

3.0 PROPOSED ACTION AND ALTERNATIVES

This section describes the U.S. Department of Energy's (DOE's) Proposed Action, and alternatives to the Proposed Action, including the No Action alternative. To satisfy the programmatic and space needs of the programs to be relocated and consolidated, the University proposed to construct a new building on the LBNL site. The construction of the new building would be a consequence of the DOE's Proposed Action. In order to evaluate and disclose all consequences of the Proposed Action, this Environmental Assessment (EA) presents not only the environmental effects from the relocation and consolidation of equipment and personnel but also from the construction, operation, and eventual removal of the building and equipment once the building and equipment reach the end of their useful lives. It should be noted that facility design and construction details described for the Proposed Action are based on conceptual plans. The final design and schedule as ultimately approved for construction may differ from that discussed within this EA. However, the nature, scope, and environmental impacts of the Proposed Action described in this document are expected to substantially reflect and bound those associated with actual construction and operation of the facility.

3.1 PROPOSED ACTION

3.1.1 Introduction

The Proposed Action comprises the following:

- Relocation of the NERSC national user facility from its existing location at the Oakland Scientific Facility (OSF), a leased building in downtown Oakland, to a new building on the LBNL site. OSF is a high-performance computing (HPC) facility for research sponsored by the DOE Office of Science. The facility houses some of the world's largest supercomputers and associated data storage systems. The Proposed Action would relocate some of the existing HPC systems and data storage systems from the OSF to a new building on the LBNL site. This relocation is necessary because the existing OSF would not have adequate space to accommodate two future NERSC supercomputing systems at one time and does not have adequate mechanical space and electrical service capacity to handle the growth in computing facilities that is projected for NERSC.
- Relocation and consolidation of ASCR-funded LBNL programs, (including personnel and equipment), which include NERSC and the Computational Research Division (CRD) of LBNL, in the same new building. In addition, the joint UC Berkeley/LBNL Computational Science and Engineering (CSE) program,¹ a related program that is focused on computational and computer science research, would use a small portion of the new building. The relocation and consolidation of NERSC, CRD, and CSE is proposed in order to centralize and co-locate all similar and related functions and programs to improve efficiency and productivity and foster intellectual exchanges. This would

¹ CSE is a UC Berkeley and LBNL collaborative program which is not ASCR funded but includes some UC Berkeley faculty, students and postdoctoral researchers who conduct research funded by ASCR.

involve relocating the offices of the CRD staff (about 165 persons) who are currently in the Building 50 complex on the LBNL site, NERSC staff at OSF (about 70 persons), and UC Berkeley/LBNL CSE staff (about 50 persons) into the new building.

- Relocation of LBNL staff from other buildings on the LBNL site into the space that would be vacated by the CRD staff in the Building 50 complex. This would involve moving the offices of approximately 165 persons from their current locations on the LBNL site into the Building 50 complex. This relocation is required to address the current overcrowding in the LBNL buildings. This backfilling of vacated space would not involve any new hires, and therefore the backfilling action will not increase LBNL site's on-site population.

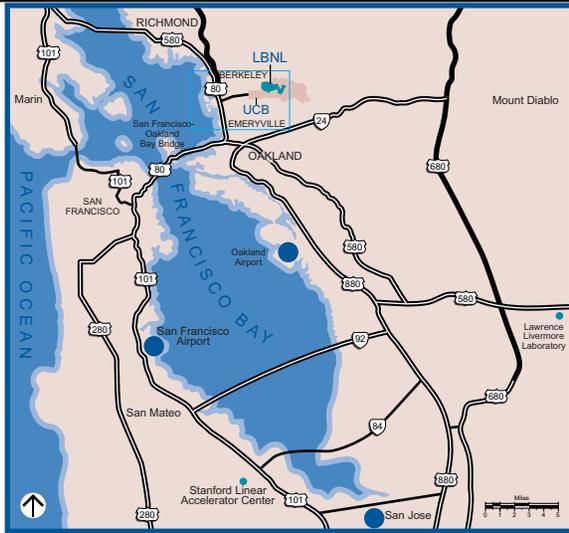
The new building to house these relocated programs and computational systems would be located in close proximity to the UC Berkeley campus to co-locate a portion of the joint LBNL/UC Berkeley Computational Science and Engineering (CSE) program² with NERSC and CRD; to foster interaction and collaboration between the NERSC staff and other LBNL and UC Berkeley researchers; and provide NERSC, CRD, and CSE staff with convenient access to other LBNL scientific facilities, programs, researchers, and services. The new multi-story building and associated infrastructure would be constructed and owned by the University of California (UC or the University) and would be called the Computational Research and Theory (CRT) facility. The facility would be operated and maintained by the University.

