spaces.
- Community outreach and education resources including exhibit, lecture and event spaces as well as conference facilities and meeting rooms focused on public education.
- Amenities such as dining, short-term accommodation facilities (for visitors), retail, and recreation facilities.
- Transportation-related facilities including parking lots and structures, bus and shuttle stops, and roadways/circulation pathways. Parking structures may house parking administration offices, bicycle support facilities, and utility structures such as distributed central plants.
- Developed open spaces that are usable by employees and visitors, ranging from courtyards, terraces, and quad-like spaces, to walkways, tree groves, and recreational fields. Open spaces in this zone may be paved or landscaped, with or without seating or other site furnishings. They will range in scale from larger areas for outdoor gatherings to smaller spaces for small group interaction or individual reflection. Stormwater will be managed within these zones in swales, permeable landscaping, and storm drainage systems. Small structures including pavilions, overlooks, and site walls may be located in these areas.
- Transition zones to buffer development from the Natural Open Space areas, allowing for maintenance access and minimizing the transference of non-native species or noise or light intrusions. The buffer zone will disallow permanent structures within 25 feet of the Natural Open Space areas. Paving will be pervious where practical and any planting will consist of native or non-invasive species.
- Structures that protect the Richmond Bay Campus from sea level rise such as sea walls, retaining walls, or embankments.

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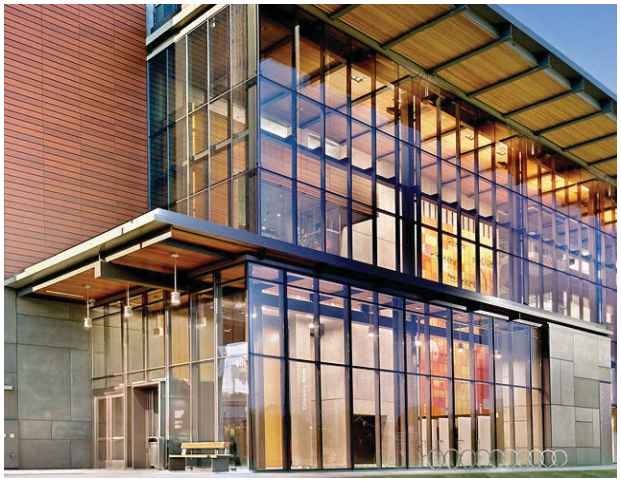
The Western Stege Marsh, as well as coastal terrace grasslands, will be designated as Natural Open Space.



Research buildings, community facilities, outdoor dining areas and plazas and developed open spaces will be among the uses included in the Research, Education, and Support designated area.

Planning Concepts

Four site planning concepts guide the overall organization of development plans for the site: the land and sense of place; neighborhoods; collaboration and interaction; and connections.

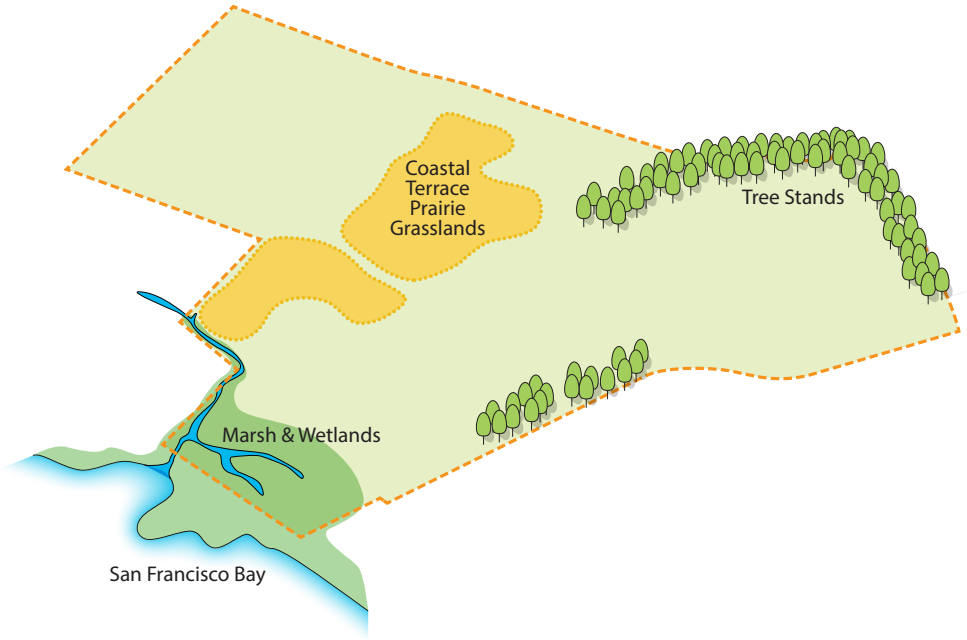
The Land and Sense of Place

The Richmond Bay Campus land use plan will preserve important natural attributes of the site, particularly the grasslands, marsh, and wetlands which are essential to maintaining the site's quality. These features will be retained as fundamental drivers of the site plan. The eucalyptus tree stands provide habitat for monarch butterflies and other wildlife and act as orienting landmarks. These non-native tree species will be replaced during development with other trees and features which perpetuate these functions as appropriate and in a manner consistent with the sustainability and landscaping policies within this LRDP.

The bay climate also has important implications for building and site design. Building layout and orientation, plus landscape design will help to block wind and create protected courtyards and other comfortable outdoor spaces. Stormwater management utilizing integrated landscape-based engineering strategies will enhance the experiential quality of the site and demonstrate commitment to sustainability. The abundant daylight will influence building orientation and provides significant opportunities for the use of daylighting within buildings. Building orientation, plus the mild temperatures will minimize the need for heating and mechanical cooling of indoor spaces.

The Richmond Bay Campus will occupy a beautiful waterfront site where building designs will take full advantage of the outstanding views from throughout the site. Near the waterfront there are clear-day views to the San Francisco skyline, the Bay Bridge, Treasure Island, and the San Francisco Bay. From many parts of the campus, views to the surrounding hillsides in Marin, Contra Costa, and Alameda counties provide visual interest and act as orienting landmarks. The design of buildings will also benefit from views on the site towards the natural features of grasslands and tree stands, and the attractive interaction spaces along the main pedestrian pathways. Views of the campus from surrounding neighborhoods and hillsides are dominated by green, blue, brown, yellow, and gray hues – the use of building finishes within this palette will minimize the visual impact of development.

As the Richmond Bay Campus is developed, a building context will be created and a new sense of place, linked to the built environment, will evolve. New buildings will relate to existing buildings and both will shape the campus identity as seen from beyond the campus boundaries. New buildings will vary in height, massing, and configuration to create a lively, diverse, and interconnected urban place.



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Neighborhoods

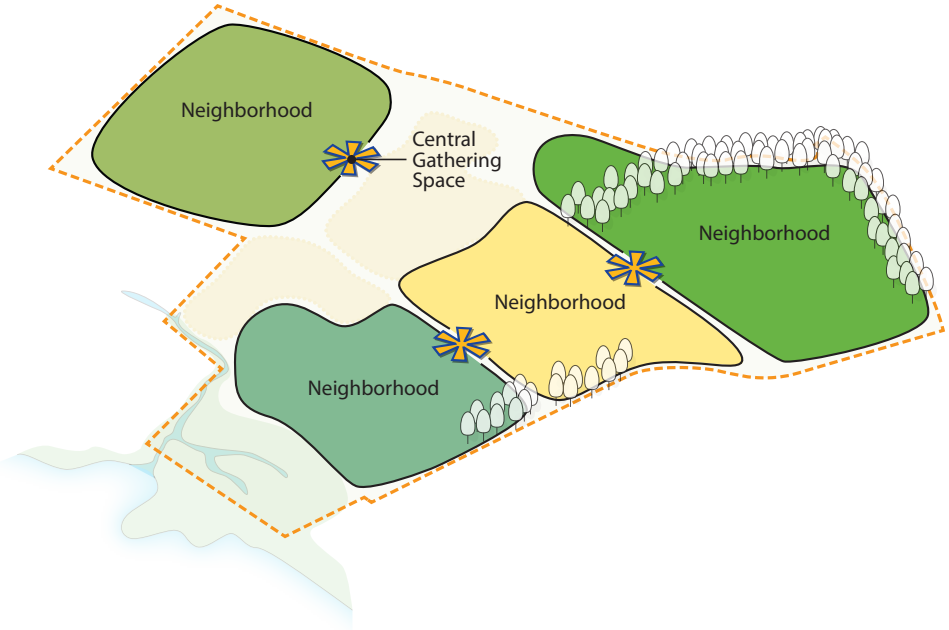
The Richmond Bay Campus will be organized by four distinct "neighborhoods" or groupings of buildings and spaces. The neighborhoods will break down the site into sectors which lend themselves to cohesive planning and development with significant economies of scale for common realm investments. Each neighborhood will be planned and designed to segregate vehicular and pedestrian uses to the extent practicable. Although parking will continue to be provided in surface lots during initial development, ultimately most parking will be structured.

Buildings will generally be oriented on an east-west axis with footprints consistent with research laboratory use that maximize passive solar orientation and minimize heating and cooling requirements. The open spaces between buildings will be configured for protection from prevailing winds. Buildings will be designed to take maximum advantage of the views in all directions.

Each neighborhood may have a unique design theme or aesthetic identity expressed through the prevailing architecture style of the time or plant material, open space, and landscaping design. These characteristics will exhibit the best practices of sustainable development to enforce the living laboratory theme of the campus.

Each neighborhood will have a central space around which concentrations of active uses—dining, meeting rooms, recreation or building lobbies—will be focused. These central spaces may also have an iconic element such as a vertical marker of substantial height, sculpture, fountain, or other landscape element to act as a place-making and orienting device. These spaces will be designed to create a more collegial environment that encourages and facilitates interaction among employees and guests.

The specific configuration and design of new development within these neighborhoods will be guided by the Physical Design Framework and concept plans cooperatively developed by LBNL and UC Berkeley. Both documents will support the goals of this LRDP and address the specific design of buildings, outdoor spaces, and circulation networks.

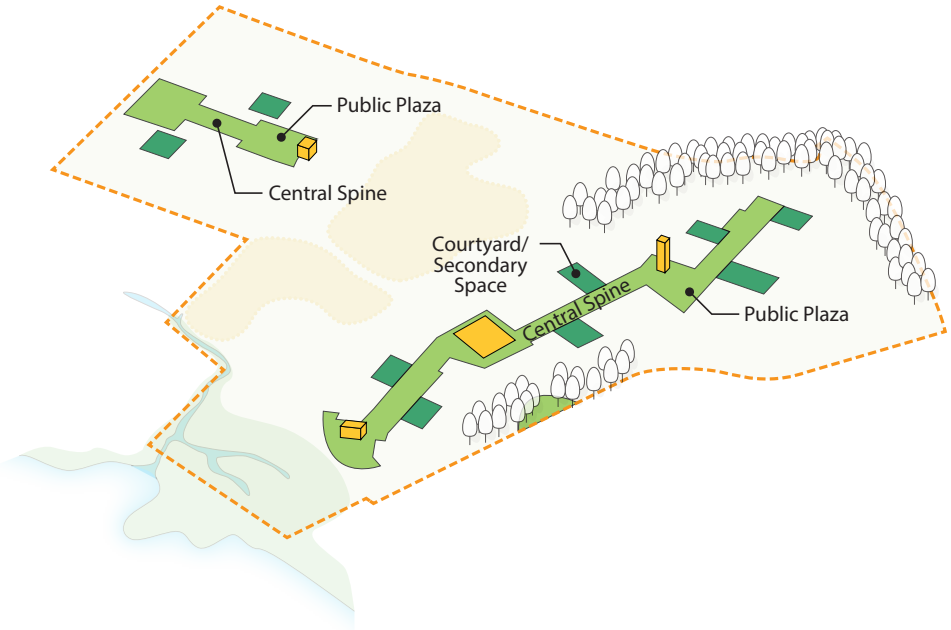


Collaboration and Interaction

Team science and collaboration, hallmarks of LBNL and UC Berkeley from their founding to present day, will be defining characteristics of the research activities to be undertaken at the Richmond Bay Campus. Buildings will be designed to facilitate teamwork, interaction, inspiration, and innovation. The use of lobbies and open stairs; the location of coffee rooms, dining halls, and restrooms; and the configuration of hallways, offices, and conference rooms will be designed to foster casual interactions which initiate important exchange of ideas and inspiration.

The campus will be designed to bring together staff, scientists, and guests from separate buildings to common spaces where they can interact on a daily basis. A north-south linear open space will be the primary pedestrian pathway connecting the central space of each neighborhood on the eastern side of the campus. Active social spaces such as building lobbies, dining venues, and meeting and special event spaces will be located along this central sequence of spaces to enliven the center of the campus. On the western side of the campus, buildings will be organized around a similar east-west open space which will accommodate public events and campus programs.

Additional outdoor collaboration and interaction spaces such as recreation fields, courtyards, and small seating areas will supplement the primary campus spaces to offer a range of choices from large group interaction to a more solitary, contemplative experience. These outdoor areas will be strategically located at major building entry points and along pedestrian routes; and will provide comfortable furnishing, lighting, and other amenities that create safe and comfortable places for collegial interaction.



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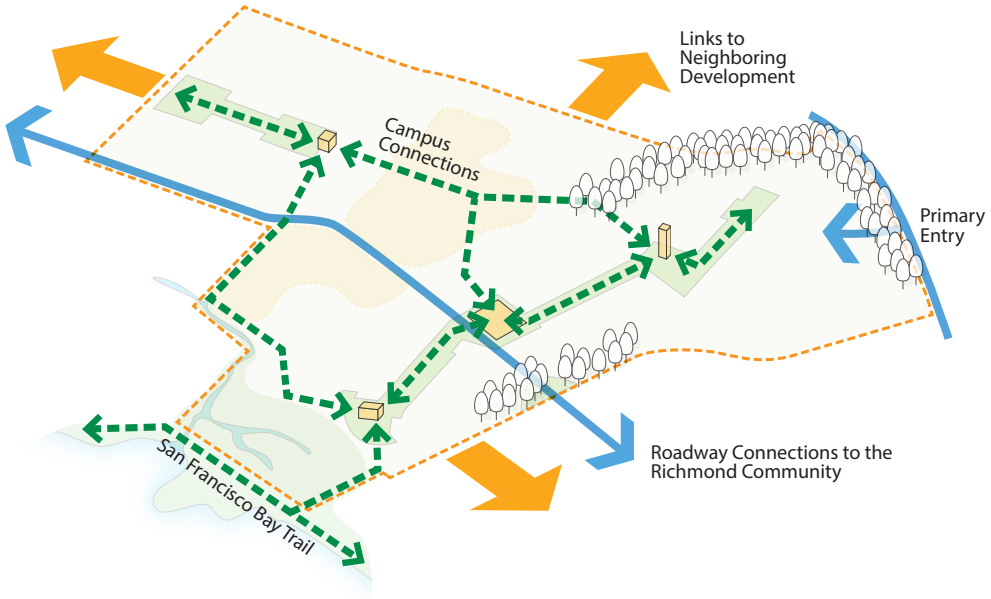
Connections

A diverse constituency will require access to the Richmond Bay Campus. The primary entry for visitors will be provided at a location on the northern edge of the site with the greatest visibility from the regional roadway network. Convenient visitor parking will be provided here and visitors will be able to access all parts of the campus from this point of origin. Parking structures will be distributed to provide for quick pedestrian access to and from campus buildings.

