Ernest Orlando Lawrence
Berkeley National Laboratory

2005 Ten Year Site Plan

Ernest Orlando Lawrence Berkeley National Laboratory
University of California
Berkeley, CA 94720
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Contents

Purpose of Ten Year Site Plan

A Ten Year Site Plan (TYSP) is prepared annually by Berkeley Lab and other Department of Energy (DOE) Office of Science (SC) laboratory sites as required by DOE Real Property Asset Management (RPAM) Order, DOE 0 430.1B.

The TYSP also recognizes the DOE SC responsibilities to operate world-class, state of the art facilities, and to design and construct new research facilities, as expressed in the FY 2006 Congressional Budget Request.

The TYSP also supports preparation of the DOE's Asset Management Plan (AMP), a requirement of Executive Order 13327 Federal Real Property Asset Management (February 2004).

The initial DOE SC TYSP's were submitted in November 2004, this May 2005 update moves the TYSP into alignment with the annual budget process. Subsequent TYSP's are to be produced for submittal in the April/May timeframe.

The TYSP integrates functional components of land use and real estate, facilities and infrastructure acquisition, maintenance, recapitalization, and disposition and long-term stewardship into a comprehensive site-wide management plan. The TYSP requires assessment of past performance and projected futures outcomes and is intended to strengthen communication and accountability between programs, sites and tenants.

The TYSP documents and ensures that DOE's real property assets at each SC site are inventoried, available, utilized in an effective and cost-efficient manner, and in a suitable condition to accomplish SC's and DOE's missions.

This TYSP includes a Resource Plan covering the FY 2007 to FY 2016 planning period plus FY 2004 to FY 2006. The portion of the Resource Plan covering FY 2004 to FY 2011 reflects the FY 2007 Integrated Facilities and Infrastructure (IFI) Crosscut Budget prepared for the annual Field Budget submission.

I. Executive Summary

The Berkeley Lab Hill site, the main facility, operates within 1.65M gross square feet (gsf) of building space and approximately 50,000 gsf of trailer space. The site was developed beginning in 1939 and contains a significant number of World War II and early Atomic Energy Commission structures. The aging infrastructure requires dedicated maintenance and renewal investments.

The Laboratory has a pattern of increasing maintenance investment and will invest approximately 2% of the Replacement Plant Value in maintenance in FY 2006. The Laboratory has partnered with the DOE to demolish high-maintenance/low-value buildings consistent with Congressional direction to demolish at least one gsf of old building when new modern facilities are planned, and to reduce the Laboratory's Deferred Maintenance Backlog (which identifies the need for major upgrades to buildings that remain in use, but are intended for demolition within the next ten years). Moreover, the Laboratory has effectively applied the capital renewal funds provided through the SLI and landlord GPP program to address pressing needs to upgrade and renew systems and spaces to address the requirements of modern science and address seismic safety concerns.

To effectively achieve mission objectives within the term of this Ten Year Site Plan, Berkeley Lab must provide appropriate modern research and support facilities, and intends to work with DOE to:

- **Demolish approximately 250,000 gsf of building space** on its main site (approximately 15% of the building space, not including trailers).

  Within the ten-year term of this TYSP, the Laboratory plans to demolish some 250,000 gsf of Hill-site buildings with support from DOE. Two redevelopment sites are identified, the Bevatron (demolition is now funded by DOE), and the "Old Town" area (demolition funding proposed within the next ten years by the SLI Excess Facilities program)

- **Upgrade approximately 600,000 gsf of building space** on its main site to conform to modern research requirements (approximately 37% of the building space, not including trailers).

  These upgrades are consistent with the FY2006 Congressional Budget Request guidance that DOE SC is to operate "world class, state of the art scientific facilities." Building and infrastructure renewal will require DOE SC SLI LIP support and Landlord GPP support at levels above current baselines.

- **Maintain, without upgrade, approximately 700,000 gsf of building space** on its main site to conform to modern research requirements (approximately 43% of the building space, not including trailers).

  The Laboratory remains committed to operating a solid maintenance program, will fund maintenance at 2% of Replacement Plant Value in FY 2006 and beyond, and will work with DOE SC SLI program to make further investments.

- **Construct approximately 230,000 gsf of new DOE research and support space.** Of particular concern is the proposed User Support Building (30,000 gsf), a candidate that

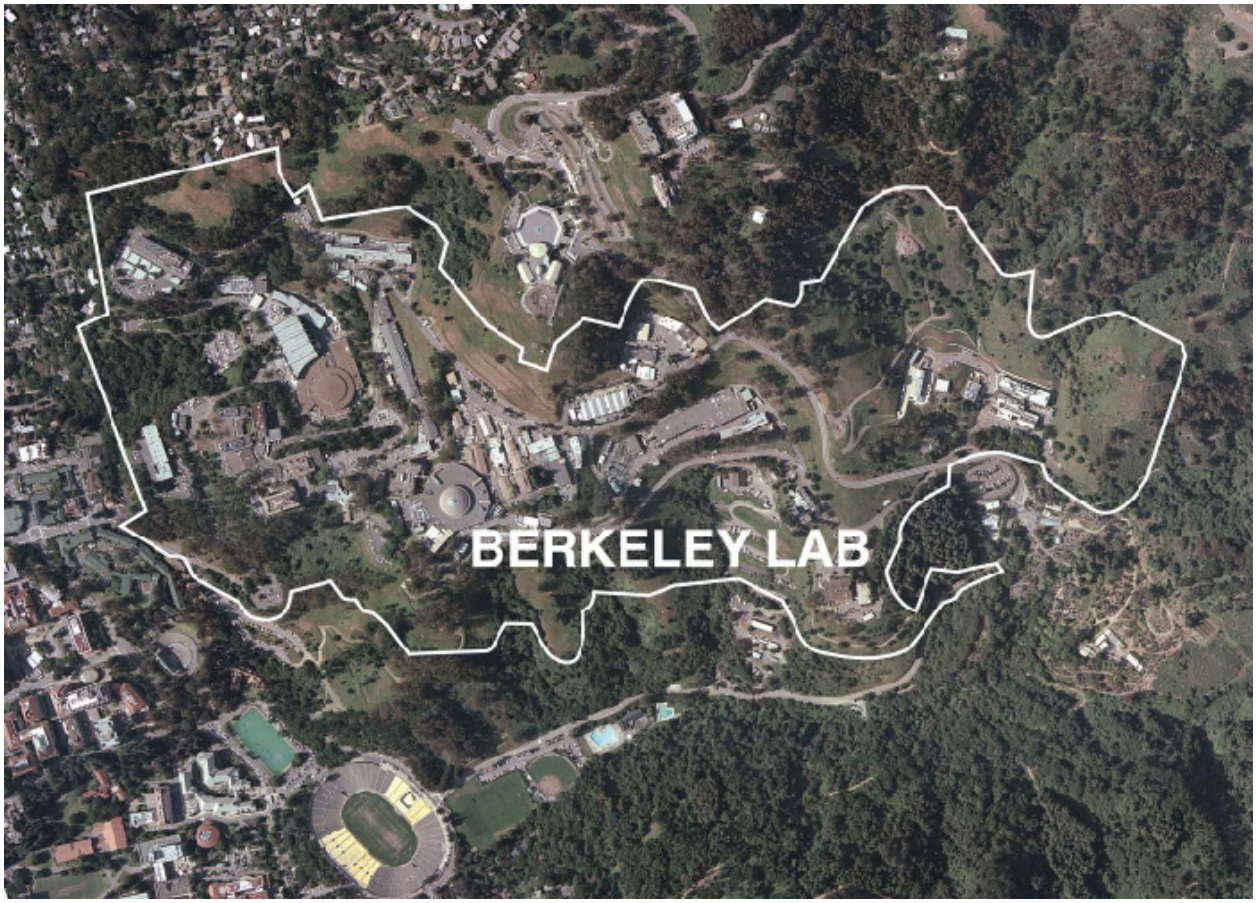
was proposed as an FY 2005 start in order to address pressing needs to serve users of the Advanced Light Source and other Berkeley Lab user facilities. This project is a high priority and anticipated as an FY 2007 start. The second priority is a Genomics GTL facility (150,000 gsf) to support the internationally recognized research conducted at Berkeley Lab and address DOE and national mission priorities in this critical area of research. Berkeley Lab is also developing conceptual plans for a new user facility (40,000 gsf) to support and further expand the Laboratory's internationally recognized research in ultrafast science.

- **Construct approximately 270,000 gsf of building space in support of the research mission of the Laboratory using non-Federal funds.** Three non-federal building starts are identified for the FY 2006 – 2007 timeframe.

- **Address Seismic Safety Issues.** The Laboratory is evaluating the seismic safety of all buildings and the infrastructure of the Hill site; approximately 50% of the buildings have been surveyed and all buildings will be surveyed by the end of FY 2007. A number of building upgrade requirements have been identified and projects to accomplish these pressing seismic safety issues must be implemented. The first of these projects will upgrade the Emergency Operations Center/Fire House in FY 2005. Three buildings will require Line Item funding as the upgrade costs exceed $5M dollars, these total approximately $23M dollars. Eight buildings in total will require GPP funding, totaling approximately $20M dollars. Unless the Laboratory's GPP allocation is increased, this need alone would consume the entire GPP allocation for some six years. Three buildings have been identified for demolition, and will require approximately $5M of operating funds.

The Laboratory and DOE must work together to address these needs.

The two seismic correction-focused Line Item Projects identified in this TYSP are particularly important. DOE's continuing support for a FY 2007 start for the first of these projects is an important cornerstone of this working relationship.


BERKELEY LAB

II. Site Summary

Berkeley Lab is located approximately one mile east of San Francisco Bay on the slopes of the Coast Range within 1,183 acres of contiguous UC land. Most of the Laboratory's main-site buildings are owned by DOE and were constructed on University land under long-term arrangements with the federal government. The Laboratory's 203 acre site is in Alameda County, with the western portion of the site in the City of Berkeley and the eastern portion in the City of Oakland.

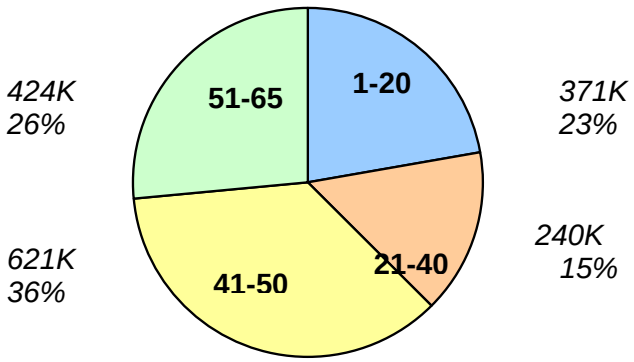
Berkeley Lab operations take place on its 203-acre "Hill" site, on the UC Berkeley campus, and in leased space in Berkeley, Oakland, and Walnut Creek, California. Most of the Laboratory's scientific, administrative, and support programs are housed on the Hill, where Berkeley Lab currently occupies approximately 1.70 million gross square feet in 107 buildings (approximately 1.65M gsf) and 50 trailers (approximately 0.50M gsf). There are two small non-SC-owned facilities listed in FIMS at Berkeley Lab (Building 31, a UC-owned facility that is solely used by DOE SC programs and to be transferred, and Building 71T, an EERE facility).

The DOE's occupancy of the earliest buildings constructed by UC and DOE on UC Regents' land was established through an occupancy agreement between DOE and UC. Subsequent major buildings have been constructed using parcel leases. The majority of the parcel leases were for an initial period of 50 years. Those that have passed the initial expiration date have been extended, through prime contract negotiations, to expire following the termination of the prime contract. A parcel lease map of Berkeley Lab is included as Appendix 11.

Berkeley Lab, a multidisciplinary national laboratory, accommodates a wide range of research and support activities**.** The majority of the Laboratory's buildings contain multipurpose lab and office space whose primary function is to support the research divisions. Advanced and specialized research facilities, like the ALS and NCEM, serve specific programmatic needs. The latter are typically dedicated national user facilities and must also provide visiting research teams with supplemental lab and office space. Support services necessary to maintain and operate the Laboratory occupy a diverse range of facilities, from administrative offices to high-bay engineering shops, utility equipment structures, and an onsite firehouse.

Over a quarter of Berkeley Lab's main site buildings are over 50 years old. Approximately half of this building space has been determined to be fundamentally sound and capable of continuing to serve the DOE mission. Thirty percent requires upgrades to address modern research requirements, the remaining 20% can be maintained in its current condition and used as support space. The other half of this 50+ year old space is no longer highly suitable for modern science and is identified for demolition when the programs using this space can be relocated.

Chart 1: Age of Berkeley Lab Buildings (not including trailers), including total square footage and percentage of total.



Approximately 36% of building space on the Laboratory's Hill site was constructed between 41 and 50 years ago. Approximately 80% of this space is in fundamentally sound buildings and can continue to serve the DOE mission. Some fifty-six percent of this space must be upgraded to meet the needs of modern science. Some twenty-six percent of this space can continue to serve the DOE mission with ongoing maintenance. Approximately five percent of the building space in this age group is not longer capable of effectively serving the DOE mission and should be demolished as soon as the programs can be relocated.

Approximately 15% of building space at the Laboratory's Hill site was constructed between 21 and 40 years ago. Approximately 97% of this space is in fundamentally sound buildings and can continue to serve the DOE mission. Some fifty-seven percent of this space must be upgraded to meet the needs of modern science. Some forty percent of this space can continue to serve the DOE mission with on-going maintenance. Approximately three percent of the building space in this age group is not longer capable of effectively serving the DOE mission and should be demolished as soon as the programs can be relocated.

Approximately 23% of building space at the Laboratory's Hill site was constructed within the past 20 years. With consistent maintenance and timely upgrades these buildings can continue to serve the DOE mission for many decades,

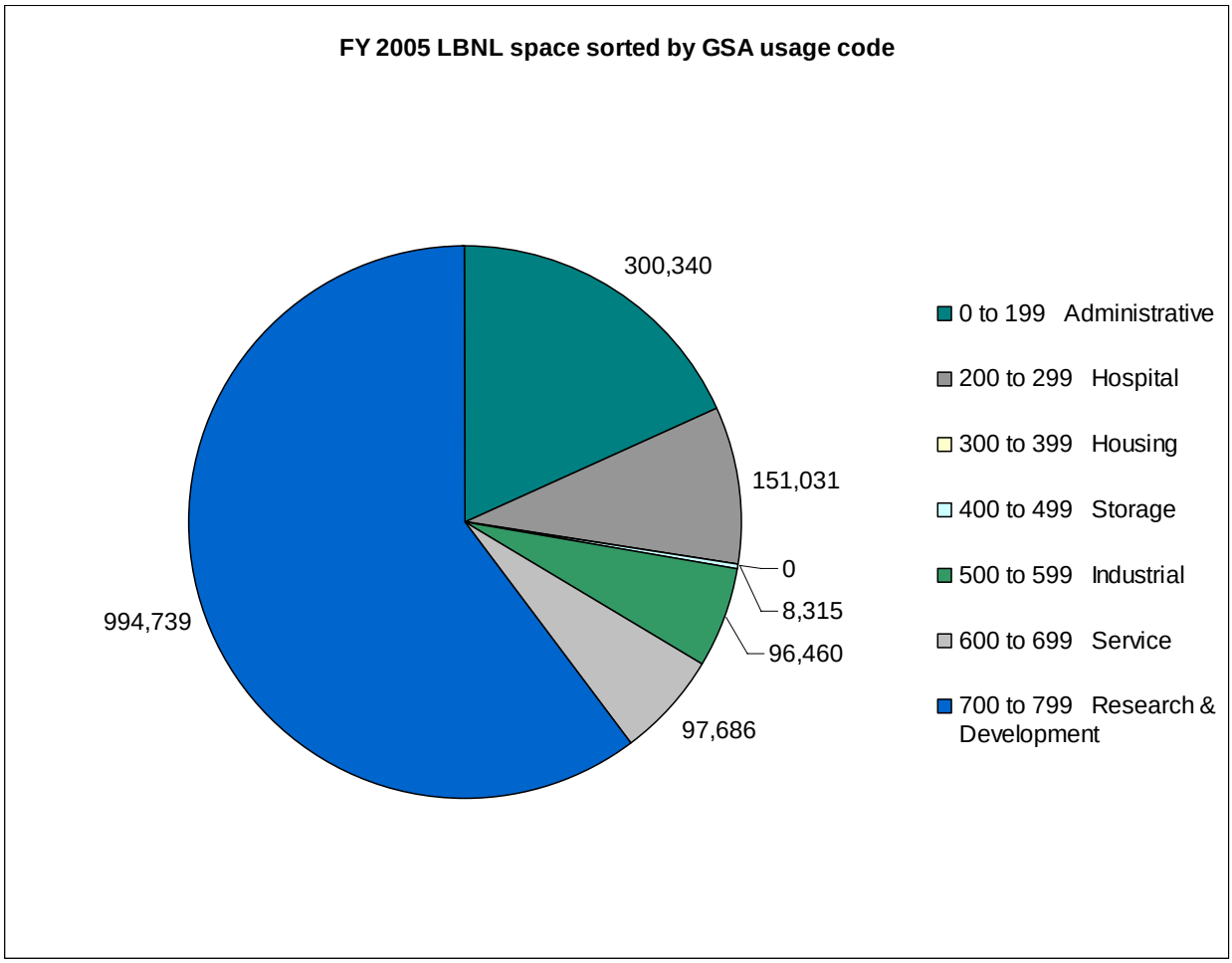
The vast majority of the 72,000 net square feet of space currently occupied by the Laboratory on the UCB campus is in two buildings that were constructed with the direct support of Berkeley Lab: Donner Laboratory, which the Donner Foundation funded to further the life sciences work of Ernest and John Lawrence; and Calvin Laboratory, constructed to carry forward the biosciences work of Berkeley Lab Nobelist Melvin Calvin.

Approximately 60,000 net square feet of space directly to the west of the UCB campus is currently leased for administrative service functions. This downtown space is served by the Berkeley Lab shuttle bus system, which provides a direct connection to the main Hill site. The Laboratory also leases a shipping-and-receiving facility in an offsite industrial area. Materials are consolidated at this location and transported by truck to the Hill once or twice a day. Approximately 60,000 net square feet of laboratory and research office has been leased approximately one-mile from the Hill site at 717 Potter Street, Berkeley.

Offsite leased space houses research functions if dictated by the type of work or by the Laboratory's overall space needs. For example, the Laboratory operates the Joint Genome Laboratory's Production Genomics Facility, jointly with other DOE laboratories, in Walnut Creek, CA; a Washington, D.C.; office for Energy and Environment program development, and the Oakland (CA) Scientific Facility, housing computing equipment and staff.

Appendix 5 contains details on Berkeley Lab buildings, trailers, and leased buildings. Appendix 7 provides detail regarding the types of space contained in the Laboratory buildings.

Below is a chart of Laboratory Space Distribution broken out by the GSA Use Codes.



Replacement Plant Value

At the beginning of FY2004 Berkeley Lab's legacy RPV data in FIMS was $821,000,000. During the course of the year OECM agreed that site preparation costs and other costs included in the Berkeley Lab legacy data was inappropriate but they rejected that Lab's methodology in calculating those costs. As a result of their rejection of the Berkeley Lab process $99,000,000 in costs were added back into the Berkeley Lab RPV, raising it to $920,000,000.

Berkeley Lab has now obtained concurrence on an updated RPV calculation. Appendix 5 contains RPV, and related indices data, for each building. The current RPV figure is $656,173,600 for non-programmatic assets (Programmatic assets total an additional $138,069,000). The overall RPV figure is provided in Appendix F, as are all other related indices and figures.

Off-Setting Space Status

Through a previously approved Secretarial Waiver, proposed Bevatron demolition project, and other planned demolitions, Berkeley Lab has identified sufficient offsetting space for all new DOE-funded construction. In this TYSP the Laboratory proposes to construct and additional approximate 230,000 gsf of new modern DOE building space. The Laboratory also identifies

an off-setting 250,000 gsf of existing buildings that can be demolished to off-set this new DOE space.

It is also assumed that the three alternatively financed projects included in this TYSP, and any other similarly financed projects to be completed in the future, will be treated in the same manner as either UCB space or leased facilities. Neither of these classes of building is currently covered by the offsetting space requirement.

Details are contained in Appendix 8. Projects are summarize din Appendix 9.

Asset Utilization

Berkeley Lab assets are near 100% utilized, with the exception of the Bevatron complex, the accelerator portion of Building 7, and a few small condemned structures. Berkeley Lab's overall average AUI[1] is currently 0.980 as derived from the data in FIMS. The rating assigned to the AUI of 0.980 is "Excellent". Our goal is to further improve the AUI as excess facilities are eliminated and consolidation increases the space utilization rate of our remaining facilities.

[1] The Asset Utilization Index (AUI) is the Department of Energy's corporate measure of facilities and land holdings against requirements. The index reflects the outcome from real property acquisition and disposal policy, planning, and resource decisions. The index is the ratio of the area of operating facilities, justified through annual utilization surveys (numerator), to the area of all operational and excess facilities without a funded disposition plan

III. Mission and Research Vision of Berkeley Lab

Berkeley Lab prepares an annual research Business Plan. The Business Plan outlines research missions and objectives as well as linkages to the DOE Strategic Plan (DOE/ME-0030), the Office of Science Strategic Plan, and the Office of Science publication "Facilities for the Future of Science: A Twenty Year Outlook", and related guidance. The Laboratory Director meets with the DOE Office of Science annually to present and discuss the Business Plan. The research vision, and associated facility requirements, presented in this TYSP reflect the 2005 Business Plan that was discussed with DOE SC in early May 2005. The 2005 Business Plan can be referenced for further detail.

Berkeley Lab is organized to address and solve the most pressing and profound scientific problems facing humankind. Berkeley Lab researchers not only address both the immediate and near-term DOE SC mission objectives, but, are also focused to deliver breakthrough research and leadership in:

- New energy technologies and environmental solutions, including development of chemical fuels from solar energy and safe, effective carbon sequestration systems.
- Discovering the nature of matter and energy in the universe, and featuring the continued development of a detector and satellite for "dark energy" exploration.
- Living systems engineered through quantitative biology, to enable the production of synthetic fuels, environmental and health protections, etc.
- Designer materials through nanoscience, leading to advanced fuels, motors and electricity-generating systems.
- Advanced x-ray and ultrafast science, to further explore energy and materials processes, biological systems, and the environment.
- Advanced computing, with new capabilities and architectures to enable the next level of scientific discovery.

The Berkeley Lab mission is focused to support particular DOE SC mission needs and to achieve science breakthroughs for Energy, Health and the Environment. This approach involves integrating core competencies in Physical and Biological Sciences:

- Chemical Dynamics, Catalysis, and Surface Science
- Advanced Detector Systems
- Computational Science and Engineering
- Multidisciplinary Biology and Environmental Science
- Particle and Photon Beams
- Material Synthesis and Characterization

For example, there are strong indications that the solution for sustainable carbon-neutral fuels may lie at the interface of biology and the physical sciences at the nano-scale. Berkeley Lab's leadership here is a establishing a roadmap for the world in science for sustainable carbon-neutral fuels for a safe, secure energy future.

The Laboratory will work with DOE to ensure that adequate and appropriate space is upgraded and used to support exceptional scientists to focus on the Joint Genome Institute, the Joint Dark Energy Mission, the Transmission Electron Achromatic Microscope (TEAM), even greater NERSC and ESnet Capabilities, Protein Production and Tags, Characterization and Imaging of Molecular Machines as well as the analysis and modeling of cellular systems, Whole protein analysis, and the upgrade of the Advanced Light Source.

Another essential part of the Berkeley Lab mission involves the operation of National User Facilities. Berkeley Lab builds and safely operates leading scientific facilities for the nation, including the:

- Advanced Light Source
- National Energy Research Scientific Computing Center
- Molecular Foundry
- National Center for Electron Microscopy
- Energy Sciences Network (ESnet)
- Joint Genome Institute/PGF with other labs

In support of its current and future missions, Berkeley Lab also continues to train the next generation of scientists and engineers for the DOE scientific mission.

Facility / Infrastructure Requirements

To effectively achieve mission objectives within the term of this Ten Year Site Plan, Berkeley Lab must provide appropriate modern research and support facilities, and intends to work with DOE to:

Demolish approximately 250,000 gsf of building space on its main site (approximately 15% of the building space, not including trailers).

Upgrade approximately 600,000 gsf of building space on its main site to conform to modern research requirements (approximately 37% of the building space, not including trailers). These upgrades are consistent with the FY2006 Congressional Budget Request guidance that DOE SC is to operate "world class, state of the art scientific facilities.

Maintain, without upgrade, approximately 700,000 gsf of building space on its main site to conform to modern research requirements (approximately 43% of the building space, not including trailers).

Construct approximately 230,000 gsf of new DOE research and support space.

Construct approximately 270,000 gsf of building space in support of the research mission of the Laboratory using non-Federal funds.

In addition, the Laboratory must address pressing seismic safety issues, and will need to seismically upgrade a number of buildings with recently identified life safety problems. Three of these buildings require Line Item funding as the upgrade costs exceed $5M dollars, these total approximately $23M dollars. Eight buildings will require GPP funding, totaling approximately $20M dollars. Three buildings have been identified for demolition, and will require approximately $5M of operating funds.

The Laboratory and DOE must work to together to address these needs.

The two seismic correction-focused Line Item Projects identified in this TYSP, are particularly important. DOE's continuing support for a FY 2007 start for the first of these projects is an important cornerstone of this working relationship.

GPP (small capital projects) and GPE (capital equipment) funding levels have not been adjusted for many years, and at current levels will not support needed safety and facility upgrades. At current GPP funding levels, the significant life safety seismic problems would consume all GPP funds for six years.

Such an approach would not allow for use of GPP funds for mission essential upgrades of research buildings. The Laboratory has a large number of research buildings which were constructed between 1943 and 1975, that are fundamentally sound, and can realistically be upgraded to support modern research and serve DOE missions for many additional decades.

GPP funding needs to be increased into the $6 – 10M/year range, a range that appears realistic as it is consistent with GPP funding support provided by DOE to other multi-program laboratories. While $10M/year will support a realistic long-term capital building renewal program (and positively impact the Deferred Maintenance projections as well), the Laboratory recognizes that this figure may not be realistic over the next couple of years, therefore a range of $6- 10M is identified in this plan to allow for consideration of Plan "A" and Plan "B" options in discussions between the Laboratory and DOE regarding this TYSP.

Similarly, there is a need to increase funding for GPE (capital equipment) funding, in this case a modest increase, to approximately $2.5M/year in order to ensure that general purpose equipment is available when required by researchers.

This TYSP program respects Congressional direction to demolish buildings that can not longer effectively serve the DOE mission before modern new DOE buildings are constructed. The Laboratory proposes to demolish approximately 250,000 gsf of buildings that have served the DOE mission but can not be effectively modernized to serve researchers in the 21st Century. The buildings to be demolished are primarily located in the World War II-era "Old Town" portion of the site, and at the site of the abandoned Bevatron accelerator. Demolition of the Bevatron will contribute approximately half of targeted demolition square footage. A funding program to demolish the Bevatron has been developed by the Laboratory and DOE, continued support of this commitment is a high priority.