A small portion of the Proposed Action site is located within a parcel that is currently leased to the DOE. While the CRT building footprint is not within a DOE lease parcel, the fire truck access road and cooling tower pad would be located within a portion of Lease Parcel 11. The Proposed Action would include a parcel line adjustment to modify Lease Parcel 11.

3.1.2 Location and Existing Conditions

The LBNL site is situated in the eastern hills of the cities of Berkeley and Oakland in Alameda County; it is located on approximately 200 acres that are owned by the University of California, with parcels leased by the DOE (see **Figure 3.0-1, Regional Location Maps**). Existing buildings on the LBNL site are used for heavy equipment laboratories, wet and dry laboratories, office space, and other uses.

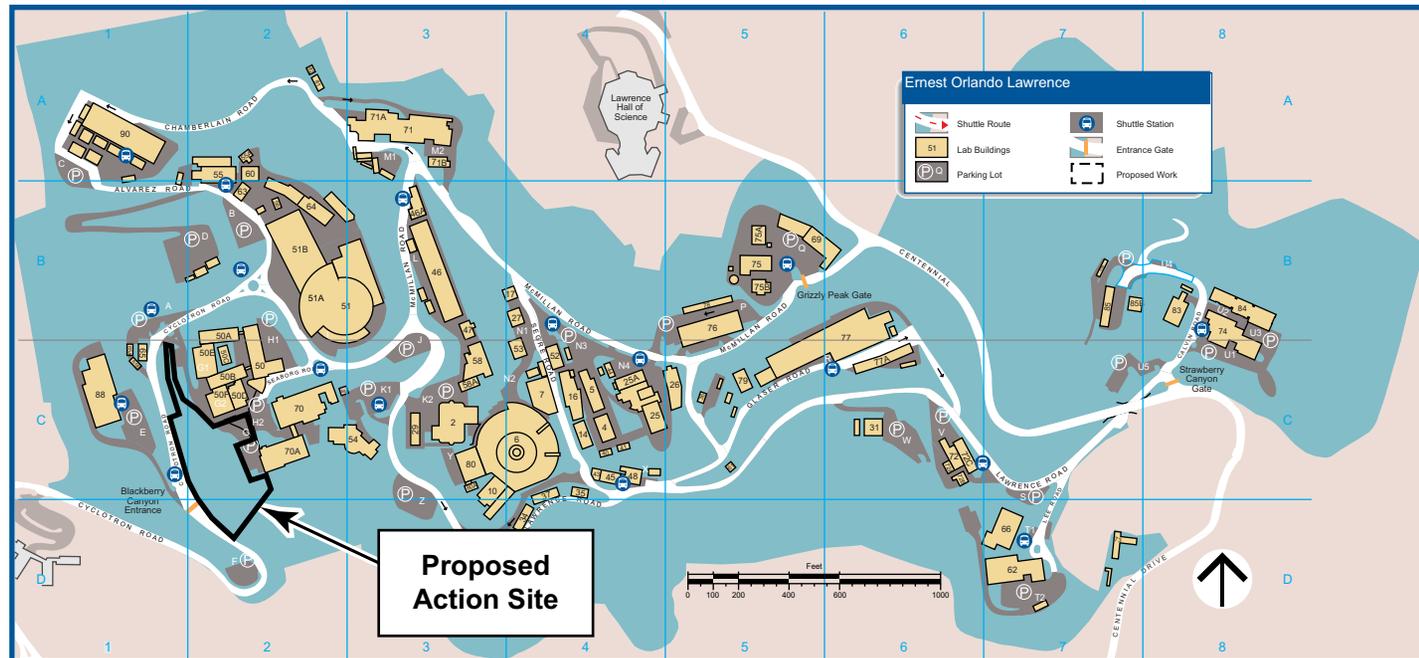
² CSE is a UC Berkeley and LBNL collaborative program that conducts research focused on computational and computer science areas. The program is not ASCR funded but includes some UC Berkeley faculty, students, and postdoctoral researchers who conduct research funded by ASCR.