Circulation on campus will take place mainly by bicycle or walking. This emphasis on an auto-free environment will give the site a campus-like quality and minimize the potential for pedestrian and vehicle conflicts. At the same time, numerous pedestrian, bicycle, and vehicular connections to the surrounding community will ensure that the campus is integrated into the surrounding urban fabric.

LBNL and UC Berkeley desire an open and engaged relationship between the campus and the Richmond community. Although the site is currently fenced, as a critical mass of facilities and population is reached, the perimeter fencing will be removed and security will be provided at the building level. As the South Shoreline Area develops into the research hub envisioned by the City of Richmond, connections with adjoining institutions and potential partners will be achieved through thoughtful extensions of the public infrastructure of roads and trails, with an emphasis on creating a multi-modal environment.

Employees at the Richmond Bay Campus will also be patrons of the amenities along the Richmond shoreline. A realigned Lark Drive running east-west through the site will connect to Regatta Boulevard, forming a continuous connection through the Marina Bay area and continuing west to the Ford Assembly Building and proposed ferry landing where commuter service is projected to begin in 2015. Designed to accommodate bicycles, pedestrians and shuttles, this will be a key South Shoreline Area street connecting jobs, housing, and amenities.



Illustrative Development Scenario

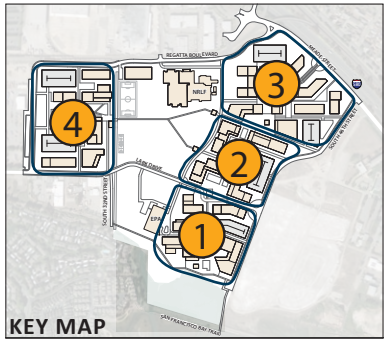
The Illustrative Development Scenario, Figure 4.2, is a conceptual portrayal of the Richmond Bay Campus at full implementation of this 2014 LRDP consistent with its goals, campus program and population projections, and Land Use Plan. The development scenario demonstrates application of the four site planning concepts and is intended to present a reasonable portrayal of the scope and scale of potential development at the Richmond Bay Campus. Its form is based on the assumptions that building configurations will vary and that all building sites will be built out to optimize the site's development capacity. The building footprints allow for typical laboratory configurations. However, it is not possible to accurately forecast the complex series of development opportunities and decisions, including future building locations, sizes, configurations, construction schedules, etc. that will comprise full implementation of the LRDP program. The actual shape and locations of buildings, organizing elements, and overall density is expected to vary as individual projects are approved, funded, and developed in the future. Therefore, the development scenario portrayed in Figure 4.2 is not intended to be a precise representation of the actual development program that will take place over the 40-year planning horizon of the 2014 LRDP.

The development scenario provides the basis for the analysis of environmental impacts due to full implementation of the LRDP program. In addition, the organization of the illustrative plan informs the circulation, open space, and infrastructure element sections which follow.

Table 4.1 shows the breakdown of the proposed building space and population by neighborhood.

Table 4.1: *Projected Building Space and Population by Neighborhood*

	GSF	Population
Neighborhood 1	813,000	1,700
Neighborhood 2	780,000	1,700
Neighborhood 3	1,880,000	4,000
Neighborhood 4	1,284,000	2,800
EPA & NRLF	651,000	70
TOTAL	**5,408,000**	**10,270**



Development Density

New development will realize the potential of the campus in a manner that balances density with an attractive environment. Building heights will vary with lower buildings at the waterfront edge and taller buildings in the northern and western areas of the site. Building size, shape, and finishes will be varied for visual interest on site and views into the campus from off site. Rooftops visible from upslope facilities as well as from beyond the campus will be designed with sensitivity to external viewers as well. Figure 4.2 illustrates a thoughtful approach toward creating an urban fabric that will provide the needed building area while preserving natural features, view corridors, and access to light and air.

Density, measured by the ratio of building floor area to the area of a site (FAR) is an important indicator of development character. The current overall FAR of the Richmond properties is 0.22 considering the existing 1,050,000 gross square feet (gsf) of building space and the proposed 107.4 acres of land use designated Research, Education, and Support. With the occupied building area increase to 5,400,000 gsf projected in this LRDP the Richmond Bay Campus FAR will be 1.15. For reference, the City of Richmond's Business/ Light Industrial General Plan land use designation for adjacent properties allows a density range of 0.25 to 3.0 FAR.

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Figure 4.2: *Illustrative Development Scenario*

Land Use Policies

The land use policies that follow support the vision that the Richmond Bay Campus will be a distinctive, attractive and inspirational place to conduct world-class collaborative science.

LU1 **Land Use Policy on Development Capacity: Provide for development of up to 5,400,000 square feet of facilities.**

- Maximize density to reduce overall building footprints, conserve open space, and share attractive views.
- Vary building heights for visual interest on site and views into the campus, with lower buildings at the waterfront edge and taller buildings in the northern and western areas of the site.
- Convey the values of the campus in each phase of development.

LU2 **Land Use Policy on Character: Provide a setting capable of attracting new research programs and retaining world class researchers.**

- Support excellence in building design that is harmonious with the waterfront location and creates visual variety in form and massing. Include iconic structures or buildings on the campus.
- Locate and design buildings, rooftops, open space, and circulation routes to allow for a variety of view corridors within and beyond the campus.
- Create a distinct identity and sense of place by preserving and enhancing the site's assets including the grasslands, marsh, and bayfront areas.

LU3 **Land Use Policy on Inspiration: Facilitate the casual interactions and new awareness of synergistic research which leads to inspiration and innovation through the layout of the campus, provision of amenities, and design of buildings and spaces.**

- Plan initial development to create a critical mass of core facilities and research programs selected to attract future synergistic enterprise.
- Design buildings to include uses such as informal meeting zones, open stairways, light-filled lobbies, and transparent walls which promote the exchange of new ideas.
- Provide amenities such as cafes, sculpture gardens, public art, recreation fields, and outdoor gathering places at multiple scales with weather protection where feasible for casual interaction, contemplation, and community-building activities.
- Develop the campus to become the centerpiece of a vibrant and revitalized South Shoreline Area, serving as a catalyst for additional development on nearby properties.

LU4 **Land Use Policy on Growth: Ensure that the Richmond Bay Campus grows in a logical and cost-effective manner.**

- Retain existing uses on campus for as long as possible and evaluate opportunities to retain or relocate uses on site for the long term.
- Concentrate development to preserve future capacity while maintaining natural areas.
- Create complete collections of buildings and open spaces as development progresses.
- Phase growth to create the critical mass of activities and population needed to support amenities.
- Plan and develop infrastructure to allow logical and cost effective extensions to support future development.
- Implement LRDP provisions for development undertaken by the private sector for synergistic uses by public or private entities.

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LU5 **Land Use Policy on Community: The Richmond Bay Campus will be an asset to residents of local East Bay communities.**

- Provide programs and facilities on site that can be used for education and outreach to the local community including an arts program that helps to establish the campus as a visitor destination.
- Support integration of the campus into the Richmond South Shoreline Area; remove peripheral fencing as adequate population is achieved; and consider adjacent uses in decisions on building siting and design.
- Allow convenient multi-mode access to the campus and promote public transit, bicycle, and pedestrian transportation modes.
- Identify Lark Drive and Regatta Boulevard as streets where the public realm will be designed to integrate with the neighboring community fabric.

ACCESS, CIRCULATION AND PARKING

Context

Access to the University's Richmond properties is most conveniently gained by motor vehicle (see Figure 4.3). Two I-580 freeway interchanges, Bayview Avenue and Regatta Boulevard, provide relatively direct access via Meade Street; more indirect access can be gained from the Marina Bay Parkway/23rd Street interchange.

The Richmond Field Station portion of the site currently has one primary entrance from Robin Drive at Seaver Avenue near South 46th Street. The entire Richmond Field Station site is fenced; additional gates are located on South 46th Street and on Regatta Boulevard, but are not currently open on a daily basis. The Regatta site is also fenced; its entrances and parking lots are most conveniently accessed from the north-south portion of Regatta Boulevard. Motor vehicle parking is currently accommodated in surface parking lots distributed throughout both properties with approximately 760 spaces existing in 2013.

Three BART stations are located within three miles of the site: Richmond (which also has an Amtrak station), and El Cerrito del Norte and El Cerrito Plaza (which have AC Transit and other bus system connections). No shuttles currently operate from these stations to the site. A limited number of shuttles run between UC Berkeley and the site on weekdays.

Bicycle access to the site is possible from all directions. The Bay Trail crosses the southern edge of the site and links to the South Shoreline Area and other communities beyond. Access to the City of Richmond in the easterly and northern directions is also convenient via the Bayview Avenue, Regatta Boulevard, and Marina Bay Parkway/23rd Street overpasses. The Bay Trail provides a continuous connection between the site and the cities of Richmond, El Cerrito, Albany, Berkeley and Emeryville, and connections from the Bay Trail, Ohlone Trail, and UC Berkeley will be available in Albany via Buchanan Street.

A ferry terminal is proposed for the South Shoreline near the Ford Assembly Building with a direct commuter service connection to and from San Francisco projected to begin in 2015. This terminal would be less than three miles from the Richmond Bay Campus by motor vehicle or a 15-minute bicycle ride on the Bay Trail.

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Figure 4.3: *Regional Access*

Access, Circulation and Parking Development Framework

UC Berkeley and LBNL have successful transit systems and transportation demand management programs which encourage cycling, walking, and transit use; and allow for alternative work schedules, telecommuting, and video conferencing. Appropriate elements of these strategies will be implemented at the Richmond Bay Campus. Convenience and safety in commuting whether by BART, bus, shuttle, ferry, bicycle, walking, or vehicle will support the attraction and retention of the workforce. Connections between the Berkeley and Richmond sites will also be necessary since researchers, faculty, staff and students may often be on multiple sites in a single day.

While the plans for the Richmond Bay Campus emphasize access by bicycle and shuttle transit, the campus will also have a vehicular access framework that serves multiple entry points, facilitates convenient deliveries, and slows traffic to support pedestrian and bicycle safety (see Figure 4.4).

Access

The Richmond Bay Campus will be designed to encourage convenient access from multiple directions for both campus employees and the community. Multiple access points will be developed as follows:

- Visitor arrival points will be located at central, well-defined locations to ensure clarity for infrequent visitors and ease of access to visitor parking.
- Secondary entrances will provide access to perimeter parking structures for campus commuters. These entrances will restrict access to maintain a safe, pedestrian-oriented campus.
- Gateway elements at all entrances will be designed to present a welcoming campus image.
- Service and delivery bays on buildings will generally be located at the perimeter of each neighborhood, when possible, to limit large service vehicle access to the pedestrian-oriented campus.
- The existing access to the Bay Trail will be improved to accommodate an increased volume of bicyclists.

Vehicular Circulation

Improvements will be made to the street system on and adjoining the Richmond Bay Campus (see Figure 4.4) to enhance site access and connectivity with the local community, including the following:

- Regatta Boulevard will be relocated to the western edge of the campus from its current north-south location east of the Regatta Building, in coordination with the City of Richmond Engineering Services Department. The re-routed Regatta Boulevard will intersect at the southwest corner of the campus with an extension of Lark Drive. This reconfiguration will create a contiguous 134-acre site to be developed and managed as the Richmond Bay Campus. The public realm along the re-aligned Regatta Boulevard would be designed to integrate with the neighboring community fabric.
- Lark Drive will pass through the campus approximating its current alignment and extend to Regatta Boulevard at the western edge of the site. On the east side of the campus it will intersect with South 46th Street. Lark Drive will provide an important link to adjoining research and industrial districts to the east as they are developed in the future. It will also be the primary route, together with Regatta Boulevard, to connect the campus workforce with the amenities and services (parks, cafés and restaurants, the ferry landing) along the Marina Bay shoreline to the west. Additionally, it will provide public access into the campus. This street will be designed to calm traffic with elements such as narrow roadway width, intersection treatments (e.g., curve radii), and special paving that prioritize pedestrian and bicycle travel and safety. The open space north of Lark Drive will be physically connected to the open space south of Lark Drive with a culvert under the road to provide safe passage for wildlife. The public realm along Lark Drive will also be designed to integrate with the neighboring community fabric. (see Figures 4.5 and 4.6)
- Peripheral Streets on the borders of the site, such as South 46th Street, will provide access to parking structures and service routes. They will also be part of the larger transit, pedestrian, and bicycle network surrounding and serving the campus. Sidewalks and bicycle lanes will be provided on all peripheral streets.