During this same period, the Laboratory intends to work with DOE SC offices to construct approximately 230,000 gsf of modern research facilities focused to near-term DOE SC mission needs.

Modern, effective, and efficient physical infrastructure is critical to maintaining the capabilities of Berkeley Lab, as well as other multiprogram laboratories, and to serve the users of the specialized instrumentation at the laboratories. DOE and the Laboratory have worked together to advance infrastructure-based Line Item Projects through the SC Science Laboratory Infrastructure program. Projected funding cuts to this program, from FY 04 funding levels that appear to allow baseline level work to proceed, will not allow this program to continue to meet this need across the complex.

Berkeley Lab has prepared this Ten-Year Site Plan (TYSP) to document the actions and resources required to sustain Berkeley Lab's contributions to DOE's mission. It was developed using information from many sources that was then compiled by Facilities Planning and reviewed by all levels of Laboratory management. Complementary to this planning is the evaluation of projects with a risk-prioritization matrix to assure that program, environmental, safety, and security risks are considered in establishing priorities.

Mission Critical, Mission Dependent, and Non-Mission Dependent Facilities

In preparing this TYSP, Berkeley Lab has reviewed its building assets and, per DOE guidance, characterized each as 1.) Mission Critical, 2.) Mission Dependent, not critical, or 3.) Non-Mission Dependent. Berkeley Lab used the proposed FIMS definitions (dated 3/24/05) in making these distinctions. The draft FIMS guidance states that a building is Mission critical if "without constructed asset or parcel of land, Mission is Compromised. The draft FIMS guidance for Mission Dependent, Not Critical is that this building or parcel of land "does not fit into Mission Critical, or Not-Mission Dependent categories. The draft FIMS guidance states that a building or parcel of land is Not-Mission Dependent if, if it were removed the "Mission would be Unaffected.

Using these definitions, the Laboratory has identified the following buildings as Not-Mission Dependent; Buildings 51, 51A, 73A, 7A, 50D, 29A, 29B, 29C, 71E and 75E. Details on these and all other buildings are provided in Appendix 5.

The Laboratory has identified Building 54A as Mission Dependent, Not Critical.

Space utilization is almost 100% at Berkeley Lab, and although some space must be upgraded to fully address the requirements of modern science, the balance of the space at Berkeley Lab is identified as Mission Critical. As opportunities to consolidate or relocate programs are identified, it is anticipated that some of the older facilities in this group will be systematically redefined, however, at this time they are critical to the performance of mission work.

IV. Land Use Plans

The Laboratory maintains both strategic/institutional and capital/infrastructure planning initiatives regarding its facilities. Strategic/institutional planning initiatives are led by the Office of Planning and Strategic Development, while capital/infrastructure planning initiatives are led by the Facilities Division. These interrelated planning processes are documented in three primary documents: the Institutional Plan, the Ten Year Site Plan, and the Maintenance Plan.

The Office of Planning and Strategic Development is responsible for Institutional planning and preparation of the Laboratory's Institutional Plan. It is through the Institutional Planning Process that the Laboratory's strategic goals and objectives are refined and communicated to the broader Laboratory community. The Institutional Planning process involves two annual planning retreats and an annual review of each research divisions programs and planning.

Facilities Planning is responsible for capital asset and infrastructure planning including preparation of the TYSP. To ensure that this planning is both inclusive and accurate, the Facilities Division Director participates in the Institutional Planning processes with his peers, the Facilities Division obtains reports on the Institutional Planning processes, and Institutional Planning and Facilities Planning staff coordinates on a monthly basis. It is through this process that future project needs are identified, vetted and forwarded for review and prioritization by the Laboratory management.

Berkeley Lab Long-Range Development Plan

Within the University of California system, each campus and Laboratory periodically prepares a Long Range Development Plan (LRDP) to guide the future physical development of the facility. The LRDP identifies the physical development needed to enable the Laboratory to achieve its scientific objectives during a planning period of approximately two-decades. The LRDP outlines the anticipated growth and provides a land use map and guidance that will be used in the siting of new facilities. Through a revised Long Range Development Plan (LRDP), Berkeley Lab leadership is now articulating a vision of a 21st Century research campus that physically achieves facility design standards that attract and retain world-class researchers.

A scientific infrastructure, capable of supporting emerging science missions, is an essential component for success at Berkeley Lab. As a preferred place for scientists to work, the Laboratory must adapt and develop facilities to meet the high expectations of modern science. The LRDP provides for the space and facilities necessary to meet the needs of near-term and next-generation research.

Berkeley Lab's LRDP was last updated in 1987. A revised LRDP, along with its accompanying Environmental Impact Report (EIR), is currently being prepared. These documents will provide a planning framework for Berkeley Lab for the early decades of the 21st Century. The LRDP will also outline a framework that will sustain development and scientific facilities over additional decades. Laboratory planners use the LRDP to site and design physical improvements and to plan for necessary infrastructure, transportation and physical services. The UC Regents refer to the LRDP and EIR as they consider the design and environmental impacts of specific major capital project proposals. The LRDP also provides another opportunity to communicate with the larger community regarding the Laboratory's research mission and future direction.

The LRDP provides a comprehensive physical framework for implementing the Laboratory's mission, presenting a long-term vision of the totality of the Laboratory's research and facilities needs. It describes Berkeley Lab's scientific objectives for the early decades of the 21st century, and identifies the physical alterations of facilities on the Laboratory's main "Hill" campus that are required to support these objectives. Continued use of space on the University of California, Berkeley (UCB) campus, and of leased space in the larger region, also receives full consideration.

Traditionally, the Laboratory has developed in an incremental manner. This development pattern has proceeded under a design framework that emphasized function, and while the Laboratory was primarily focused on physics, there was a common understanding of building design and the associated pedestrian routes. Today, Berkeley Lab is a multiprogram campus hosting research in a wide variety of fields. The needs and vision of various research organizations differ, and there is a new need to implement a coherent community-wide design framework that is flexible enough to accommodate various types of scientific facilities.

The 1987 development plan laid out a series of "functional planning areas", a planning framework that was useful during the initial phases of conversion to a full-fledged multiprogram laboratory. This approach allowed developing programs to locate space that could be adapted to meet their needs, and to develop research centers at these locations. This is a form of overlay zoning.

The new development plan seeks to build upon this base to establish a set of topographically based "Intellectual Centers," readily identifiable areas that are prime for development. It is anticipated that this model will allow divisions that are currently fragmented at locations across the site to develop mini-campuses and co-locate programs.

A new set of design guidelines will also bring forward 21st century public spaces of a caliber typically associated with a top-flight research facility and of UC in general. This approach is consistent with the Laboratory's sustainability objectives as it concentrates development and allows for greater density in developed areas, rather than a pattern of low-rise, low-density structures. The Laboratory's new design standards echo existing standards and ensure that buildings are designed to be seen among the trees and valleys of the site.

The LRDP will establish a growth profile for the early decades of the 21st century, and a siting and design framework for new facilities. It provides guidance to ensure that overall development is orderly and consistent with the Laboratory's commitments to first-order scientific excellence and achievement, effectively serves the growth of an overall scientific community, establishes a coherent and unified campus environment, and achieves the Laboratory's sustainability and community-relations objectives.

V. Facilities and Infrastructure

Strategic Facilities and Infrastructure (F&I) Goals and Issues

Ernest Orlando Lawrence Berkeley National Laboratory (Berkeley Lab) is a major multi-program research laboratory. Berkeley Lab is operated by the University of California (UC) under contract to the U.S. Department of Energy (DOE) largely in support of Office of Science (SC) missions.

Berkeley Lab is recognized for research of national and international significance, Berkeley Lab scientists have received ten Nobel Prizes as well as numerous other honors and distinctions for their work. Berkeley Lab is the only DOE SC multi-program research laboratory located adjacent to a major research university, the University of California, Berkeley. Berkeley Lab is also located in close proximity to two other internationally recognized research universities, Stanford University and the University of California, San Francisco. There is significant interaction between researchers at these facilities that benefits DOE mission performance at Berkeley Lab.

Berkeley Lab operations take place on its 203-acre Hill site, on the UC Berkeley campus, and in leased space in Berkeley, Oakland, and Walnut Creek, California. Most of the Laboratory's scientific, administrative, and support programs are housed on the Hill, where Berkeley Lab currently occupies approximately 1.70 million gross square feet in 107 buildings (approximately 1.65M gsf) and 50 trailers (approximately 0.50M gsf). There are two small non-SC-owned facilities listed in FIMS at Berkeley Lab (Buildings 31, a UC-owned facility that is solely used by DOE SC programs and to be transferred, and 71T, an EERE facility).

Berkeley Lab operates at near 100% occupancy. Over a quarter of Berkeley Lab's main site buildings are over 50 years old. Approximately half of this building space has been determined to be fundamentally sound and capable of continuing to serve the DOE Mission. Thirty percent requires upgrades to address modern research requirements; the remaining 20% can be maintained in its current condition and used as support space. The other half of this 50+ year old space is no longer highly suitable for modern science and is identified for demolition when the programs using this space can be relocated.

About two-thirds of the Laboratory's research directly supports the missions of the DOE Office of Science. The balance involves complementary and synergistic research performed largely for other federal and state agencies.

The scientific drivers and buildings identified in Berkeley Lab's infrastructure planning advance DOE missions, principally those of the SC Offices of Basic Energy Sciences, Biological and Environmental Research, High Energy Physics, Nuclear Physics, Advanced Scientific Computing Research, and Fusion Energy Sciences. In addition, technology advancements made by the Laboratory support the DOE Energy Efficiency and Renewable Energy Programs and the DOE Office of Civilian Radioactive Waste Management and well as other elements of DOE.

During the period of the TYSP, the Laboratory will work with DOE to ensure that adequate and appropriate space is upgraded and used to support exceptional scientists. Moreover, the Laboratory will work with DOE to implement the Office of Science vision; to focus on the Joint Genome Institute, the Joint Dark Energy Mission, the Transmission Electron Achromatic Microscope (TEAM), even greater NERSC and ESnet Capabilities, Protein Production and Tags, Characterization and Imaging of Molecular Machines as well as the analysis and modeling of cellular systems, Whole protein analysis, and the upgrade of the Advanced Light Source.

Four of the Laboratory's unique and powerful scientific facilities, are regularly made available to the larger scientific community as DOE national user facilities. These are the Advanced Light Source (ALS), ESNet (Energy Sciences Network), National Center for Electron Microscopy (NCEM), and the National Energy Research Scientific Computing (NERSC) Center. In FY 2006, the Molecular Foundry will be completed and will be added to this list.

Appendices I, J and K present maps of the buildings, utilities and parcel leases at the hill site.

Berkley Lab has committed to work with DOE to obtain the maximum useful value from all assets through maintenance and upgrades and modernization efforts. The site was developed beginning in 1939 and contains a significant number of World- War II and early Atomic Energy Commission structures. The aging infrastructure requires dedicated maintenance and renewal investments.

The Laboratory has a pattern of increasing maintenance investment and will invest approximately 2% of the Replacement Plant Value in maintenance in FY 2006. The Laboratory has partnered with the DOE to demolish high-maintenance/low-value buildings consistent with Congressional Direction to remove at least one gsf of old building when new modern facilities are planned, and to reduce the Laboratory's Deferred Maintenance Backlog (which identifies the need for major upgrades to buildings that remain in use, but are intended for demolition within the next ten years). Moreover, the Laboratory has effectively applied the capital renewal funds provided through the SLI and landlord GPP program to address pressing needs to upgrade and renew systems and spaces to address the requirements of modern science and address seismic safety concerns.

To effectively achieve mission objectives within the term of this Ten Year Site Plan, Berkeley Lab must provide appropriate modern research and support facilities, and intends to work with DOE to:

- **Demolish approximately 250,000 gsf of building space** on its main site (approximately 15 percent of the building space, not including trailers).

  Within the ten-year term of this TYSP, the Laboratory plans to demolish some 250,000 gsf of Hill-site buildings with support from DOE. Two redevelopment sites are identified, the Bevatron (demolition is now funded by DOE), and the "Old Town" area (demolition funding proposed within the next ten years by the SLI Excess Facilities program)

- **Upgrade approximately 600,000 gsf of building space** on its main site to conform to modern research requirements (approximately 37% of the building space, not including trailers).

- These upgrades are consistent with the FY2006 Congressional Budget Request guidance that DOE SC is to operate "world class, state of the art scientific facilities. Building and infrastructure renewal will require DOE SC SLI LIP support and Landlord GPP support at levels above current baselines.

- **Maintain, without upgrade, approximately 700,000 gsf of building space** on its main site to conform to modern research requirements (approximately 43% of the building space, not including trailers).

  The Laboratory remains committed to operate a solid maintenance program, will fund maintenance at 2% of Replacement Plant Value in FY 2006 and beyond, and will work with DOE SC SLI program to make further investments.

- **Construct approximately 230,000 gsf of new DOE research and support space.** Of particular concern is the proposed User Support Building (30,000 gsf), a candidate that was proposed as a FY 2005 start in order to address pressing needs to serve users of the Advanced Light Source and other Berkeley Lab user facilities. This project is a high priority and anticipated as a FY 2007 start. The second priority is a Genomics:GTL facility (150,000 gsf) to support the internationally recognized research conducted at Berkeley Lab and address DOE and national mission priorities in this critical area of research. Berkeley Lab is also developing conceptual plans for a new user facility(40,000 gsf) to support and further expand the Laboratory's internationally recognized research in ultrafast science.

- **Construct approximately 270,000 gsf of building space in support of the research mission of the Laboratory using non-Federal funds.** Three non-federal building starts are identified for the FY 2006 – 2007 timeframe.

- **Address Seismic Safety Issues.** The Laboratory is evaluating the seismic safety of all buildings and the infrastructure of the Hill site; approximately 50% of the buildings have been surveyed and all buildings will be surveyed by the end of FY 2007. A number of building upgrade requirements have been identified and projects to accomplish these pressing seismic safety issues must be implemented. The first of these projects will upgrade the Emergency Operations Center/Fire House in FY 2005. Three buildings will require Line Item funding as the upgrade costs exceed $5M dollars, these total approximately $23M dollars. Eight buildings in total will require GPP funding, totaling approximately $20M dollars. Unless the Laboratory's GPP allocation is increased, this need alone would consume the entire GPP allocation for some six years. Three buildings have been identified for demolition, and will require approximately $5M of operating funds.

  The Laboratory and DOE must work to together to address these needs.

- The two seismic correction-focused Line Item Projects identified in this TYSP, and are particularly important. DOE's continuing support for a FY 2007 start for the first of these projects is an important cornerstone of this working relationship.

Facilities and Infrastructure (F&I) Condition Assessment

Since FY1999, Berkeley Lab has been conducting a robust condition assessment program. Under the direction of Plant Operations, annual inspections and evaluations are conducted by highly qualified outside consultants who advise Plant Operations on the maintained condition of buildings and major subsystems. Plant Operations then reviews and prioritizes the inspection findings in five-year and ten-year maintenance plans.

Requirement

Under a DOE requirement by the Statement of Federal Financial Accounting Standards (SFFAS) No.6, Accounting for Property, Plant, and Equipment (PP&E), guide for Deferred Maintenance Reporting Requirements, Lawrence Berkeley National Laboratory (Berkeley Lab) was directed, under a five-year plan, to inspect at least twenty percent of all real property every year. The goal of the inspections was to establish a baseline of current facility conditions, and develop a 5-year maintenance/repair plan without the influence of budgetary or operational constraints.

In FY2003 the Berkeley Lab Facilities Division conducted a pilot assessment and software project with Vanderweil Facility Advisor Inc, (VFA) the leading provider of Web-based facilities and capital asset management solutions and software. Berkeley Lab contracted VFA to perform a detailed facility condition assessment, provide training on VFA's assessment methodology and deliver VFA facility software, the central Web-based platform of VFA's capital planning and management solutions (CPMS) tools for six- (6) buildings with a combined total of approximately 150,000 square feet. The outcome of the pilot was extremely successful and the decision was made to retain VFA to perform detailed condition assessment for the balance of the Laboratory buildings over the subsequent three years, and integrating VFA's software and assessment methodology into Berkeley Lab's existing facility management program.

This process is enabling the Facilities Division to capture and quantify the Lab's deferred maintenance backlog efficiently and effectively. VFA's software including VFA facility and AssetFusion VFA's integration with MAXIMO, the Facilities Division Work Management System, gains access to versatile and extensive capabilities for reporting and modeling, improving the accuracy of building cost estimates, estimating time to failure and optimal period to take action, and improves the quality of the information gathered. Facilities will also use the software to develop reports that demonstrate the exponential growth of potential deferred maintenance costs over time.

Deferred Maintenance

Deferred Maintenance Backlog is identified through Condition Assessment Inspection and by in-house experts then prioritized, reviewed, and planned based on funding. Annually maintenance project candidates are assessed during the planning process by the condition and the consequences of failure of the asset based on the Strategic Value to the Berkeley Lab Mission determining the priority. Maintenance projects are funded through a combination of overhead and recharge funding. Overhead is used to fund the backlog reduction and non-cap maintenance projects. The remaining maintenance projects are funded through electrical recharge funds and portions of Capital projects. Throughout the year numerous other small

Maintenance projects are funded through ongoing maintenance funds as needed. Year end excess funds are also used for deferred maintenance reduction.

At this time we are projecting an increase in deferred maintenance backlog based on the DOE definition of deferred maintenance and reporting requirements, the continuing condition assessment process, deterioration, inflation factors, and lifecycle capital renewal needs. Increased maintenance investment will be made into facilities in a manner that addresses high priority issues and to help prevent further backlog growth. Much of our deferred maintenance is in buildings that are substandard and in which we have no intent to reduce deferred maintenance by applying extra maintenance funds. Until substandard buildings are demolished or upgraded/recapitalized, the deferred maintenance backlog will not shrink appreciably. Increased DOE support would allow the maintenance and infrastructure backlogs to be effectively reduced. The use of non-capital funds could be efficiently allocated to maintain essential building and equipment investments. If the deferred maintenance list is retired by large blocks of funding, it will keep the list from growing. These large blocks of funding can come in the form of increased capital project funds (GPP or GPE), demolition funds (SLI or Program), or major recapitalization projects (SLI or Programmatic LIP)

Annually maintenance project candidates are reviewed during the planning process, the condition of the asset, and the consequences of failure of the asset are assessed to determine the planning year of the project.

Throughout the Laboratory's history, buildings have been constructed using the most common and cost-effective methods available at any given time. The result is a range of construction types as diverse as their use and age. Many of the buildings in the oldest portion of the Laboratory were intended to be temporary. Still in service today, these buildings are uninsulated metal panel structures with expanses of single-pane glass windows. There are also wood-frame buildings with corrugated composite siding, such as Building 64, and sturdy cast-in-place concrete structures, such as the landmark Building 50 complex.

Berkeley Lab's deferred maintenance figure increased significantly between 2003 and 2005. this increase is due to implementation of a more through and accurate survey method (described above). Deferred Maintenance figures are expected to remain roughly in the 2005 range until a number of older limited-use buildings can be demolished, and other buildings that are identified for upgrade are rehabilitated. The Deferred Maintenance figure reflects maintenance deficiencies in these buildings, however, correction of these deficiencies with maintenance funds is not advised.

Deferred Maintenance (DM) Trend	
DM 2002	$46,505,430
DM 2003	$9,545,791
DM 2004	$18,469,064
DM 2005	$54,647,239
DM 2006	$59,488,422
DM 2007	$62,879,666

Rehabilitation and Improvement Cost (RIC)

As the first DOE National Laboratory, Berkley Lab has a number of older buildings. Many of these buildings are fundamentally sound, but the building systems and the spaces reflect the nature of science at the time that they were constructed rather than modern research requirements. With upgrades, these buildings can continue to serve the DOE mission for many additional decades. The need for upgrades is a major theme of this TYSP and has been discussed previously in this Plan. Over the course of the next year, Berkeley Lab will refine the RIC figure.

A major indicator of building conditions is the Facilities Condition Index (FCI), which is defined as dollars of deferred maintenance for a building, trailer, or utility system divided by the Replacement Plant Value (RPV) for that building, trailer, or utility system. The Asset Condition Index (ACI) is simply 1 minus the FCI. While the ACI provides an accurate representation of the maintained state of an asset, it may not provide a complete picture of the asset's condition.

The life-cycle status of each of the various subsystems comprising the asset needs to be determined and evaluated along with code deficiencies and other "non-maintenance" considerations in order to complete the condition analysis. This evaluation develops a Rehabilitation and Improvement Cost (RIC) which, for buildings and trailers, Berkeley Lab currently utilizes an analysis tool patterned after the RS Means methodology used by FIMS for RPV calculation. Appendix 4 contains a more detailed explanation of this process and the calculation of the Total Summary Condition Index (TSCI). Utility Systems are similarly evaluated and the appropriate percentage from Appendix 4 is applied to determine the RIC.

A significant part of VFA's detailed condition assessment of our assets is the preparation of life-cycle based renewal information and code deficiencies. As more experience is gained with the VFA assessment and methodologies, it is anticipated that their actual inspection and evaluation data will replace the current, more qualitative, RIC calculation method.

Rehab and Improvement Cost (RIC)	$117,862,509
*Doesn't include personal property trailers	

Total Rehabilitation and Improvement Costs (TRIC)

This 2005 figure (the sum of Deferred Maintenance (DM) and RIC) is $54,647,239 + $117,862,500 = $172,509,739

Facility Condition Index (FCI)

A facility condition index (FCI) value is simply the cost required to correct all deficiencies in a building divided by the total replacement cost of that building. This FCI value is a useful tool for comparing the relative condition of all buildings. This tool will be useful in determining which buildings or systems should be considered for major renovations or up-grades, and to assure

that funding sources have been identified for each project to help assure that each deficiency is properly addressed. Altogether this would be a powerful tool useful in the development of a five-year or longer capital renewal model that shows the needs versus available funding and the resultant FCI.

The 2005 figure (Deferred Maintenance (DM) as a percentage of RPV) is: $54,647,239 / $656,173,600 = 0.020. This calculation reflects current DM and RPV figures. The same calculation, using March 1st, 2005 FIMS data, recently cited by SC 32, would reflect a DM figure of $14,711,106 and an RPV figure of $659,461,467, and accordingly report the index at 0.022 on that date.

Total Summary Condition Index (TSCI)

The 2005 index figure (the sum of DM and RIC as a percentage of the RPV), and the associated Rehab & Improvement Cost Index follow:

Total Summary Condition Index (TSCI): (percent of Total RPV)*	0.305
Rehab & Improvement Cost Index (based on RIC/percent of Total RPV)	0.266

Appendix 5 contains the RIC and TSCI for all applicable Berkeley Lab assets. Appendix 4 contains background information on calculation of RIC.

Facilities Management; Space Management & Utilization

Berkeley Lab operates at near 100% occupancy. The Asset Utilitization Index (AUI) follows.

AUI (Asset Utilization Index from RPAM Order)	0.987 (excellent)

The Laboratory Director has the ultimate authority for both facilities and space management at the Laboratory. The Laboratory Director may delegate the implementation of policy and the authority to manage facilities and allocate space in all Berkeley Lab. The Director of the Facilities Division oversees both facilities management and space allocation, and advises the Laboratory Director.

The Laboratory's facilities management policies are directed to maximize the use of existing assets and to ensure that research activities are fully supported. The Laboratories space management polices are directed to maximize the use of this asset in a planned, judicious, and cost-effective manner while minimizing disruption of activities. In order to implement this policy, Laboratory organizations are given stewardship responsibility for certain portions of the Laboratory’s space. These stewardship assignments will be periodically reviewed and adjusted by Laboratory management to ensure that, to the extent possible, the appropriate amount and type of space is made available for new and expanding activities.

Each division is responsible for effective utilization of space for which it is steward. When a division has new space needs, it is responsible for examining all possibilities to meet this need within its existing allocations before submitting a request for additional space to Facilities Planning. Any modifications made to a room configuration, including change of use, must be approved by Facilities Planning for compliance with applicable building codes and consistency with Laboratory-wide plans.

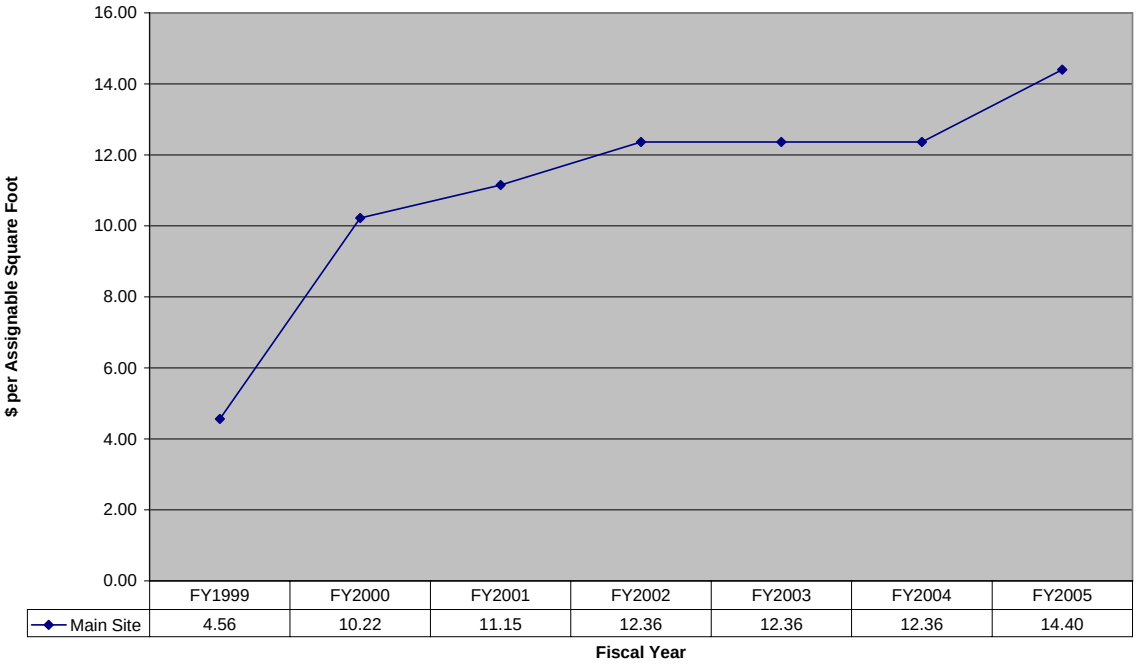
Facilities Planning works with each Division Deputy or designee to assist in achieving optimal utilization and solving additional space needs. The Division Deputy or designee serves as the primary point of contact for the division's space information, is authorized by the Division Director to act for the division in day to day space activities, and ensures that Facilities Planning staff are invited to attend relevant portions of division meetings and reviews.

Metrics for evaluating effective utilization of space will be proposed by the Laboratory Space Planning Committee and approved by the Laboratory Director.