LBNL Regional Location



LBNL Local Location



LBNL Site

NOT TO SCALE

SOURCE: Lawrence Berkeley National Laboratory, 2004

FIGURE 3.0-1

Regional Location Maps

The LBNL site is surrounded by a mix of land uses, including open space, institutional uses, and residential and neighborhood commercial areas. The main campus of the University of California, Berkeley (UC Berkeley) lies to the west, with other UC Berkeley lands, including the Strawberry Canyon open space areas, to the south and southeast of the LBNL site. Residential neighborhoods and a small neighborhood commercial area in the City of Berkeley lie to the north and northwest, and regional open space, including the Tilden Regional Park, lies to the east and northeast.

The 0.91-hectare (2.25-acre) site proposed for the CRT facility is located in the western portion of the LBNL site and is flanked on three sides by Buildings 70 and 70A to the east, the Building 50 complex to the north, and Cyclotron Road and the Blackberry Canyon entrance gate to the west (see **Figure 3.0-2, Approximate Proposed Action Site**). The Building 50 stairway currently provides pedestrian access from the Blackberry Canyon entrance gate to the Building 50 complex and Buildings 70/70A. The sloped terrain of the project site drops roughly 30 meters (100 feet) from east to west and is vegetated with approximately 75 eucalyptus and a few oak and bay trees. The site is located in an area known as Blackberry Canyon. The project site was chosen because it is in close proximity to the UC Berkeley campus. It has frontage on Chu Road and is within walking distance or a short shuttle bus trip of the Division of Mathematical and Physical Sciences and the Electrical Engineering and Computer Science Department on the UC Berkeley campus.

3.1.3 Proposed Building Design

The new three-story building would consist of an approximately 3,000 gross-square-meter (32,000-gross-square-foot [gsf]) HPC floor with a high ceiling and two additional floors of office space for a total of approximately 12,980 gross-square meters (139,700 gsf) of space. The HPC floor would be a contiguous largely column-free floor to maximize flexibility in siting future supercomputer systems and would have additional height for computer system cooling flexibility. The two floors above the HPC floor would provide a variety of general office, computer configuration and support, software support, videoconferencing, meeting and visualization laboratory spaces. The building would include common areas such as a main entrance plaza and a lower-level entry plaza. The building would be approximately 18–21 meters (60–70 feet) high. The design of the new facility is planned to be energy efficient. Please see **Figure 3.0-3, Site Plan**, and **Figure 3.0-4, CRT Facility Section**.

Although the entire building would be constructed in one phase of construction, approximately 950 square meters (approximately 10,000 square feet [sf]) of the HPC floor might be shelled (i.e., no interior improvements would be made initially) and not be used initially for installation of computing systems. The interior improvements in this shelled area would be made subsequently as and when additional computing systems are needed. The interior improvements to two upper floors of the building (which

would contain the offices) would be completed as part of the project construction, and the two floors would be fully occupied at initial occupancy of the building.

3.1.4 Landscaping and Tree Removal

The proposed project site would be landscaped consistent with LBNL design guidelines and standards. The landscaping would conform to and complement the existing character of planting in the project area, including the use of drought-tolerant and low water use plant materials and native trees. No lawn areas are proposed. The landscaping materials to be used in the project would also be reviewed by the LBNL Fire Marshal to ensure that fire fuel loads around the project site would not be increased as a result of project landscaping.