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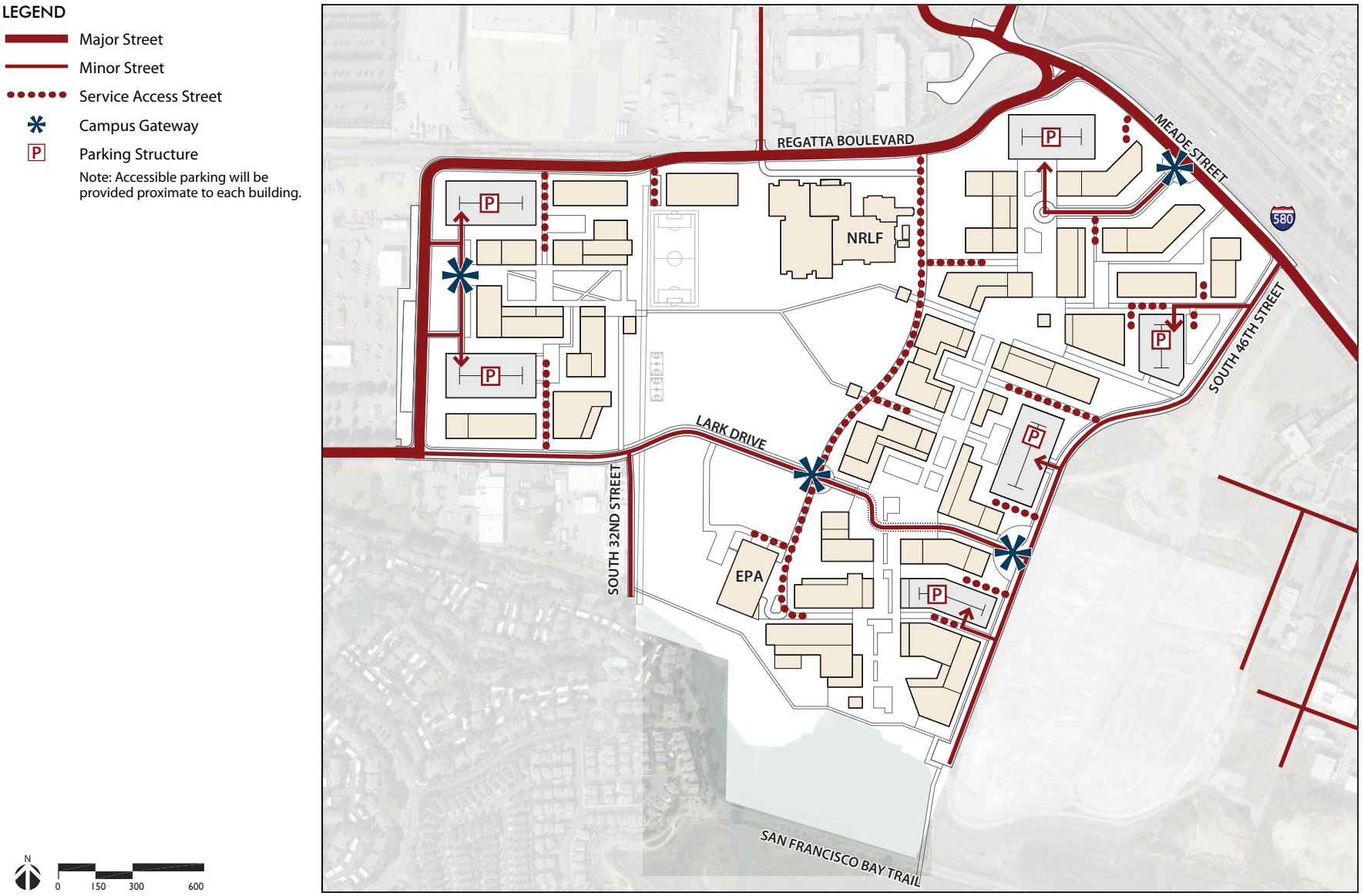
Figure 4.4: *Vehicular Circulation*



- Service Access Streets will allow maintenance and delivery vehicles to access the service courts of individual buildings (see Figures 4.7 and 4.8). These streets will be accessed from peripheral streets where possible and will extend into the campus as far as loading docks or service entries. Service vehicles will be limited to these specific corridors. The streets will be designed to encourage use by pedestrians and bicycles; general vehicular traffic will be restricted. Along the grassland's eastern perimeter, a service access street will provide maintenance access to the natural areas while serving as a buffer from the active campus uses (see Figure 4.8). Plantings, lighting and signage will be compatible with the adjoining natural areas and typically be located on the developed side of the street.

Figure 4.5: *Section - Lark Drive at Grasslands*

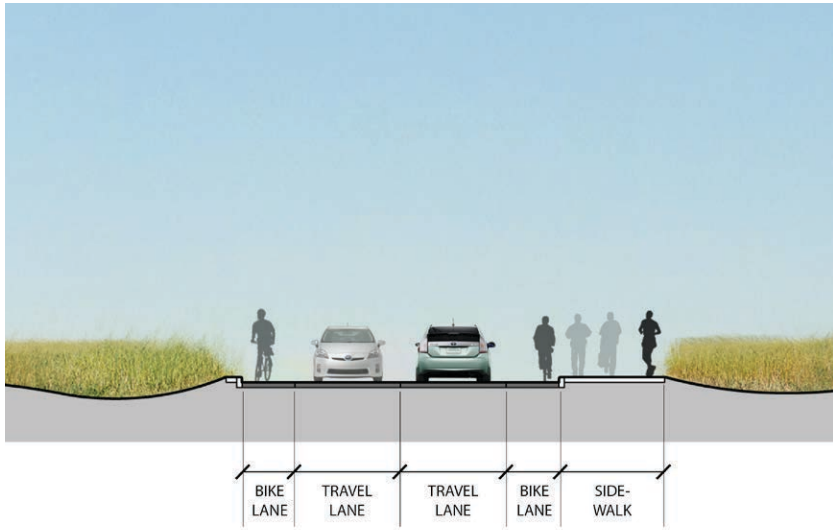
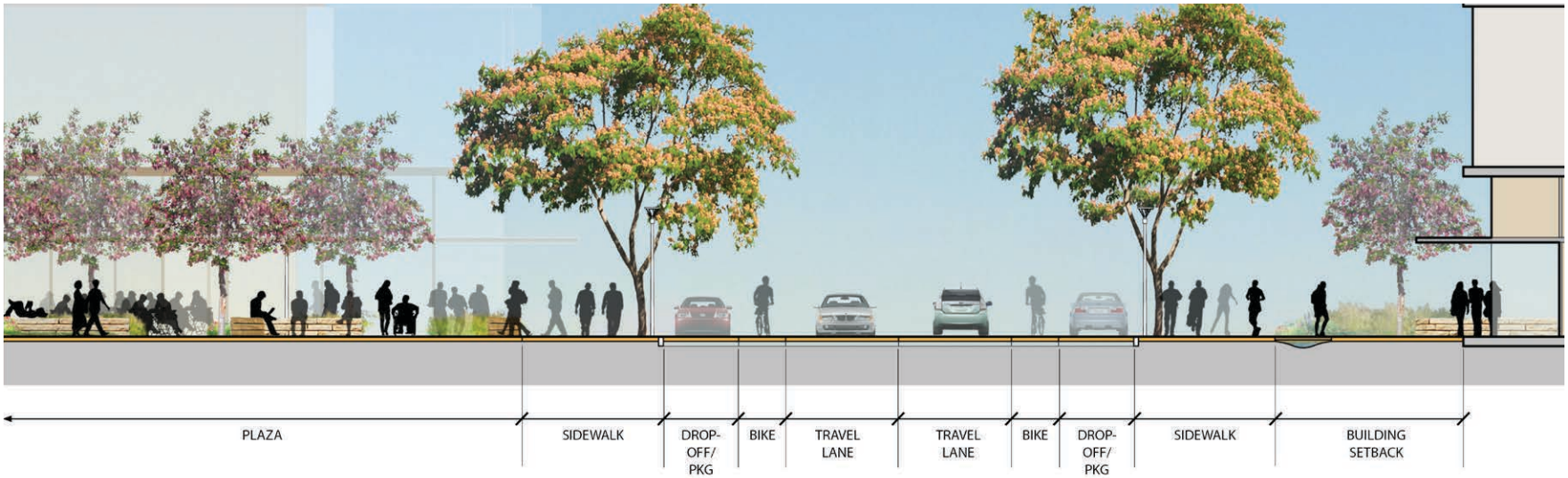


Figure 4.6: *Section - Lark Drive at Central Spine*



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4.5 Lark Drive at Grasslands

4.6 Lark Drive at Central Spine

4.7 Service Access Street between Buildings

4.8 Service Access Street at Grasslands Edge

4.9 Central Spine

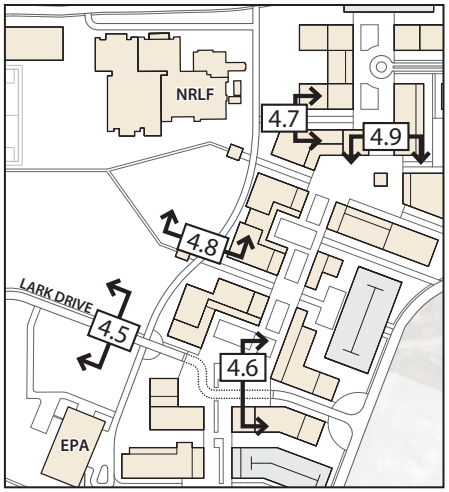


Figure 4.7: *Section - Service Access Street between Buildings*

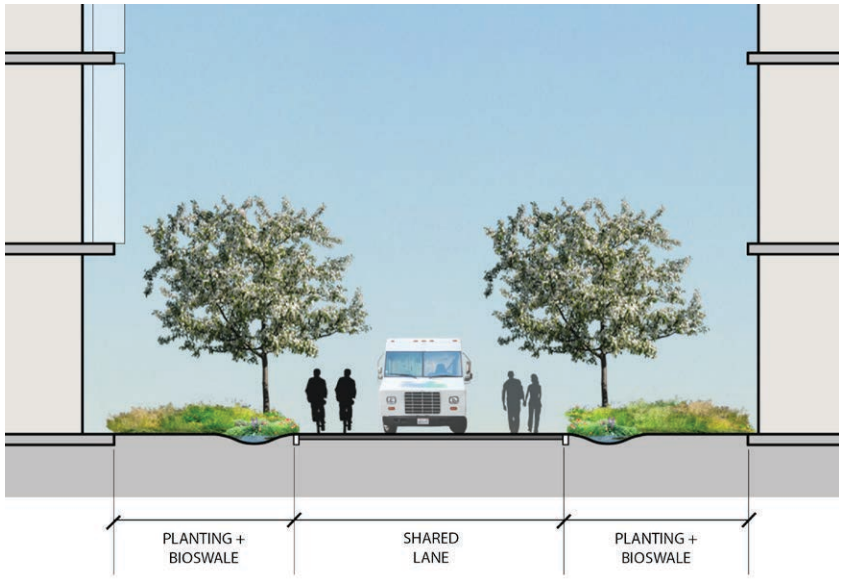
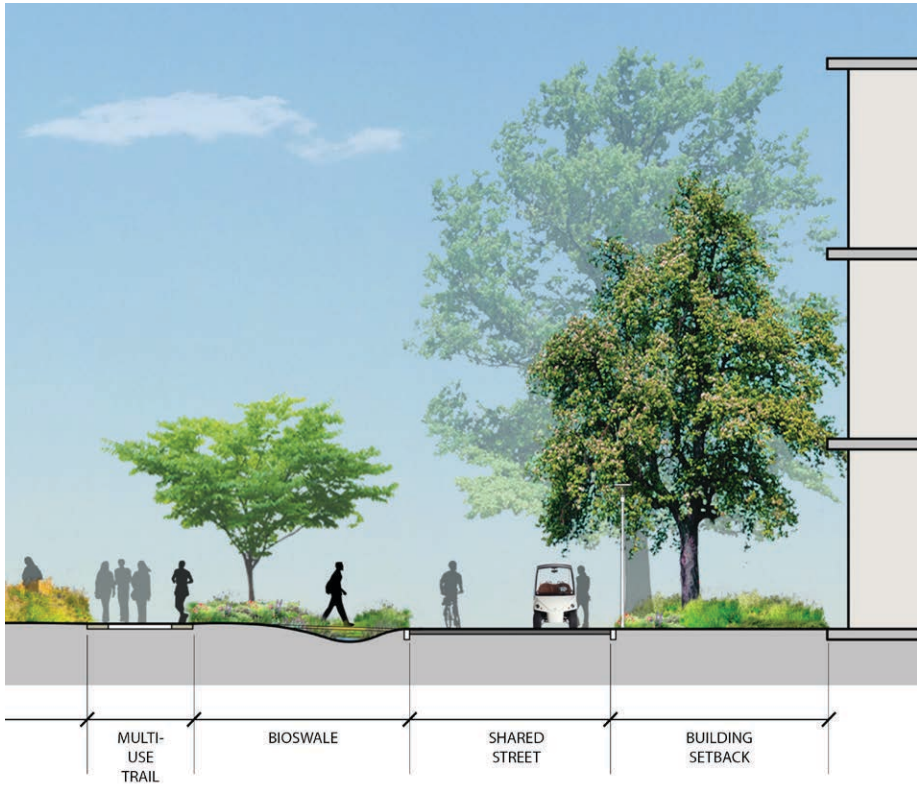


Figure 4.8: *Section - Service Access Street at Grasslands Edge*



Pedestrian and Cycling Circulation

The street network, such as that depicted in the illustrative development scenario, is intended to create a pedestrian-friendly environment with narrow streets and traffic calming features. Pedestrian access will be accommodated virtually unimpeded throughout the campus (see Figure 4.10). A central pedestrian and bicycle spine will extend throughout the three eastern neighborhoods from the visitor entry in the north to the bayfront in the south as well as east-west through the western neighborhood. These spines are intended to be the primary pedestrian orienting and movement passageways for the campus, linking most buildings and users (see Figure 4.9).

The central spine will contain a mix of landscape and built environments with views to the bay, wooded areas, and grasslands; as well as spaces that are protected from channeled southwesterly winds. As a consequence, rather than a single linear space, the central spine will take on different alignments along its length, providing a range of views and sheltered spaces. Areas for stormwater retention will also be incorporated into the central spine and the hardscape will be pervious where practical.

Raised boardwalks will extend across and in some locations around the grasslands and marsh. These will be sited and designed for minimum intrusion into these sensitive areas. They will provide connections between the western and eastern developed areas and also traverse the southern part of the site along the Western Stege Marsh and Meeker Slough. This southern walkway will connect to the proposed Bay Trail staging areas at South 32nd Street and South 46th Street. These trails will be designed in accordance with conservation goals and marked to minimize access into sensitive areas. They will also be accompanied by interpretive signage and other educational elements.