An annual space audit will be conducted by the Facilities Division to ensure that divisional stewardship responsibilities are being carried out effectively. The results of the audit will be presented to the Laboratory Director. When evidence of poor space utilization is identified, the Division will be asked develop and implement a plan for better utilization. If sufficient improvements are not made, the Division will be asked to relinquish their stewardship responsibility for underutilized space.

Allocation of costs associated with space will be charged directly to the project utilizing the space, consistent with the Cost Accounting Standards of the Laboratory. With the exception of approximately 8,000 assignable square feet of animal care facility space and 24,000 assignable square feet of space on the UCB Campus, all space is currently recharged at a rate of $12.36 per assignable square foot per year. Chart 1 shows the recent trends in the space charge rate.

Chart 1
Space Charge for Main Site Space



The following are guidelines for space allocation:

- Research functions have priority for space over support operations.
- Laboratories should be used for the purposes for which they were designed (e.g., wet laboratories should be used for wet-laboratory-based research). Converting laboratory space to office space should be avoided.
- In buildings containing both offices and laboratories, groups with laboratory space in the building have priority for office space. If research programs depend on a major facility (e.g., the Advanced Light Source, the 88-Inch Cyclotron, electron microscopes), programs using the facility have priority for adjacent office and laboratory space.
- Office space is allocated to be generally equitable among the divisions. "Equitable" means that roughly the same quantity and quality amount of floor area should be provided for people, including students, of approximate equal rank. This approach accounts for program size and funding in a reasonable way. For cost effectiveness and maximum utilization, the Laboratory encourages open and shared office space.
- Space in the stewardship of a Division should be contiguous or as nearly so as can reasonably be achieved. The number of different Divisions occupying a single building should be kept to a minimum, if possible.
- When possible, researchers should also be placed in the “Research Cluster” with which they are most closely aligned.

Facilities Supporting Mission Activities

As was discussed in the preceding section, Berkeley Lab operates at near 100% occupancy and is managed as a single facility in order to ensure that all DOE missions are achieved. Space assignments are adjusted as necessary to ensure all mission needs are addressed.

The Laboratory's 2005 budget reflects the multi-program purpose of the facility, and includes complementary work for others. The 2005 budget, as well as the proposed 2006 Budget and a projected FY2010 budget are presented below.

Berkeley Lab's FY 2005 Multiprogram Budget:* (with Major Facility Budgets)	
Program	**Budget ($M)**
Biological and Environmental Research	**78**
Joint Genome Institute	**48**
Basic Energy Sciences	**124**
Advanced Light Source	43
Molecular Foundry Construction	32
Molecular Foundry Op	2
Biological and Environmental Research	**78**
Joint Genome Institute	**48**
Building 51 & Bevatron Demolition	**1.4**
Energy	**32**
Fossil Energy	**6**
Fusion	**7**
High EnergyPhysics	**43**
GPE	1.6
GPP	4.1
SNAP/JDEM	3
Math and Computing Sciences	**77**
NERSC	38
ESnet	20
National Institutes of Health	**43**
NNSA	**6**
Nuclear Physics	**17**
Other DOE)	**20**
Work for Others	**70**
Department of Homeland Security	2
Yucca Mtn	**8**
TOTAL	**533**

***Cost projection: January 2005**

FY 2010 Program Area Budget Outlook (Constant 2006$)		
Program	**Baseline Plan* ($M)**	**Science Support Case** ($M)**
ASCR	67	96
BER	60	85
BES	105	136
DHS	9	9
Energy Tech	29	29
HEP	39	89
NIH	83	83
NNSA	6	6
NP	17	20
Other DOE	37	37
WFO	70	70
TOTAL	**525**	**663**
	***Baseline Plan Includes:** • 2006 President's Budget guidance which includes Molecular Foundry Ops and 51 & Bevatron Demolition • Multidisciplinary Biology • Systems Biology (NIH) $20M • Genomics/Other (NIH) $20M • Homeland Security $7M	****Includes Baseline Plan and:** • JDEM (HEP) $50M • GTL (BER) $25M plus construction • Solar to Chemical (BES) $20M • Ultrafast Science Center (BES) $2.5M • Instrumentation Initiative (BES) $8M • NERSC Upgrade (ASCR) $22M • ESnet Upgrade (ASCR) $7M • Double Beta Decay (NP) $3M

The Laboratory's proposed GPP and LIP projects are scoped to benefit the entire Laboratory community.

Site Utility Systems

The Laboratory's operations require a complex and extensive network of utility systems. These utility systems are owned and maintained by Berkeley Lab within the management boundary. Larger aggregate utility suppliers—municipal, regional, and federal—provide service up to the management boundary. The Laboratory also works to effectively use utility resources and has implemented significant conservation programs over past decades. The Laboratory will continue with resource conservation efforts and will add emphasis to onsite generation of energy and "green" design.

The Laboratory designates utility corridors and seeks to locate new lines within existing corridors whenever possible. Further development of the utility systems will make use of the utility corridors whenever possible. The Laboratory sustains a significant investment program to rehabilitate and replace utilities. Permanently installed Laboratory utility systems are generally located underground, and will be in the future.

Expansion and renovation of the utility system is not primarily driven by new growth. Since the 1987 LRDP, Berkeley Lab has grown almost 25 percent while attaining a 40 percent decrease in water use (due to conservation measures and the installation of water conserving and efficient equipment). Expansion and renovation of the utility system is driven primarily by research needs. Increasingly rigorous environmental standards, along with new state and federal regulations, are also anticipated to require system upgrades. To ensure reliability after a major seismic event, meticulous study will be given to locations where the utilities cross the earthquake faults.

Even though Berkeley Lab has grown in both physical size and in population, carefully targeted investments in conservation over the past 20 years have enabled Berkeley Lab to reduce its total water demand from the East Bay Municipal Utilities District (EBMUD). The Laboratory's water is supplied continuously from two sources: the primary water source is EBMUD's Shasta Reservoir, which supplies the Laboratory's high-pressure fire and domestic system; the secondary water source is EBMUD's Berkeley View tank, connected to Berkeley Lab by EBMUD piping.

Berkeley Lab's ***water distribution system*** contains several backup secondary distribution loops and is valved to provide extensive control in case of emergency. The system normally operates by gravity flow, requiring no pumps or energy consumption for operation within the Laboratory.

Berkeley Lab has three 750-cubic-meter (200,000-gallon) fire protection storage tanks. One is located near Building 71 in the Central Research Area, another near Building 75 in the Grizzly Operations Support Area, and one more near Building 85 in the East Canyon area. Automatically starting diesel-powered pumps connected to the tanks at Buildings 71 and 75 will maintain a reliable flow for the fire protection system during emergencies. The tank at Building 85 will maintain reliable flow for fire protection during emergencies by gravity feed.

Sanitary sewer flow, concurrent with the reduction in water use, has also declined over the past 20 years. The western portion of Berkeley Lab's sanitary sewer system connects to the City of Berkeley sewer main on Hearst Avenue. South of the Laboratory, a second connection is made to the UCB campus on Centennial Drive and then onto the City of Berkeley system. The City of Berkeley sewer basins that take flow from Berkeley Lab are not identified as being constrained. The Laboratory's sewers are maintained in excellent condition, and the Laboratory is not a contributor to the regional wet weather flow issues. The Laboratory monitors its discharges for the presence of certain chemicals and radioactivity. From 1996 to 1997, this monitoring system was upgraded.

The south side sewer flow to the City of Berkeley sewer system at Centennial and Stadium Rim Road will be constrained when the Molecular Foundry comes online in 2006. Currently we are doing a sewer study of re-routing the sewer flow from Centennial Drive to the west side of campus via existing campus lines. This re-routing will need to occur around the same time that the Molecular Foundry comes online. In addition, the monitoring station at Strawberry Canyon (Building 13F) will need to be upgraded.

The Berkeley Lab ***storm drainage system*** consists of a labwide system of several hundred inlets and 6 miles of underground piping. This system must handle large volumes of runoff during winter storms, diverting water from potentially unstable hillsides and preventing accumulations of water that could flood streets, buildings, and other Berkeley Lab facilities.

Widespread deterioration of the system's steel piping has degraded its effectiveness by permitting large quantities of water to leak out of the pipes and migrate through the trench bedding material, which is typically sand or rock. This permeable material allows the water to travel and accumulate at some distance from the point of the leak, saturating the ground. This can result in landslides and in the movement of known contaminant plumes into the ground water. Approximately two-thirds (2/3) of the existing metal storm drain piping needs to be replaced or given nonmetallic linings in order to prevent the potentially costly and environmentally harmful effects of uncontrolled storm runoff.

Natural gas to Berkeley Lab is supplied by the Defense Fuel Supply Center via the Pacific Gas and Electric Company (PG&E) distribution system. A 6-inch main on Hearst Avenue feeds the PG&E-owned meter station at the Laboratory's west entrance. The Hearst Avenue meter station contains one meter for gas supplied at an interruptible rate. PG&E main pressure is about 40 pounds per square inch (psi), reduced to 13 psi at the Hearst Avenue meter-station computerized system. The 13 psi distribution pressure is further reduced at various regulator stations to serve either a group of buildings or, in some cases, a single building. Building pressure is in the range of 0.25 to 1.25 psi. Earthquake shutoff valves have been installed at the entrance main, and outside major buildings, to reduce the possibility of explosions following a quake. The natural gas is principally used for space and water heating; there is no central heating plant at Berkeley Lab.

Electrical power at the Laboratory is purchased from the Western Area Power Administration and delivered via PG&E's transmission system. Onsite electricity is distributed underground at 12 kilovolts (kV) from the centrally located Grizzly Substation. A PG&E aerial 115 kV electrical power line traverses the eastern portion of the site. The PG&E supply system consists of two overhead 115 kV, 3-phase, 60 Hz transmission lines with a joint capacity of approximately 100 MW. Both transmission lines feed power from PG&E's Sobrante switching station to the Grizzly Substation on Berkeley Lab's site. The 12 kV distribution circuits are arranged in dual feed radial configuration.

Two SLI Line Item Projects are proposed in the out-years to upgrade the Utility systems, these are the:

Utility Infrastructure Modernization – West Corridors

Reliable and adequate utility services are fundamental to modern laboratory research. This project will address service deficiencies, and will comprehensively provide necessary reliability and capacity to support 21st Century science.

The project will address needs in the Laboratory's natural gas, sanitary sewer, storm sewer, communication and electrical distribution systems. Under this project, the utility corridors in the western area of the Laboratory will be improved to meet 21st century service and reliability requirements.

These systems were first constructed in the late 1930's and have been incrementally modified to meet specific needs over the past six decades. This project will comprehensively upgrade the core utility distribution systems in this portion of the Laboratory and provide adequate and reliable services to research facilities in the 21st century.

This is the first phase of a two-phase project and will address needs in the western portion of the Laboratory. Phase two will address needs in the eastern area of the Laboratory. This project is currently under review and the TEC of this project is currently estimated at $20 million pending completion of that review.

Utility Infrastructure Modernization – East Corridors

This is the second phase of the two-phase project described above and will address needs in the eastern portion of the Laboratory, phase one will address needs in the western area of the Laboratory. This project is currently under review and the TEC of this project is currently estimated at $20 million pending completion of that review.

Transportation, Circulation, and Parking

The Laboratory actively supports a wide range of employee and guest commuting options and, among employers outside central city locations, has one of the highest use rates for alternative transportation in the state, with over 40 percent of staff and guests using an option other than their cars. This ratio is particularly notable as the Laboratory is not served directly by the regional bus system and is located approximately one mile from a BART station. Berkeley Lab is committed to reducing the trips generated by its daily activities to reduce traffic congestion, consumption of natural resources, and the amount of land dedicated to parking. The Laboratory supports a mix of transportation alternatives through:

- Local shuttle system serving two nearby BART stations, numerous AC Transit stops, and connecting its Hill site, downtown leased spaces, and UCB buildings. All of the shuttle buses have bike racks.
- Vanpools and carpools for employees in remote locations
- Systems that support bicycle commuters
- Multiple secured points of entry for pedestrian access
- Program alternatives such as telecommuting
- On-going improvements to internal pedestrian path systems and shuttle stations.

The Hill site has two major circulation corridors, an upper and a lower roadway, and walkways that run east-west across the site. The upper and lower corridors run with the topographic contours and provide easy access between all buildings. The system consists of "upper" and "lower" primary traffic routes linked by several secondary roadways that provide, primarily, service and emergency access. Chamberlain Road and Macmillan Road make up the primary upper route; Lawrence and Alvarez roads form the lower route. Chamberlain Road was originally a two-way road, but it has been reduced to one way to allow space for approximately 70 roadside parking spaces. Connecting service roads and pathways link the major roadways and provide access to individual buildings.

Berkeley Lab's Hill site is a pedestrian environment. Although an extensive roadway and shuttle system provide access to all Laboratory facilities, it is the pedestrian walkway that is the backbone of the Hill-site circulation system. Pedestrians can easily access all Hill site facilities, parking, and shuttle stops along walkways that offer a variety of visual experiences**.** Views of the San Francisco Bay and the natural setting make the experience of walking across the Laboratory one of its greatest assets. Secondary networks of pathways weave through the wooded slopes, providing access for vegetation management and recreational uses. Locations where pedestrian path improvements are needed have been identified, prioritized, and will be addressed over the term of this TYSP.

Land suited for parking lots or roadside parking is in limited supply at the Laboratory. Parking space is provided in small surface lots, some with a stacked configuration, and alongside roadways. Trailers serving as temporary office and storage space have been placed in parking lots, further reducing available spaces. Currently, Berkeley Lab provides parking space for 2,048 vehicles and 254 government-owned vehicles stored on site for day use. The resulting persons-per-parking space ratio is 1.7:1.

Leasing

Approximately 59,000 net square feet of space directly to the west of the UCB campus is currently leased for administrative service functions. This downtown space is served by the Berkeley Lab shuttle bus system, which provides a direct connection to the main Hill site. The Laboratory also leases a shipping-and-receiving facility in an offsite industrial area. Materials are consolidated at this location and transported by truck to the Hill once or twice a day.

Offsite leased space houses research functions if dictated by the type of work or by the Laboratory's overall space needs. For example, the Laboratory operates the Joint Genome Laboratory's Production Genomics Facility, jointly with other DOE laboratories, in Walnut Creek, CA; a Washington, D.C.; office for Energy and Environment program development, and the Oakland (CA) Scientific Facility, housing computing equipment and staff. There is also a leased telecommuting center in Livermore, CA.

Details on Leases are presented in Appendix 5. At this time, the Laboratory anticipates that these, or comparable, leases will be maintained indefinitely. At this time, Berkeley Lab has no plans to lease significant additional off-site space.

Other Facilities

The Laboratory's FIMS database records all but two small buildings as DOE SC assets. The two small buildings are Building 71T, an EERE windows experimental facility, and Building 31, a multi-purpose building that is listed as owned by UC. Over the next year, we will review the status of Building 31 and work with DOE to ensure is space is appropriately characterized. Details on both buildings are provided in Appendix 5.

Disposition

Consistent DOE Operating Funding is at the base of the Laboratory's efforts to remove surplus facilities. These are facilities that were constructed to serve missions no longer supported by the DOE and which are not cost effective or suitable for adaptive reuse. These facilities are located

at two “redevelopment” sites, the Bevatron-area, and the “Old Town” area. Demolition of the existing buildings, that are less than fully suitable for modern scientific research and cannot be effectively upgraded, will both reduce the deferred maintenance backlog as they are removed, and will allow for development of future new modern research facilities. It is the Laboratory’s intention to demolish these buildings prior to the identification of particular replacement buildings; at the same time, the Laboratory will upgrade utilities and roadways in order to create “plug-in” development sites within the central core of the Laboratory.

Long Term Stewardship

Once a facility is declared excess and becomes non-operational Berkeley Lab secures the facility by locking it tight, posting it and disconnecting all non-essential utilities and systems. In most instances the only remaining active systems are the fire alarm and fire sprinkler systems. Both fire systems continue receiving necessary maintenance and are monitored through a central control system. The facility is placed on a routine surveillance program where the exterior of the facility receives physical inspections on an on-going basis by the Plant Operations Department in the Facilities Division. The security of the interior of the excessed facility is managed by Lab Security in EH&S. This process continues until demolition occurs. The process of acquiring funding for the demolition of excess facilities is managed by the Design & Construction Department in the Facilities Division. When funds are secured the Design & Construction Department manages the demolition process of the excessed facility.

Demolition Plan

Over the next 20-years the Laboratory plans to demolish up to 500,000 gsf of Hill-site buildings that:

- are seismically poor and not cost effective to upgrade,
- are no longer suitable for modern science,
- are costly to maintain,
- and that make inefficient use of valuable building sites within the existing developed zone of Berkeley Lab.

Within the ten-year term of this TYSP, the Laboratory plans to demolish some 250,000 gsf of Hill-site buildings with support from DOE.

This demolition/reconstruction program will allow the Laboratory to better use already developed lands within the Intellectual Centers, and to achieve improved scientific interactions, implement new design standards in the Intellectual Centers, and to achieve sustainability objectives in land use and building design. Two redevelopment areas have been identified, these areas comprise some 90% of the all space to be demolished.

The ***Bevatron Redevelopment Area*** produces a 4.4 acre development site for modern new buildings. The Laboratory has proposed dismantling, decontaminating as required, and demolishing the Building 51 Bevatron Complex. The work includes removal of the accelerator, shielding, buildings, related structures, and surface foundation. This site would then be productively used to meet DOE’s emerging scientific missions.

The abandoned Bevatron accelerator cannot be adaptively reused and should be removed. The Bevatron comprises 172,000 gsf of Laboratory space. Until recently, the Bevatron complex had been largely abandoned. DOE has now agreed to fund, pursuant to the completion of environmental documentation, a multi-year demolition program that will result in the accelerator and all related buildings being demolished by 2010/2011 at proposed funding levels.

The mission of the Bevatron and Building 51 ended in 1993 with the last experimental run. The building accounts for 7.5% of the built space at the Lab and it occupies over 4 acres of centrally located, flat real estate in the hilly terrain of LBNL. The building is 87% vacant but accounts for 69% of the LBNL excess space backlog awaiting demolition and removal.

The demolition and removal of Building 51 and the Bevatron would have the following benefits to the Department of Energy:

- Eliminate approximately 126,500 gross square feet (GSF) of excess facility space.
- Implement compliance with requirements established in the Congressional Conference Committee Report 107-258 that accompanied the Fiscal Year (FY) 2002 Energy and Water Development Appropriations Bill that at each DOE site the construction of new facility space be offset by the elimination of an equal amount of excess space at the site.
- Respond to conditions set by Secretary Abraham's approval of a Waiver of Requirement for Eliminating Excess Space at LBNL to allow construction of the Molecular Foundry. The approval letter directed the Office of Science to prepare a plan, including a schedule, for the demolition of Building 51 and the Bevatron. The Office of Science (SC) was directed to submit the plan to Under Secretary Robert G. Card, and to the Office of Management, Budget and Evaluation (OMBE) by May 1, 2004. The waiver requires that the plan demonstrate a commitment to commence the disposition process promptly in compliance with congressional direction.
- Support the Office of Science's Strategic Plan by providing a clear, centrally located spot at the LBNL site capable of allowing an, as yet, undesignated future facility to be built.
- Remove a building code deficient, seismic risk with a porous roof.
- Remove an abandoned 180-foot diameter accelerator and safely dispose of the resultant low level, mixed, hazardous and common waste materials in a cost-effective manner.
- Respond to community stakeholders, "asking LBNL for timely environmental reviews and….requesting that the Department of Energy allocate funds to complete the Bevatron deconstruction in a manner acceptable to the community." (March 11, 2003 letter from the Berkeley City Manager advising the Mayor and City Council regarding "Bevatron deconstruction.")
- Eliminate future maintenance costs.

Demolition and removal methods will be impacted by adjacent occupied buildings, central location and community/environmental sensitivities. Dismantling, as well as, more conventional demolition methods will be used: particular attention will be paid to material characterization, separation and safe disposal. Demolition is estimated to take 6 to 7 years with an estimated cost of about $83M, assuming significant funding starts in FY 06. These figures are

conservative and include contingency and escalation. Projected completion is forecast for FY 12.

The **"Old Town" Redevelopment Area** contains World War II–era buildings that are not suitable for modern science and are no longer fully functional. The average age of these scientific buildings is 56 years; they have served the mission well and are now slated for removal to make a large 5.5-acre site available for modern research structures. These buildings are typically small wooden structures, yet they occupy prime sites that can be redeveloped to accommodate larger modern research facilities in line with current and future DOE mission requirements.

The Laboratory proposes a retirement schedule for these structures that allows current building occupants to be relocated into more modern and appropriate space. The Laboratory proposes to reuse these building sites to construct modern multistory research facilities at these locations in order to seamlessly meet DOE's mission requirements for many decades. The proposed work includes demolition of Buildings 4, 5, 7, 14, 16, and 25 as well as smaller structures in the area, termination of utilities such that future projects can tap into the Laboratory's main infrastructure, and any required decontamination of the sites. The cost estimate is under review.

Disposition of Excess Nuclear and Hazardous Materials

Excess materials will be generated as a result of the building renovations and demolitions that are planned over the next ten years. As a result of the wide variety of research activities performed at Berkeley Lab, it is anticipated that a wide variety of hazardous materials – both chemical and radioactive – will be excessed. Berkeley Lab has developed a process that ensures the safe and orderly disposition of these materials. The Laboratory has implemented a hazard tracking system that maintains a permanent record of the chemical and radioactive hazards found within work areas. In addition, due to the historical usage of lead, asbestos, PCB equipment and radioactive materials and to the ages of the buildings at the Berkeley Lab site, all work areas are currently reviewed for the presence of these hazardous materials prior to building renovations or demolitions. From this information and in consultation with Berkeley Lab EH&S staff, the appropriate disposition pathways are determined.

Details on "operating status" and other factors for all buildings are provided in Appendix 5.

Long-Term Stewardship

The Berkeley Lab Facilities Division uses MAXIMO as its Work Management System (WMS). Preventive, Predictive, Corrective, and Emergency Maintenance work is performed using MAXIMO to keep Berkeley Lab equipment running efficiently. PM's are used to plan for regular maintenance work by planning the labor, material, and tool needs of our regularly scheduled maintenance and inspection work orders. Preventive, Corrective, and Emergency Maintenance work hours are track monthly to determine the pro-activeness of our Maintenance program.

Corrective and Emergency Maintenance work will be analyzed using Reliability Centered Maintenance (RCM) and the Failure Modes Effects and Criticality Analysis (FMECA) processes. RCM is a systematic way of identifying failure modes within equipment and determining appropriate maintenance tasks to combat the failures. The FMECA is the heart of the RCM process. This systematic approach when coupled with plant information about plant failures, costs, safety impacts, environmental impacts, and operational criticality will allow Facilities Plant Operations to set appropriate tasks and maintenance intervals to generate a strategy that is optimized to the needs of our business.

For a completely integrated Asset Management Solution, links between our Work Management System, MAXIMO, and our Capital Planning and Management System, VFA facility, are required to provide a total picture of associated projected and actual cost for routine/preventive maintenance, repair, capital renewal, and multi-year capital requirements. The integration of the two systems involves more than data synchronization. The solution encompasses an organization's total business process, an approach in which to properly manage our facilities assets in a more proactive manner (as opposed to reactive maintenance). The program will provide a solid knowledge of the deficiencies that must be corrected. Currently this knowledge is spread out among many different individuals and departments. The lack of a centralized repository of facilities deficiencies information has resulted in renovation/repair projects that may have omitted critical deficiencies. These omissions must later be corrected, usually at significantly higher costs. When all of the deficiencies have been consolidated, it is far more difficult to omit critical items from the design of on-going renovation projects. This would also be useful tool for organizing and prioritizing all deficiency corrective measures using standardized criteria.

A process of generating project scopes and consistent budget estimates, would greatly improve the accuracy of forecasting future capital renewal and maintenance needs. Without the centralized (and complete) deficiency database, only projects planned for the immediate future typically have any supporting cost and / or prioritization information. The lack of detailed information on longer-range projects makes forecasting maintenance budget needs extremely difficult. This difficulty in forecasting results for future budget requirements creates budgets based on historical expenditures as opposed to what is actually needed. The information would be valuable at the DOE HQ level for assessing funding requirements.

Non-SC Facilities

The Laboratory's FIMS database records all but two small buildings as DOE SC assets. The two small buildings are Building 71T, an EERE windows experimental facility, and Building 31, a multi-purpose building that is listed as owned by UC. Over the next year, we will review the status of Building 31 and work with DOE to ensure this space is appropriately characterized. Details on both buildings are provided in Appendix 5.

Value Engineering

Value Engineering opportunities for all new projects will be performed. Value Engineering is an organized effort directed at analyzing the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life-cycle cost consistent with required performance, reliability, quality, and safety. These organized efforts can be performed by both LBNL in-house staff personnel and by contractor personnel.

The goal is to review all aspects of the project and develop ideas which will optimize scope and budget and reduce the overall cost, including design costs, initial direct construction costs, and life cycle costs, while maintaining or enhancing the quality of the project such as increased productivity, higher quality, durability and maintainability.

Five-Year Sustainment Requirements

Maintenance requirements and actions forecasted for the next five-years are identified through Condition Assessment Inspection and by in-house experts. They are then prioritized, reviewed, and the plan is approved annually. Annually maintenance project candidates are assessed during the planning process by the condition and the consequences of failure of the asset to determine the priority and planning year of the project. Requirements not accomplished during that year are reported to the DOE as Deferred Maintenance.

Maintenance Program for Nuclear Facilities

Not Applicable

Recapitalization / Building Modernization

Annually, the Facilities Planning Group, with input from Laboratory management, reviews the mission need for each hill site building and off-site leased facility. Among the factors reviewed are:

- the prospects of continued funding for the program or programs currently occupying the building,
- the possibility and ease of conversion the building for reuse for projected new programs,
- and the overall condition of the building (using both ACI and TSCI).

The results of this evaluation are translated into the Modernization Planning Indicator (MPI), which is recorded in FIMS. The MPI indicates one of the following for each building and OSF:

asset to be replaced by another new facility

asset to be demolished without replacement,

asset to continue to operate.

Appendix 5 contains the MPI listing each Berkeley Lab asset.

Narrative for Line Item Construction Projects

New Buildings — Programmatic Funding

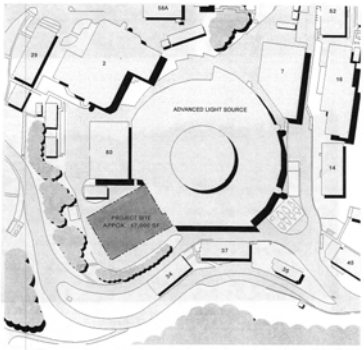
The Molecular Foundry - Funded

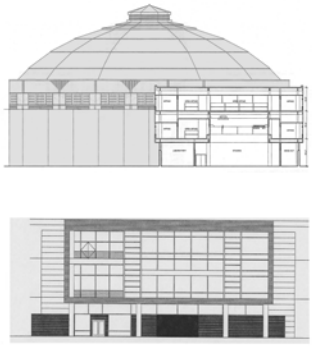
The BES Molecular Foundry Building will include state-of-the-art materials characterization, manipulation, and synthesis laboratories for studies of matter of nanometer dimensions. At this size, materials display unexpected properties that can be exploited in designing materials and devices with previously unattainable, but critically required, characteristics. These materials and devices will have a major impact on energy technologies and protection of the environment.