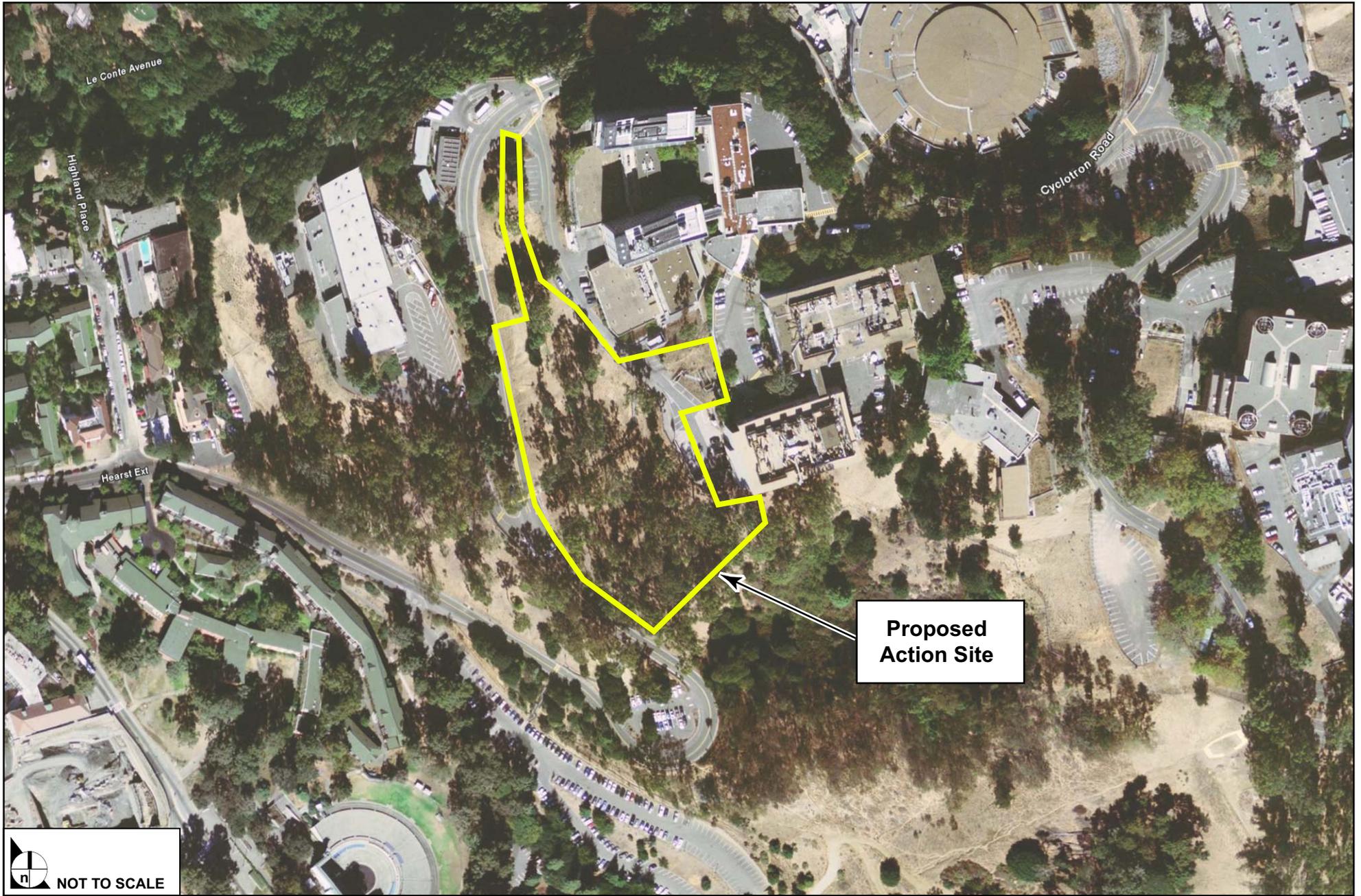
Approximately 75 trees, primarily eucalyptus, would be removed for the construction of the project. Removed trees requiring replacement under LBNL design guidelines and standards would be replaced on the project site or in other parts of the LBNL site at a 1:1 ratio.

3.1.5 Access and Parking

Automobile access to the project site would be via Cyclotron Road. Parking spaces for disabled guests' use only would be provided near the proposed building. Additional limited-time parking would be provided for use by delivery and maintenance vehicles. No general use parking would be included in the project for the occupants and visitors of the proposed building. These people would use existing parking lots on the LBNL site, including the Horseshoe parking lot (Lot F) to the south and Blackberry Canyon parking lot (Lot D) to the north. Bicycle parking spaces would also be included in the proposed facility. Final design of the CRT building shall provide a minimum of 32 bicycle parking spaces to further encourage bicycling and walking to the site.