Service access streets throughout the Richmond Bay Campus will be part of the pedestrian network as well. Paving and signage will communicate the

Figure 4.9: *Section - Central Spine*

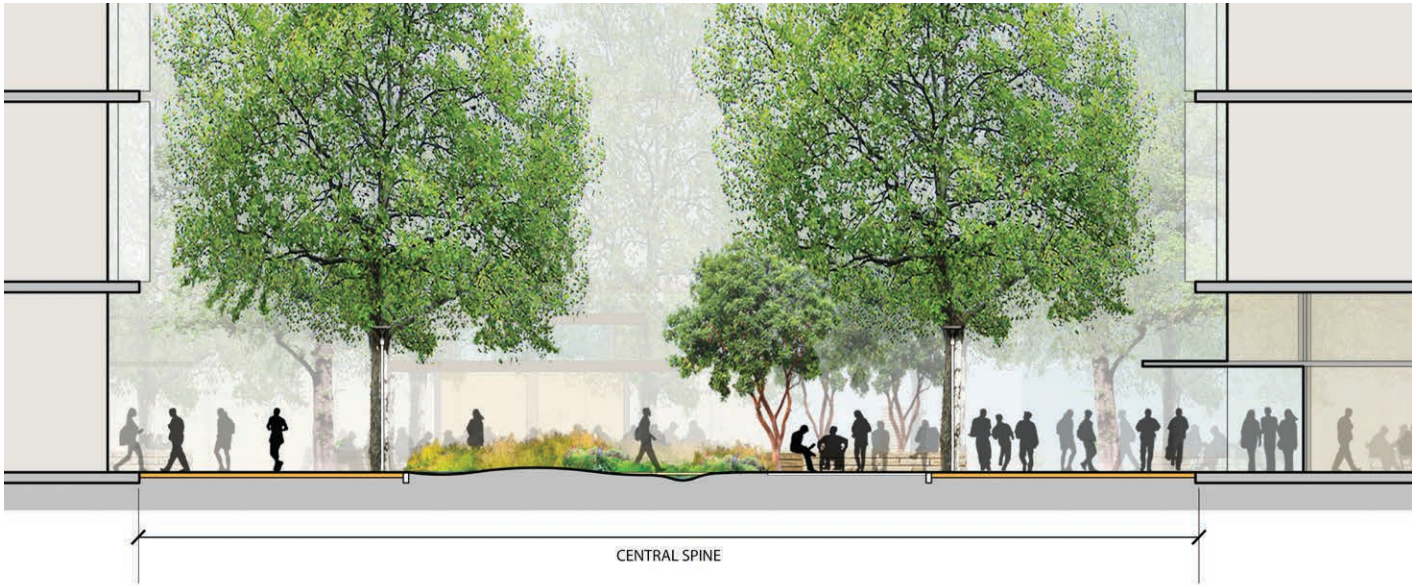


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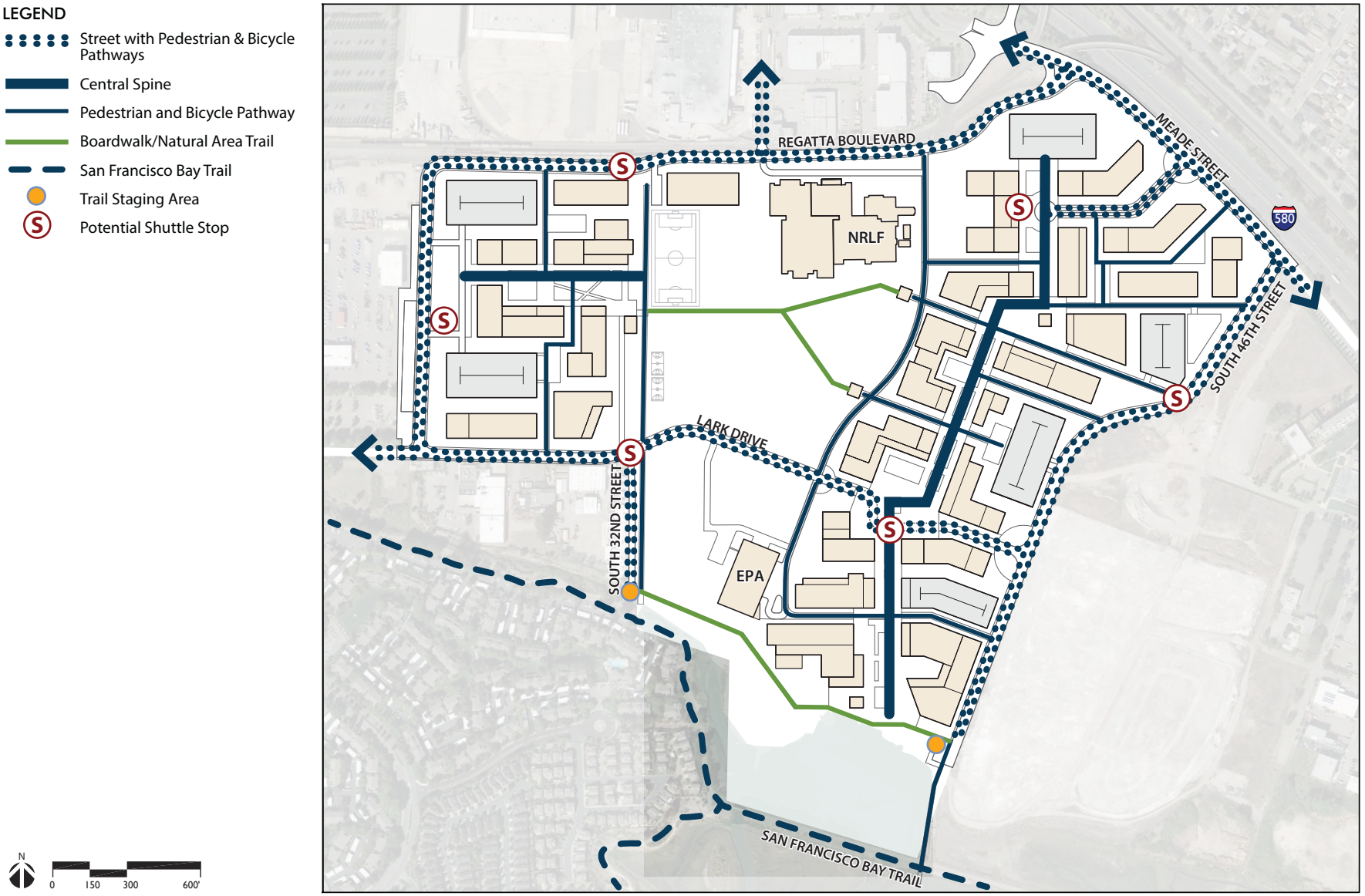
Figure 4.10: *Pedestrian and Cycling Circulation*



shared nature of these corridors. Wherever possible, loading docks and maintenance areas will be located along the neighborhood perimeter to minimize potential conflicts with pedestrians and bicyclists.

The Bay Trail provides convenient access regionally along the bay throughout the Richmond, Albany and Berkeley waterfronts. Direct access from the Bay Trail into the Richmond Bay Campus will make bicycling a viable and convenient commuting option. The bicycle committees at LBNL and UC Berkeley have recommended route improvements for consideration in the City of Richmond's pending circulation plan for the South Shoreline Area. Bicycle access from BART will be similar to the shuttle when factoring in the total time of travel to a specific destination on campus.

On-street bicycle lanes located on Lark Drive, Regatta Boulevard, and South 46th Street will provide bicycle access to campus. Bicyclists will also be permitted to use the shared streets and pedestrian pathways that are otherwise limited to service vehicles and/or pedestrians on campus. All shared pathways will be designed to provide adequate width for safe travel by all modes – typically 12 to 16 feet. If increased bicycle traffic volumes raise concerns for pedestrian safety, measures such as designating bicycle walking zones or separate routes will be implemented. Bicycle parking will be provided throughout the campus in convenient, visible, and secure locations.

Transportation and Parking

As the Richmond Bay Campus grows, development will occur on many of the existing surface parking areas, and new parking will be provided in parking structures. Structured parking is desirable on the campus to maximize building capacity for research and support space dedicated to the campus' mission. Structured parking will also allow for more land to be preserved as open space throughout the campus.

UC Berkeley and LBNL have robust transportation demand management (TDM) plans at their existing campuses, and will use their experience to develop a TDM plan for the Richmond Bay Campus. The goals of the TDM plan will be to create a program that could evolve and adapt as the campus grows, to partner with the City of Richmond and other public or private entities housed at the campus, and to minimize parking demand over the long term.

Parking demand rates per employee, student, or visitor are expected to be higher in the earliest phases, and be reduced as the Richmond Bay Campus matures. The campus "drive-alone" rate is projected to be 50% at full implementation of the LRDP which will result from the implementation of programs such as more robust local transit, shuttles to BART, bikeways, shuttles to UC Berkeley and the main LBNL site, carpooling/rideshare matching services, car share access, and convenient bicycle parking. These programs will ultimately result in a relatively "low traffic, low carbon" condition where the drive-alone rate for the Richmond Bay Campus approximates the current drive-alone rates for the LBNL main site (55%) and UC Berkeley employees and staff (43%).

While these rates are aggressive given that the Richmond location has much less transit access than the Berkeley sites, with opportunities for employees to live nearby, as well as enhanced transit service, shuttles, and improved bicycle and pedestrian access, they are reasonably achievable during the development of the campus. Additional parking will be provided for carpool, visitors, government, University, and vendor vehicles resulting in an overall parking space ratio of approximately 60% relative to the daily population at full implementation of the LRDP.

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Table 4.2: *Projected Parking Demand by Neighborhood*

	Parking Demand
Neighborhood 1	1,000
Neighborhood 2	1,000
Neighborhood 3	2,300
Neighborhood 4	1,600
EPA & NRLF	40
TOTAL	**5,940**

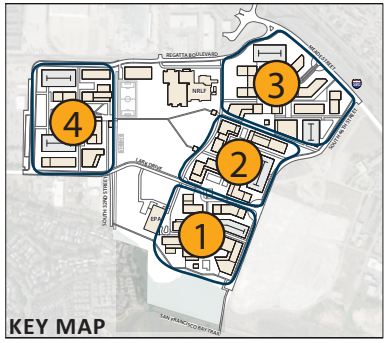

Table 4.2 shows the projected parking demand for the Richmond Bay Campus at full implementation of the LRDP program. Distributed into the "neighborhoods" described earlier, it represents a logical correlation of parking with facilities and population on campus. The minimized parking capacity will help reach sustainability goals by encouraging multiple-occupant vehicle commuting. As shown in the illustrative development scenario, parking structures are intended to be located at the periphery of the campus, leaving the interior free for unconstrained pedestrian movement.

Transit

Convenient access to and from the Richmond Bay Campus by public or privately operated transit will be critical to the success of the campus and will help to minimize vehicle trips and their associated parking needs and greenhouse gas emissions. In the near term, expanded shuttle routes will carry campus employees to and from BART as well as the main UC Berkeley and LBNL sites. Over time, additional shuttles will connect site users to the planned ferry terminal near the Ford Assembly Building as well as to other off-site destinations such as dining establishments and convenience retail in the Marina Bay neighborhood or downtown Richmond.

Shuttle routes and stops will be located throughout the Richmond Bay Campus in locations designed to minimize walking distances to buildings. The on-site shuttle route and stops will be adjusted as required with development phasing. Figure 4.10 illustrates shuttle stops as they might be distributed at full implementation of the LRDP program. Seating and shelter will be provided at each stop and, when possible, stops will be co-located with other on-site activities such as cafes or plazas. Attractively designed shelters will function as wayfinding and placemaking elements on the campus. Shuttle routes will also be indicated with special paving material or finish to assist with navigation and raise awareness of shuttle options.

As additional development takes place on sites surrounding the Richmond Bay Campus, there will be an opportunity to coordinate shuttle routes with other property owners to enhance their viability and efficiency.

Access, Circulation, and Parking Policies

Access and circulation policies in the LRDP support the principles that the Richmond Bay Campus will facilitate sustainable land use and circulation patterns; coordinate planning with the City of Richmond for the South Shoreline Area and maximize connectivity to the surrounding community; be easily accessible from LBNL and UC Berkeley; and fully accommodate all travel modes.

The following four policies will guide Richmond Bay Campus access and circulation with the goal of implementing a comprehensive multimodal transportation plan.

ACP1 **Access and Circulation Policy on Connectivity: Ensure that the Richmond Bay Campus is readily accessible through a variety of transportation modes, including transit (BART, Amtrak, AC Transit, and ferry) and shuttle services as well as bicycle and pedestrian routes.**

- Coordinate connectivity plans with City of Richmond transportation plans for the South Shoreline Area and provide convenient connections to City neighborhoods, one or more BART stations, and commercial areas.
- Work with city, regional, and state authorities to facilitate bicycle and shuttle transportation network improvements between the Richmond Bay Campus and the Berkeley campuses.
- Implement campus shuttle service improvements with initial development and additional improvements as needed for each project implementing the LRDP.
- Provide robust electronic infrastructure to promote virtual connectivity, telecommuting, and remote teleconferencing.
- Facilitate the improvement of connections to transit service, ferry service, and bicycle and pedestrian pathways and provide convenient access between the Richmond Bay Campus and nearby amenities.

ACP2 **Access and Circulation Policy on Sustainable Access: The Richmond Bay Campus will feature and prioritize access to, from, and around the site by sustainable means.**

- Develop a transportation demand management plan to identify strategies for reducing single vehicle trips and encourage travel by other modes. Prioritize convenient access and entries for transit vehicles. Make shuttle use appealing for employees and visitors through frequent scheduling; display real time arrival information at key stops, building lobbies, and over the network; integrate CCTV and/or emergency phones into shuttle stops; and provide network access in shuttle vehicles.
- Target less than 50% of all trips being made to the campus in single occupant vehicles by supporting alternative modes of transport.
- Maximize convenient access for employees and visitors, particularly in early stages of campus development. Manage parking to facilitate travel between the campuses.
- Encourage bicycle use through provision of convenient and secure bicycle parking and maintenance facilities, including showering facilities and changing rooms. Provide bicycle parking for a minimum of 20% of anticipated peak period occupants of new buildings.
- Implement a bicycle sharing program, with bikes to “borrow” at convenient locations in each campus neighborhood, to encourage biking among campus and nearby destinations.
- Ensure shuttles and other modes serving the campus are equipped with racks to carry bicycles and maximize the capacity of the racks.
- Capitalize on sustainable transportation research conducted at the Richmond Bay Campus and elsewhere, implementing new practices and technologies on the site. Support alternative energy and hybrid vehicle use in shuttles, service, and personal vehicles.
- Improve the pedestrian and bicycle connection between the Richmond Bay Campus and the Bay Trail, construct the proposed staging areas for Bay Trail access, and provide appropriate access to open space areas.
- Provide infrastructure to improve sustainability of vehicle-related travel, such as electric charging stations.

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ACP3 **Access and Circulation Policy on Pedestrian Priority: Create a pleasant, safe, and convenient pedestrian environment that encourages pedestrian circulation within and around the campus.**

- Design site circulation to separate vehicular traffic from walking areas except on shared service roads.
- Provide safe, attractive, and efficient walking connections between shuttle stops, facilities, and parking.
- Design pedestrian routes to be attractive, interesting, and educational.

ACP4 **Access and Circulation Policy on Parking: Implement convenient parking in a phased, cost-effective manner.**

- Provide accessible and service vehicle parking adjacent to buildings.
- Locate visitor parking to be convenient and easily accessible from primary campus entrances.
- Provide parking in surface lots in the early years of development in the areas of future development sites.
- Provide parking structures as the campus is developed over time to minimize the amount of land devoted to parking.
- Provide limited-time street parking on the segments of Lark Drive and Regatta Boulevard where retail and other amenities are located.

OPEN SPACE AND LANDSCAPE

Context

The Richmond Bay Campus natural landscape links culture with nature and the past with the present. The trees, grasslands, and marsh are well-managed and highly valued for their inherent interest, contribution to local distinctiveness, and artistic inspiration. They provide a range of ecosystem services and heavily influence the character of the site.