The Molecular Foundry will use Berkeley Lab's major user facilities—ALS, NCEM, and NERSC—for investigations of nanoscale materials and structures. These facilities will be instrumental in supporting the characterization, simulation, and theory functions that will be a critical part of this program.

The Molecular Foundry Building will be a new, six-story facility, sited between Buildings 66 and 72, with a total gross area of approximately 95,692 gross square feet. Laboratory and office space in the new facility will be designed to support highly interdisciplinary studies in nanostructures involving the collaboration of experts in materials science, physics, chemistry, biology, molecular biology, and engineering. Clean room laboratories with low vibration will be provided. The total estimated cost of this Line Item Project is $83.7 million. Construction is in progress. This project removed no building space and has an approved off-setting space allocation.

User Support Building





The new User Support Building will provide critically needed modern research support space for users of the ALS and other national user facilities. This BES building will support research in all disciplines, including condensed matter physics, chemistry, materials, environmental and earth sciences, biology, atomic and molecular physics, plasma sciences, and nanosciences.

The new multi-user structure includes a high bay for assembly of experimental apparatus, as well as modern analytical laboratory and office space to support the projected 2,000+ scientific

facility users. This space will support activities to prepare experiments and to address other critical but short-term high-activity work activities. Demolition of substandard space and improved productivity combine for a payback of approximately seven years. This new 30,000 gsf building will replace Building 10, a wooden 15,200 gsf structure constructed as a service building during World War II, and which contains structural and life-safety elements that restrict use. Building 10 cannot be cost-effectively upgraded to serve modern science requirements. This project is proposed for a FY-2007 project start. This project will demolish Building 10, the Laboratory has identified off-setting space in its planning and will work with DOE to achieve the balance of the required 1:1 space reduction. RIC and DM data for Building 10 are listed in Appendix 5. As Building 10 is rated Seismically "Very Poor" staff and programs are being relocated, and it is anticipated that this building will be removed from the DM list prior to funding of the USB.

Genomes to Life Facility

Berkeley Lab's efforts are directed towards an integrated program of environmental microbiology, functional genomic measurement, and computational analysis and modeling, to understand the basic biology of microbial systems and to restore contaminated environments.

The Berkeley Lab *Genomes to Life* (GTL) effort (BER) is focused to support integrated research to predict, control and design microbial systems for DOE missions. This facility will develop new knowledge and new technologies to measure and model intra-and inter-cellular processes and to manage and query complex physiological data including world-class research to: bioengineer processes for biofuels, optimize bio-remedial processes, and to design stabilized microbial communities for environmental remediation. This facility is also oriented to support work in synthetic biology reinforcing technologies including genetic circuits, computational design and bio-fabrication. These research actions are well matched to the Laboratory's proven GTL strengths and capabilities to serving DOE and national needs in the era of systems biology. This project is identified as a FY 2008 start. This project will not remove building space and the Laboratory will work with DOE to implement plans to fully off-set space.

Ultrafast Science Center

Ultrafast research points to very real prospects of revealing the processes that underlie chemical reactions and energy transitions. This new user facility will build on competencies in particle and photobeams, chemical dynamics, and advanced detector systems. Berkeley Lab has been recognized as a world leader in ultrafast science, and from its work has emerged the potential for a most compelling user facility. These research and user support activities are well matched to the Laboratories internationally recognized leadership and capabilities to serve DOE and national needs. This project is in conceptual development and with a start late in the current decade. This project has not been sited, the Laboratory's demolition plans (as presented in this TYSP) provide for demolition of off-setting space.

Performance Indicators and Measures

Although qualitative measures can often best describe performance; such measures are difficult to benchmark. The following quantitative performance-based metrics are developed to address the use and condition of Laboratory assets relative to the research requirements.

Facilities Condition Index (FCI)

$$FCI = \frac{\$\text{deferred maintenance}}{\$RPV}$$

This widely used metric provides insight into the effectiveness of the maintenance program. This metric measures the relative cost of remedying maintenance deficiencies listed in the deferred maintenance backlog and conveys condition information.

Asset Condition Index (ACI):

ACI = 1- FCI and provides a declining scale matching the maintained condition of a building.

Deferred Maintenance (DM)

Deferred maintenance is defined as maintenance that was not performed when it should have been or was scheduled to be and which, therefore, is put off or delayed for a future period. It specifically excludes major ”like-in-kind” rehabs normally funded from General Plant Project/General Purpose Equipment (GPP/GPE) and line item projects.

Rehabilitation and Improvement Cost (RIC)

This indicator is defined as the total of all rehab and improvement costs, including needed function or capacity upgrades and the costs to bring the facility in compliance with all applicable building codes, such as Americans with Disability Act/Uniform Federal Accessibility Standards (ADA/UFAS) and Life Safety requirements, as well as the costs to make facilities suitable for planned mission needs. These costs are normally funded via GPP/GPE or line item funding, but could include large operating expense funded projects or Institutional General Plant Projects (IGPP). This metric provides insight into the overall management of facilities.

Rehabilitation and Improvement Cost Index (RIC)

The Rehabilitation and Improvement Cost Index is RIC divided by the facility’s Replacement Plant Value (RPV)

Total Summary Condition Index (TSCI)

TSCI = the sum of Deferred Maintenance (DM) plus Rehab and Improvement Costs (RIC) divided by the facility’s Replacement Plant Value (RPV).

Asset Utilization Index (AUI)

The Asset Utilization Index (AUI) is the Department of Energy's corporate measure of facilities and land holdings against requirements. The index reflects the outcome from real property acquisition and disposal policy, planning, and resource decisions. The index is the ratio of the area of operating facilities, justified through annual utilization surveys (numerator), to the area of all operational and excess facilities without a funded disposition plan.

The Laboratory needs DOE support to achieve its recapitalization objectives. GPP funding needs to be increased into the $6 – 10M/year range, a range that appears realistic as it is consistent with GPP funding support provided by DOE to other multi-program laboratories. While $10M/year will support a realistic long-term capital building renewal program (and positively impact the Deferred Maintenance projections as well), the Laboratory recognizes that this figure may not be realistic over the next couple of years, therefore a range of $6- 10M is identified in this plan to allow for consideration of Plan "A" and Plan "B" options in discussions between the Laboratory and DOE regarding this TYSP.

Similarly, there is a need to increase funding for GPE (capital equipment) funding, in this case a modest increase, to approximately $2.5M/year in order to ensure that general purpose equipment is available when required by researchers.

Process for Development of the Plan

The 2005 TYSP is an update of the 2004 TYSP that was iissued in November 2004. The 2005 TYSP reflects guidance received from DOE regarding both the TYSP and the 2005 Business Plan. The 2005 TYSP was developed in concert with the Laboratory's Business Plan, Maintenance and Capital Project Renewal planning processes, and the Long Range Development Plan. This document reflects and is consistent with these other plans and processes – and reflects DOE Plans. Moreover, this TYSP is well grounded in the overall Laboratory program to apply a graded approach to maintain and upgrade assets. The 2006 TYSP will be be prepared over the next year.

Facility Information Management System (FIMS)

The Laboratory utilizes the Facilities Information Management System (FIMS) to record key data that is used by the Laboratory and DOE locations to summarize and analyze data regarding the Laboratory's real property inventory. The Laboratory has demonstrated leadership in updating records and maintaining the FIMS database. At this time, the Laboratory has no issues to identify regarding maintenance of all required fields. Please note that both the RPV and the DM figures have been updated with the 2005 TYSP. A description of how the condition of Berkley Lab assets are surveyed and Replacement Plant Values are established was presented earlier in this Plan. The ACI's for all buildings are presented in Appendix 5; Building 78 is rated poor and is a GPP project to upgrade this facility is under development, in addition, two trailers are rated "poor" and are slated for demolition. Key data elements tracked in FIMS and used in the planning process include the following:

- **Asset Acquisition and Inventory**

  Land leases

  DOE Owned Buildings

  Building Leases

  Capitalized improvements to existing real property and new acquisitions are recorded when completed.

- **Maintenance and Recapitalization**

Results of condition assessments for every facility are reflected in deferred, actual and required maintenance costs, deficiency data, and inspection dates.

Rehabilitation and improvement costs, which are updated annually for buildings and other structures and facilities.

Effective utilization of assets

Modernization Planning Indicator

- **Disposition of Real Property**

  Facilities planned to be replaced and facilities planned for demolition without replacement are indicated as excess.

  Demolitions in progress.

  Disposed asset records are archived in FIMS per DOE reporting requirements.

The accuracy and completeness of FIMS entries is evaluated at least annually by self-assessment and a formal validation by DOE-BSO and Berkeley Lab Facilities Planning and Plant Operations personnel. Where appropriate, program staff is included to validate the use and occupancy of the facility, deficiencies, and utilization/deficiency categorization.

The Laboratory's FY 2006 DM reduction priority for the SLI program is the Replacement of one of two High Pressure water lines that serve the Laboratory. Serious weaknesses in this line have been identified and it has been valved-off in order that a failure will not jeopardize the Lab-wide water system. At this time, the Laboratory operates using only a single High Pressure Water Line.

Summary of Resource Needs

In addition to the Line Item Building Projects discussed above, the Laboratory will work with DOE to maintain and upgrade buildings and infrastructure. The major project needs are identified below, a more complete list is contained in Appendix 6.

Existing Facilities—Upgrade and Adaptive Reuse Projects

Berkeley Lab has effective maintenance and space improvement programs that work to allow researchers to use building space and other assets for the maximum number of years.

GPP Funded Research-Driven Upgrades

Most Berkeley Lab buildings can continue to meet research mission requirements under this program, and the Resource Needs section of this report describes a number of GPP projects that are currently at the core of this ongoing effort. However, unless GPP funding levels are increased, and the Laboratory is given the ability to reprogram maintenance funds to permit appropriate upgrades when equipment is scheduled for replacement, this highly cost-effective program will not be able to accomplish the upgrades required for seamless mission performance. The Laboratory's GPP funding level does not allow the Laboratory to both

address research-driven upgrades to building systems and spaces at the same time that it addresses the seismic safety upgrades required for some eight buildings. These seismic upgrades each cost less than $5.0M, and are appropriate for GPP funding, however, the total cost of these projects exceeds $20M, therefore, the Laboratory's total GPP allocation for nearly six years would be required to address this safety problem. Raising the Laboratory's GPP allocation to the $6.0M range will both allow priorities to be addressed and more closely match the current GPP funding allocations made to comparable SC multi-program Laboratories. Annual funding in the $10M range is required to renew DOE assets in a consistent and rational manner – extending both the lives and the utility of assets for many decades.

Similarly, there is a need to increase funding for GPE (capital equipment) funding, in this case a modest increase, to approximately $2.5M/year in order to ensure that general purpose equipment is available when required by researchers.

Line-Item Funded Upgrades

A number of existing buildings and sitewide utility systems are in fundamentally sound condition, but major structural elements elements of a few buildings and infrastructure elements are inadequate from a seismic safety perspective. These buildings and infrastructure elements are identified for Line Item funding as the cost of upgrades exceeds $5.0M cap of GPP. In addition, Line Item funds are required to upgrade the utility infrastructure and two projects have been identified, one to upgrade the infrastructure on the eastern portion of the Laboratory, and the second to upgrade the utilities on the western portion of the Laboratory. The highest priority upgrade/rehabilitation projects are summarized below.

Building 77 Rehabilitation of Building Structure and Systems, Phase 2

Building 77 and the adjacent annex (77A) are multiprogram buildings that provide specialized technical services and assembly space. This project will correct mechanical, electrical, and architectural deficiencies in buildings 77 and 77A. Both buildings house machine shop and assembly operations and have a combined net area of 68,000 sf in which production of highly sophisticated research components for a variety of DOE research projects takes place. Recent and current work includes precision machining, fabrication and assembly of components for the ALS, the Dual Axis Radiographic Hydrodynamic Test (DAHRT) Facility, the Spallation Neutron Source (SNS), and the ATLAS Detector. Infrastructure systems installed by this project include heating, ventilation, and air conditioning (HVAC), power distribution, lighting, and noise absorption materials.

The improvements are necessary to satisfy urgent demands for high levels of cleanliness, temperature, and humidity control, and OSHA and reliability requirements. Phase II was funded at $13.36 million as a FY-2003 project start.

Seismic and Structural Safety of Buildings, Phase 1

Unacceptably high life-safety risks have been identified in recent seismic safety evaluations of Buildings 50 and 74. These buildings are occupied by over 300 personnel in the Life Sciences Division, Nuclear Science Division, Physics Division and Laboratory Administration. Relocation of personnel to life-safe space is not possible because of Berkeley Lab's critical space shortage. This project will correct the following structural deficiencies:

- **Building 50:** Reduces unacceptably high seismic demand capacity ratios in concrete spandrel beams and shear walls, reinforces a column supporting a discontinuous shear wall and rehabilitates inadequately anchored non-structural elements.

- **Building 74:** Strengthens vertical bracing, eliminates an inadequate seismic gap, resolves diaphragm discontinuities and a discontinuous shear wall, and retrofits a compromised shear wall.

This project is planned for a FY2007 project start.

Seismic and Structural Safety of Buildings and Infrastructure, Phase 2

Berkeley Lab is conducting seismic performance evaluations for its buildings and infrastructure, and additional buildings and infrastructure elements are being identified with "Poor" or "Very Poor" seismic performance ratings. These buildings and infrastructure elements will require upgrades to improve their seismic resistance and reduce falling hazards so that they can be reclassified as "Good". This project will correct these deficiencies so that the seismic safety issues can be addressed and a safe working environment ensured at Berkeley Lab.

Utility Infrastructure Modernization – West Corridors

Reliable and adequate utility services are fundamental to modern laboratory research. This project will address service deficiencies, and will comprehensively provide necessary reliability and capacity to support 21st Century science.

The project will address needs in the Laboratory's natural gas, sanitary sewer, storm sewer, communication and electrical distribution systems. Under this project, the utility corridors in the western area of the Laboratory will be improved to meet 21st century service and reliability requirements. These systems were first constructed in the late 1930's and have been incrementally modified to meet specific needs over the past six decades. This project will comprehensively upgrade the core utility distribution systems in this portion of the Laboratory and provide adequate and reliable services to research facilities in the 21st century.

This is the first phase of a two-phase project and will address needs in the western portion of the Laboratory. Phase two will address needs in the eastern area of the Laboratory. This project is currently under review and the TEC of this project is currently estimated at $20 million pending completion of that review.

Utility Infrastructure Modernization – East Corridors

This is the second phase of the two-phase project described above and will address needs in the eastern portion of the Laboratory, phase one will address needs in the western area of the

Laboratory. This project is currently under review and the TEC of this project is currently estimated at $20 million pending completion of that review.

Existing Facilities — Information Technologies Infrastructure

The purpose of Berkeley Lab's information technology infrastructure is to provide Berkeley Lab with efficient, effective, and innovative information technologies and services to enable world-class science. The range of services provided encompasses virtually all areas of modern computing and communications technology with the exception of large-scale scientific computing.

Berkeley Lab's strategic plan for information technology (IT) infrastructure defines an integrated approach that builds on the substantial technology benefits that the Laboratory has realized during the past decade and incorporates the modern technologies necessary to remain at the forefront of scientific research.

There are a number of specific requirements driven by user needs and technological opportunities that demand new or improved services categorized in the following major areas:

- Modernize aging infrastructure to increase science and business productivity, including reinventing library services and enhancing scientific computing support, "productivity" tools, and network infrastructure.
- Improve the utility of administrative systems through development of an integrated information portal to support timely decision making at all levels of Berkeley Lab's operations.
- Improve the IT technical architecture to help assure that the Information Technology Services Division's resources are being directed in a consistent, cost-effective manner, and to help assure that Berkeley Lab is achieving maximum benefits from its IT investments.
- Establish and provide appropriate levels of protection, recovery, and continuity for all of the Berkeley Lab's critical IT systems and data.

The major infrastructure services are:

- Scientific computational services (e.g., midrange computing, visualization)
- Productivity services (e.g., email, desktop computing)
- Information services (e.g., information systems, library)
- Presentation services (e.g., publishing, conference tools)
- Protection (e.g., intrusion detection, firewalls, backups and archiving)
- Networking and telecommunications (e.g., networking, telephones, remote access)
- Service delivery architecture (e.g., technical architecture, cost recovery, ISSM)

The majority of activities in each of these areas are ongoing production services. The largest strategic challenge is sustaining the effectiveness and dealing with the growth of these services. Meeting this challenge is particularly difficult in view of the rapid technology advancements and obsolescence that characterize IT functions. This impacts both the need to enable Berkeley Lab to benefit from substantial ongoing improvements in computer and communications hardware and software, and the need to continually develop high-quality staff that remain up to date with this technology.

To meet these information technology needs and regularly refresh equipment before it fails and is no longer supported by vendors, an increase in funding of approximately $500K/year for GPE equipment is needed.

Alternative Financed Buildings

Berkeley Lab Guest House

Berkeley Lab's ALS and NCEM are host to a growing number of users—more than 1,300 this year. Many other scientific visitors come to work with researchers in laboratories at other locations across the site, and although most computational scientists use NERSC Center facilities remotely, many meet with NERSC Center scientific and support staff.

In addition, beginning in 2007, the Molecular Foundry is expected to host hundreds of users annually. All of these users need dormitories in close proximity to their research to effectively and efficiently conduct their experimental and scientific programs. Working with UCOP and UCB, Berkeley Lab is developing the scope and approach for third-party support of a dormitory in order to meet these visiting users' short-term housing needs. A central "Civic Center" location—in close proximity to the ALS and a short walk to NCEM, the Molecular Foundry, and NERSC Center scientific staff—has been identified as an ideal location for the proposed Guest House.

Theory and Computational Sciences Building

A pre-conceptual plan for the computer and office space required to meet these needs includes approximately 40,000 gsf to accommodate a machine room for existing and next-generation supercomputers, storage systems, and support equipment; 10,000 gsf for the SCS program; and 90,000 gsf for offices, workstations, office support space, and conference rooms. A site to the west of Building 70A has been identified and preliminary site planning and occupant programming is underway.

Nano Physics Research Laboratory

A pre-conceptual plan to support research in nano science and physics laboratories and office space has been identified. A 100,000 gsf building is proposed to address this need. Construction is projected to start in 2007. Approximately 60% of the usable space will accommodate laboratory sciences, the balance will accommodate offices and

meeting/interaction space. A site to the north of the Molecular Foundry has been identified and preliminary site planning and occupant programming is underway.

Maximizing Research Productivity

All usable space is fully committed to the scientific mission, and maintenance and administrative actions ensure that scientific needs are addressed. However, the World War II–era buildings are not suitable for most modern research programs. Also of concern are buildings that were designed specifically for specialized functions that are no longer being conducted and that cannot be cost-effectively adapted for other uses. Use of unsatisfactory space is costly, and requires reliance on administrative controls to ensure that operational safety requirements continue to be attained.

Adaptive Reuse Plan

The Laboratory has always been a leader in adaptive reuse of existing structures; e.g. conversion of the 184" Cyclotron Building (Building 6) into the space to house the state-of-the-art Advanced Light Source. There are currently two major adaptive reuse opportunities at Berkeley Lab. This option is considered when new research requirements are identified.

Workforce Planning and Development

Achieving the Laboratory's scientific goals will require the diverse mix of talent, collaborative culture, advanced instruments, and dedicated research space that are Berkeley Lab's hallmark. The population and space growth allowed for in the long-range plans address these goals and ensure that these resources are in place to function as needed. These growth projections are consistent with historical trends.

The modest growth identified below is necessary for the Laboratory to meet the scientific goals it has set in conjunction with DOE. These scientific goals form the basis of the Laboratory development program and objectives described later in this document. Berkeley Lab planning objectives, land use, and development principles represent the best possible relationship among Berkeley Lab research, administrative, and public service goals; staff and user needs; site characteristics; and integration with the surrounding communities.

To address the mission needs identified above, it is projected that the Laboratory's average daily population (ADP) will grow from approximately 4,450 in 2005 to approximately 5,525 over the next twenty years. The ADP includes FTE's for all full-time employees plus 40 percent of the part-time guests and facility users. This population figure includes Laboratory personnel located on the main Hill site, the adjacent UC Berkeley campus, and in offsite leased space.

Long-term plans are to consolidate almost all staff that are located in offsite leased space to the main Hill site. This goal will probably not be fully achieved during the term of this TYSP. A handful of Laboratory personnel will remain at remote locations (Washington, DC, Walnut Creek, etc.) in numbers that are expected to remain roughly the same over the course of this Plan. The Laboratory's population on the UC Berkeley campus is projected to remain roughly the same as it is today.

As project funding limitations may make it impossible to bring all staff from offsite leased space, it is anticipated that use of leased space will rise and fall as buildings are demolished and constructed and as mission needs evolve. Berkeley Lab will also provide for continuous placement of staff in leased space in the general area on an as-needed basis.

The projected increase in building area on the Hill site during the term of this TYSP is 350,000 gsf, from approximately 1.70 million gsf (including trailers) in 2005 to approximately 2.05 million gsf. The increase will provide office, laboratory, and support space for the projected population growth and will relieve current space shortages, allowing fragmented research units to consolidate functions.

VI Berkeley Lab Facilities Resource Allocation and Performance Tracking

The Facility and Infrastructure priorities have been summarized in the preceding sections. The associated Resource Requirements are summarized in Appendix 6.

Capital Asset/Infrastructure Plan

Capital asset/infrastructure needs are identified through an annual "Unified Call" for construction projects. It is the primary method of project identification at the Laboratory. The "Unified Call" for construction projects (Non-Capital Alterations through Line Item Projects) is issued annually to all scientific and resource divisions.

Candidates are evaluated and prioritized through the "Cal" process, each candidate is rated using both the Capital Asset Management Process (CAMP) and Risk-Based Priority Matrix (RPM) rating systems. Project proposals are also reviewed for consistency with the Institutional Plan, the TYSP, and the Sitewide Environmental Impact Report (SEIR). Items that are not consistent with existing plans are noted. These notes are considered both during the project prioritization process and during the next revision process for the respective plan.

Master Plan for Site Development

The Laboratory's Ten-Year Site Plan is based upon the strategic scientific vision of the Laboratory and the specific infrastructure and facility requirements of the researchers. The Laboratory plans for three types of projects in order to address the site-development requirements of these research missions in an integrated and highly cost-effective manner:

- Appropriate facility and infrastructure upgrades coupled with preventive maintenance and an active space-management program.
- Programmed demolition of surplus facilities and facilities that, in the near term, will be unable to meet mission requirements in a cost-effective manner.
- Construction of specific new buildings and the infrastructure required to support mission objectives.

The primary projects and resource requirements are described below.

Sustainable Design

Berkeley Lab follows the Executive Order 13123 on "Greening of America" by promoting environmentally responsible design and construction. The environmental impact of new construction is reduced by paying attention to sensitive site development, water and energy conservation, indoor air quality, waste reduction, and environmentally responsible building materials that minimize environmental impact throughout their life cycle.

Green buildings provide a healthy and environmentally responsible workplace. It is Berkeley Lab's goal to qualify for a Leadership in Energy and Environmental Design (LEED) rating in

design and construction of new buildings. The LEED Green Building Rating System is developed and administered by the U.S. Green Building Council.

Berkeley Lab has been widely recognized for its innovative and effective recycling and reuse programs, efforts that span all aspects of the Laboratory's operations. In addition to the conventional paper and metal recycling programs, laboratory chemicals are made available for reuse whenever this is proper, and former shielding blocks are reused within the DOE complex where possible. These programs are summarized in an annual performance measure report to DOE.

VII Ten-Year Site Plan Issues

Communication

A key element of the Laboratory's strategic planning includes the strengthening of communications and involvement at all levels, both internal and external, in order to build trust with the public and Berkeley Lab employees. This emphasis parallels DOE's goal to maintain a culture of openness, communication, and trust. Community relations has been an important element of Berkeley Lab strategic planning and is integral to the Operations Vision and strategic planning for FY 2005 and beyond. The Laboratory has taken many steps to enhance community interaction and understanding, including a fire services agreement with the City of Berkeley, and implementing a community-developed vegetation-management plan. An ongoing speakers' bureau and tour program provides continued outreach to the breadth of community stakeholders. Berkeley Lab also participates in community-sponsored activities like science education and energy-use reduction programs, offering the Laboratory's expertise and in-kind support.

Communications with local government, regulatory agencies, citizens' groups, schools and educational institutions, the news media, and other stakeholders require regular interactions between Berkeley Lab and community members. The purpose of these activities is to consider and respond to the interests of specific groups, including elected officials, opinion leaders, city staff, site neighbors, and employees. Activities have included briefings for elected officials, attendance at local community meetings, sponsorship of meetings with the public, speakers at local events and organizations, as well as tours of Berkeley Lab. In addition, through the National Environmental Policy Act and California Environmental Quality Act (NEPA/CEQA), and other federal and state regulations requiring public involvement, Berkeley Lab works with these stakeholders to disseminate information and to solicit public commentary on relevant issues, including the environmental review process for proposed Berkeley Lab projects and actions. Berkeley Lab values its relations with local communities and is committed to an expanding outreach effort.

The Berkeley Lab Open House, a periodic event staged most recently in the fall of 2002, promotes the possibilities in science education and careers, the value of research, and the DOE missions to thousands of visitors and stakeholders in the Bay Area. Berkeley Lab employees make additional commitments to their communities through participation in numerous local councils, boards, and commissions, and through an annual charitable giving campaign.

Funding

The Resource Allocation Table in Appendix 6 lists the resource needs and candidate projects for the term of this TYSP. The following paragraphs describe the impacts of less than adequate funding and, if applicable, the amount of additional funding required to resolve our backlog of projects.

DOE-EM

DOE's Office of Environmental Management (EM) will terminate programmatic support of Berkeley Lab's Waste Management Program and Environmental Restoration Program in 2006. EM's decision has raised important questions for the Laboratory to examine: Will the Office of Science be able to afford long-term stewardship that is consistent with the commitments made to state and local regulatory agencies and to the public; in addition, if subsurface contamination is later found, would the Office of Science provide a funding remedy in currently inaccessible areas?

Science Lab Infrastructure (SLI) Support

Historically, SLI funding at Berkeley Lab has been an average of approximately $3.8 million per year. Over the period of fiscal years 1998– 2002, the funding level has been only slightly above this average level, at $4.2 million per year. The profile of funding has been irregular, including no new starts in fiscal years 1994, 1995, 1997, 2000, and 2004.

While Berkeley Lab's funding trend has increased slightly in actual dollars, this program has not been able to address pressing concerns at current funding levels. Moreover, we note that the SLI budget is projected to be cut almost in half between FY 2004 and FY 2006.

The SLI program is the only available strategic capital renewal program in the Office of Science for nonprogrammatic infrastructure. Funding levels should be increased or restored (corrected for inflation) in order to begin to achieve the infrastructure renewal needed at the multiprogram labs.