3.1.6 Utilities and Infrastructure

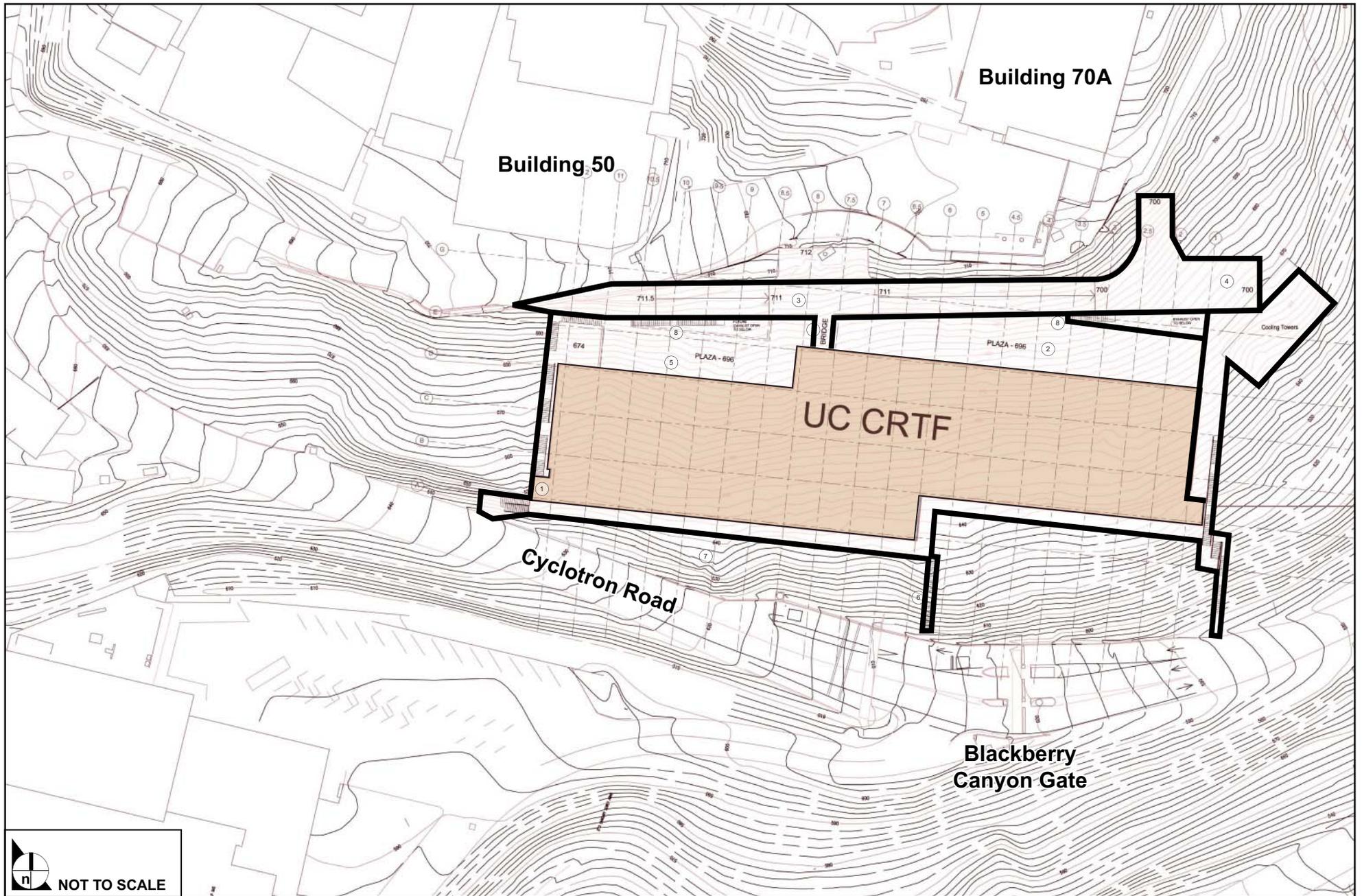
Domestic water service (including water for fire suppression) for the CRT facility would be supplied from an existing 8-inch high-pressure water main along Seaborg Road. The existing water main would be extended to the project site to provide water service. Water consumption for the CRT facility at full occupancy is estimated at approximately 32 million gallons per year or an average of about 88,000 gallons per day (gpd). This includes demand for domestic water, fire suppression water, and cooling tower water. The proposed facility would include high-efficiency fixtures and storm water reclamation for toilet flushing and recirculation of cooling water, which would reduce water demand.