The pine and redwood trees along the northern perimeter of the campus provide an attractive visual screen for views of the site from the north. The eucalyptus trees, originally planted as a blast buffer for the legacy explosives manufacturing activities located at the site, now serve as a visual landmark from surrounding areas and provide habitat for a variety of wildlife. However, the eucalyptus trees are not native, are prone to limb breakage, and are a fire hazard.

The coastal terrace prairie grasslands, shown on Fig. 2.4, are a remnant of what was once common in the East Bay. These grasslands provide opportunities for preservation, education, on-site interpretation, and expanding the views of locations beyond the campus.

The Western Stege Marsh at the southern extent of the site has been the focus of ongoing maintenance and restoration. Efforts by UC Berkeley have returned much of the marsh's original habitat value. This waterfront area of the site provides an attractive foreground to long views across the bay from the southern campus neighborhood.

Open Space and Landscape Development Framework

Although over one million square feet of existing facilities currently exist on the Richmond Bay Campus site, it has a feeling of openness rural in nature. The dominant eucalyptus in the north, grasslands in the center, and bay views and marshes in the south inform the character of the usable outdoor space of the site. Each of the four neighborhoods envisioned for the campus has a location within the larger site that provides clues as to how the open space and landscape help to create the campus' identity. The gentle slope of the site toward the south will allow bay views from taller buildings in the north or from the southerly outdoor areas; this slope will also inform site grading and drainage and influence the selection of materials and plantings. The configuration, programming, and design of open space at the campus will support the interactive nature of the research endeavors.

Elements of the Richmond Bay Campus open space development framework include:

- Pathways and Streets
- Gathering Spaces
- Recreation Areas
- Informal Landscape

Figure 4.11 is a diagrammatic illustration of the open space framework.

Pathways and Streets

The streets within the Richmond Bay Campus will provide access around the site for pedestrians, bicyclists, and service vehicles and serve as part of the open space network. Lark Drive will be configured to promote pedestrian and bicycle use and discourage high vehicle speeds. Service access streets will be designed to be comfortable for pedestrians with paving, lighting, and signage that signals to drivers that these are shared by multiple modes.

The central spine will contain a mix of landscape and built environments; courtyards, plazas, paths, and overlooks will all be found along its length. Views will be provided to the bay, wooded areas, and grasslands; and spaces that are protected from channeled southwesterly winds will be created. As a consequence, rather than a single linear space, the central spine will take on different alignments along its length, providing a range of views and sheltered spaces. Areas for stormwater retention will also be incorporated into the central spine and the hardscape will be pervious where practical.

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Figure 4.11: *Open Space Framework*

Landscaping and built elements such as street lighting along the urban sections of Lark Drive and Regatta Boulevard might be integrated seamlessly with similar elements located throughout the South Shoreline Area. Views to Marin County will be visible along Lark Drive and a more intimate environment will be developed along Regatta Boulevard. Areas for stormwater retention will also be incorporated into the landscaping.

Gathering Spaces

Diverse gathering spaces, ranging from open areas with high visibility to smaller, intimate spaces will be provided throughout the site. Major spaces or commons will be located along the central spine. All gathering spaces will be designed to provide shelter from inclement weather and sunny places to linger. More intimate spaces like courtyards, alcoves, patios, and other outdoor rooms will accompany each facility and may be fully protected, located within the perimeter of the building, or at an edge opening to the central spine, grasslands, or forest.

Ornamental, non-invasive landscaping will be used to add color and visual interest where high levels of pedestrian or vehicle traffic occurs at the main campus entrances, common areas, and small gathering areas within the developed portions of the site. The developed areas of the campus, corresponding to research clusters, support areas, and parking lots are currently landscaped with a variety of plant materials. This strategy will be continued as aging or outdated facilities are removed and new development occurs.

Recreation Areas

An outdoor recreation area suitable for informal games of basketball or soccer will be located to the east of the western campus neighborhood, providing a significant amenity for the campus that could potentially be used by community members as well. Smaller facilities such as basketball or volleyball courts will also be provided in this area or at locations throughout the site.

Informal Landscape

The Richmond Bay Campus will sit within an informal landscape setting. In addition to the areas designated Natural Open Space, grasslands, trees and other plantings will surround and extend into the developed areas of the campus.

Monitoring and proactive maintenance of the grasslands and marsh, which are threatened by invasive species, will add biological value and promote the visual interest of these areas. Pedestrian access along the Bay Trail and on campus trails will provide additional recreational, interpretive, and contemplative opportunities for campus employees and members of the public.

The pine and redwood trees along the northern perimeter of the campus currently screen the view of the site from the surrounding community and will be maintained -- as their health allows -- for the long term. Additional screening trees will be planted along South 46th Street to filter the views of Richmond Bay Campus buildings from areas at higher elevations. The eucalyptus tree stands will be replaced over time.

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Open Space and Landscape Policies

Open space and landscape policies in the LRDP support the principles that the Richmond Bay Campus will be an inspirational and sustainable place; be distinctive and attractive; harmoniously feature the natural assets of the site, including climate, grasslands, and proximity to San Francisco Bay and the Bay Trail; conserve open space and allow access to attractive views; provide practical opportunity for innovation and education in sustainable design; and convey the LRDP values for the campus as a whole during each phase of growth.

The following policies will guide the development of the site's open space and landscape:

OSL1 **Open Space and Landscape Policy on Primacy of Landscape: The landscape of the Richmond Bay Campus, its unique location at the edge of San Francisco Bay, and the coastal prairie grasslands will be protected and featured in the daily experience of the campus.**

- Feature ornamental landscaping at the public realm and entry points to create a more welcoming and vibrant campus; the palette will be selected for non-invasives and with sensitivity to protection of natural open spaces.
- Implement feasible means to effectively remove and stop the spread of invasive species from sensitive marsh and grasslands.
- Establish buffers, setbacks, and procedures to review new plantings in order to protect and enhance coastal plant communities and wildlife habitat on the site.
- Provide visual connections to the bay, surrounding hills, and natural features of the site and incorporate interpretive elements, public art, and signage into the open space areas to create educational opportunities.
- Refer to the site's natural features and employ ecologically-sensitive native plantings in the site's landscape design.

OSL2 **Open Space and Landscape Policy on Interaction: The open space and landscape of the Richmond Bay Campus will create and promote opportunities for interaction.**

- Promote a healthy exchange of ideas by providing easily accessible landscape spaces that encourage formal and informal interaction among researchers, staff, students, and community members.
- Mitigate adverse climate conditions through landscape forms that enhance the comfort of open spaces.

OSL3 **Open Space and Landscape Policy on Sustainability: New landscapes will be consistent with "Bay-friendly" design.**

- Design landscaping that does not rely on irrigation from potable water after an initial establishment period. Specify native species where practical and foster biodiversity which supports and enhances local ecosystems. Coordinate landscape design and maintenance efforts with the surrounding community where possible.

UTILITIES AND INFRASTRUCTURE

Context

The East Bay Municipal Utility District (EBMUD) currently serves the Richmond Field Station with one 8-inch domestic water supply line. The existing utilities include a network of 8, 6, and 4-inch diameter water mains. Two 8-inch fire protection water main lines currently serve the Richmond Field Station. Current irrigation demands are low and are provided through connections to the potable water system.

The Richmond Field Station and Regatta properties are currently served by sanitary sewer mains located at the south and north edges of the site. A 12-inch sanitary sewer main runs along the southern-most edge of the site and connects to a 15-inch main north of the marsh area. Two 24-inch sanitary sewer mains are located at the northernmost portion of the site and connect to a 30-inch main on Regatta Boulevard. Wastewater from the site flows to the City of Richmond's publicly-owned treatment plant, located west of the campus on Canal Boulevard.

Stormwater drainage at the Richmond Field Station currently flows from the north to the south by way of sheet flow, open swales, culverts, and storm drains. The existing stormwater drain system includes two main 24" lines generally located near the eastern and western edges of existing improvements. The eastern main storm drain and a sub-catchment to the east of the EPA building discharge to the transition area north of Western Stege Marsh. The western main storm drain and a sub-catchment to the west of the EPA building discharge to Meeker Slough. The trapezoidal concrete stormwater drain channel conveys runoff from northern neighboring properties and the eastern side of the Regatta property to Meeker Slough. The western side of the Regatta property drains to Meeker Creek near the Marina Bay Parkway.

Pacific Gas and Electric (PG&E) currently provides electrical power to the Richmond Field Station and Regatta properties through multiple overhead 12-kilovolt electrical lines. Both underground and aerial power lines comprise the on-site electrical service infrastructure. PG&E also provides natural gas service to the site through multiple high-pressure gas mains, with underground gas lines serving the larger facilities.

AT&T currently provides communications service to the site with 48 strands of fiber optic cable and 300 pairs of copper wire.

The capacity of this existing site infrastructure is insufficient to support development at the Richmond Bay Campus of the magnitude described in this LRDP. Table 4.3 provides a projection of utility demands and consumption assuming a full LRDP implementation at the site. An entirely new utilities infrastructure will be needed to meet these requirements.

Projected Utility Demand

Projected utilities demands listed in Table 4.3 are based on metered loads of existing facilities housing biosciences programs. The metered data was scaled down for variations in climate, improved building and system design, and consolidation of program functions. The projections are based on the assumption that the majority of the facilities at the campus will have a similar load profile with energy-intensive uses. The intent was to identify the upper limit of utilities consumption for CEQA analysis purposes and provide future land use decision makers with a margin of flexibility in the event a facility such as a high-performance computing center were to be located at the Richmond Bay Campus. These values are not intended to be used to calculate an energy budget for any particular project. With innovative design and compliance with the University's sustainability policies, including those defined in this LRDP, it is expected that the projected demand in 2050 will be significantly lower than the values listed in Table 4.3.

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Table 4.3: *Projected Utility Demand*

Utility	Projected Demand (2050)
Potable Water	340 million gallons/year (peak demand – 2,230 gpm)
Firefighting Water	(peak demand – 6,000 gpm)
Wastewater	273 million gallons/year (peak demand – 2,140 gpm)
Chilled Water	12,600 tons of cooling installed
Heating Hot Water	218,400 kBTUs/hour
Electrical energy	142,400 megawatt hours/year (peak demand – 24.7 MW)
Standby Power	peak demand –16 MW (installed capacity –20 MW)
Natural Gas	6,600,000 therms/year (peak demand – 240,300 kBTUs/hour)
Telecommunications	1,000 strands of fiber optic cable and 3,600 pairs of copper wire

Utilities and Infrastructure Development Framework

All new permanent utility lines on the campus will be located underground to minimize maintenance requirements and contribute to the appearance of the campus. New distribution lines and related facilities will be phased with campus development. The Richmond Bay Campus utility infrastructure will consist of the following systems as described in this section:

- Water Supply and Distribution
- Sanitary Sewer System
- Stormwater Drainage
- Electrical Power and Distribution
- Telecommunications
- Natural Gas Distribution
- Heating and Cooling Systems

Water Supply and Distribution

Potable Water

The potable water infrastructure will be expanded and distributed throughout the campus via an interconnected network of mains that connect to EBMUD facilities. Connections will be made in at least two locations for redundancy and to ensure adequate system pressure is maintained throughout the site. A third connection may be necessary depending on final system configuration and available flow and pressure. Figure 4.12 illustrates the general proposed domestic and fire water distribution system.

Sizing of the water distribution infrastructure for future development will be based on the projections shown in Table 4.3. Twelve-inch diameter trunk mains will be required to deliver water to the site. Connections to these trunk mains will be sized to meet localized demands in accordance with development phasing.

Fire Protection Water

The fire protection water system will be distributed throughout the campus and connected to EBMUD facilities with two or more interconnection points to comply with applicable fire codes and provide adequate flow and system redundancy. While the flow rate requirements will vary throughout the site by building type, it is expected that the maximum will be 6,000 gpm, as shown in Table 4.3. The UC Berkeley and LBNL Fire Marshals will confirm system design and capacity as needed during campus development.

Irrigation Water

As the Richmond Bay Campus develops, irrigation water will be required in higher quantities, primarily in the vicinity of proposed buildings to establish new landscaping. A distinct irrigation water network will be developed as a non-potable water system for both interior and exterior uses if recycled water becomes available from the local utility. EBMUD's current recycled water transmission pipeline terminates approximately three miles from the site at the intersection of Buchanan Street and Highway 580 in the City of Albany.