General Plant Projects (GPP)

GPP funds have been relatively flat ($3.3 million to $3.5 million in actual dollars) at Berkeley Lab since 1993 (in FY2005, it became necessary to re-color approximately $1.0 in needed GPE funds in order to address the even more pressing seismic safety and research support GPP needs. However, relative to FY 1993, in FY 2005 the purchasing power of these funds dropped some 32% to about $2.8 million due to inflation. This inflation-induced shortfall, caused by a flat funding scenario, has resulted in a serious backlog of mission-critical projects. GPP funding is extremely valuable to the Laboratory. Under DOE regulations, this type of funding is the only one the Laboratory can use to seamlessly upgrade facilities to meet evolving research requirements. These funds are critical to maximizing the utility of existing assets and to address seismic safety issues. An increase in GPP funding into the $6.0M range is needed to address priorities. In the longer term, an increase to $10.0M a year will allow for rational facility renewal.

General Purpose Equipment (GPE)

Institutional GPE funding has also been historically flat at Berkeley Lab, ranging from $1.87 million in FY 1993 to $1.95 million in FY 2002 to $1.64 million for the past two years. The actual spending power of these GPE dollars has declined approximately 32% during this period. The limited funding has severely restricted our ability to implement a reasonably full program of modernization and upgrades. To meet the research objectives outlined in this plan, and to recover from the inflation-induced shortfalls caused by the flat funding scenario, an increase of approximately $500K a year in GPE funding is needed.

Real Property Maintenance

As modernization efforts proceed to meet the current and future research needs at Berkeley Lab, it is expected that maintenance and operations costs will also rise. Currently, the Laboratory has been able to maintain existing old facilities with the funding provided; however, as expectations rise, the frequency and severity of complaints are expected to increase as the mismatch between obsolete and modern facilities increases. Additionally, as more modern buildings are provided with more sophisticated mechanical and electrical systems, it is expected that the associated maintenance costs will rise. The Congressionally mandated expenditure of 2% of the Laboratory's RPV on maintenance is straining the Laboratory's ability to be effective in all overhead funded activities.

Operating Funding

Among projects on the Operating (Non-Capital Project) backlog are wild land fire management and non-structural seismic safety alterations, both of which can only be partially funded each year; and numerous projects to improve the utilization or quality of our office and laboratory space, a significant problem due to the aging and overcrowding of our buildings.

Appendix 1. Berkeley Lab 2005 Ten Year Site Plan

5 13 2005

Field	Figure
Total Building Space (gross ft^2)	1,700,000 gsf
Total Number of Buildings	107
(Including building 71T and 31, total = 109)	
Largest Occupied Building (gross ft^2):	
Warehouse, Shipping, Receiving (903) (offsite leased)	120,780 gsf
The ALS (Advanced Light Source) (6)	118,573 gsf
Trailers, number of:	49
Real Property	36
Personal Property	13
Wooden Buildings	30
Excess Facilities (Buildings, Trailers & OSF): (Through 2005)	11
Uncontaminated Buildings 73A, 25, 50D & Trailers 71E, 29A, 29B, 29C, 67C	8
Contaminated Bldg. 51 (Mixed); Bldg. 51A (Mixed); Bldg. 25B (Haz.)	3
Excess Buildings: (Through 2005)	6
Uncontaminated Buildings 73A, 25, 50D	3
Contaminated Bldg. 51 (Mixed); Bldg. 51A (Mixed); Bldg. 25B (Haz.)	3
Excess Building Space to be Removed in FY04	44,775 gsf
Excess Building Space to be Removed in FY05	20,580 gsf
Replacement Plant Value (RPV): Total	$794,242,600
Programmatic (OSF 3000 category)	$138,069,000
Non-Programmatic (used for calculating Indices)	$656,173,600
Landlord Program	SC High Energy Physics
Age of Buildings: Average	39.6 years
% of space older than 40 years	67%
% of space 30 years or younger	26%
Maintenance Investment Index (MII) & Maintenance Funding	
FY 02	1.34% $8,450,000
FY 03	1.47% $9,264,038
FY 04	1.69% $10,625,807
FY 05	1.70% $11,154,952
FY 06	2.00% $14,080,481
FY 07	2.00% $15,440,481

Field	Figure
FY 08	2.00% $15,903,606
Deferred Maintenance (DM) Trend	
DM 2002	$46,505,430
DM 2003	$9,545,791
DM 2004	$18,469,064
DM 2005	$54,647,239
DM 2006	$59,488,422
DM 2007	$62,879,666
Total Summary Condition (DM + RIC) *:	$134,860,387
Deferred Maintenance (DM)	$54,647,239
Rehab and Improvement Cost (RIC)	$117,862,509
*Doesn't include personal property trailers	
Total Summary Condition Index (TSCI): (percent of Total RPV)*	0.305
Facility Condition Index (FCI) (based on DM)	0.020
Rehab & Improvement Cost Index (based on RIC/percent of Total RPV)	0.266
ACI (Asset Condition Index from RPAM Order) (1-FCI)	0.980
AUI (Asset Utilization Index from RPAM Order)	0.987 (excellent)
Leased assets:	
Square footage: Total	364,674
Annual Lease Costs:	$7,202,500

[1] The Total RPV used for calculating MII included the RPVs for the following excess facilities: 071E, 029A, 029B, 029C, 025, 025B, 050D, and 067C.
The Total RPV also included 29D and 48A --- 29D has since been demolished (FIMS record has been archived) and 48A is a personal property trailer.

Appendix 2. Affirmation of DOE SC Modernization Objectives

This TYSP supports the SC goal to modernize the infrastructure of its laboratories by 2015 in support of the missions of SC and the Department of Energy in the 21st Century. SC's objectives of the modernization effort (or vision) are given below:

- **Mission:** The laboratory's Facilities and Infrastructure will be adequate to accommodate each laboratory's expected programmatic mission activities and technological changes well into the 21st century. Facilities will be "right-sized" to the type and quality of space and equipment needed to meet mission needs. Activities and organizations that need to be co-located will be. Facilities will be readily adaptable to changing research requirements and technologies. Off-site leased space will be reduced where economically appropriate.

- **Working Environment:** The laboratory will achieve a quality of facilities which provides a "preferred" working environment for researchers that helps attract and retain high quality staff. The laboratory will employ the latest advances in information technology to enhance worker productivity, interactions with other scientists, and the advancement of science. Quality training and conferencing facilities will be available. Visiting scientists will have access to quality accommodations and to research support facilities.

- Environment, Safety, Health and Security: The laboratory's F&I will provide a safe, healthy, and secure working environment for laboratory employees and visitors. Retired facilities will be removed and environmental cleanup will be completed. The laboratory will be viewed as a good community neighbor.

- Operations and Maintenance: F&I will be efficient to operate and maintain.

This TYSP, and the associated design standards of the Laboratory also support SC's general objectives that facilities incorporate the following:

- Flexibility - e.g., interior design facilitates the dynamic changes in the scientific programs associated with the site;

- Versatility - e.g., interior space/layout is adaptable, with minimal modification and relocation, for new programs and personnel;

- Durability and Longevity - e.g., where practical, construction materials and technology used will yield structures with a lifetime greater than 50 years without major renovation.

- Incorporate state-of-the-art sustainable design principles regarding selection of building materials and furnishings, construction techniques, energy and water conservation, habitability features, etc., where economically feasible.

- Ensure that the proposed investments yield what the laboratory considers to be a significant rate of return (e.g., > than 10 percent) and help reduce operating and maintenance costs.

Appendix 3. Process for Development of the 2005 Plan

The 2005 TYSP is an update of the 2004 TYSP that was iissued in November 2004. The 2005 TYSP reflects guidance received from DOE regarding both the TYSP and the 2005 Business Plan. The 2005 TYSP was developed in concert with the Laboratory's Business Plan, Maintenance and Capital Project Renewal planning processes, and the Long Range Development Plan. This document reflects and is consistent with these other plans and processes – and reflects DOE Plans. Moreover, this TYSP is well grounded in the overall Laboratory program to apply a graded approach to maintain and upgrade assets. The 2006 TYSP will be be prepared over the next year.

Appendix 4. RIC METHODOLOGY

A	***B***	***C***	***D***	***E***	***F***
Building	RPV	Planned Usage Code	Model Description	Last Summary Condition	Last Suitability Index
Sample Building	21,340,375	741	Labs, Biology/ Enviornmental (50/50)	4	N/A

G	***H***	***I***	***J***	***K***	***L***	***M***	
Subsystem	Usage Model Percentage	New Const. To Renovation Converter	Replacement Value	Rehab and Improvement Assessment	Percentage from Table 4	Rehab and Improvement Cost Calculation	
Foundations	2.5	1.3	693,562	C	7.5	52,017	
Substructure	1.2	1.8	448,148	C	7.5	33,611	
Superstructure	7.4	2.0	3,158,376	F	100.0	3,158,376	
Exterior Closure	5.7	1.0	1,216,401			0	
Roofing	1.3	1.3	360,652	A	1.0	3,607	
Interior Construction	11.5	1.0	2,454,143	E	40.0	981,657	
Conveying	2.0	1.3	554,850	E	40.0	221,940	
Mechanical-Plumbing	8.8	1.7	3,192,520	D	17.5	558,691	
Mechanical-Fire Protection	1.2	1.7	435,344			77,000	
Mechanical-Heating	2.8	1.7	1,015,802	D	17.5	177,765	
Mechanical-Cooling	6.3	1.7	2,285,554	F	100.0	2,285,554	
Mechanical-Special Systems	0.4	1.7	145,115	E	40.0	58,046	
Electrical	31.1	1.8	11,946,342	E	40.0	4,778,537	
Special Construction	17.6	2.8	10,516,537	D	17.5	1,840,394	
SiteWork	0.2	2.5	106,702	A	1.0	1,067	
Total Rehab and Improvement Cost	100.0	N/A	N/A	N/A	N/A	14,228,261	
FY04 Deferred Maintenance						253,255	***N***
Rehab and Improvement Cost						13,975,006	***O***
Total Summary Condition Index						66.67%	***P***
Summary Condition						FAIL	***Q***

A. Building	Number or identifier from FIMS
B. RPV	Replacement Plant Value as entered in FIMS. Can be system generated or locally calculated per current FIMS guidance.
C. Usage Code	From FIMS. Determines percentages used in column ***H***
D. Model Description	Corresponds to Usage Code. Should be verified during inspection phase
E. Last Summary Condition Rating	From FIMS.
F. Last Suitability Index	From FIMS.
G. Subsystem	From FIMS RPV calculation algorithm (Derived from R. S. Means definitions)
H. Usage Model Percentage	From FIMS RPV calculation algorithm (Derived from R. S. Means definitions). Descriptions and percentages available through FIMS help screens. These percentages will vary among usage codes and may be adjusted to meet local conditions. All adjustments must be documented and made available for HQ inspection.
I. New Construction to Renovation Converter	Added factor (site specific to convert new construction cost estimates to renovation cost estimates
J. Replacement Value	Building RPV (***B***) times Usage Model Percentage (***H***) to determine value of subsystem.
K. Condition Assessment	A through F rating, based on criteria contained in Table 3, determined during inspection by qualified personnel. Evaluation should be performed against requirement identified by Facilities Planning and O&M. Leave code blank to indicate amount in Column M is from actual estimate.
L. Rehab Cost Percentage	Percentage from Table 4 associated with the numerical Condition Assessment (***J***)
M. Total Rehab and Improvement Cost	Subsystem Replacement Value (***I***) times Rehab Cost Percentage (***K***). Provides numerical value of identified deficiencies, not their true repair cost. May be overwritten by actual estimated costs, where known.
N. Deferred Maintenance	O&M Supplied data based on condition assessment
O. Rehab and Improvement Cost	M-N. Data entered into FIMS for automatic calculation of TSCI which is defined as the sum of (Rehab and Improvement Cost [O] + Deferred Maintenance [N]) divided by RPV [B]
P. Summary Condition Index	Total Rehab and Improvement Cost/Replacement Plant Value
Q. Summary Condition	Descriptor from FIMS contained in Table 5

Appendix 4 Table 1[2]

Condition Assessment Ratings for Rehab and Improvement Cost Calculation

Score	Rating	***Definition***
A	Excellent	Consistently meets all condition requirements for current use. Only routine maintenance required
B	Good	Routinely meets all condition requirements for current use. Minimal repair required.
C	Adequate	Operational. Minor repair, rehabilitation, or upgrade required. Non-compliance with code issues considered a "deviation from good management practices".
D	Fair	Unreliable. Often fails to meet all condition requirements for current use. Major repair, replacement, or upgrade required. Marginal non-compliance with codes having significant life-safety impact.
E	Poor	Highly Unreliable. Frequently fails to meet all condition requirements for current use. Replacement or upgrade urgently required. Major non-compliance with codes having significant life-safety impact but not involving significant fines or penalties or resulting in serious injury.
F	Fail	Routinely fails to meet all condition requirements for current use. Major non-compliance with codes having significant life-safety impact involving significant fines or penalties or resulting in serious injury.

Appendix 4 Table 2

Conversion of Condition Assessment Ratings to Rehab and Improvement Cost Percents

Score	Rating	**Percentage to be applied to subsystem RPV**
A	Excellent	1.0
B	Good	3.5
C	Adequate	7.5
D	Fair	17.5
E	Poor	40.0
F	Fail	100.0

Appendix 4 Table 3

Total Summary Condition Index Descriptors

0-2%	Excellent
2-5%	Good
5-10%	Adequate
10-25%	Fair
25-60%	Poor
60-100%	Fail[3]

[2] Tables 1, 2, and 3 are extracted from Condition and Suitability Assessment Model prepared for DOE SC by Berkeley Lab in May 2002.

[3] This category has been eliminated by the RPAM Order and the range for “Poor” has been extended to 75%

Appendix 5. BERKELEY LAB BUILDINGS/TRAILERS/LEASES

TYPE	ID	NAME	GSF	YR BLT	STATUS DESC	DM	RIC	DM+RIC =TRIC	RPV	FCI	ACI	ACI Descriptor	TSCI (TRIC/RPV)	1-TSCI	TSCI Descriptor	Excess Year	MPI - Modernization Planning Indicator
Buildings	002	Advanced Materials Lab	85,506	1988	Operating	725,001	1,006,075	1,731,076	28,934,929	2.5	97.5	GOOD	6.0	94.0	ADEQUATE		Continue to Operate
B	002A	Storage	182	1993	Operating	0	913	913	47,631	0.0	100.0	EXCELLENT	1.9	98.1	EXCELLENT		Continue to Operate
B	004	ALS Support Facility	10,176	1944	Operating	336,585	24,000	360,585	2,541,963	13.2	86.8	FAIR	14.2	85.8	FAIR	2012	DEMO w/o Replacement
B	005	AFR	7,176	1950	Operating	110,331	14,000	124,331	2,050,259	5.4	94.6	ADEQUATE	6.1	93.9	ADEQUATE	2011	DEMO w/o Replacement
B	006	The ALS (Advanced Light Source)	118,573	1991	Operating	85,673	4,626,556	4,712,229	42,111,728	0.2	99.8	EXCELLENT	11.2	88.8	FAIR		Continue to Operate
B	007	ALS Support Facility	21,432	1943	Operating	321,277	1,443,840	1,765,117	5,587,689	5.7	94.3	ADEQUATE	31.6	68.4	POOR	2016	DEMO w/o Replacement
B	007A	Storage	128	1974	Operating	1,195	5,120	6,315	10,212	11.7	88.3	FAIR	61.8	38.2	POOR		Continue to Operate
B	010	ALS Support Facility	15,200	1944	Operating	129,570	19,875,923	20,005,493	4,352,285	3.0	97.0	GOOD	459.7	-359.7	POOR	2007	DEMO with Replacement
B	013A	Environmental Monitoring Station	76	1965	Operating	815	0	815	12,998	6.3	93.7	ADEQUATE	6.3	93.7	ADEQUATE		Continue to Operate
B	013B	Environmental Monitoring Station	76	1965	Operating	815	0	815	12,998	6.3	93.7	ADEQUATE	6.3	93.7	ADEQUATE		Continue to Operate
B	013C	Environmental Monitoring Station	76	1965	Operating	648	0	648	12,998	5.0	95.0	GOOD	5.0	95.0	GOOD		Continue to Operate
B	013D	Environmental Monitoring Station	76	1965	Operating	1,381	0	1,381	12,998	10.6	89.4	FAIR	10.6	89.4	FAIR		Continue to Operate
B	013E	Environmental Monitoring Station	68	1977	Operating	0	168	168	11,630	0.0	100.0	EXCELLENT	1.4	98.6	EXCELLENT		Continue to Operate
B	013F	Environmental Monitoring Station	36	1965	Operating	0	195	195	6,157	0.0	100.0	EXCELLENT	3.2	96.8	GOOD		Continue to Operate
B	013H	Environmental Monitoring Station	90	1990	Operating	0	222	222	15,392	0.0	100.0	EXCELLENT	1.4	98.6	EXCELLENT		Continue to Operate
B	014	ES LAB	4,201	1944	Operating	77,383	11,000	88,383	1,197,927	6.5	93.5	ADEQUATE	7.4	92.6	ADEQUATE	2008	DEMO w/o Replacement
B	016	AFR LAB	11,808	1943	Operating	218,847	17,000	235,847	3,244,660	6.7	93.3	ADEQUATE	7.3	92.7	ADEQUATE	2010	DEMO w/o Replacement
B	016A	Storage	339	1960	Operating	1,877	13,560	15,437	27,047	6.9	93.1	ADEQUATE	57.1	42.9	POOR	2010	DEMO w/o Replacement
B	017	EHS	2,222	1949	Operating	85,486	0	85,486	473,364	18.1	81.9	FAIR	18.1	81.9	FAIR		Continue to Operate
B	025	ENG Shops	20,304	1947	Operating	997,683	0	997,683	5,071,884	19.7	80.3	FAIR	19.7	80.3	FAIR	2005	DEMO w/o Replacement
B	025A	ENG Shops	7,548	1963	Operating	56,100	15,000	71,100	1,909,818	2.9	97.1	GOOD	3.7	96.3	GOOD	2006	DEMO w/o Replacement
B	025B	Houses Waste Treatment Unit	360	1963	Operating	0	14,400	14,400	28,722	0.0	100.0	EXCELLENT	50.1	49.9	POOR	2005	DEMO w/o Replacement
B	026	Health Services, EH&S	10,563	1964	Operating	17,907	231,770	249,677	3,038,389	0.6	99.4	EXCELLENT	8.2	91.8	ADEQUATE		Continue to Operate
B	027	ALS Support Facility	3,299	1948	Operating	64,096	2,000	66,096	908,790	7.1	92.9	ADEQUATE	7.3	92.7	ADEQUATE		Continue to Operate
B	028	Radio Shelter Facility	544	2003	Operating	0	0	0	1	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		Continue to Operate
B	031	Chicken Creek Bldg	7,327	1986	Operating	18,710	172,562	191,272	2,550,299	0.7	99.3	EXCELLENT	7.5	92.5	ADEQUATE		Continue to Operate
B	033A	Strawberry Canyon Guard House	52	1965	Operating	1,252	11,504	12,756	8,237	15.2	84.8	FAIR	154.9	-54.9	POOR		Continue to Operate
B	033B	Blackberry Canyon Guard House	94	1996	Operating	3,048	0	3,048	14,891	20.5	79.5	FAIR	20.5	79.5	FAIR		Continue to Operate
B	033C	Grizzly Peak Guard House	80	1965	Operating	1,339	11,737	13,076	12,673	10.6	89.4	FAIR	103.2	-3.2	POOR		Continue to Operate
B	034	ALS Chiller Building	5,163	1992	Operating	206,191	0	206,191	1,191,765	17.3	82.7	FAIR	17.3	82.7	FAIR		Continue to Operate
B	036	Grizzly Substation	880	1989	Operating	616	11,613	12,229	203,129	0.3	99.7	EXCELLENT	6.0	94.0	ADEQUATE		Continue to Operate
B	037	Utility Services Building	5,833	1987	Operating	20,810	29,433	50,243	996,285	2.1	97.9	GOOD	5.0	95.0	ADEQUATE		Continue to Operate
B	040	Storage	993	1947	Operating	39,212	39,720	78,932	252,362	15.5	84.5	FAIR	31.3	68.7	POOR	2008	DEMO w/o Replacement
B	041	Communications Lab	995	1948	Operating	45,548	39,800	85,348	252,870	18.0	82.0	FAIR	33.8	66.2	POOR	2008	DEMO w/o Replacement
B	043	Site Air Compressor/FD Emerg Gen	1,020	1979	Operating	1,553	3,654	5,207	81,380	1.9	98.1	EXCELLENT	6.4	93.6	ADEQUATE		Continue to Operate
B	044	ENG	805	1956	Shutdown Pending D&D	12,688	32,200	44,888	n/a	n/a	n/a	EXCELLENT	n/a	n/a	n/a	2006	DEMO w/o Replacement
B	045	Fire Apparatus	3,342	1970	Operating	10,400	20,050	30,450	480,350	2.2	97.8	GOOD	6.3	93.7	ADEQUATE		Continue to Operate
B	046	AFR, EE, ENG, Printing	60,364	1949	Operating	411,080	7,296,024	7,707,104	14,885,419	2.8	97.2	GOOD	51.8	48.2	POOR		Continue to Operate
B	046A	ENG Division Offices	5,564	1977	Operating	19,720	76,229	95,949	890,761	2.2	97.8	GOOD	10.8	89.2	FAIR		Continue to Operate
B	047	AFR	6,242	1957	Operating	96,771	8,000	104,771	1,620,560	6.0	94.0	ADEQUATE	6.5	93.5	ADEQUATE		Continue to Operate
B	048	Fire Station, Emerg. Command Ctr.	6,622	1981	Operating	41,517	31,776	73,293	951,789	4.4	95.6	GOOD	7.7	92.3	ADEQUATE		Continue to Operate
B	050	AFR, PHY, Auditorium, Library	48,534	1943	Operating	499,267	1,468,682	1,967,949	14,341,718	3.5	96.5	GOOD	13.7	86.3	FAIR		Continue to Operate
B	050A	Directorate, PHY, NSD	66,628	1962	Operating	347,216	1,427,933	1,775,149	19,034,717	1.8	98.2	EXCELLENT	9.3	90.7	ADEQUATE		Continue to Operate
B	050B	PHY, CSD	63,603	1967	Operating	325,423	4,129,943	4,455,366	17,614,162	1.8	98.2	EXCELLENT	25.3	74.7	POOR		Continue to Operate
B	050C	CSD, NERSC	2,768	1980	Operating	27,437	39,343	66,780	443,139	6.2	93.8	ADEQUATE	15.1	84.9	FAIR		Continue to Operate
B	050D	CSD	4,959	1979	Shutdown Pending	8,568	303,634	312,202	793,904	1.1	98.9	EXCELLENT	39.3	60.7	POOR		DEMO w/o

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B	050E	CSD	10,560	1984	D&D Operating	82,131	98,793	180,924	1,690,589	4.9	95.1	GOOD	10.7	89.3	FAIR		Replacement Continue to Operate
B	050F	CSD - ICS, NERSC	9,449	1985	Operating	76,682	85,105	161,787	1,511,764	5.1	94.9	ADEQUATE	10.7	89.3	FAIR		Continue to Operate