SOURCE: Google Earth - July 2007, Perkins+Will - September 2007

FIGURE 3.0-2

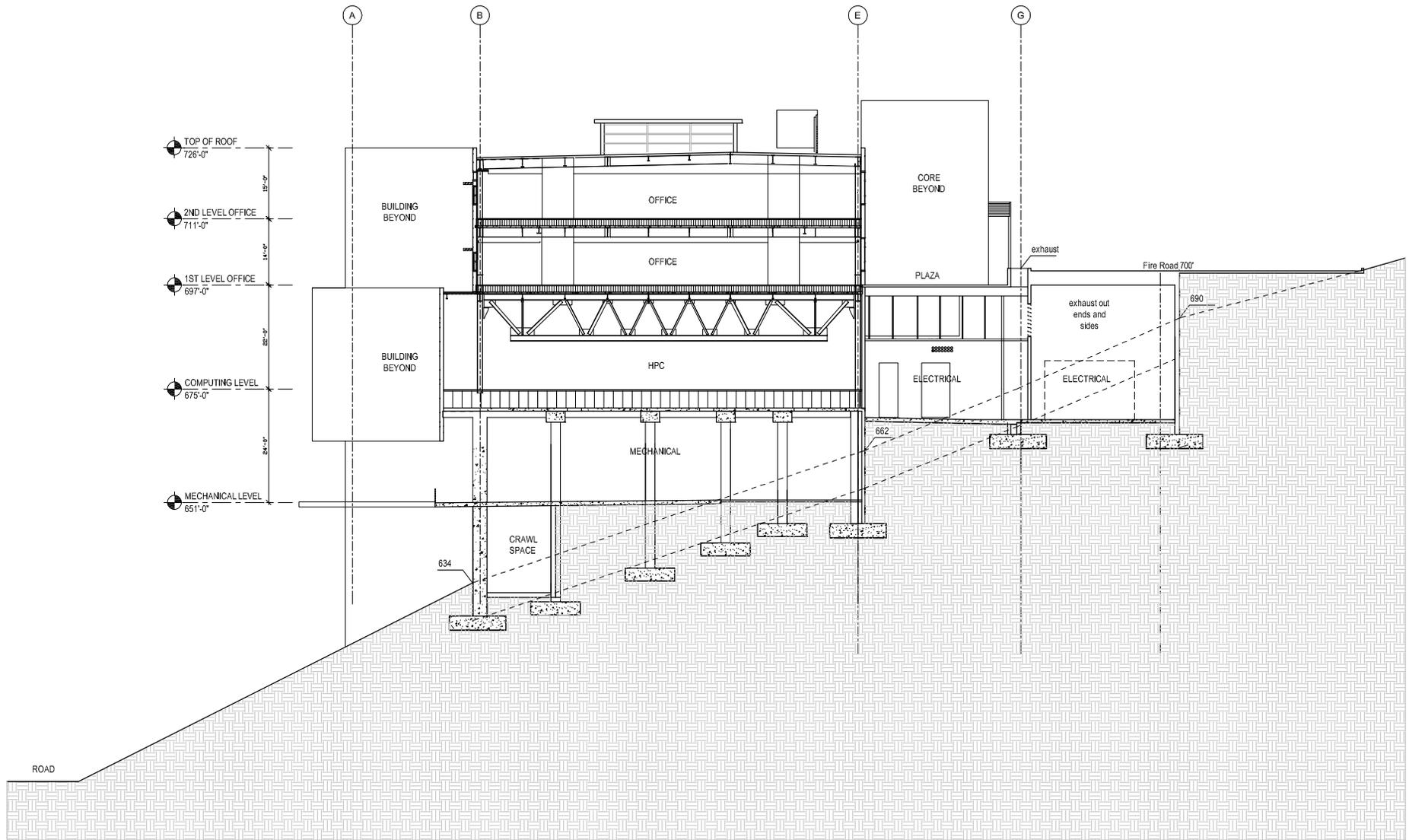
Approximate Proposed Action Site



SOURCE: Perkins+Will – January 2010

FIGURE 3.0-3

Site Plan



SOURCE: Perkins & Will – January 2010

FIGURE 3.0-4

CRT Facility Section

Wastewater (sewage) generation from the facility at full occupancy is estimated at approximately 220,000 gallons per year or about 600 gpd. The project would include a connection to the existing LBNL sanitary sewer system located in Cyclotron Road. Wastewater from the western portion of the LBNL site, including the CRT site area, flows to the Hearst Monitoring Station and then into the City of Berkeley's sewer system at City sanitary sewer sub-basin 17-013. Sub-basin 17-013 is not currently constrained during peak wet weather flows.

The CRT site design would minimize the amount of impervious surfaces by limiting the footprint of the building and minimizing creation of new parking areas. The net increase in impervious surfaces for the project site would be approximately 0.6 hectare (about 1.49 acres or 65,000 sf). The storm drainage system would be constructed to control discharge and to direct flows away from Cafeteria Creek and toward on-site collection facilities. To comply with the requirements of storm water regulations, storm flows would be captured by a network of inlets, vegetated swales,³ and drainage pipes and directed to a series of subsurface hydromodification vaults that are sized appropriately to control flows so that scour and erosion in the receiving waters is avoided.⁴ An in-line pollution prevention device (such as a Continuous Deflective Separation unit or Stormceptor) shall be installed within the storm drain system to control sediment and floatables from the access driveway and loading dock area in the northern portion of the project site prior to release of stormwater to the storm drain at Cyclotron Road.