Figure 4.12: *Domestic and Fire Water*

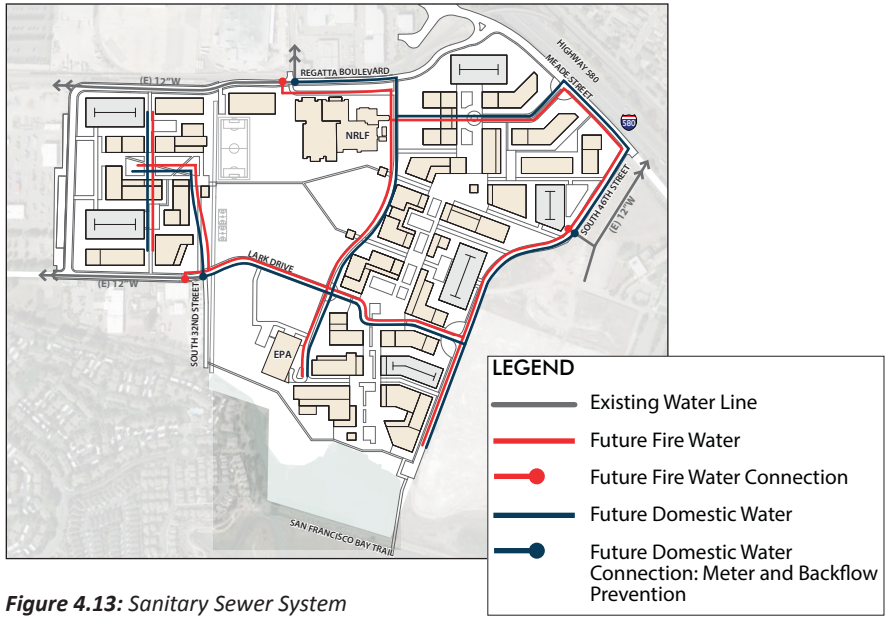

Figure 4.13: *Sanitary Sewer System*

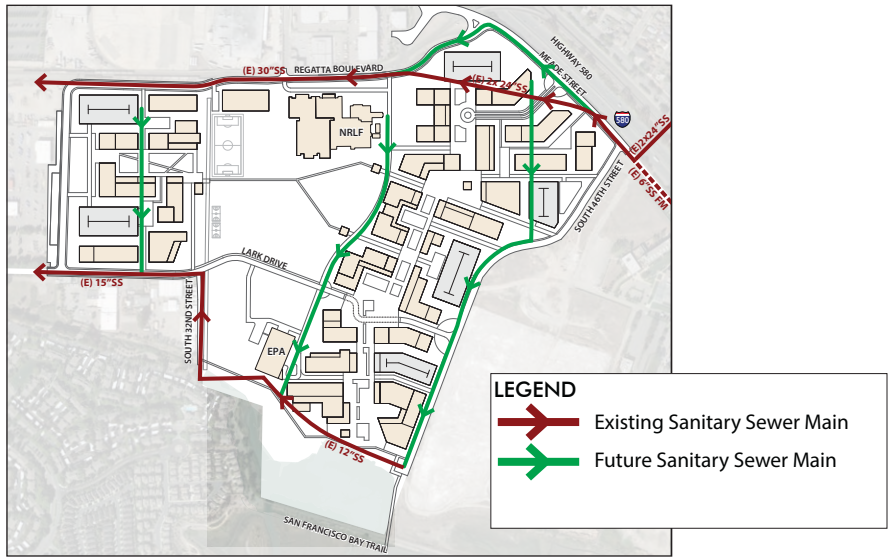

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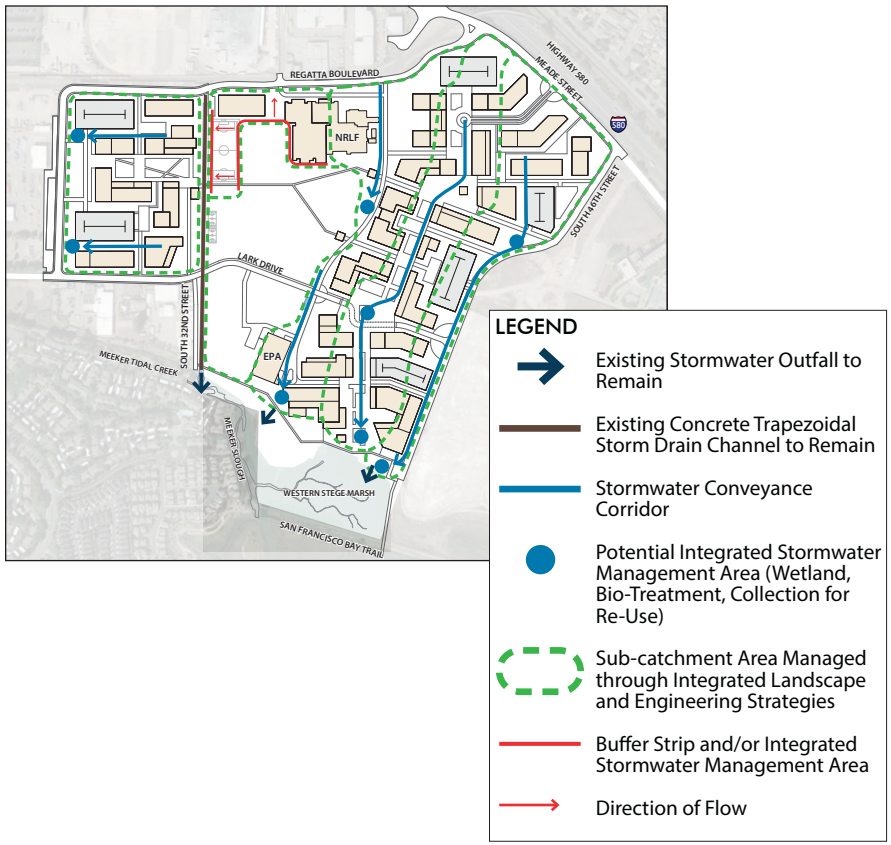
Figure 4.14: *Storm Drainage*



As part of the long-term water supply planning, EBMUD may investigate expanding the existing recycled water infrastructure or constructing a localized satellite facility that utilizes on-site waste and rain water treatment to provide recycled water to the campus. It will be supplied through a separate service connection and metered separately from the potable water system.

Sanitary Sewer System

Future infrastructure development will include a new system of sewer mains and laterals configured to discharge wastewater to the public sewer system through a gravity flow configuration. The system's configuration will be based on generation rates and site topography in relation to the vertical location of the existing public system. The system will primarily flow from north to south following the campus' main circulation elements and topography. The two 24" sewer mains located at the northernmost portion of the site will require realignment due to the proposed changes in the Regatta Boulevard alignment. An estimate of wastewater demand at full development of the LRDP program is included in Table 4.3. Figure 4.13 illustrates the general layout of the proposed sanitary sewer system.

Stormwater Drainage

As the Richmond Bay Campus is developed, additional stormwater quality treatment and source control measures will be implemented to create a sustainable, integrated stormwater management system which minimizes runoff. It is anticipated that stormwater quality discharge permit requirements may include infiltration where practical; evapotranspiration through landscape-based stormwater facilities; as well as capture, treatment, and re-use systems (tanks and ponds supported by treatment and irrigation systems or recycled water systems). Wherever possible, drainage design for future development at the Richmond Bay Campus will utilize low impact surface conveyance solutions to minimize the scope of the underground distribution system. Figure 4.14 illustrates a conceptual storm drainage system for the campus.

Electrical Power Distribution

Electrical power will be provided by suppliers on a competitive, best value, basis which will consider renewable energy, cost, and other factors. A summary of estimated electrical demand at full development of the LRDP program is included in Table 4.3. The sitewide power distribution system will be designed and constructed to meet this demand and ensure reliability, maintainability, and redundancy. The initial phases of development will be served at 12kv; as loads increase there is potential for the campus to be served at 115kv connected to an on-site substation which would feed the sitewide 12kv power distribution system. Figure 4.15 illustrates the general electrical power distribution system routing.

Telecommunications

As the Richmond Bay Campus develops, the telecommunication infrastructure will be upgraded and distributed in an underground loop configuration allowing connection by multiple service providers. The distribution of the new telecommunications network will be routed in the same configuration as the electrical system.

Natural Gas Distribution

With Richmond Bay Campus development, natural gas delivery service will continue to be provided by PG&E. The natural gas will be provided by suppliers on a competitive basis. Projected natural gas demand at full implementation of the LRDP program is included in Table 4.3. Figure 4.16 illustrates the general proposed natural gas distribution system routing.

Heating and Cooling Systems

The proposed campus configuration provides the flexibility to construct either decentralized or central plant heating and cooling facilities to serve each distinct neighborhood. These services could be provided with every building as it is constructed or centralized into one or more central plant facilities. Further, these plants could provide both chilled and condenser water; only condenser water; or include heat recovery chillers providing chilled water and low temperature hot water. An estimate of projected heating and cooling demands for the Richmond Bay Campus at full implementation of the LRDP program is identified in Table 4.3.

Figure 4.15: *Electrical Power Distribution*

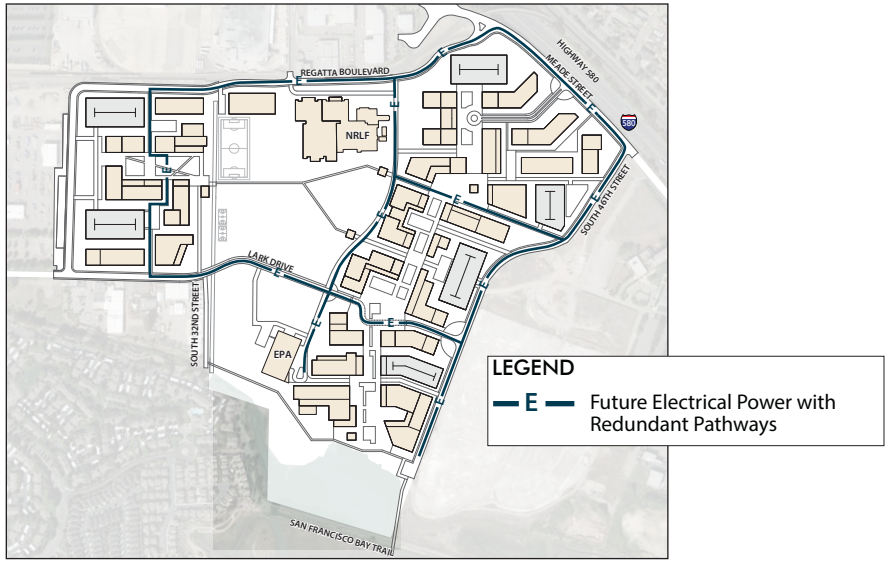
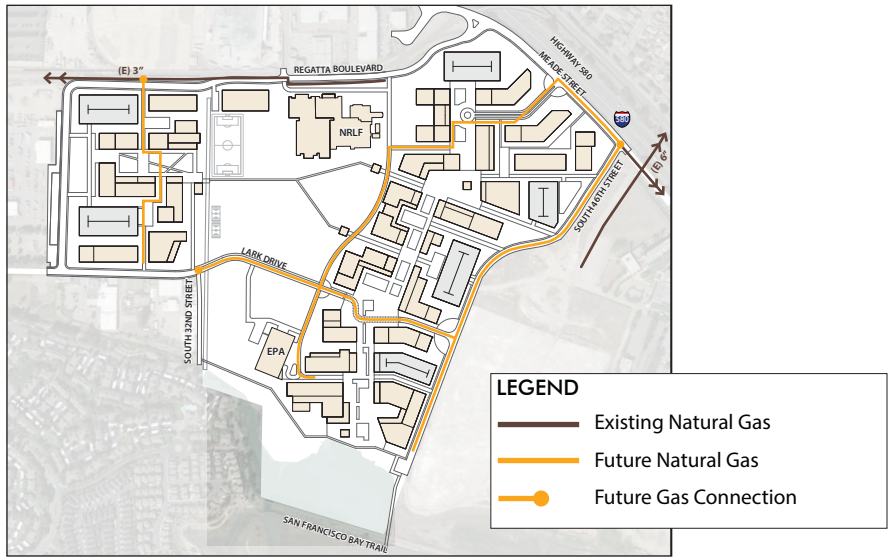


Figure 4.16: *Natural Gas Distribution*



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Protection from Sea Level Rise

As described in the section on Sea Level Rise, BCDC projects an increase in sea level of 16" by year 2050 and 55" by year 2100. BCDC guidance states (BCDC, 2009):

> Where shoreline protection is necessary to protect development, it should be constructed to provide protection for a 100-year flood that takes future sea level rise into account. Shoreline protection can be structural, natural, or a combination of both. Choosing the appropriate form of shoreline protection—one that both protects public safety and minimizes ecosystem impacts—is critically important.

The southern-most portion of the Research, Education, and Support area is potentially subject to water inundation by year 2100 due to a 100-year flood taking future sea level rise into account. A variety of options to protect the facilities to be constructed in this area from water inundation will be evaluated. One option is to increase the base elevation of this area from an average of approximately 13 feet above sea level (asl) to a minimum of 15 feet asl. The soil used to increase the base elevation would have a gentle south-facing slope approximating the 17:1 profile south of the EPA building to minimize wave run-up elevation.

The use of natural shore forms to provide erosion and flood control benefits is a potential strategy to adapt to accelerated sea level rise. In addition to increasing the minimum site elevation, a natural shore form such as a beach could be constructed south of the Bay Trail embankment to provide sustainable wave dissipation.

Future development at the Regatta property would also potentially be subject to water inundation by year 2100 due to a 100-year flood, taking future sea level rise into account. Specific protections for development at the Regatta property would be defined, using updated projections, at the time of a proposal to construct one or more facilities at that portion of the campus.

Utilities and Infrastructure Policies

Utilities and infrastructure policies in the LRDP support the principle that the Richmond Bay Campus will provide a robust infrastructure phased over a 40-year period.

Two overarching policies will guide decisions regarding implementation of site utilities:

UI1 **Utilities and Infrastructure Policy on Efficiency: Build a safe, efficient, cost-effective infrastructure.**

- Provide a safe and reliable utility infrastructure capable of supporting the research programs conducted on the campus.
- Design infrastructure in a manner that can be phased over time and provide redundancy as needed.
- Consolidate utility distribution into centralized corridors which primarily coincide with campus streets.

UI2 **Utilities and Infrastructure Policy on Sustainability: Design infrastructure improvements to embody sustainable practices.**

- Design infrastructure to minimize energy use and maximize on-site renewable energy generation.
- Plan infrastructure in a manner that promotes minimal use of potable water.
- Explore and implement measures to use recycled gray or black water on site for non-potable uses such as irrigation and toilet flushing.
- Maintain or restore, to the maximum extent technically and practically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of stormwater flow.
- Incorporate low impact development strategies in site planning to manage stormwater.
- Protect campus development from 55" of sea level rise through the year 2100 using natural shore forms where practicable; and coordinate closely with the East Bay Regional Park District on maintaining the Bay Trail embankment.

SUSTAINABILITY

Context

UC Berkeley and LBNL are national leaders in sustainability-related scientific research, and they strive to make facilities and infrastructure decisions that result in sustainable operations as well. Each has strong policies and programs in place to address a wide range of sustainability topics ranging from carbon neutrality to waste stream diversion. Each institution continually seeks ways to further improve and expand their comprehensive sustainability programs.

In the last decade, the University of California established a wide-ranging standard for sustainable practices and has become a leader for institutions of its scale. The University adopted the most recent version of the UC Sustainable Practices Policy in August 2011, setting goals to advance environmental practices in key areas. All projects at the Richmond Bay Campus will meet or exceed the goals defined in this, or any future, applicable, sustainability policy. As the current policy notes:

> The University of California is committed to responsible stewardship of resources and to demonstrating leadership in sustainable business practices. The University's campuses should be living laboratories for sustainability, contributing to the research and educational mission of the University, consistent with available funding and safe operational practices.

The City of Richmond has recently adopted a new General Plan which includes an Energy and Climate Change Element that identifies goals and policies in this area. In 2012 Richmond became a partner in a Community Choice Aggregation program, which allows energy purchased from renewable energy sources to be delivered through existing distribution systems, reducing greenhouse gas emissions associated with energy use.

The City of Richmond, LBNL, and UC Berkeley are among the many founding members of the East Bay Green Corridor, a commitment by the mayors of all major cities along the eastern shoreline of San Francisco Bay and the corridor's major university and research institutions to build upon the region's existing strength as a center for emerging green technology, innovation and entrepreneurship.

At the California state level, a planning and regulatory environment has developed alongside compliance activities associated with the Global Warming Solutions Act (AB32).

Sustainability Development Framework

The vision for the Richmond Bay Campus is to become a model of sustainability and environmental stewardship. UC Berkeley and LBNL expect to test and showcase innovations in sustainable design and operations, to educate and inspire staff and visitors, and serve as a living laboratory through which research interests and sustainable facilities operations will align. Living laboratory opportunities will arise from all phases of planning, designing, financing, constructing, and operating the Richmond Bay Campus and span multiple disciplines – scientific research, urban planning, information technology, ecology, business management, and facilities design.