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B	051	Bevatron	96,562	1950	D&D in Progress	129,738	41,040,550	41,170,288	n/a	n/a	n/a	EXCELLENT	n/a	n/a	n/a	2005	DEMO w/o Replacement
B	051A	Bevatron	28,478	1958	D&D in Progress	34,495	12,096,350	12,130,845	n/a	n/a	n/a	EXCELLENT	n/a	n/a	n/a	2005	DEMO w/o Replacement
B	052	Cable Winding Facility	6,425	1943	Operating	48,406	14,000	62,406	1,739,272	2.8	97.2	GOOD	3.6	96.4	GOOD	2009	DEMO w/o Replacement
B	052A	Storage	516	1961	Operating	2,530	20,640	23,170	41,169	6.1	93.9	ADEQUATE	56.3	43.7	POOR	2009	DEMO w/o Replacement
B	053	EE, AFRD	6,944	1949	Operating	152,913	327,688	480,601	2,378,338	6.4	93.6	ADEQUATE	20.2	79.8	FAIR		Continue to Operate
B	054	Cafeteria	15,428	1950	Operating	145,017	789,053	934,070	4,557,579	3.2	96.8	GOOD	20.5	79.5	FAIR		Continue to Operate
B	054A	Automated Teller	195	1982	Operating	680	484	1,164	40,476	1.7	98.3	EXCELLENT	2.9	97.1	GOOD		Continue to Operate
B	055	LS	19,048	1951	Operating	980,157	41,000	1,021,157	4,412,777	22.2	77.8	FAIR	23.1	76.9	FAIR		Continue to Operate
B	055A	LS	1,535	1985	Operating	21,442	5,000	26,442	403,813	5.3	94.7	ADEQUATE	6.5	93.5	ADEQUATE		Continue to Operate
B	055B	Emergency Generator Building	209	1987	Operating	0	433	433	16,675	0.0	100.0	EXCELLENT	2.6	97.4	GOOD		Continue to Operate
B	056	Biomed Isotope Facility	1,782	1976	Operating	1,889	25,204	27,093	629,179	0.3	99.7	EXCELLENT	4.3	95.7	GOOD		Continue to Operate
B	058	Heavy Ion Fusion	10,279	1950	Operating	177,169	4,000	181,169	2,806,503	6.3	93.7	ADEQUATE	6.5	93.5	ADEQUATE		Continue to Operate
B	058A	Accelerator R&D Addition	12,653	1969	Operating	521,067	0	521,067	3,515,647	14.8	85.2	FAIR	14.8	85.2	FAIR		Continue to Operate
B	060	Hibay Lab	3,615	1979	Operating	46,088	3,000	49,088	682,230	6.8	93.2	ADEQUATE	7.2	92.8	ADEQUATE		Continue to Operate
B	061	Storage	323	1969	Operating	5,609	6,936	12,545	25,770	21.8	78.2	FAIR	48.7	51.3	POOR		Continue to Operate
B	062	MS, CH Lab	55,904	1965	Operating	495,364	2,767,005	3,262,369	16,180,903	3.1	96.9	GOOD	20.2	79.8	FAIR		Continue to Operate
B	062B	Telephone Equip. Storage	169	1965	Operating	158	699	857	13,484	1.2	98.8	EXCELLENT	6.4	93.6	ADEQUATE		Continue to Operate
B	063	EE	2,696	1963	Operating	18,499	145,719	164,218	469,528	3.9	96.1	GOOD	35.0	65.0	POOR		Continue to Operate
B	064	LS/ES	29,374	1951	Operating	360,358	0	360,358	6,491,393	5.6	94.4	ADEQUATE	5.6	94.4	ADEQUATE		Continue to Operate
B	065	OFFICES	3,423	1952	Operating	9,548	33,827	43,375	548,000	1.7	98.3	EXCELLENT	7.9	92.1	ADEQUATE		Continue to Operate
B	066	Ctr for Surface Sci. Catalysis	44,134	1987	Operating	526,612	47,529	574,141	13,776,791	3.8	96.2	GOOD	4.2	95.8	GOOD		Continue to Operate
B	068	Upper Pump House	500	1979	Operating	0	0	0	101,764	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		Continue to Operate
B	069	FACILITIES DEPT. OPERATIONS	20,461	1967	Operating	214,001	0	214,001	4,265,969	5.0	95.0	ADEQUATE	5.0	95.0	ADEQUATE		Continue to Operate
B	070	NS, EE LAB	63,550	1955	Operating	595,816	1,603,756	2,199,572	16,825,497	3.5	96.5	GOOD	13.1	86.9	FAIR		Continue to Operate
B	070A	NS, LS, CS, ES, ENG LAB	67,741	1961	Operating	313,219	1,291,521	1,604,740	17,808,180	1.8	98.2	EXCELLENT	9.0	91.0	ADEQUATE		Continue to Operate
B	070B	Telephone Equip. Storage	382	1979	Operating	0	1,937	1,937	30,478	0.0	100.0	EXCELLENT	6.4	93.6	ADEQUATE		Continue to Operate
B	071	ION BEAM TECH, CTR BEAM PHY	53,739	1956	Operating	3,497,345	90,000	3,587,345	17,176,509	20.4	79.6	FAIR	20.9	79.1	FAIR		Continue to Operate
B	071A	Low Beta Lab	4,041	1964	Operating	37,725	0	37,725	1,022,060	3.7	96.3	GOOD	3.7	96.3	GOOD		Continue to Operate
B	071B	CTR BEAM PHYS	6,892	1978	Operating	56,599	15,000	71,599	2,046,083	2.8	97.2	GOOD	3.5	96.5	GOOD		Continue to Operate
B	071T	EETD Windows Test Facility	949	2003	Operating	0	1	1	143,385	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		Continue to Operate
B	072	Nat'l Ctr for Electron Microscopy	5,352	1961	Operating	151,996	8,000	159,996	1,413,670	10.8	89.2	FAIR	11.3	88.7	FAIR		Continue to Operate
B	072A	High Voltage Electron Microscopy	2,532	1980	Operating	57,243	1,000	58,243	647,052	8.8	91.2	ADEQUATE	9.0	91.0	ADEQUATE		Continue to Operate
B	072B	Atomic Resolution Microscope	4,413	1984	Operating	50,560	1,000	51,560	1,074,113	4.7	95.3	GOOD	4.8	95.2	GOOD		Continue to Operate
B	072C	NCEM	8,394	1984	Operating	134,122	9,000	143,122	2,084,922	6.4	93.6	ADEQUATE	6.9	93.1	ADEQUATE		Continue to Operate
B	073	ATM AEROSOL RSCH	4,228	1961	Operating	137,963	7,000	144,963	1,307,180	10.6	89.4	FAIR	11.1	88.9	FAIR		Continue to Operate
B	073A	Utility Equipment Building	403	1961	Shutdown Pending D&D	18,501	16,120	34,621	n/a	n/a	n/a	EXCELLENT	n/a	n/a	n/a	2003	DEMO w/o Replacement
B	074	LS LABS	45,382	1962	Operating	301,609	4,050,167	4,351,776	12,981,288	2.3	97.7	GOOD	33.5	66.5	POOR		Continue to Operate
B	074F	Dog Kennel	1,560	1996	Operating	0	0	0	191,398	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		Continue to Operate
B	075	EH&S Radiological Services	8,498	1961	Operating	339,935	7,000	346,935	2,516,970	13.5	86.5	FAIR	13.8	86.2	FAIR		Continue to Operate
B	075A	EH&S	4,000	1987	Operating	36,126	1,000	37,126	1,030,855	3.5	96.5	GOOD	3.6	96.4	GOOD		Continue to Operate
B	075C	Calibration Building	450	1979	Operating	315	58,469	58,784	158,884	0.2	99.8	EXCELLENT	37.0	63.0	POOR		Continue to Operate
B	075D	Storage	1,895	1979	Operating	1,733	75,800	77,533	151,191	1.1	98.9	EXCELLENT	51.3	48.7	POOR		Continue to Operate
B	076	FAC Shops	31,642	1964	Operating	23,348	1,501,841	1,525,189	8,520,444	0.3	99.7	EXCELLENT	17.9	82.1	FAIR		Continue to Operate
B	077	ENG Shops	68,937	1963	Operating	475,418	1,210,294	1,685,712	17,699,201	2.7	97.3	GOOD	9.5	90.5	ADEQUATE		Continue to Operate
B	077A	Composites Lab and Assembly Facility	12,118	1988	Operating	12,561	259,632	272,193	2,507,254	0.5	99.5	EXCELLENT	10.9	89.1	FAIR		Continue to Operate
B	077H	Utility Storage	576	1983	Operating	1,231	3,000	4,231	120,173	1.0	99.0	EXCELLENT	3.5	96.5	GOOD		Continue to Operate
B	078	Craft Stores	5,391	1966	Operating	108,444	0	108,444	430,117	25.2	74.8	POOR	25.2	74.8	POOR		Continue to Operate
B	079	Metal Stores	4,564	1965	Operating	21,932	116,349	138,281	1,138,998	1.9	98.1	EXCELLENT	12.1	87.9	FAIR		Continue to Operate
B	080	ALS Support Facility	29,931	1954	Operating	166,393	711,529	877,922	10,685,999	1.6	98.4	EXCELLENT	8.2	91.8	ADEQUATE		Continue to Operate

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B	080A	ALS Support Facility	960	1977	Operating	4,932	6,365	11,297	153,690	3.2	96.8	GOOD	7.4	92.6	ADEQUATE		Continue to Operate
B	081	Chemical Storage	1,129	1968	Operating	4,392	2,090	6,482	90,077	4.9	95.1	GOOD	7.2	92.8	ADEQUATE		Continue to Operate
B	082	Lower Pump House	537	1981	Operating	0	0	0	96,216	0.0	100.0	EXCELLENT	0.0	100.0	EXCELLENT		Continue to Operate
B	083	LS LAB	6,856	1979	Operating	23,119	1,526,674	1,549,793	2,481,912	0.9	99.1	EXCELLENT	62.4	37.6	POOR		Continue to Operate
B	084	LS Human Genome Lab	55,031	1997	Operating	2,754	355,303	358,057	19,769,594	0.0	100.0	EXCELLENT	1.8	98.2	EXCELLENT		Continue to Operate
B	084B	Utility Building	1,633	1997	Operating	248	6,575	6,823	376,942	0.1	99.9	EXCELLENT	1.8	98.2	EXCELLENT		Continue to Operate
TYPE	**ID**	**NAME**	**GSF**	**YR BLT**	**STATUS DESC**	**DM**	**RIC**	**DM+RIC =TRIC**	**RPV**	**FCI**	**ACI**	**ACI Descriptor**	**TSCI (TRIC/RPV)**	**1-TSCI**	**TSCI Descriptor**	**Excess Year**	**MPI - Modernization Planning Indicator**
B	085	Hazardous Waste Handling Facility	15,405	1996	Operating	15,357	96,528	111,885	4,774,254	0.3	99.7	EXCELLENT	2.3	97.7	GOOD		Continue to Operate
B	085A	Storage Racks	885	1996	Operating	0	1,222	1,222	70,609	0.0	100.0	EXCELLENT	1.7	98.3	EXCELLENT		Continue to Operate
B	088	88 CYCLOTRON	53,864	1960	Operating	615,187	2,095,288	2,710,475	19,953,733	3.1	96.9	GOOD	13.6	86.4	FAIR		Continue to Operate
B	088D	Emergency Generator Building	265	1979	Operating	0	5,582	5,582	85,368	0.0	100.0	EXCELLENT	6.5	93.5	ADEQUATE		Continue to Operate
B	090	DOE, EE, EHS, ES Offices	89,184	1960	Operating	370,166	2,718,872	3,089,038	27,661,026	1.3	98.7	EXCELLENT	11.2	88.8	FAIR		Continue to Operate
Real Prop Trailers	007C	Offices	479	1977	Operating	19,680	n/a	n/a	84,939	23.2	76.8	FAIR	n/a	n/a	n/a		n/a
T	029A	(vacant)	1,751	1978	Shutdown Pending D&D	0	n/a	n/a	310,496	0.0	n/a	n/a	n/a	n/a	n/a	2001	n/a
T	029B	(vacant)	1,440	1978	Shutdown Pending D&D	0	n/a	n/a	255,348	0.0	n/a	n/a	n/a	n/a	n/a	2001	n/a
T	029C	(vacant)	1,440	1978	Shutdown Pending D&D	0	n/a	n/a	255,348	0.0	n/a	n/a	n/a	n/a	n/a	2002	n/a
T	031A	FA	623	1978	Operating	16,143	n/a	n/a	110,473	14.6	85.4	FAIR	n/a	n/a	n/a		n/a
T	044A	PHY	481	1979	Operating	70,995	n/a	n/a	85,293	83.2	16.8	POOR	n/a	n/a	n/a	2006	n/a
T	044B	ENG	1,441	1979	Operating	50,010	n/a	n/a	255,525	19.6	80.4	FAIR	n/a	n/a	n/a	2006	n/a
T	046B	ENG	1,239	1979	Operating	10,099	n/a	n/a	219,705	4.6	95.4	GOOD	n/a	n/a	n/a		n/a
T	046C	AFR	1,029	1977	Operating	14,773	n/a	n/a	182,467	8.1	91.9	ADEQUATE	n/a	n/a	n/a		n/a
T	046D	AFR	771	1984	Operating	5,462	n/a	n/a	136,717	4.0	96.0	GOOD	n/a	n/a	n/a		n/a
T	051F	ES, EET	1,499	1979	Operating	28,570	n/a	n/a	529,259	5.4	94.6	ADEQUATE	n/a	n/a	n/a	2010	n/a
T	062A	EE, MS	1,238	1978	Operating	22,088	n/a	n/a	219,528	10.1	89.9	FAIR	n/a	n/a	n/a		n/a
T	064B	FAC	480	1977	Operating	2,545	n/a	n/a	85,116	3.0	97.0	GOOD	n/a	n/a	n/a		n/a
T	065A	Offices	1,453	1984	Operating	8,696	n/a	n/a	257,653	3.4	96.6	GOOD	n/a	n/a	n/a		n/a
T	065B	Offices	1,020	1983	Operating	4,503	n/a	n/a	180,871	2.5	97.5	GOOD	n/a	n/a	n/a		n/a
T	067B	Offices	1,238	1978	Operating	42,255	n/a	n/a	219,528	19.2	80.8	FAIR	n/a	n/a	n/a		n/a
T	067C	Offices	1,237	1978	Operating	48,038	n/a	n/a	219,351	21.9	78.1	FAIR	n/a	n/a	n/a	2005	n/a
T	071C	Offices	511	1968	Operating	5,177	n/a	n/a	90,613	5.7	94.3	ADEQUATE	n/a	n/a	n/a		n/a
T	071D	Offices	520	1970	Operating	13,002	n/a	n/a	92,209	14.1	85.9	FAIR	n/a	n/a	n/a		n/a
T	071E	Offices	513	1973	Shutdown Pending D&D	0	n/a	n/a	90,968	0.0	n/a	n/a	n/a	n/a	n/a	1995	n/a
T	071G	Offices	517	1974	Operating	2,640	n/a	n/a	91,677	2.9	97.1	GOOD	n/a	n/a	n/a		n/a
T	071J	Offices	1,289	1978	Operating	12,101	n/a	n/a	228,572	5.3	94.7	ADEQUATE	n/a	n/a	n/a		n/a
T	071P	Offices	511	1981	Operating	5,120	n/a	n/a	90,613	5.7	94.3	ADEQUATE	n/a	n/a	n/a		n/a
T	075B	EH&S	4,640	1979	Operating	9,293	n/a	n/a	822,787	1.1	98.9	EXCELLENT	n/a	n/a	n/a		n/a
T	075E	EH&S Offices	410	1978	Operating	4,659	n/a	n/a	72,703	6.4	93.6	ADEQUATE	n/a	n/a	n/a		n/a
T	076L	FA Offices	1,439	1977	Operating	11,320	n/a	n/a	255,170	4.4	95.6	GOOD	n/a	n/a	n/a		n/a
T	085B	Offices	3,601	1996	Operating	1,767	n/a	n/a	638,546	0.3	99.7	EXCELLENT	n/a	n/a	n/a		n/a
T	090B	Offices	1,443	1977	Operating	10,686	n/a	n/a	255,880	4.2	95.8	GOOD	n/a	n/a	n/a		n/a
T	090C	FA Offices	1,193	1977	Operating	29,308	n/a	n/a	211,548	13.9	86.1	FAIR	n/a	n/a	n/a		n/a
T	090F	FA Offices	2,462	1979	Operating	18,737	n/a	n/a	436,573	4.3	95.7	GOOD	n/a	n/a	n/a		n/a
T	090G	FA Offices	1,853	1978	Operating	24,482	n/a	n/a	328,583	7.5	92.5	ADEQUATE	n/a	n/a	n/a		n/a
T	090H	FA Offices	1,849	1977	Operating	18,726	n/a	n/a	327,873	5.7	94.3	ADEQUATE	n/a	n/a	n/a		n/a
T	090J	FA Offices	2,846	1978	Operating	28,560	n/a	n/a	504,666	5.7	94.3	ADEQUATE	n/a	n/a	n/a		n/a
T	090K	FA Offices	2,846	1978	Operating	17,050	n/a	n/a	504,666	3.4	96.6	GOOD	n/a	n/a	n/a		n/a
T	090P	ES	2,129	1979	Operating	19,025	n/a	n/a	377,524	5.0	95.0	ADEQUATE	n/a	n/a	n/a		n/a
T	090Q	Restroom Trailer	425	1978	Operating	5,774	n/a	n/a	75,363	7.7	92.3	ADEQUATE	n/a	n/a	n/a		n/a
Personal Prop Trailers	010A	Telecommunications Equipment	242	1960	Operating	0	n/a	n/a	41,388	0.0	n/a	n/a	n/a	n/a	n/a		n/a

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T	031B	Storage	157	1965	Operating	0	n/a	n/a	12,526	0.0	n/a	n/a	n/a	n/a	n/a		n/a
T	031C	Storage	157	1965	Operating	0	n/a	n/a	12,526	0.0	n/a	n/a	n/a	n/a	n/a		n/a
T	048A	Storage Container	320	1978	Operating	0	n/a	n/a	100,079	0.0	n/a	n/a	n/a	n/a	n/a		n/a
T	053B	AFR	519	1972	Operating	41,133	n/a	n/a	92,032	44.7	55.3	POOR	n/a	n/a	n/a		n/a
T	070E	Storage Container	432	1979	Operating	0	n/a	n/a	34,467	0.0	n/a	n/a	n/a	n/a	n/a		n/a
T	070G	Storage	173	1979	Operating	0	n/a	n/a	13,803	0.0	n/a	n/a	n/a	n/a	n/a		n/a
T	071F	Offices	516	1974	Operating	7,840	n/a	n/a	91,500	8.6	91.4	ADEQUATE	n/a	n/a	n/a		n/a
T	071K	Offices	474	1974	Operating	8,215	n/a	n/a	84,052	9.8	90.2	ADEQUATE	n/a	n/a	n/a		n/a
T	071Q	Restroom Trailer	357	1996	Operating	1,344	n/a	n/a	63,305	2.1	97.9	GOOD	n/a	n/a	n/a		n/a
TYPE	**ID**	**NAME**	**GSF**	**YR BLT**	**STATUS DESC**	**DM**	**RIC**	**DM+RIC =TRIC**	**RPV**	**FCI**	**ACI**	**ACI Descriptor**	**TSCI (TRIC/RPV)**	**1-TSCI**	**TSCI Descriptor**	**Excess Year**	**MPI - Modernization Planning Indicator**
T	076K	FA Offices	371	1974	Operating	1,366	n/a	n/a	65,787	2.1	97.9	GOOD	n/a	n/a	n/a		n/a
T	083A	LS Lab Trailer	507	1965	Operating	15,576	n/a	n/a	95,401	16.3	83.7	FAIR	n/a	n/a	n/a		n/a
T	090R	Transformer Equipment	160	1979	Operating	0	n/a	n/a	27,364	0.0	n/a	n/a	n/a	n/a	n/a		n/a

Leased Space (Off-site)	ID	Name	Net Sq. Ft.	Gross Sq. Ft.	Status Desc.	Lease Expires
B	100/400	Joint Genome Institute	42260	56,976	Operating	6/7/2008
B	500	JGI Warehouse	4700	4,700	Operating	6/7/2008
B	903	Warehouse, Receiving	117495	122,374	Operating	5/14/2006
B	937	Berkeley Tower	26163	46,109	Operating	2/2/2009
B	939	Powerbar Building	8973	13,962	Operating	4/28/2006
B	941	2000 Center Street	5066	8,098	Operating	8/31/2005
B	943	Oakland Scientific Facility	29285	51,896	Operating	6/30/2010
B	962	Wash. DC L'Enfant Plaza	2199	4,012	Operating	9/30/2007
B	965	Kitty Hawk	1575	2,547	Operating	5/31/2006
B	977	717 Potter Street	40894	54,000	Operating	1/31/2010

Note: Includes Buildings 31 and 71T (Non-DOE SC buildings per FIMS)

APPENDIX 6. Resource Requirements Table

	Project Number	Gross Building Area	2004 Approp. ($000)	2005 Approp ($000)	2006 Budget ($000)	2007 Budget ($000)	2008 Budget ($000)	2009 Budget ($000)	2010 Budget ($000)	2011 Budget ($000)	2012 Budget ($000)	2013 Budget ($000)	2014 Budget ($000)	2015 Budget ($000)	2016 Budget ($000)
SITE NAME: Lawrence Berkeley National Lab (LBNL)															
PROGRAM: Office of Science (High Energy Physics Landlord)															
1.0 Capital Line Item (Include project number & identify Funding Program)															
1.1 New Construction (facilities and additions)															
Molecular Foundry	MFCON02/39KC02	**95,692**	34,794	31,828	9,606	257									
User Support Building	USERSUPPT	**30,000**				2,100	5,800	13,100	400						
Building 10 - Demolition (Costs included in User Support Building above)	USERSUPPT	**(15,200)**													
Building 77 - Utility Bldg (Costs included in Project FN3100, Section 1.2)	B77PH2PED/CONS	**1,750**													
Genomics: GTL Facility		**150,000**					20,000	45,000	75,000	45,000	15,000			350,000	200
Ultrafast Science Facility		**40,000**							10,000	20,000	9,000	1,000			
1.2 All Other Projects															
Building 77 - Rehabilitation of Bldg. Structures & Systems, Phase 2	FN3100/39KG01		2,088	5,845	3,780										
Seismic & Structural Safety of Buildings Phase 1	SEISMICPH1					3,000	4,600	10,200	5,200						
Seismic & Structural Safety of Buildings and Infrastructure Phase 2	SEISMICPH2							2,000	5,000	12,000	1,000				
Utility Infrastructure Modernization - West Corridors	MECHUTILP1									3,000	16,000	1,000			
Utility Infrastructure Modernization - East Corridors	MECHUTILP2											2,000	17,000	1,000	
Subtotal Line Item Projects		**302,242**	**36,882**	**37,673**	**13,386**	**5,357**	**30,400**	**70,300**	**95,600**	**80,000**	**41,000**	**4,000**	**17,000**	**351,000**	**200**
2.0 General Plant Project (GPP) (Include project number & identify Funding Program)															
2.1 New Construction (facilities and additions)															

	Project Number	Gross Building Area	2004 Approp. ($000)	2005 Approp ($000)	2006 Budget ($000)	2007 Budget ($000)	2008 Budget ($000)	2009 Budget ($000)	2010 Budget ($000)	2011 Budget ($000)	2012 Budget ($000)	2013 Budget ($000)	2014 Budget ($000)	2015 Budget ($000)	2016 Budget ($000)
Building 64 - Construct New Biosciences Lab Space	GPPPLANDLD	**1,200**	1,050												
New Animal Care Facility	GPPPLANDLD	**7,100**		1,877	3,023										
Building 58A - Extension	GPPPLANDLD	**500**							750						
Site - Install Environmental Monitoring Sample Prep. And Equip.Storage Trailer	GPPPLANDLD	**960**									300				
Site - Construct Sensitive Instrument Facility	GPPPLANDLD	**2,000**												2,500	2,500
2.2 All Other Projects (recap)															
Building 66 - Laboratory Renovations	GPPPLANDLD		700												
Building 71 - Provide Tempered Air to Cave	GPPPLANDLD		42												
Site - Replace Shuttle Bus Shelter at Strawberry Canyon Gate	GPPPLANDLD		35												
Building 90 - HVAC System Upgrades	GPPPLANDLD		1,320												
Building 46 - Provide Loading Dock Hoist	GPPPLANDLD		80												
Sitewide Exterior Loudspeaker	GPPPLANDLD		80												
Building 62 - Install Fume Hoods in Room 246	GPPPLANDLD		60												
Building 2 - Convert Conference Room to Lab	GPPPLANDLD		30												
Building 48 - Upgrade Seismic Safety	GPPPLANDLD			150											
Building 77 Shop Capabilities Upgrades	GPPPLANDLD			268											
Building 6 - Convert Spaces for Laboratory Use	GPPPLANDLD			240											
Building 74 - Upgrade 3rd Floor Laboratory Suite	GPPPLANDLD			600											
Building 71 - Convert Cave for Laboratory Use	GPPPLANDLD			450											
Building 2 - Convert Space for Laboratory Use	GPPPLANDLD														

	Project Number	Gross Building Area	2004 Approp. ($000)	2005 Approp ($000)	2006 Budget ($000)	2007 Budget ($000)	2008 Budget ($000)	2009 Budget ($000)	2010 Budget ($000)	2011 Budget ($000)	2012 Budget ($000)	2013 Budget ($000)	2014 Budget ($000)	2015 Budget ($000)	2016 Budget ($000)
			30	950											
Building 70A - Reinstate One-hour Fire Protection at Top of Corridor Wall (070A-2235)	GPPPLANDLD				100										
Americans with Disabilities Act Compliance: Exterior Ramp to Replace Wheelchair Lift (054)	GPPPLANDLD				60										
Upgrade Computer/Communications Network Fiber Utility	GPPPLANDLD				325										
Building 25A - Upgrade Structural Elements for Seismic Safety	GPPPLANDLD				1,500										
Building 72 - Upgrade Seismic Safety	GPPPLANDLD				515										
Building 6 - Convert Storage Room to Laboratory - Rm. 2263 - Move Staff from Seismically Very Poor Space	GPPPLANDLD				300	600									
Building 72A - Convert for use by TEAM Microscope	GPPPLANDLD				700	200									
Building 76 - Upgrade Structural Elements for Seismic Safety	GPPPLANDLD					300									
Building 72 - Upgrade West Wing & Seismic Safety	GPPPLANDLD					515									
Building 54 - Modernize Building and Upgrade Seismic Safety	GPPPLANDLD					550									
Building 2 - Convert Room 300F to Offices	GPPPLANDLD					25									
Building 70 - Upgrade Rm 141	GPPPLANDLD					300									
Building 70 - Upgrade Ventilation in Rm. 141A	GPPPLANDLD					50									
Building 6 - Electrical Power Upgrade	GPPPLANDLD					120									
Upgrade Computer/Communications Network Fiber Utility	GPPPLANDLD					170									
Building 72 - Provide Space for the TEAM Microscope Users	GPPPLANDLD					1,250	3,000								
Building 25A - Construct Second Floor for Project Surge Space for Seismic Safety	GPPPLANDLD					1,100	1,400	1,000							
Building 64 - Laboratory Upgrades	GPPPLANDLD					1,700	1,000								
Building 10 Area - Widen and Realign Road N (Fire/Life Safety Access, Laydown and Parking)	GPPPLANDLD						1,600								
Upgrade Computer/Communications Network Fiber Utility	GPPPLANDLD														

	Project Number	Gross Building Area	2004 Approp. ($000)	2005 Approp ($000)	2006 Budget ($000)	2007 Budget ($000)	2008 Budget ($000)	2009 Budget ($000)	2010 Budget ($000)	2011 Budget ($000)	2012 Budget ($000)	2013 Budget ($000)	2014 Budget ($000)	2015 Budget ($000)	2016 Budget ($000)
							100								
Building 70 - Upgrade Rooms 143 and 158	GPPPLANDLD							300							
Building 70A - Upgrade Rooms 4413 - 4419	GPPPLANDLD							1,000							
Building 71 - Remove Abandoned Shielding Blocks for Seismic Safety	GPPPLANDLD							4,900							
Upgrade Computer/Communications Network Fiber Utility	GPPPLANDLD							125							
Building 71 - Remove Abandoned Accelerator for Seismic Safety	GPPPLANDLD								2,900						
Building 71 - Upgrade and Relocate Electrical Utilities	GPPPLANDLD								2,000						
Building 64 - Upgrade For Seismic Safety	GPPPLANDLD								1,600						
Building 77 - Install Waste Water - Zero Discharge System	GPPPLANDLD								360						
Upgrade Computer/Communications Network Fiber Utility	GPPPLANDLD								100						
Building 51F - Relocate Functions and Demolish Building	GPPPLANDLD									500					
Building 71 - Upgrade and Relocate Mechanical Utilities	GPPPLANDLD									3,000					
Building 74 Electrical Utilities Upgrade	GPPPLANDLD									4,250					
Upgrade Computer/Communications Network Fiber Utility	GPPPLANDLD									100					
Seismic Safety - Construct Seismically Secure Roadway Connection to Regional Roads	GPPPLANDLD										4,900				
Building 74 - Mechanical Utilities Upgrade	GPPPLANDLD										3,000	1,500			
Building 62 - Electrical Utilities Upgrade	GPPPLANDLD											4,000			
Building 50A - Upgrade Electrical and Communication Utilities	GPPPLANDLD											3,000			
Building 62 - Replace First Floor Slab	GPPPLANDLD												3,500		
Building 50A - Upgrade Mechanical Utilities	GPPPLANDLD												3,000		
Building 13F - Replace Structure and Upgrade Sanitary Sewer Monitoring	GPPPLANDLD														