HPC floor and office building cooling would be provided by a series of high-efficiency evaporative cooling towers approximately 20 feet high on a 3-foot platform located near the exterior southeast side of the HPC portion of the facility. This system would serve liquid- and air-cooled computational equipment. Initially, two cooling towers would be installed. At full project implementation, three additional cooling towers would be needed, for a total of five cooling towers. The cooling towers would operate at full capacity only during the warmest days of the year, typically in August. A small boiler with a heat input rating of approximately 0.9 million British thermal units (BTU) per hour is also proposed. Natural gas service to the boiler would be provided via a connection to the underground gas main in the Building 50/Building 70 area.

³ Should it be determined that appropriately sized vegetated swales are not feasible, then alternative Regional Water Quality Control Board-approved methods of treating stormwater runoff, such as in-line pollution prevention devices or infiltration galleries, will be incorporated into the project. All water quality treatment and source controls will be summarized in the project-specific Storm Water Pollution Prevention Plan (SWPPP), which will be available to regulatory agencies for inspection.

⁴ The hydromodification vaults or stormwater pipe system will be designed such that "flow duration control" is provided between 10 percent of the two-year recurrence storm and the 10-year recurrence storm. The vaults will be oversized to allow detention of peak flows for the 25-, 50- and 100-year design storms and release at a rate no greater than the pre-development condition, or equivalent separate facilities will be incorporated to provide such control. Final design calculations showing no increases in peak runoff for the 25-, 50-, and 100-year events will be provided to and reviewed by LBNL staff upon finalization of the project design.

The project would connect to the existing electrical underground lines in the Building 50/Building 70 area for electrical service. At the time of initial building occupancy, the facility would require up to 7.5 megawatts (MW) of power; at full buildout of the project, this demand could increase to a maximum of 17 MW. All of the required electricity would come from the grid.

Upgrades to the Grizzly Peak substation and transmission facilities within LBNL would be needed in order to accommodate the CRT facility's power needs. These upgrades would include use of existing spare breakers at the Grizzly Peak substation, installation of new conductors from the substation to the proposed CRT building using spare conduits through an existing electrical manhole, and extension of a new duct bank from an existing manhole close to the CRT building. All upgrades would be accomplished entirely within the footprint of existing utilities or within the CRT project site.

Emergency electrical power would be provided by a 750-kilowatt (kW) diesel backup generator located on the ground floor of the building near the cooling towers. A second 750-kW diesel backup generator would be installed if the electrical capacity of the facility were increased. One fuel tank (belly tank) would be an integral part of each generator. A battery backup system would also be provided to ensure uninterrupted power service for computing center critical systems. The project would also connect to the existing high-speed Energy Sciences Network (ESnet) Bay Area data network using existing and new conduits on the LBNL site.

3.1.7 Chemical Use On-Site

Research that would be conducted in the proposed facility would be limited to open scientific computing and computing-related operations and would not involve radioactive materials, hazardous chemicals, non-hazardous organic or inorganic materials, nano-scale materials, or genetically modified/transgenic plant materials and microorganisms. No "wet" laboratories would be located in the building. A non-chemical treatment system would be used to control scaling in the facility's cooling towers. The only hazardous material stored on site (other than materials used for custodial work) would be diesel fuel in two 500-gallon belly tanks, one for each emergency generator. Sealed batteries containing battery acid would be used on site. Batteries would be kept either in racks on the computer floor or in specially designed areas within the building and would be collected and recycled at the end of their useful lives.

3.1.8 Project Population

The proposed CRT facility would accommodate approximately 300 employees, of which approximately 250 would be UC LBNL staff and HPC systems vendors, and 50 would be UC Berkeley staff and students. Of the approximately 250 UC LBNL staff, about 165 would be existing on-site staff relocated from the adjacent Building 50 Complex, and 70 persons would be relocated from the off-site OSF. These OSF staff

members and computing systems vendors were located at the LBNL site prior to 2000 and would be returning to the LBNL site. Approximately 15 staff could be new or relocated UC LBNL staff. The CRT facility would result in the addition of approximately 135 additional persons (70 LBNL staff from OSF, 15 new or relocated UC LBNL staff, and 50 UC Berkeley staff and students) to the LBNL site.

