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.

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, research at the Richmond Bay Campus will focus on cleaner methods to produce biofuels; an advanced understanding of the genomics of plants, microbes, and microbial communities; the biological mechanisms and environmental conditions affecting human health; the production of non-petroleum-based essential materials and chemicals; and diagnostic capabilities to advance the field of bioscience research. Another early program under consideration may establish the campus as a hub of joint research in advanced manufacturing. 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. In addition, the bioscience 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; particularly in the biotechnology sector.

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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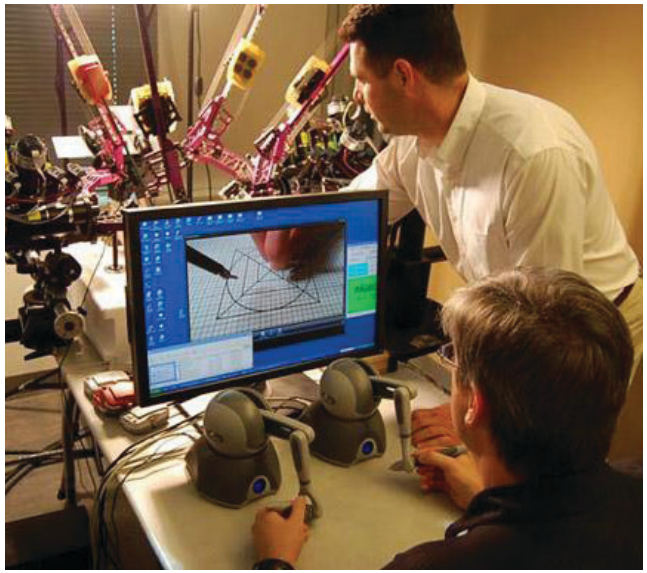

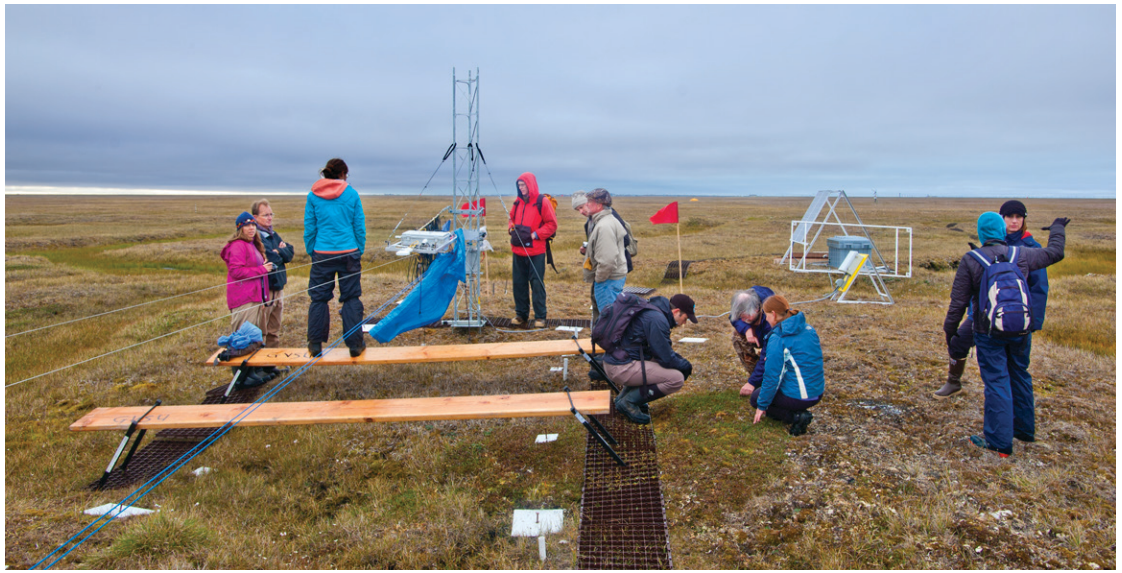

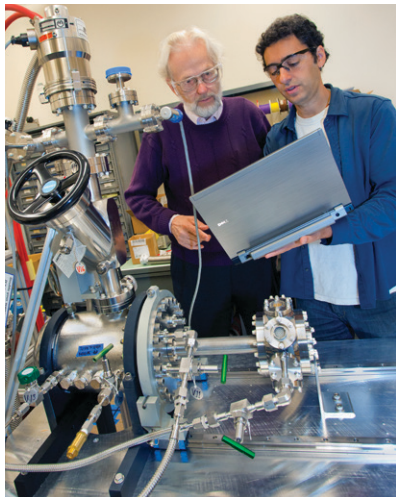

Scientists at UC Berkeley and LBNL are actively engaged in innovative science in numerous disciplines.

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:

- *Consolidate research programs from geographically-dispersed leased facilities to enhance collaboration, productivity, and efficiency.* The initial phase of development will consolidate bioscience research programs currently in leased space and on the main campuses, and house programs from synergistic institutions. This development will add up to 600,000 gross square feet of research space and 1,000 people to the campus, increasing the daily population from approximately 300 to 1,300.

- *Expand the capacity of high-demand advanced facilities and provide broader functionality.* Core staff and visitors are expected to increase when LBNL's advanced scientific user facilities are relocated to the Richmond Bay Campus and integrated with an expanded set of synergistic research activities. The demand for these revitalized capabilities for genome sequencing, bioinformatics, biofuels development, and high-resolution characterization will increase substantially when newly interconnected investigators gain efficient access to them along with their own research laboratories, conferencing facilities, and a campus custom-designed for collaboration and inspiration.

- *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 partner-

ships 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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Placeholder for illustrative rendering to be included in the Final LRDP.

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. The initial development will 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

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roadways will be designed for safe and efficient access for service and emergency vehicles.

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.