System	Project Number	Gross Building Area	2004 Approp. ($000)	2005 Approp ($000)	2006 Budget ($000)	2007 Budget ($000)	2008 Budget ($000)	2009 Budget ($000)	2010 Budget ($000)	2011 Budget ($000)	2012 Budget ($000)	2013 Budget ($000)	2014 Budget ($000)	2015 Budget ($000)	2016 Budget ($000)
													2,200		
Building 62 - Mechanical Utilities Upgrade	GPPPLANDLD													4,900	
Building 50B - Upgrade Mechanical Utilities	GPPPLANDLD													1,500	1,500
Building 50 - Upgrade Mechanical Utilities	GPPPLANDLD													500	1,000
Building 50B - Upgrade Electrical and Communication Utilities	GPPPLANDLD														2,500
Building 50 - Upgrade Electrical and Communication Utilities	GPPPLANDLD														1,000
Building 70A - Upgrade Ventilation System	GPPPLANDLD														1,000
Other GPP Priorities (Rounding)	GPPPLANDLD		73												
Subtotal GPP (Note line below regarding FY05 GPP total):		**11,760**	**3,500**	**4,535**	**6,523**	**6,880**	**7,100**	**7,325**	**7,710**	**7,850**	**8,200**	**8,500**	**8,700**	**9,400**	**9,500**
Re-program of $470K FY 05 GPE to FY 05 GPP				**470**											
Safety and Security GPP															
Blackberry Gate Improvements	EHSSP2 / FS10 (Safe&Sec)			816											
Site Perimeter Fencing Replacement	EHSSP2 / FS10 (Safe&Sec)					1,485									
Main Entry Gate Kiosk Modifications	EHSSP2 / FS10 (Safe&Sec)					655									
Subtotal S&S GPP Projects				816	-	2,140									
3.0 Institutional General Plant Project (IGPP)															
Subtotal IGPP Projects															
See also SC SLI Proposed Deferred Maintenance GPP in Section 5.1															
4.0 Operating/Expense for Excess Elimination and Other															
4.1 Excess Elimination (demolition, sale, lease, transfer) Show area eliminated in Gross Area column															

	Project Number	Gross Building Area	2004 Approp. ($000)	2005 Approp ($000)	2006 Budget ($000)	2007 Budget ($000)	2008 Budget ($000)	2009 Budget ($000)	2010 Budget ($000)	2011 Budget ($000)	2012 Budget ($000)	2013 Budget ($000)	2014 Budget ($000)	2015 Budget ($000)	2016 Budget ($000)
Building 44, 44A-B - Removal & Surface Site Remediation	OLDTOWNDEMO	**10,275**			1,000	1,000									
Building 14, 40, & 41 - Removal & Surface Site Remediation	OLDTOWNDEMO	**6,189**					1,000	1,000							
Building 16, 16A, 52, & 52A - Removal & Surface Site Remediation	OLDTOWNDEMO	**19,088**							1,000	2,000					
Building 5 - Removal & Surface Site Remediation	OLDTOWNDEMO	**7,176**							1,000	1,000	2,000				
Building 4 - Removal & Surface Site Remediation	OLDTOWNDEMO	**10,176**									1,000	2,000			
4.1 Subtotal		**52,904**	**-**	**-**	**1,000**	**1,000**	**1,000**	**1,000**	**2,000**	**3,000**	**3,000**	**2,000**	**-**	**-**	**-**
4.2 All Other (List direct O&E maintenance under 5.1)															
Demolition of Building 51 - Complex	B51DEMOSLI	**126,527**		1,360	11,046	14,000	14,000	14,000	14,000	14,000	1,954				
Removal of Accelerator and Shielding in Building 71	B71REMOVAL				4,900	2,900									
Building 25, 25B - Removal & Surface Site Remediation	OLDTOWNDEMO	**20,664**			850	850									
4.2 Subtotal		**147,191**	**-**	**1,360**	**16,796**	**17,750**	**14,000**	**14,000**	**14,000**	**14,000**	**1,954**	**-**	**-**	**-**	**-**
Subtotal Operating/Expense Projects			**-**	**1,360**	**17,796**	**18,750**	**15,000**	**15,000**	**16,000**	**17,000**	**4,954**	**2,000**	**-**	**-**	**-**
TOTAL Capital & Operating Investment:			**40,382**	**44,384**	**37,705**	**33,127**	**52,500**	**92,625**	**119,310**	**104,850**	**54,154**	**14,500**	**25,700**	**360,400**	**9,700**
TOTAL Overhead Investments (IGPP)			-	-	-	-	-	-	-	-	-	-	-	-	-

Integrated Facilities and Infrastructure Budget Data Sheet (IFI)	Project Number	Gross Building Area	FY2004 Approp. ($000)	FY2005 Approp ($000)	FY2006 Budget ($000)	FY2007 Budget ($000)	FY2008 Budget ($000)	FY2009 Budget ($000)	FY2010 Budget ($000)	FY2011 Budget ($000)	FY2012 Budget ($000)	FY2013 Budget ($000)	FY2014 Budget ($000)	FY2015 Budget ($000)	FY2015 Budget ($000)
SITE NAME: Lawrence Berkeley National Lab (LBNL)															
PROGRAM: Science (High Energy Physics Landlord)															
5.0 Maintenance & Repair															
5.1 Direct Funded (by HQ or Site Program)															
Deferred Maintenance Reduction - GPP (DMR) (budget per 2005 TYSP guidance)															

	Project Number	Gross Building Area	2004 Approp. ($000)	2005 Approp ($000)	2006 Budget ($000)	2007 Budget ($000)	2008 Budget ($000)	2009 Budget ($000)	2010 Budget ($000)	2011 Budget ($000)	2012 Budget ($000)	2013 Budget ($000)	2014 Budget ($000)	2015 Budget ($000)	2016 Budget ($000)
Replace High Pressure Water Line	GPPDMPROG				270	80									
Other Priorities to be presented in the 2006 TYSP						1,675	3,240	4,725	6,210						
Total Direct Maintenance & Repair			-	-	270	1,755	3,240	4,725	6,210	-	-	-	-	-	-
5.2 Indirect (from Overhead or Space Charges)			10,626	11,155	14,080	15,440	15,904	16,381	16,872	17,790					
Include indirect O/E maintenance projects in total															
Total Indirect Maintenance & Repair			10,626	11,155	14,080	15,440	15,904	16,381	16,872	17,790	-	-	-	-	-
6.0 Indirect O&E Excess Elimination (demolition, sale, lease, transfer) Show area eliminated in Gross Area column															
Total Indirect Excess Elimination															

Integrated Facilities and Infrastructure Budget Data Sheet (IFI)	**Project Number**	**2004 Approp (GSF)**	**2005 Approp (GSF)**	**2006 Budget (GSF)**	**2007 Budget (GSF)**	**2008 Budget (GSF)**	**2009 Budget (GSF)**	**2010 Budget (GSF)**	**2011 Budget (GSF)**	**2012 Budget (GSF)**	**2013 Budget (GSF)**	**2014 Budget (GSF)**	**2015 Budget (GSF)**	**2015 Budget ($000)**	**2016 Budget ($000)**
SITE NAME: Lawrence Berkeley National Lab (LBNL)															
PROGRAM: Science (High Energy Physics Landlord)															
7.0 Area of Excess Eliminated															
List of projects, by type of funding, with project number, and excess AREA eliminated by fiscal year accomplished.															
Building 10 - Demolition	USERSUPPT					15,200									
Line Item Total		**-**	**-**	**-**	**-**	**15,200**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Excess Elimination (demolition, sale, lease, transfer) Show area eliminated in Gross Area column															
Building 44, 44A-B - Removal & Surface Site Remediation	OLDTOWNDEMO	-			10,275										
Building 14, 40, & 41 - Removal & Surface Site Remediation	OLDTOWNDEMO	-					6,189								
Building 16, 16A, 52, & 52A - Removal & Surface Site Remediation	OLDTOWNDEMO	-							19,088						

	Project Number	Gross Building Area	2004 Approp. ($000)	2005 Approp ($000)	2006 Budget ($000)	2007 Budget ($000)	2008 Budget ($000)	2009 Budget ($000)	2010 Budget ($000)	2011 Budget ($000)	2012 Budget ($000)	2013 Budget ($000)	2014 Budget ($000)	2015 Budget ($000)	2016 Budget ($000)
Building 5 - Removal & Surface Site Remediation	OLDTOWNDEMO	-								7,176					
Building 4 - Removal & Surface Site Remediation	OLDTOWNDEMO	-									10,176				
SLI Excess Elimination		-	-	-	10,275	-	6,189	-	19,088	7,176	10,176	-	-	-	-
GPP		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Direct Funded Operations/Expense															
Building 25, 25B - Removal & Surface Site Remediation	OLDTOWNDEMO			20,664											
B51B (EPB Hall) and B51L - Removal (Funded in FY03)	FT3200/KG0601	44,775													
Demolition of Building 51 - Complex	B51DEMOSLI									126,527					
Operations/Expense		**44,775**	**-**	**20,664**	**-**	**-**	**-**	**-**	**-**	**126,527**	**-**	**-**	**-**	**-**	**-**
Indirect Operations/ Expense		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Transfer by sale or lease, or transfer to an outside federal agency		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Subtotal of Excess Facility Area Eliminated		**-**	**-**	**-**	**10,275**	**-**	**6,189**	**-**	**19,088**	**7,176**	**10,176**	**-**	**-**	**-**	**-**
Total Area to be Eliminated Each Year (Demolition, Sale or Transfer Completion Year)		**44,775**	**-**	**20,664**	**10,275**	**15,200**	**6,189**	**-**	**19,088**	**133,703**	**10,176**	**-**	**-**	**-**	**-**
Building 77 - Utility Building	FN3100/39KG01				1,750										
Building 64 - Construct New Biosciences Lab Space	GPPPLANDLD	1,200													
Molecular Foundry	MFCON02/39KC02			95,692											
Building 74 - Construct Replacement Animal Housing Facility	GPPPLANDLD				7,100										

	Project Number	Gross Building Area	2004 Approp. ($000)	2005 Approp ($000)	2006 Budget ($000)	2007 Budget ($000)	2008 Budget ($000)	2009 Budget ($000)	2010 Budget ($000)	2011 Budget ($000)	2012 Budget ($000)	2013 Budget ($000)	2014 Budget ($000)	2015 Budget ($000)	2016 Budget ($000)
User Support Building	USERSUPPT							30,000							
Genomics: GTL Facility									150,000						
Ultrafast Science Facility															
Site - Construct Sensitive Instrument Facility	GPPPLANDLD														
Total Area to be Added by GPP, IGPP, and LI Construction (List Area Under Occupancy Year)		**1,200**	**-**	**95,692**	**8,850**	**-**	**-**	**30,000**	**150,000**	**-**	**-**	**-**	**-**	**-**	**-**

Integrated Facilities and Infrastructure Budget Data Sheet (IFI)	**Project Number**	**Gross Building Area**	**2004 ($000)**	**2005 ($000)**	**2006 ($000)**	**2007 ($000)**	**2008 ($000)**	**2009 ($000)**	**2010 ($000)**	**2011 ($000)**	**2012 Budget ($000)**	**2013 Budget ($000)**	**2014 Budget ($000)**	**2015 Budget ($000)**	**2015 Budget ($000)**
SITE NAME: Lawrence Berkeley National Lab (LBNL)															
Third Party Funded Construction of New Buildings															
Berkeley Lab Guest House		21,000			1,400	5,000	1,000								
Computational Research and Theory Facility		150,000			2,500	4,500	35,000	48,000							
Nano Physics Research Laboratory		100,000				5,000	5,000	35,000	50,000						
Subtotal Third Party Funded Construction of New Buildings:		**271,000**	**-**	**-**	**3,900**	**14,500**	**41,000**	**83,000**	**50,000**	**-**	**-**	**-**	**-**	**-**	**-**

Appendix 7. LABORATORY SPACE DETAIL

Building Number	Gross Square Feet	Animal Housing	Comp Room	Dry Lab	Heavy Lab	Misc	Office	Shop	Storage	Wet Lab
002	85,761			5,941		2,226	16,132	1,632	1,221	21,813
002A	182								182	
004	10,176					346	5,941		18	
005	7,176			1,492		21	2,280		447	1,079
006	118,573		429	422	79,475	2,754	10,151		136	5,900
007	21,432					1,345	8,481		8,179	
007A	128								106	
010	15,200		509	519	723	160	2,474	6,178	340	1,792
013A	76					67				
013B	76					67				
013C	76					67				
013D	76					67				
013E	68					60				
013F	36					25				
013H	90					78				
014	4,201			170		914	1,572		210	817
016	11,808			1,780	2,799	14	429	1,851	610	839
016A	339								319	
017	2,222						263	1,651	186	
025	20,304			81		187	1,119	10,772	1,290	3,933
025A	7,548			108		563	1,218	3,921		
025B	360								322	
026	10,563					2,353	2,733		658	1,331
027	3,299			1,763	431		167	553	177	
028	544					495				
031	7,327			7,327						
033A	52					44				
033B	94					89				
033C	80					68				
034	5,163				673					
036	880					839				
037	5,833									
040	993								925	
041	995					140	182	332	273	
043	1,020									
044	805						688			
045	3,342					3,169				
046	60,363		2,241	5,650		938	19,857	5,319	907	
046A	5,564					72	3,747			
047	6,242					24	4,366			
048	6,622					2,024	1,983			
050	48,698		133	4,529		8,631	18,916	873	212	771

Building Number	Gross Square Feet	Animal Housing	Comp Room	Dry Lab	Heavy Lab	Misc	Office	Shop	Storage	Wet Lab
050A	66,477		3,058	2,769		4,448	26,617		308	
050B	63,561		12,881	2,752		2,837	22,642		398	
050C	2,768					64	1,947			
050D	4,959		119			48	3,268			
050E	10,560		355				6,799		727	
050F	9,443					1,008	4,785			
051	96,566			4,756	23,036	46,474	4,502	755	2,403	
051A	28,462				21,644	1,754			1,773	
052	6,425			173	4,422			292	636	
052A	516								489	
053	6,944			133		17	795	5,097	355	
054	15,428					11,343	99		838	
054A	195					169				
055	19,048		266	1,805		97	6,113	427	210	4,236
055A	1,535			1,275					25	
055B	209									
056	1,782				540					771
058	10,279					224	1,512	6,534	318	
058A	12,653			4,085	6,586					
060	3,615				3,494					
061	323								286	
062	55,902		101	2,922	2,251	2,335	7,785	5,210	677	14,479
062B	169									
063	2,696						117	2,390	103	
064	28,190		175	3,841	2,269	440	5,760	793	1,300	5,479
065	3,423					59	1,716			
066	44,134			192		3,512	8,473		361	13,517
068	500									
069	20,709		290			1,515	6,306	131	7,490	
070	63,550			7,356	307	1,838	13,364	433	1,179	19,928
070A	67,741			7,890		1,163	11,335		661	23,489
070B	382									
071	53,739		2,135	2,901	14,937	3,580	10,962	2,725	1,092	
071A	4,104				3,842		63			
071B	6,892					59	2,017	2,517		
071T	949			480						
072	5,352			1,398		213	1,240			449
072A	2,532				2,334					
072B	4,413			70	3,673					
072C	8,392		412	1,383		278	2,165		379	758
073	4,228			1,029		30	1,465	393	233	191
073A	403				2,334					
074	45,382	5,581	542	2,677		665	5,153		659	14,175
074F	1,560	1,432								

Building Number	Gross Square Feet	Animal Housing	Comp Room	Dry Lab	Heavy Lab	Misc	Office	Shop	Storage	Wet Lab
075	8,495		317	214		262	1,723		109	3,944
075A	4,000			1,220					2,737	
075C	450					92	3,374			
075D	1,895			291					1,466	
076	31,639			891		527	4,787	15,459	5,625	
077	68,937					411	5,857	48,714	3,701	
077A	12,118				2,487	1,256	76	7,482	23	
077H	576							527		
078	5,391								4,988	
079	4,564						100	3,883	286	
080	29,931		1,102	3,529	1,381	1,100	6,501	4,428	1,286	3,003
080A	960						898			
081	1,129								1,110	
082	537									
083	6,856			558		37	1,268		258	2,675
084	55,031		138	3,600		2,144	6,706	308	557	11,340
084B	1,633									
085	15,405			769		4,825	960		301	2,124
085A	885								834	
088	53,864		320	204	16,742	690	10,798	4,095	3,018	1,269
088D	265									
090	89,233		903			5,370	52,900		1,193	

TRAILERS

Building Number	Gross Square Feet	Animal Housing	Comp Room	Dry Lab	Heavy Lab	Misc	Office	Shop	Storage	Wet Lab
007C	479						384			
010A	242									
029A	1,751									
029B	1,440									
029C	1,440									
029D	276									
031A	623						560			
031B	157								148	
031C	157								148	
044A	481						438			
044B	1,441						1,137			
046B	1,239						994			
046C	1,029						733			
046D	771						723			
048A	320								296	
051F	1,499		449	925						
053B	519						418			
062A	1,238						1,032			

Building Number	Gross Square Feet	Animal Housing	Comp Room	Dry Lab	Heavy Lab	Misc	Office	Shop	Storage	Wet Lab
064B	480						437			
065A	1,453					129	1,011		9	
065B	1,020						970			
067B	1,238			473			580		134	
067C	1,237			1,186						
070E	432								396	
070G	173								157	
071C	511						324			
071D	520						489			
071E	513									
071F	516						475			
071G	517			470						
071J	1,289						1,058			
071K	474						439			
071P	511						480			
071Q	357									
075B	4,640					92	3,374			
075E	410						385			
076K	371						292			
076L	1,439						1,356			
083A	507						279		185	
085B	3,601					71	2,288		12	
090B	1,443						1,160			
090C	1,193						916			
090F	2,462						1,824			
090G	1,853					83	1,348			
090H	1,849						1,428			
090J	2,846						2,168			
090K	2,846						2,078			
090P	2,129						1,611			
090Q	425									
090R	160									

Note: Includes Buildings 31 and 71T (non-DOE SC facilities per FIMS)

Appendix 8. OFFSETTING SPACE AT BERKELEY LAB

	New Construction	Demolition	Running Total
2002			
29		10,567	-10,567
51G		1,440	-12,007
51Q		2,977	-14,984
44D		205	-15,189
67D		130	-15,319
53A		192	-15,511
45A		128	-15,639
2002 Subtotal		15,639	
2003			
71H		1,424	-17,063
51N		645	-17,708
2003 Subtotal		2,069	
2004			
LEHR Space, Davis, CA		79,891	-97,599
51B		43,911	-141,510
51L		864	-142,374
2004 Subtotal		124,666	
2005			
Bldg. 25		20,304	-160,628
Bldg 29D		276	-160,904
2005 Subtotal	2,050	20,580	
2006			
Animal Colony (near 85B)	7,100		-149,404
Utility Bldg (near 77)	1,750		-147,654
Molecular Foundry	95,692		-51,962
Bldg. 25A		7,548	-59,510
Bldg. 44		805	-60,315
Bldg. 44A		481	-60,796
Bldg. 44B		1,441	-62,237
Bldgs. 29A-29C		4,631	-68,367
73A		403	-68,770
2006 Subtotal	108,942	16,808	

	New Construction	Demolition	Running Total
2007			
Bldg. 14		4,201	-72,971
Bldg. 40		993	-73,964
Bldg. 41		995	-74,959
2007 Subtotal		6,189	
2008			
Bldg. 72 TEAM Microscope Space	850		-74,109
Bldg. 10		15,200	-89,309
2008 Subtotal	850	15,200	
2009			
User Support Building	30,000		-59,309
Bldg. 52		6,425	-65,734
Bldg. 52A		516	-66,250
2009 Subtotal		6,941	
2010			
51F		1,499	-67,749
Bldg. 16		11,808	-78,058
Bldg. 16A		339	-78,397
2010 Subtotal		12,147	
2011			
Bldg. 51		96,566	-174,963
Bldg. 51A		28,462	-203,425
Bldg. 5		7,176	-210,601
2011Subtotal		132,204	
2012			
GTL Facility	150,000		-60,601
Bldg. 4		10,176	-70,777
2012 Subtotal	150,000	10,176	
2013			
Ultrafast Science Facility	40,000		59,223
2013 Subtotal	40,000	0	

Appendix 9. Projects That Add or Demolish Space

Project *Page*

Project Name

Molecular Foundry

Project Description

A new building. This is a funded project.

The Molecular Foundry Building will include state-of-the-art materials characterization, manipulation, and synthesis laboratories for studies of matter of nanometer dimensions. At this size, materials display unexpected properties that can be exploited in designing materials and devices with previously unattainable and highly desirable characteristics. These materials and devices will have major applications in energy technologies and protection of the environment.

Funding Source

MFCON02/39KC02

Funding Program

BES

Space to Be Added

95,692 GSF

Space to Be Removed by Project (if any)

None

Difference in Demolition and Addition

95,692 GSF

Fiscal Year Construction is Expected to Start

Construction started FY2004

Fiscal Year Construction is Expected to End

FY2006

Project Name

Demolition of Building 51 Complex

Project Description

Building demolition.

The Laboratory has proposed dismantling, decontaminating as required, and demolishing the Building 51 Bevatron Complex. The work includes removal of the accelerator, shielding, buildings, related structures, and surface foundation. This site would then be available to meet DOE's emerging scientific mission needs. The abandoned Bevatron accelerator cannot be adaptively reused and should be removed. The Bevatron comprises 172,000 GSF of Laboratory space. Until recently, the Bevatron complex had been largely abandoned. DOE has now agreed to fund, pursuant to the completion of environmental documentation, a multi-year demolition program that will result in the accelerator and all related buildings being demolished by 2010/2011 at proposed funding levels. This project will create a 4.4-acre development site for new buildings.

Funding Source

B51DEMOSLI

Funding Program

SC-32

Space to Be Added

None

Space to Be Removed by Project (if any)

126,527 GSF

Difference in Demolition and Addition

(126,527) GSF

Fiscal Year Construction is Expected to Start

FY2006

Fiscal Year Construction is Expected to End

FY2011

Project Name

User Support Building

Project Description

A new building.

The new User Support Building will provide critically needed modern research support space for users of the Advanced Light Source (ALS) and other national user facilities. The building will support research in all disciplines, including condensed matter physics, chemistry, materials, environmental and earth sciences, biology, atomic and molecular physics, plasma sciences, and nanosciences.

The new multi-use structure includes a high bay for assembly of experimental apparatus, a modern analytical laboratory, and office space to support a projected 2,000+ scientific facility users. This space will support activities to prepare experiments and other critical, short-term, high-activity work. Demolition of substandard space and improved productivity combine for a payback of approximately seven years.

This new 30,000 GSF building will replace Building 10, a wooden 15,200 GSF structure constructed as a service building during World War II that contains structural and life-safety elements that restrict use. Building 10 cannot be cost-effectively upgraded to serve modern science requirements. The estimated cost is $21 million. This project is on track for a FY-2007 project start.

Funding Source

USERSUPPT

Funding Program

BES

Space to Be Added

30,000 GSF

Space to Be Removed by Project (if any)

15,200 GSF

Difference in Demolition and Addition

14,800 GSF

Fiscal Year Construction is Expected to Start

FY2007

Fiscal Year Construction is Expected to End

FY2010

Project Name

Building 77—Utility Building

(included in Building 77 Rehabilitation of Building Structure and Systems, Phs. 2; SLI Line Item Project)

Project Description

This project adds a new utility building as part of a larger Line Item Project. A funded project.

Building 77 is a 69,000 GSF building, originally constructed in 1963, housing the Engineering Division. This facility serves as the primary design and machine works for LBNL. Building 77 also constructs instruments complex-wide for DOE, including, for example, the front end equipment for the Spallation Neutron Source (Oak Ridge) and the ATLAS detector at the Large Hadron Collider (CERN).

Fabrication and assembly of these increasingly precise and sensitive instruments requires the engineers to reduce the effects of temperature, vibration, and magnetic field as much as possible. This project would relocate and consolidate utility equipment, currently located in several locations within Building 77, on the roof of Building 77, and mounted on concrete pads adjacent to the building, to a new separate building outside and adjacent to the existing Building 77. This relocation will reduce the effects of temperature, vibration, and magnetic field on the precise fabrication and assembly work in Building 77. It will also allow replacement of existing 1960s-era mechanical and electrical equipment, which is expensive to maintain and operate, with new, higher efficiency, more reliable building mechanical and electrical equipment.

Funding Source

FN3100/39KG01

Funding Program

SC-32

Space to Be Added

1,750 GSF

Space to Be Removed by Project (if any)

None

Difference in Demolition and Addition

1,750 GSF

Fiscal Year Construction is Expected to Start

FY2003

Fiscal Year Construction is Expected to End

FY2007

Project Name

Genomes to Life Facility

Project Description

A new building.

To understand the basic biology of microbial systems and to restore contaminated environments, Berkeley Lab is working toward an integrated program of environmental microbiology, functional genomic measurement, and computational analysis and modeling. The Berkeley Lab Genomes to Life (GTL) effort is working to establish high-throughput protein complex characterization, functional genomics and metabolomics, and computational facilities to build and test accurate predictive cell models of regulatory networks' responses to stress. To better understand and engineer microbial systems and restore contaminated sites, advanced computational models of the organisms will be developed that agree with observations. The Laboratory is currently considering the facilities required to best apply the Laboratory's GTL strengths and capabilities to serving DOE and national needs in the era of systems biology.

Funding Source

N/A

Funding Program

BER

Space to Be Added

150,000 GSF

Space to Be Removed by Project (if any)

None

Difference in Demolition and Addition

150,000 GSF

Fiscal Year Construction is Expected to Start

FY2008

Fiscal Year Construction is Expected to End

FY2010

Project Name

Ultrafast Science Facility

Project Description

A new building.

The Ultrafast Science Center will establish a user facility that buildings upon Berkeley Lab research that is internationally recognized, providing greater access to this research and facilities to support work by a users from across the nation. This 40,000 gsf building in conceptual at this point.

Funding Source

N/A

Funding Program

BES

Space to Be Added

40,000 GSF

Space to Be Removed by Project (if any)

None

Difference in Demolition and Addition

40,000 GSF

Fiscal Year Construction is Expected to Start

FY2010

Fiscal Year Construction is Expected to End

FY2013

Project Name

Building 64—Construct New Biosciences Lab Space

Project Description

New space created within a building.

Building 64 is a two story, 30,000 GSF building, constructed in 1951. Building 64 is approximately 1/3rd office space, 1/3rd lab space, and 1/3rd highbay space. The majority of the highbay spaces no longer meets the program requirements of the Life Science Division that occupies the space.

This project will convert the two story clear floor to ceiling height highbay bay space bay '3' into two one story Genome sequencing labs. The *Drosophila* project currently occupies the majority of the space in the rest of building 64.

Funding Source

GPPPLANDLD

Funding Program

HEP

Space to Be Added

1,200 GSF

Space to Be Removed by Project (if any)

None

Difference in Demolition and Addition

1,200 GSF

Fiscal Year Construction is Expected to Start

Construction started FY2004

Fiscal Year Construction is Expected to End

Construction completed FY2004

Project Name

Environmental Monitoring Sample Prep and Equipment Storage Trailer

Project Description

A new building.

LBNL has a DOE and State of California mandated program to monitor sewer discharges for certain chemicals and radiological compounds. This program is currently housed in space in Building 75D. The 75D facility is reaching the end of its design life, it can not be cost effectively renovated for continued use and still meet the programmatic requirements in the future. The life-cycle cost analysis indicates that a new 960 GSF facility to house the program would be the best investment.

Funding Source

GPPPLANDLD

Funding Program

HEP

Space to Be Added

960 GSF

Space to Be Removed by Project (if any)

None - One other additional program currently located in 75D will have to be relocated in order to allow for demolition of this facility. Plans to relocate that program will need to be finalized before a demolition date can be set. Therefore the 75D building total 1900 GSF is not being counted as demolished.