The planning, design, and operations of the Richmond Bay Campus will be subject to standards set by the State of California, the Regents of the University of California, and the Department of Energy, as applicable. Given the role of programs at the campus in performing research and developing technologies directly related to energy and other elements of sustainability policy, development and operations at the Richmond Bay Campus will attempt to exceed these standards.

Development of the Richmond Bay Campus will provide the opportunity to enhance the University of California's stewardship and leadership in critical areas such as energy efficiency; transportation; waste minimization and diversion, stormwater management; climate change and sea level rise; and environmental remediation.

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Sustainable measures employed at the Richmond Bay Campus will include energy efficiency, promotion of alternative transportation modes, waste minimization and diversion, and stormwater management.

Sustainability Policies

The sustainability policies below support the vision that the new campus will be a model of sustainability and environmental stewardship. Issues of sustainability are broad in scope and include numerous and diverse stakeholders. Decisions made in planning, design, construction, and operation on the campus therefore have broad reach. While the scope of sustainability is extensive, specific quantitative targets are necessary to motivate and guide implementation. As such, the sustainability policies below cover a wide range of development activities at various levels of detail. These sustainability policies are intended to be consistent with planning related to AB32, as well as regulatory policy placing energy efficiency, demand response, and distributed renewable generation as preferred approaches to meet new energy loads.

S1 **Sustainability Policy on Decision Making: Sustainability choices will be given equal weight with other planning, programming, cost, and design factors for facilitating scientific research and facility operations.**

- Include deliberate steps during early planning, design, and construction to encourage communication and integrated design across all disciplines to identify coordinated, low-cost means to fully satisfy occupant needs with minimized resource use.

S2 **Sustainability Policy on Living Laboratory: The Richmond Bay Campus will be cultivated as a living laboratory, in which planning, operating practices and infrastructure, facilities performance monitoring data, and sustainability goals are leveraged to engage, apply, and strengthen research.**

- Install energy, water and other performance monitoring systems to facilitate efficient use of those resources.
- Develop infrastructure and resources for the campus based on state-of-the-practice research in sustainability fields. Make and prioritize decisions based on scientific research and outcomes and lifecycle costing whenever possible.

S3 **Sustainability Policy on Site Development: Embody environmental stewardship and respect the unique character of the Richmond Bay Campus in site development.**

- Draw on the neighborhood context and prominently feature the natural assets including climate, wetlands, and proximity to the San Francisco Bay and the Bay Trail.
- Actively promote sustainability as a core value at the campus and provide practical opportunities for innovation and education in sustainable design.
- Manage soil contamination as a component of each construction project.
- Control construction dust by implementing the best management practices (BMPs) defined in the BAAQMD CEQA Guidelines.

S4 **Sustainability Policy on Transparency: Operate transparently in sustainability efforts by setting targets, measuring performance, and regularly reporting results.**

- Establish a multi-stakeholder committee that periodically evaluates sustainability goals and progress made towards those goals in a transparent process.
- Make the cost for future flexibility, redundancy, and spare capacity explicit and subject to budgeting processes.

S5 **Sustainability Policy on Energy and Climate: Pursue energy efficiency targets and renewable energy use consistent with leading-edge best practices in mitigating climate change.**

- Develop, track, and pursue energy efficiency goals that include annual consumption and peak demand targets for all buildings and infrastructure.
- Use building orientation and passive design strategies to minimize energy use.
- Maximize on-site generation of renewable energy.
- Purchase grid power from 100% renewable sources where available at reasonable cost.

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- Directly address the challenge of high energy use in laboratory research facilities by exploring innovative design and making use of the mild climate at the Richmond Bay Campus site to minimize energy use.
- Develop projections for infrastructure and resources to serve the campus that are measured relative to benchmarks from best practice scenarios.
- Prepare a Climate Action Plan to guide Richmond Bay Campus development and operations and publicly report greenhouse gas emissions using standard protocols.

S6 **Sustainability Policy on Green Building: New construction projects exceeding $5 million will target certification through the US Green Building Council of LEED Gold® at a minimum.**

- In addition to the LEED Gold requirement, laboratory and data center spaces and buildings will be designed to an equivalent "Gold" level using the LBNL Environmental Performance Criteria (EPC) or equivalent rating system for each building type.
- Buildings will be designed to comply with the UC Sustainable Practices Policy, the UC Berkeley Campus Sustainability Plan, the LBNL Policy on Sustainability Standards for New Construction, and any future sustainability policies, as applicable.

S7 **Sustainability Policy on Reduced Total Costs: Plan and manage use of all resources to minimize lifecycle costs.**

- Implement integrated design approaches that manage first costs and minimize life cycle costs for all facility and infrastructure investments.

S8 **Sustainability Policy on Waste Minimization: Waste minimization and diversion planning for the Richmond Bay Campus will target 100% diversion of municipal solid waste to composting and recycling by 2020, while simultaneously minimizing all waste streams.**

- Take advantage of opportunities to minimize the overall amount of material handled either as compost, recycle, or landfill waste identified through ongoing evaluation of activities.
- Apply acquisition policies to minimize waste and environmental impacts.

S9 **Sustainability Policy on Health and Wellness: Richmond Bay Campus development will promote health and wellness of the community - including employees, and visitors – as well as ecosystems associated with the site.**

- The on-campus transportation system will encourage walking and bicycling between buildings on the campus, minimizing the levels of greenhouse gases produced for local travel.
- Provide an outdoor recreation area suitable for physical exercise.
- Provide walkways with signage interpreting the ecological value of the grassland and marsh areas.
- Provide health-conscious food choices at on-site eating amenities.

S10 **Sustainability Policy on Local Connections: The Richmond Bay Campus procurement policies will embody the University's commitment to sustainability and improving the quality of life of citizens in the local communities.**

- Food and other goods and services will be sourced from local growers and vendors to the degree practicable.
- Recognize that potable water is a shared resource that must be conserved though building design, utility and landscape approaches.

SAFETY AND PREPAREDNESS

Context

Both UC Berkeley and LBNL have successful histories of managing safety in research operations. Safety issues are well understood and research is subject to extensive controls which are strictly enforced. The University's safety record has demonstrated a dedicated effort to meet, and in some cases exceed, the standard of compliance set by federal, state, and local regulatory agencies.

The EPA facility at the Richmond Field Station and users of leased space in the Regatta warehouse building are responsible for the management of their safety and materials separately with oversight by appropriate agencies.

The Richmond Bay Campus falls within the jurisdiction of the University of California Police Department (UCPD) which performs all patrol, investigation, crime prevention education, emergency preparedness, and related law enforcement duties for the site. UCPD has mutual aid agreements in place with the City of Richmond Police Department, operates joint patrol programs in the South Shoreline Area, and coordinates efforts at all levels to ensure the effective provision of police services. The site is located within the jurisdiction of the City of Richmond Fire Department.

Safety and Preparedness Development Framework

Preparedness

As occurs at UC Berkeley and LBNL, safety protocols at the Richmond Bay Campus will address the following topics:

- Emergency planning, drills, and exercises
- Self assessment and quality assurance of environmental, health, and safety (EHS) activities
- Hazardous and radioactive materials storage, use, and waste handling
- Fire protection engineering
- Emergency response to fire, medical, and hazardous materials incidents
- Air emission and wastewater discharge controls
- Occupational health and safety
- Seismic events

Site Security

The Richmond Bay Campus is envisioned as an open campus. The security fence currently installed along the site perimeter will be removed once a critical mass of on-site population and enhanced security measures are achieved. Employee work space will be secured within buildings, other portions of buildings will be accessible as needed, and the outdoor areas on the campus will be accessible by all. Community members will be able to frequent on-site businesses such as cafes and use meeting spaces or lecture halls, as well as campus trails. Developed as well as natural areas will be monitored for intrusion or disturbance. Thoughtful placement of building lobbies with good visibility and well-lighted outdoor areas with clear paths of travel to parking or transit services will also contribute to site security.

Hazardous Waste and Radioactive Materials Handling

Activities involving hazardous materials at the Richmond Bay Campus will be subject to numerous federal, state, and local laws and regulations. Chemical reagents, solvents, fuels, paints, cleansers, and pesticides will be used in activities such as laboratory research, building and grounds maintenance, vehicle maintenance, and fine arts. Other hazardous materials, including radioactive and biohazardous materials, will also be used in laboratory research. UC Berkeley and LBNL are committed to creating a safe workplace and ensuring that safe work practices are continually maintained.

Site planning will promote operational safety at the Richmond Bay Campus. Specific truck routes for hazardous material transport will be defined and coordinated with the City of Richmond. Loading docks designed for safe delivery and shipping of hazardous materials will generally be located at the perimeters of the Richmond Bay Campus neighborhoods accessible via service roads

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and away from the primary pedestrian central spines. Standby generators will also be located at the perimeters of the neighborhoods and provide backup power to life/safety systems during normal utility power disruptions.

Emergency Services

The closest City of Richmond Fire Station is located on Bayview Avenue approximately one half mile and four minutes away. It is expected that LBNL and UC Berkeley will continue to use local emergency services until fire safety and emergency assessments indicate the need for additional services. Eventually, emergency service equipment and personnel may be housed on the campus.

UCPD operations for the Richmond Field Station are managed from the approximately 1,900 square feet, 60 year-old Building 194. Law enforcement and security assessments may eventually indicate the need for expanding police services, which may necessitate improving or replacing the existing police station. LBNL will retain ultimate responsibility for all security, fire protection, and emergency service requirements for all DOE-funded facilities, assets, and personnel.

Safety and Preparedness Policies

Safety and preparedness policies in the LRDP support the principles that the Richmond Bay Campus will model inclusion and healthy living; allow for addressing contamination in a cost-effective and transparent manner in association with new development; become an open campus; and welcome research partnerships and engagement beyond existing partnerships.

All aspects of Richmond Bay Campus operations will be compliant with applicable state, federal, and local regulations. Two policies will guide decisions addressing safety and emergency preparedness on the Richmond Bay Campus.

SP1 **Safety and Preparedness Policy on Model Programs: Develop model environment, health, and safety programs for the Richmond Bay Campus.**

- Develop comprehensive and effective physical safety, life safety, and emergency service plans to protect the environment, the public, employees, and guests at all times.
- Ensure clear and responsible management of environment, health, and safety programs and services.
- Implement land use controls to prohibit unsafe exposure of workers, visitors, and the surrounding community to environmental contaminants.
- Utilize transparent environment, health, and safety reporting practices.

SP2 **Safety and Preparedness Policy on Inclusion: Ensure that the Richmond Bay Campus contributes to and serves as a resource for the Richmond community.**

- Encourage inclusion with an open campus where security boundaries occur at the building level rather than the campus level to advance the ideals of institutional transparency and mutual trust.
- Enable community access to amenities such as outdoor spaces and meeting facilities to promote a better understanding of the University's mission.
- Expand partnerships with local agencies, including fire and police departments, as well as local neighborhoods to promote understanding and address safety and security concerns of neighbors as well as the campus workforce.

IMPLEMENTATION

Context

The University is committed to continuously delivering innovations in science and technology which address significant problems facing humankind and the environment. Discoveries across a broad range of scientific disciplines promise to advance human knowledge and improve health, environmental protection, and our economy. Research facilities purpose-built to achieve these discoveries will be the key to future global competitiveness. Demand for such facilities at the Richmond Bay Campus will evolve as science and technology advance and national priorities emerge. The long-term success of the campus as a place for state-of-the art research will also depend on the provision of adequate infrastructure, attractive open spaces, efficient services, and amenities.

Implementation Framework

Phasing

In such a dynamic environment, it is impossible to predict the specific types or configurations of new facilities that will be required in the future. Therefore, a strategy has been developed to guide initial development within each neighborhood and assure long-term integrated campus development. The neighborhood development concept ensures that each portion of the campus enjoys a sense of place and fosters cross-organizational interaction. The LRDP provides for flexibility in phasing; adjacent open spaces, pedestrian walkways, landscaping and amenities would be built in parallel with building projects while creating linkages to previously developed parcels. The neighborhood concept allows economies of scale for common realm investments in each phase of development.

The location and configuration of initial development will establish a strong campus identity, a high quality work environment, and a critical mass of people and services as buildings are built and occupied. Temporary surface parking lots will be located adjacent to the first buildings with structured parking eventually to be built as the surface lots become building sites.

The order and pace of neighborhood development will depend on the ongoing needs of each institution as well as third party demand. The Regatta area on the west side of the site will likely be developed last, as it currently contains the highest-density development.

Neighborhood Concept Plans

Implementation of the LRDP will be informed by the preparation of Concept Plans, or detailed planning studies, for each of the four neighborhoods before any new development will be allowed to occur within the neighborhood. Figure 4.17 illustrates one possible demarcation of neighborhoods for which Concept Plans will be prepared. Each Concept Plan will be prepared when UC Berkeley and LBNL have a strong sense of the facilities program to be constructed within the neighborhood. Design criteria and conceptual-level data will be provided in each plan on such topics as:

- location of neighborhood boundaries and entrances from primary corridors and central spines
- location of vehicular circulation and parking; pedestrian, bicycle, and shuttle circulation
- location of buildings, parking structures, shuttle stops, open spaces, landscape zones, areas to be preserved, and setback zones, and stormwater management areas, as well as services and amenities (for example, food services, fitness facilities, etc.)
- location of utility corridors and connections, as well as basic sizing for each system
- sustainability features and Climate Action Plan update
- design elements such as bird-safe building design and wildlife habitat sensitivity
- sources of vibration or electromagnetic radiation
- tsunami, flood, sea level rise, and other hazards

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- elements that facilitate linking the neighborhood with existing and/or subsequent development of the adjacent neighborhoods and properties

- supportive detail as necessary, e.g. sections, utility consumption calculations, basic design criteria, wind and solar data, etc.

- mitigation measures to be implemented as defined in applicable environmental impact review documents, and operational procedures to be implemented as defined in applicable regulatory jurisdictional documents

- an implementation schedule and financial strategy for public realm improvements, integrated with the sequence and schedule for construction of individual buildings

Figure 4.17: *Neighborhoods*

Operational Structure

Land use and design process responsibility at the University's Richmond properties currently are held by the UC Berkeley campus, and will continue to be held by UC Berkeley under this LRDP. The UC Berkeley Chancellor will continue to have ultimate operational responsibility and land use authority for the site. The prioritization, planning, review, approval, and implementation process for major capital investments will be consistent with that articulated in the current UC Berkeley LRDP and Capital Financial Plan. However, development of the Richmond Bay Campus will be a cooperative effort of LBNL and UC Berkeley. While the entities have a close existing partnership and both are managed under the auspices of the University of California, the institutions are distinct administrative entities of the University. Upon determination by the Regents to adopt the 2014 LRDP and certify the LRDP EIR, an organizational structure will be established to oversee operations at the Richmond Bay Campus and implement the LRDP, subject to the ultimate administrative control of the UC Berkeley Chancellor.

Some of the facilities developed on the Richmond Bay Campus will be used by LBNL to accomplish the missions and activities assigned and funded by the US Department of Energy (DOE). Some of the existing buildings and new buildings on the site will be occupied by UC Berkeley teaching and research programs. The laws, regulations, and policies that will apply to design and construction of an individual facility will depend on its funding source; and the laws, regulations, and policies that apply to the operation of an individual facility will depend on the organization occupying the facility.

It is expected that facilities primarily occupied by LBNL programs or UC Berkeley programs would be maintained and operated by LBNL or UC Berkeley, respectively. The facilities LBNL will be responsible for will be managed in accordance with applicable policies and federal and state regulations as outlined in the University's contract with the Department of Energy. The facilities UC Berkeley will be responsible for will be managed primarily in accordance with state regulations. New facilities completed by private sector entities will be subject to operational oversight by either LBNL or UC Berkeley, as determined by the LBNL Director and the UC Berkeley Chancellor.

Implementation Policies

All aspects of Richmond Bay Campus development will be compliant with applicable state, federal, and local regulations.

I1 **Implementation Policy on Phasing: Ensure significant initial population influx to support placemaking, a strong campus identity, and a highly functional work environment from the outset and seamlessly integrate future phases of the Richmond Bay Campus.**

- Design each neighborhood to be complete including infrastructure, open spaces, services, and amenities; and part of a coherent and integrated campus.
- Treat land as a valuable resource with facilities configured in a dense manner to allow for development up to the site's capacity with preservation of natural areas.
- Promote community within each neighborhood and offer a variety of environments to the campus workforce.
- Create complete collections of buildings and open spaces prior to developing other areas of the site.
- Capitalize on economies of scale for common realm investments in each neighborhood.
- Design neighborhood infrastructure for compatibility with, and extensions of, site-wide utilities and circulation networks.
- Retain existing programs at the site to the extent possible while the campus develops. Accommodate those with an important relationship to new Richmond Bay Campus programs within new facilities as existing facility sites are redeveloped.

I2 **Implementation Policy on Neighborhood Concept Plans: Develop a Concept Plan for each Richmond Bay Campus neighborhood prior to development within the neighborhood.**

- Each Concept Plan will comply with all UC policies and conform to the Richmond Bay Campus Long Range Development Plan and Physical Design Framework documents.

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- Each Concept Plan will be reviewed by the UC Berkeley Design Review Committee and Campus Architect and approved by the Chancellor or the Chancellor's delegate.

I3 **Implementation Policy on Individual Projects: Individual site preparation, utilities infrastructure, building, and other construction projects will follow all LRDP and other applicable policies and procedures.**

- Proposals for individual project development at the Richmond Bay Campus will be reviewed for consistency with the LRDP, its EIR, and any necessary further compliance with CEQA and NEPA.
- All capital projects and related improvements will be reviewed in accordance with UC Berkeley's Design Review process, consistent with the administrative control of the Richmond Bay Campus delegated to the UC Berkeley Chancellor; and consistent with UC Regents policy.
- UC Berkeley's design review process entails initial consultation with staff responsible for compliance with adopted plans, landscape design and physical plant maintenance. As detailed in UC Berkeley's 2020 Long Range Development Plan EIR, project-specific design guidelines are prepared for major new projects, and reviewed with the UC Berkeley Design Review committee, composed of independent design professionals. The UC Berkeley Design Review committee reviews the project during the design phases and makes recommendations to the campus regarding design. Depending on project cost and in accordance with University policy the UC Berkeley Chancellor, UC Board of Regents, or their designee will approve design following a CEQA determination.
- The UC Berkeley Campus Architect will issue a Finding that the project will bear an appropriate share of public realm improvements cost consistent with the Concept Plan and that the improvements will be provided in a timely way.
- The design and construction of capital projects subject to the procurement policies and regulations of the Department of Energy will be managed by LBNL. The design and construction of capital projects subject solely to the procurement policies and regulations of the University of California will be managed by UC Berkeley. The design and construction of 3rd-party capital projects will be managed by either LBNL or UC Berkeley depending on the institution defining the need for the building.
- Capital projects managed by UC Berkeley will be designed and constructed in accordance with the goals and strategies adopted in the UC Berkeley Sustainability Plan. Capital projects managed by LBNL will be designed and constructed in accordance with the LBNL Sustainability Standards for New Construction. All capital projects will be designed and constructed in accordance with the University of California Sustainable Practices Policy.

APPENDICES

Appendix 1: Existing Richmond Field Station Building Inventory (2012)

Appendix 2: Related Documents

Appendix 3: Abbreviations and Definitions

Appendix 4: Acknowledgements

Opposite page: View of Western Stege Marsh in the foreground and the San Francisco Bay and Marina Bay residential community beyond.

APPENDIX 1: EXISTING RICHMOND FIELD STATION BUILDING INVENTORY (2012)

Bldg. No.	Current Use	Year Built	GSF	Ht. (Ft.)	Struc. Cond.
38	Shop	post 1996	5,740	25	Good
102	Inactive	pre 1940	6,737	12	Poor
110	Inactive	pre 1940	1,325	12	Good
111	Shop	unknown	507	15	Good
112	Research Ofc	1960-1969	16,949	12	Poor
113	Storage	1980-1989	1,800	14	Good
114	Storage	pre 1940	4,523	12	Good
116	Shop	1950-1959	967	15	Good
117	Field Bldg	unknown	608	12	Good
118	Research	pre 1940	1,708	20	Good
120	Storage	unknown	269	12	Good
121	Storage	unknown	728	15	Good
125	Storage	pre 1940	1,024	12	Good
128	Storage	pre 1940	10,287	12	Good
149	Storage	unknown	720	12	Good
150	Research	pre 1940	5,410	15	Good
151	Research Ofc	1960-1969	2,629	20	Good
152	Research	pre 1940	4,201	12	Poor
153	Shop	pre 1940	3,754	14	Good
154	Research	1960-1969	2,731	20	Good
155	Office	pre 1940	1,896	14	Good
158	Research	pre 1940	3,343	24	Good
159	Research Ofc	pre 1940	2,366	15	Poor
160	Recreation	pre 1940	1,926	15	Poor
161	Research	pre 1940	2,392	15	Good
162	Restroom	unknown	240	15	Good
163	Office	pre 1940	6,430	12	Good
164	Office	pre 1940	3,462	15	Good
165	Research	pre 1940	749	15	Good
167	Shop	1950-1959	4,092	14	Good

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Bldg. No.	Current Use	Year Built	GSF	Ht. (Ft.)	Struc. Cond.
175	UC Bindery	pre 1940	16,052	12	Poor
176	Research	unknown	672	15	Good
177	Research	pre 1940	2,969	14	Poor
178	Office	pre 1940	3,950	12	Poor
180	Office	pre 1940	11,008	15	Poor
185	Storage	pre 1940	3,165	12	Good
190	TSRC	pre 1940	2,951	14	Poor
190 TLR	Storage	unknown	480	9	Good
194	SPO	1950-1959	1,892	14	Good
195	Storage	unknown	664	12	Untenable
196	Conference	pre 1940	2,807	14	Poor
197	Veh Stor Sv	unknown	2,419	18	Poor
198	Storage	1980-1989	1,800	14	Good
201	EPA	1980-1989	46,000	20	Good
275	Research Lab	1960-1969	7,914	12	Good
276	Research	1960-1969	4,880	18	Good
277	Research	1960-1969	21,426	25	Good
280A	Research Ofc	unknown	13,069	20	Good
280B	Storage	unknown	15,777	20	Good
282	Research Lab	unknown	129	10	Good
300	Research Ofc	1960-1969	1,320	9	Good
400	NRLF	1970-1979	253,660	36	Good
400	NRLF Addition	1980-1989	incl.	48	Good
420	Storage	1960-1969	10,635	42	Good
421	Research Lab	1960-1969	1,242	10	Good
445	Conference	1950-1959	2,336	14	Poor
450	Veh Storage	1950-1959	6,778	14	Good
451	Office	1950-1959	7,421	12	Poor
452	Office	1950-1959	7,355	12	Poor

Bldg. No.	Current Use	Year Built	GSF	Ht. (Ft.)	Struc. Cond.
453	Office	1950-1959	5,764	12	Poor
454	Office	1960-1969	6,580	12	Poor
460	Storage	unknown	984	12	Good
470	Research	unknown	438	14	Good
471	Greenhs Sv	unknown	558	14	Good
472	Research Ofc	1950-1959	2,633	14	Good
473	Office	1950-1959	3,570	14	Good
474	Storage	1950-1959	342	14	Good
475	Storage	unknown	1,296	14	Good
478	RFS Admin Ofc	1950-1959	38,862	25	Poor
480	Research	1950-1959	7,036	14	Poor
482	Research	unknown	1,516	14	Good
484	PEER	1960-1969	14,133	63	Poor
485	Research	1960-1969	429	14	Good
486	Research Lab	1960-1969	8,068	36	Good
487	Inactive	unknown	543	14	Good
488	Storage	unknown	175	14	Good
490	Storage	unknown	180	14	New

Existing Buildings

LEGEND

- Property Boundary
- Existing Buildings
- **NRLF** Northern Regional Library Facility
- **EPA** US EPA Region 9 Laboratory
- **PEER** Pacific Earthquake Engineering Research Center
- **ADMIN** Richmond Field Station Administrative Offices (formerly Forest Products Laboratory)
- **TSRC** Transportation Sustainability Research Center
- **HFS** Hydrogen Fueling Station

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APPENDIX 2: RELATED DOCUMENTS

Berkeley Lab Policy on Sustainability Standards for New Construction, Lawrence Berkeley National Laboratory, DRAFT, November 2012.

City of Richmond Bicycle Master Plan, City of Richmond, CA, October 2011.

City of Richmond Pedestrian Plan, City of Richmond, CA, October 2011.

Current Conditions Report, University of California Berkeley Richmond Field Station, Tetratech EM Inc. and Sea Engineering, Inc., November 2008.

Richmond Bay Campus Bicycle Access and Infrastructure – Guiding Principles, Haet, Nordman, and Greenberg, June 2012.

Richmond Field Station Working Paper, A Study in Support of the 2020 Long Range Development Plan, University of California, Berkeley, November 2002.

Richmond General Plan 2030, City of Richmond, CA, August 2011.

UC Berkeley Campus Sustainability Report, University of California, Berkeley, September 2011.

University of California Berkeley Richmond Field Station Campus Concept Plan, LBNL, UC Berkeley, and WRT, February 2011.

University of California Sustainable Practices Policy, August 22, 2011.

Richmond Bay Campus Physical Design Framework, May 2014

APPENDIX 3: ABBREVIATIONS AND DEFINITIONS

BART	Bay Area Rapid Transit District: see http://www.bart.gov/
Bay-Friendly Design	A systematic, ecologically-based approach to creating landscapes to conserve water and reduce waste and pollution. See bayfriendlycoalition.org.
BCDC	Bay Conservation and Development Commission
BIF	Biosciences Integration Facility
Black Water	Water that has come into contact with fecal matter.
BMP	Best Management Practice
CEQA	California Environmental Quality Act: see http://ceres.ca.gov/ceqa/
DOE	United States Department of Energy: see http://energy.gov/
DTSC	California State Department of Toxic Substances Control: see http://www.dtsc.ca.gov/
EBMUD	East Bay Municipal Utility District: see http://www.ebmud.com/
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency: see http://www.epa.gov/
FAR	Floor Area Ratio: The ratio of floor area in a building to the land area of the lot on which it sits. Used to regulate or measure building volume and planning density.
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
First Costs	The initial costs for design and construction of a project.
GHG	Greenhouse Gas Emissions
GPM	Gallons Per Minute
Gray Water	Untreated waste water (for example, from clothes washers, showers, bathtubs, bathroom sinks, laundry tubs) that can be used for outdoor watering.
GSF	Gross Square Feet
I	Interstate
IDS	illustrative development scenario: one of many possible development scenarios under this LRDP, specifically designed to encompass the maximum amount of new building space, population, parking, and other site improvements identified in the LRDP, as a basis for assessing the environmental impacts in the EIR
kBtuh	Thousand British Thermal Units per Hour: a measure of heat
kWh	Kilowatt hour: a unit of energy equal to 1000 watt hours. For constant power, energy in watt hours is the product of power in watts and time in hours. The kilowatt hour is most commonly known as a billing unit for energy delivered to consumers by electric utilities.
LBNL	Lawrence Berkeley National Laboratory: a United States Department of Energy National Laboratory,

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	managed by the University of California; see http://www.lbl.gov/
LEED	Leadership in Energy and Environmental Design: A green building rating system developed by the US Green Building Council.
"Life Cycle Costs"	A method of economic analysis for all costs related to building, operating, and maintaining a project over a defined period of time
LRDP	Long Range Development Plan: defined as a "physical development and land use plan to meet the academic and institutional objectives for a particular campus or medical center of public higher education" (Public Resources Code of the State of California Section 21080.09). It is a comprehensive document that establishes the land use patterns and relevant policies to guide implementation of facilities and infrastructure.
MDFs	Main Distribution Facilities
MPOEs	Minimum Points of Entry
MW	Megawatt
MWh	Megawatt hour
NAVD	North American Vertical Datum
NEPA	National Environmental Policy Act: see http://www.epa.gov/compliance/basics/nepa.html
NGVD	National Geodetic Vertical Datum
NRLF	Northern Regional Library Facility: see http://www.lib.berkeley.edu/NRLF/
PCBs	Polychlorinated Biphenyls
PG&E	Pacific Gas and Electric: see http://www.pge.com/
PDF	Physical Design Framework: A companion document to the LRDP that articulates a detailed vision for the physical form of the campus and serves as a foundation for the specific planning and design of future projects.
RFS	Richmond Field Station: Name of a portion of the site on which the Richmond Bay Campus will be located, owned by the University of California, managed by UC Berkeley
TDM	Transportation Demand Management
UC	University of California: see http://www.universityofcalifornia.edu/
UCOP	UC Office of the President: see http://www.ucop.edu/
USEPA	United States Environmental Protection Agency: see http://www.epa.gov/
USGBC	United States Green Building Council: see https://new.usgbc.org/
VOCs	Volatile Organic Compounds
WAPA	Western Area Power Administration: see http://www.wapa.gov/

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“Future generations will consider themselves bound by our preparations ... only to the extent that we have foreseen their needs and have planned wisely for them. We cannot force them to follow out our schemes if these run contrary to their own inclinations; but we may fairly expect that if we plan wisely and in accordance with the really natural and right thing, our successors will follow out what we arrange, if only because it will accord with reason.”

John Galen Howard, 1908