Difference in Demolition and Addition

960 GSF

Fiscal Year Construction is Expected to Start

FY2010

Fiscal Year Construction is Expected to End

FY2010

Project Name

Building 72A—Forefront Electronic Microscope Building Addition

Project Description

A building addition.

The National Center for Electron Microscopy is continually updating its capabilities with plans and developments for new instrumentation, research, expertise and outreach to its user community. Systems are being developed to allow scientists to go from viewing atom columns to viewing individual atoms, from two-dimensional to 3D images, and from static to real-time observations.

The original Building 72, built in 1961, is a one-story wood structure. The 72C addition was built in two increments, in 1982 and 1996. The project will add two state-of-the-art microscope rooms on the north side of Building 72. The addition will be a one-story structure of approximately 700 GSF. The exterior will match the appearance of the existing north facade of Building 72 with painted concrete block walls, blue corrugated metal fascia, and a flat roof with single-ply roofing. Interior finishes will match finishes in the 1996 72C addition. Each microscope room will have an isolated slab and built-in trenches for cable connections from the back service rooms, matching existing installations in microscope rooms in the 72C addition.

Funding Source

GPPPLANDLD

Funding Program

HEP

Space to Be Added

850 GSF

Space to Be Removed by Project (if any)

None

Difference in Demolition and Addition

850 GSF

Fiscal Year Construction is Expected to Start

TBD

Fiscal Year Construction is Expected to End

TBD

Project Name

Building 74—Construct Replacement Animal Housing Facility

Project Description

A new building.

The Animal Care Facility (ACF) would house existing animal housing, feeding, and some research functions primarily for laboratory mice and rats at LBNL. These functions are currently carried out in Building 74 in outdated 1960's facilities. The ACF would be a 7,100 GSF one-story building. The proposed site is currently not occupied by any building and no demolitions would be necessary. Space vacated in Building 74 would need to be renovated to address building code and seismic issues before being returned to the Life Sciences Division for use as either office or lab space.

Funding Source

GPPPLANDLD

Funding Program

HEP

Space to Be Added

7,100 GSF

Space to Be Removed by Project (if any)

None

Difference in Demolition and Addition

7,100 GSF

Fiscal Year Construction is Expected to Start

FY2006

Fiscal Year Construction is Expected to End

FY2007

Project Name

Building 72—Provide Space for the TEAM Microscope and User Interface

Project Description

A new building.

The Transmission Electron Aberration-corrected Microscope (TEAM) is a new instrument to be installed at the National Center for Electron Microscopy (NCEM) Building 72 complex. This new equipment and additional space would support aberration-correction devices for electron-beam instruments. These unique atomic-scale imaging tools observe and define the quantum mechanical boundary conditions, and are essential to the electronic structure calculations required to understand how nanostructures work.

The original Building 72 is a one story wood structure built in 1961. The 72C addition was built in two increments, in 1982 and 1996. The project will construct a two-story addition replacing a portion of the west wing of the original Building 72, locate the microscope in a new building in the Building 72 parking lot, or site the microscope in Building 72A. It will house the state-of-the-art Transmission Electron Aberration-corrected Microscope (TEAM) and two electronic microscopes on the first floor, and offices on the second floor.

The new office floor will be contiguous with the first floor of Building 72. The lower floor, housing microscopes, will be partially recessed in to the hill. It will be accessible by stairs, and a ramp for equipment and handicapped access. In exterior appearance and in interior finishes the new addition will match the appearance of the 72C addition. Each microscope room will have an isolated slab and built-in trenches for cable connections from the back service room to the microscope, matching existing installations of microscope rooms in the 72C addition. The new construction will comply with latest building, seismic, and fire codes.

Funding Source

GPPPLANDLD

Funding Program

HEP

Space to Be Added

TBD

Space to Be Removed by Project (if any)

TBD

Difference in Demolition and Addition

TBD

Fiscal Year Construction is Expected to Start

FY2006

Fiscal Year Construction is Expected to End

FY2008

Project Name

Building 58A—Extension

Project Description

An addition to a building.

Building 58A is a 13,000 GSF two story Accelerator and Fusion Research Division facility built in 1969. It is primarily used by the superconducting magnet program. The program works to advance the state of the art in superconducting material, forming it into cable, and designing and building magnets, while emphasizing cost-effective approaches to conductor and magnet fabrication techniques. This additional space would extend the existing equipment room 104 and allow the program to test greater intensity and higher tesla superconductors magnets.

Funding Source

GPPPLANDLD

Funding Program

HEP

Space to Be Added

500 GSF

Space to Be Removed by Project (if any)

None

Difference in Demolition and Addition

500 GSF

Fiscal Year Construction is Expected to Start

FY2008

Fiscal Year Construction is Expected to End

FY2009

Project Name

Site—Construct Sensitive Instrument Facility

Project Description

Two new buildings

As researchers increase their ability to detect, manipulate, and/or measure smaller objects and fainter phenomena, it becomes increasingly important to develop research space as free of external influence or bias as possible. The Sensitive Instrument Facilities (or "Pods") are designed to minimize the effect of such external influences as cosmic background radiation, stray electromagnetic fields, equipment vibration, temperature, air pressure, etc. on the accuracy of measurement in scientific research. The Pods would be used in a cross-disciplinary fashion by all the various research functions at Berkeley Lab. The 3 to 5 scientists using each Pod would be expected to also have offices and/or regular laboratories elsewhere at Berkeley Lab in existing buildings.

The pods would be two individual one-story structures. Each structure is planned at about 1,000 GSF for a combined space of 2,000 GSF. Most of the building would be built underground, or covered over with earth after construction. Floor-to-ceiling heights would be up to 25 feet. The proposed sites are currently not occupied by any building and no demolitions would be necessary.

Funding Source

GPPPLANDLD

Funding Program

HEP

Space to Be Added

2,000 GSF

Space to Be Removed by Project (if any)

None

Difference in Demolition and Addition

2,000 GSF

Fiscal Year Construction is Expected to Start

FY2015

Fiscal Year Construction is Expected to End

FY2016

Project Name

Buildings 25, 25B—Removal and Surface Site Remediation

Project Description

Building demolition.

Building 25 is a 20,306 GSF two story facility built in 1947. It is currently partially occupied by the LBNL Engineering Division. Building 25B is a 360 GSF one story facility built in 1963. It is a waste treatment unit in support of Building 25 programs. Building 25 has life/ safety building code and seismic deficiency issues. The halogenated hydrocarbons in the groundwater below B25A are not addressed in this project.

Funding Source

OLDTOWNDEMO

Funding Program

SC-32

Space to Be Added

None

Space to Be Removed by Project (if any)

20,664 GSF

Difference in Demolition and Addition

(20,664) GSF

Fiscal Year Construction is Expected to Start

FY2005

Fiscal Year Construction is Expected to End

FY2005

Project Name

Buildings 44, 44A, 44B—Removal and Surface Site Remediation

Project Description

Building demolition.

Building 44 is a 800 GSF single story facility constructed in 1956. B44A is a 480 GSF single story office trailer constructed in 1979. B44B is a 1440 GSF single story office trailer also constructed in 1979.

Funding Source

OLDTOWNDEMO

Funding Program

SC-32

Space to Be Added

None

Space to Be Removed by Project (if any)

2,720 GSF

Difference in Demolition and Addition

(2,720 GSF)

Fiscal Year Construction is Expected to Start

FY2006

Fiscal Year Construction is Expected to End

FY2006

Project Name

Buildings 14, 40, 41—Removal and Surface Site Remediation

Project Description

Building demolition.

Building 14 is a 4,200 GSF one story facility constructed in 1944. Building 14 has occupants from several research divisions. Building 40 is a 950 GSF single story facility constructed in 1947. Building 40 is occupied by the Facilities Division. Building 41 is a 995 GSF single story facility constructed in 1948. Building 41 is occupied by the facilities division. All three buildings are currently occupied. All three buildings have reached the end of their design life and are not cost effective to renovate for future use.

Funding Source

OLDTOWNDEMO

Funding Program

SC-32

Space to Be Added

None

Space to Be Removed by Project (if any)

6,189 GSF

Difference in Demolition and Addition

(6,189) GSF

Fiscal Year Construction is Expected to Start

FY2007

Fiscal Year Construction is Expected to End

FY2008

Project Name

Buildings 16, 16A, 52, 52A—Removal and Surface Site Remediation

Project Description

Building demolition.

Building 16 is a 11,800 GSF two story facility constructed in 1943. It is primarily occupied by the Accelerator and Fusion Research Division. Building 16A is a 340 GSF single story facility constructed in 1960. Building 52 is a 6,500 GSF single story facility constructed in 1943. Building 52 is a 520 GSF single story facility constructed in 1961. It is primarily occupied by the Accelerator and Fusion Research Division. Building 16 and 16A have reached the end of their design life and are not cost effective to renovate for future use.

Funding Source

OLDTOWNDEMO

Funding Program

SC-32

Space to Be Added

None

Space to Be Removed by Project (if any)

19,088 GSF

Difference in Demolition and Addition

(19,088) GSF

Fiscal Year Construction is Expected to Start

FY2009

Fiscal Year Construction is Expected to End

FY2010

Project Name

Building 5—Removal and Surface Site Remediation

Project Description

Building demolition.

Building 5 is a 7,200 GSF 2 story facility constructed in 1950.

Funding Source

OLDTOWNDEMO

Funding Program

SC-32

Space to Be Added

None

Space to Be Removed by Project (if any)

7,176 GSF

Difference in Demolition and Addition

(7,176) GSF

Fiscal Year Construction is Expected to Start

FY2010

Fiscal Year Construction is Expected to End

FY2011

Project Name

Building 4—Removal and Surface Site Remediation

Project Description

Building demolition.

Building 4 is a 10,200 GSF 2 story facility constructed in 1944.

Funding Source

OLDTOWNDEMO

Funding Program

SC-32

Space to Be Added

None

Space to Be Removed by Project (if any)

10,176 GSF

Difference in Demolition and Addition

(10,176) GSF

Fiscal Year Construction is Expected to Start

FY2011

Fiscal Year Construction is Expected to End

FY2012

Project Name

Buildings 51B (EPB Hall) and 51L—Removal

Project Description

Building demolition. This is a funded project.

Building 51B was a 44,800 GSF high bay facility constructed in 1962.

Funding Source

B51DEMOSLI

Funding Program

SC-32

Space to Be Added

None

Space to Be Removed by Project (if any)

44,775 GSF

Difference in Demolition and Addition

(44,775) GSF

Fiscal Year Construction is Expected to Start

Project started FY2003

Fiscal Year Construction is Expected to End

Project completed FY2004

Appendix 10. Scientific History of Berkeley Lab

A Physicist from the East*: Little did UC Berkeley Physics Chairman Robert Birge know that, in 1928, when he recruited a promising young assistant professor from Yale named Ernest Lawrence, he would be getting a whole lot more than an outstanding campus academician. He acquired someone who would lead a scientific revolution.*

The 1920s was a time when UC President Robert Gordon Sproul undertook the task of developing UC Berkeley into a major research university. Physics was an important part of this effort. Lawrence brought with him a vision of a new accelerator-based science founded on large-scale research activities. When he invented the cyclotron in 1929— a particle accelerator that would be used to reveal the inner workings of the atom—he initiated a dramatic growth of the discipline and equally dramatic discoveries about the nature of matter that would follow over the next few decades.

Lawrence's vision began to be realized in August 1931, when he received President Sproul's backing to use a surplus campus building to develop cyclotrons larger than his 5-inch prototype. The UC Radiation Laboratory eventually evolved into a single-purpose federal facility, and finally into today's multiprogram, interdisciplinary research center that is Berkeley Lab. Lawrence would also become the first of nine Nobel laureates who would conduct their work at the Laboratory.

In its first decade, the Radiation Laboratory outgrew its original building, extending into other campus buildings such as Crocker Hall, which housed the historic 60-inch Cyclotron. At the same time, the scope of the Laboratory's research was expanding to include a wider range of disciplines. In 1936, for example, John Lawrence, Ernest's brother, started a biomedical research program. He was the first to treat a leukemia patient with a radioactive isotope of phosphorous and used particle beams for radiation therapy, establishing the Laboratory as the birthplace of nuclear medicine and a center of biophysics and imaging research.

The Laboratory moved off the UC Berkeley campus to its present location in 1940, when ground was broken on Charter Hill for a 184-Inch cyclotron. Designed by Arthur Brown, architect of San Francisco's City Hall and Coit Tower, the domed building—now home to the Advanced Light Source—is an East Bay Hills landmark. It reinforces the visual axis, created by UC Berkeley campus architect John Galen Howard, that runs west through campus and aligns with the Golden Gate Bridge across the bay.

During World War II, the Charter Hill site became crowded with a number of hastily constructed temporary buildings as the Laboratory responded to national defense needs, developing machines for the electromagnetic separation of uranium isotopes as part of the Manhattan Project. Later development on the Hill would feature the construction of permanent concrete and steel-frame structures.

The Laboratory's civilian research program began in 1947 under the sponsorship of the Atomic Energy Commission and quickly began fielding new, more powerful particle accelerators and a broader base of research programs. Luis Alvarez' proton linear accelerator and the first electron synchrotron, invented by Edwin McMillan, appeared in 1948. The Bevatron, which followed in 1954, became the nation's leading high-energy physics facility, achieving distinction in 1956 with the discovery of the antiproton. In 1958, the Heavy Ion Linear Accelerator (HILAC) came on

line. It was later combined with the Bevatron to form the Bevalac, ushering in a new era of relativistic heavy-ion nuclear physics. The 88-Inch Cyclotron was completed in 1964 and remains in operation today as an important experimental facility in low-energy nuclear physics. During the 1950s and early 1960s, a number of permanent laboratory and office buildings were constructed to accommodate the growth in accelerator-related programs.

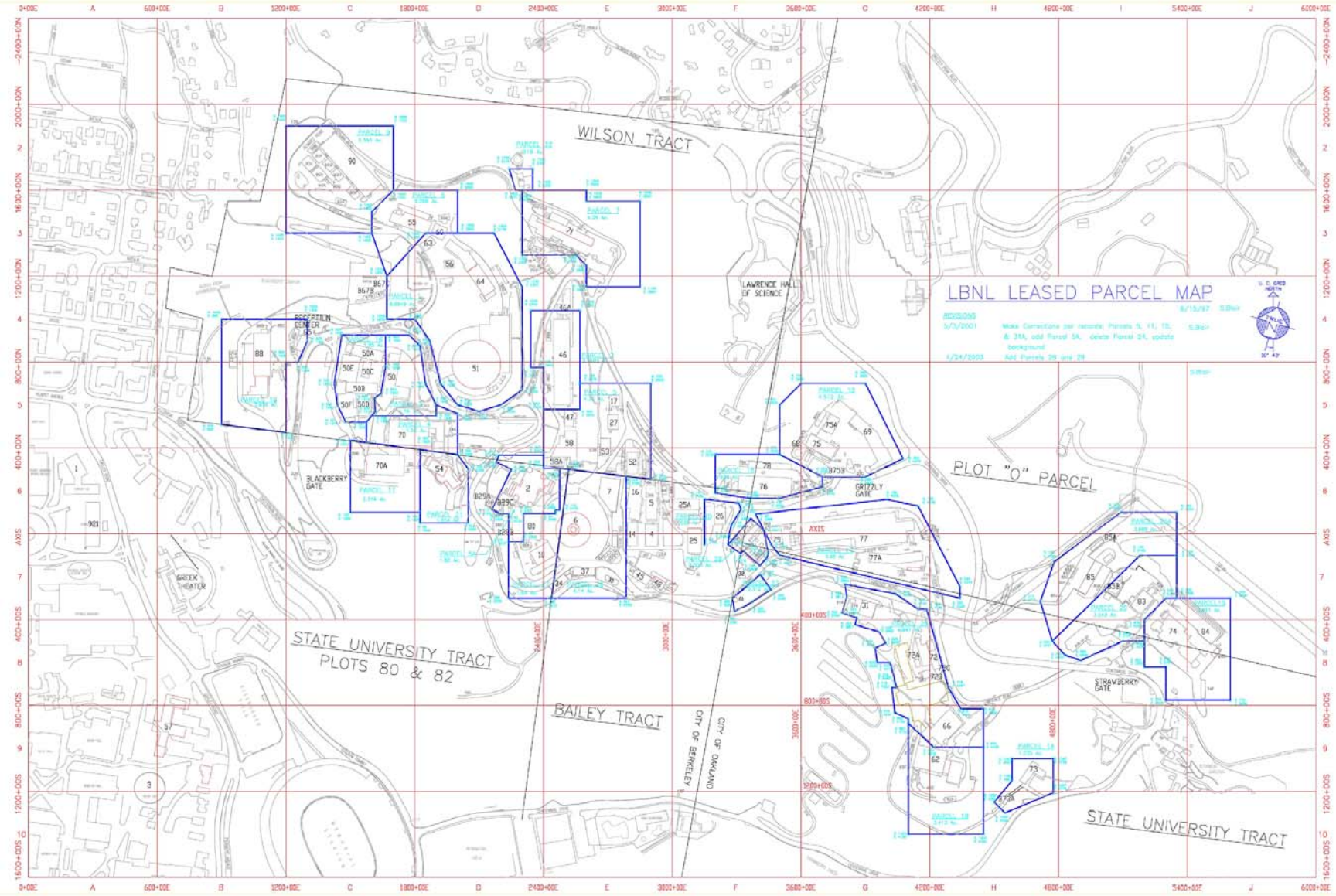
In the aftermath of the 1973 oil embargo, new research program growth targeted national energy supply and use. The Laboratory's population reached its high point in 1979 following the establishment of DOE, but no permanent buildings were constructed to accommodate this growth. Instead, temporary trailers were installed, existing spaces were adapted, and space was leased in Berkeley and Emeryville for research programs and support services.

By 1980, Berkeley Lab was a national laboratory with recognized expertise in a broad range of scientific areas, with high energy physics accounting for only 25 percent of the research, a dramatic change from the 75 percent it captured in 1970. With its research scope supporting DOE's science, energy, health, and environmental missions, as well as the scientific needs of other government agencies, the Laboratory emphasized energy, materials, and life sciences while maintaining historically important roles in high energy and nuclear physics. New national user facilities and modern research buildings were constructed. NCEM was completed in 1984, and the Surface Science and Catalysis, and Advanced Materials laboratories followed in 1988 and 1989, respectively. The ALS, which reused the renovated dome of the 184-Inch Cyclotron, was completed in 1993. The ALS, one of the world's brightest sources of x-ray and ultraviolet light, and NCEM serve scientists from around the world.

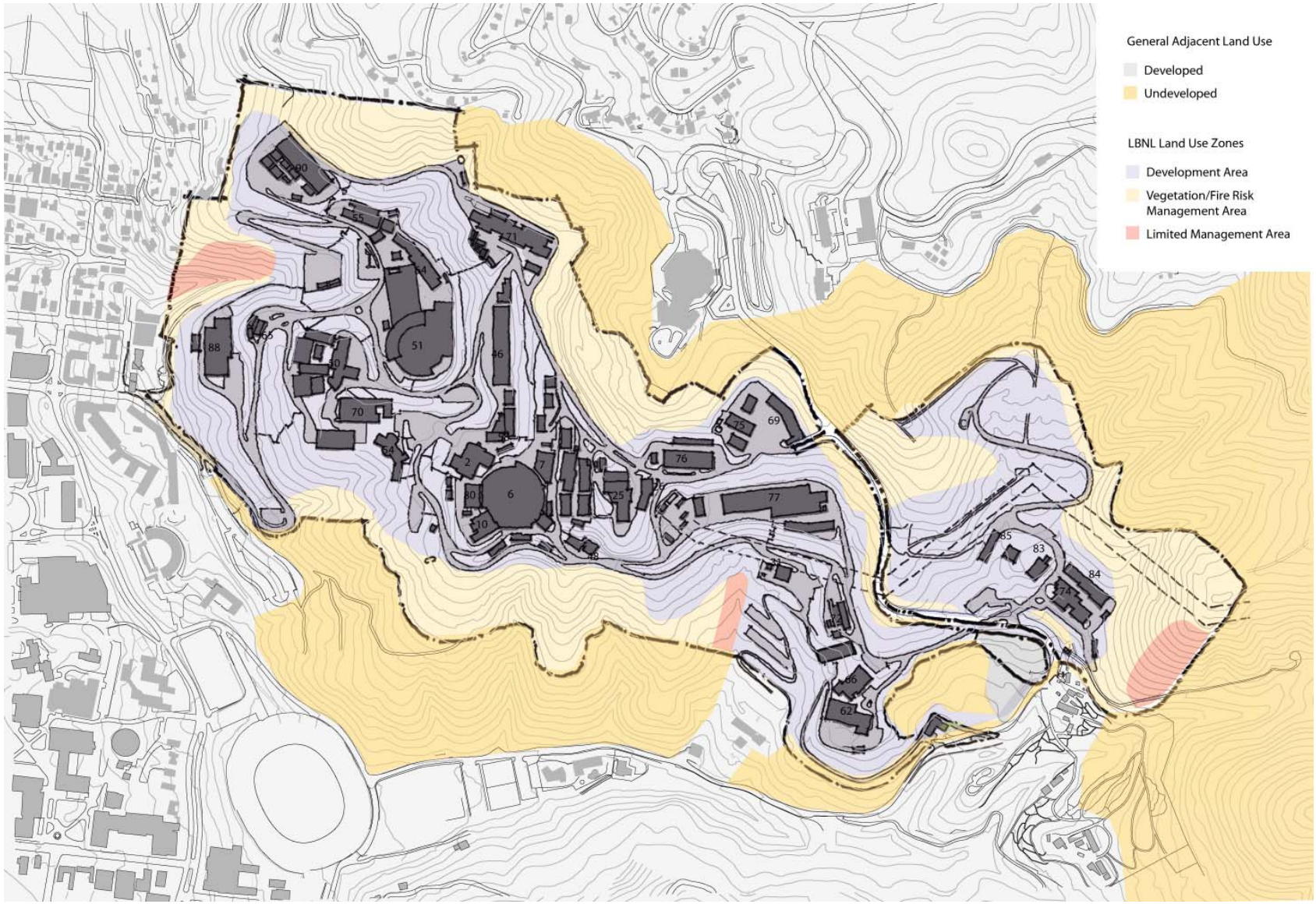
In the 1990s, DOE formulated plans for programs in genome sciences and computational sciences that built on Berkeley Lab's multidisciplinary capabilities. The Genome Sciences Building was completed in 1997 to serve DOE's national human genome program. In 1999, the Laboratory successfully adapted buildings in Walnut Creek to house the DOE Joint Genome Institute's (JGI) Production Sequencing Facility. Having successfully completed its sequencing task for the Human Genome Project, the three-laboratory JGI— composed of Berkeley along with Livermore and Los Alamos national labs— is now focused on efforts to sequence microbial genomes.

Berkeley Lab's computational sciences capability was greatly strengthened when the DOE National Energy Research Scientific Computing (NERSC) Center moved here in 1996, bringing with it one of the nation's most powerful unclassified supercomputers. NERSC enables sophisticated computer analysis of genomic, physics, materials science, and energy technology data, extending the reach of science to areas that had previously been inaccessible.

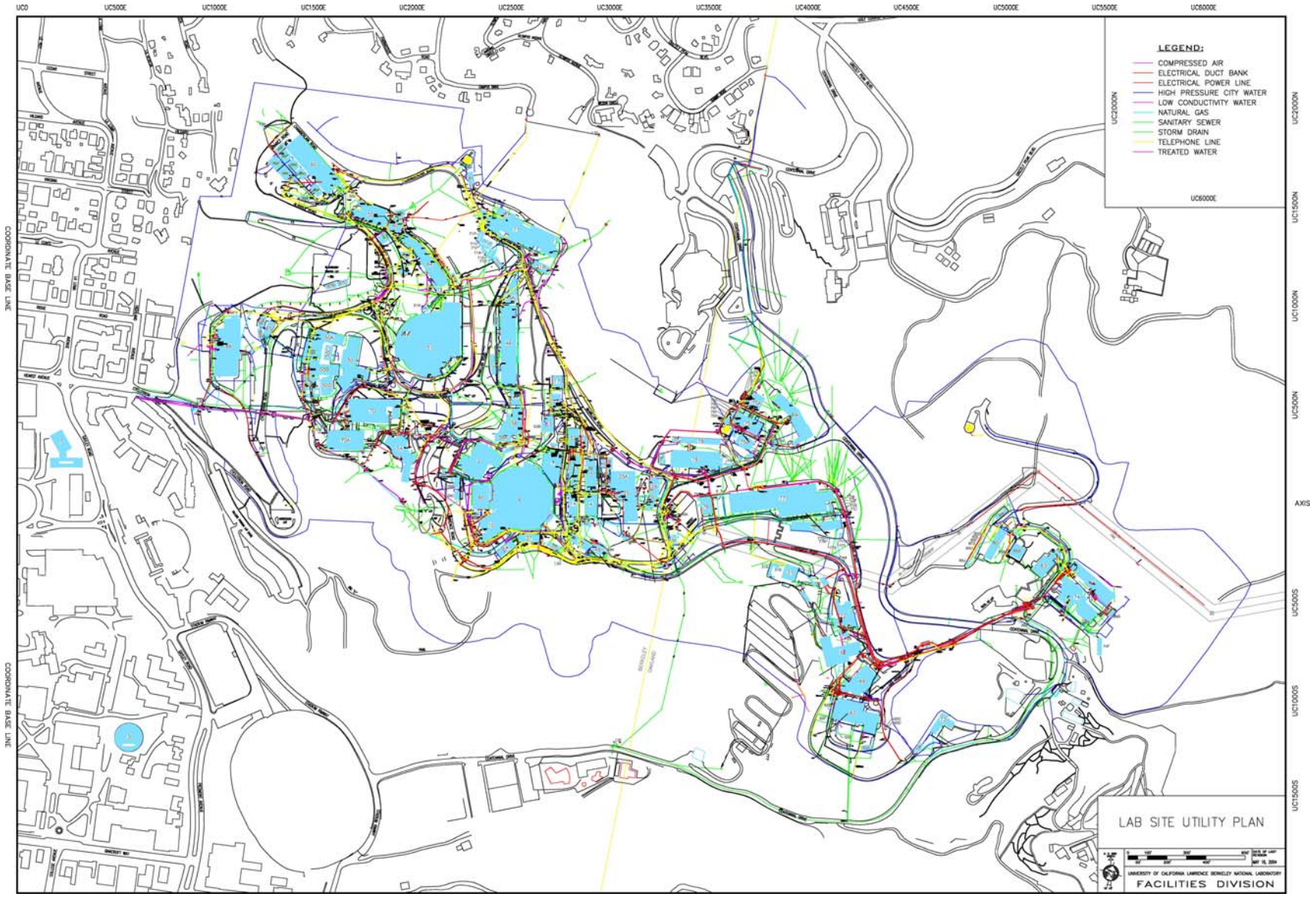
Appendix 11: PARCEL LEASE MAP



Appendix 12: LAND USE ZONES



Appendix 13: SITE UTILITY PLAN



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