3.1.9 Construction

Site Grading

Because of the hillside location of the proposed building, project construction would involve both cuts and fills. In addition, a shallow landslide (less than 8 feet deep⁵) underlies a portion of the building site. This landslide would be removed and replaced with compacted fill before the building is constructed. Based on the proposed design of the building, the proposed project would require approximately 11,850 cubic meters (15,500 cubic yards [cy]) of cut and off-haul and approximately 9,330 cubic meters (12,200 cy) of approved structural fill.

Schedule and Manpower

Project construction is anticipated to begin in fall/winter 2010 and end in summer/fall 2013. Construction would take place Monday through Friday and would involve typical construction hours that extend from early morning through mid-afternoon. Construction of the project would require a workforce that would vary from about 15 to 20 construction workers at the start of construction in fall 2010 to a peak of about 300 workers in fall 2012, dropping to about 20 workers in summer 2013 during the final months of construction.

Construction Traffic

Approximately 12,200 cy of structural fill would be required, which would be hauled to the project site from a storage area on the LBNL site, using existing internal LBNL roadways to transport the fill materials to the project site.

Although the University is continuing to examine the possibility of storing all excess earth materials excavated at the CRT site in a storage area on the LBNL site to use as fill at other LBNL project sites, off-haul of approximately 15,500 cy of earth materials could be required. Assuming a truck capacity of 12 cy, this would result in approximately 1,290 truck trips from the CRT facility site to the disposal site

⁵ Kleinfelder, Inc., 2006, Fault Investigation, Computation Research and Theory Building, Lawrence Berkeley National Laboratory, Berkeley, California, Consulting report prepared for LBNL, 44p.

and 1,290 return truck trips. These truck trips would follow the city-designated truck route (Hearst-Oxford-University Avenue) in the City of Berkeley to and from the LBNL site.

In addition to off-haul of earth materials, project construction activities would generate daily construction vehicle trips associated with delivery of construction materials and transport of construction workers to the site. There would be an average of three large delivery truck trips per day, with a peak number of 10 to 15 round trips per day, in fall 2011 associated with the delivery of concrete, rebar, form work, structural steel, mechanical and electrical equipment, exterior siding and windows, drywall and studs, pipes and conduits, roofing materials, etc. On average, there would be 1 to 5 construction worker bus trips (round trips) each day, and there would be from 10 to 50 small truck deliveries to the project site daily during the construction period. Therefore, at peak there could be up to 10 large delivery truck trips, about 50 small delivery truck trips, and 1 to 5 construction worker bus trips to the site in one day.

The 2006 LRDP EIR⁶ identified existing construction management “best practices” routinely undertaken at LBNL to limit otherwise potentially adverse construction-related traffic impacts and set these forth as LBNL Best Practices 6a through 6c. The LRDP EIR identified these best practices as continuing best practices required to be incorporated into contract specifications and management oversight for all development projects under the 2006 LRDP.⁷ Pursuant to LRDP Best Practice TRANS-6c, UC LBNL has instituted a program to manage construction schedules of projects to minimize the overlap of heavy truck activity periods. As a part of this program, UC LBNL makes necessary adjustments to truck movements to keep the total number of one-way truck trips on the Hearst-Oxford-University Avenue truck route below 98 trips per day. Truck trips associated with the proposed project would also be governed by this LBNL site program to ensure that the project’s trips—when added to truck trips from other ongoing construction projects—would not exceed the established limit.

⁶ <http://www.lbl.gov/Community/LRDP/index.html>

⁷ The 2006 LRDP EIR, under Impact TRANS-6 (focused on construction traffic), concluded that estimated construction truck traffic from the LBNL site including 65 one-way daily truck trips (33 trucks per day) in a peak year would not result in a significant impact to city intersections. An impact threshold for truck trips was not identified in the 2006 LRDP EIR. Since the certification of the 2006 LRDP EIR, in anticipation of concurrent construction of a number of large projects on the LBNL site, UC LBNL conducted a reevaluation of the traffic impacts associated with construction truck trips. This study, conducted by Fehr & Peers, examined the existing (2009) traffic conditions along the designated truck route from the LBNL site through the City of Berkeley to I-80, focusing on major intersections that are known to be operating at or near failing conditions. The study determined that so long as the total number of one-way truck trips from the LBNL site that pass through the Hearst Avenue, Oxford Street, and University Avenue intersections do not exceed 98 one-way truck trips per day (or 49 trucks per day) and LBNL’s construction truck traffic does not exceed 50 one-way truck trips (or 25 trucks a day) through the Gayley Road/Stadium Rim Way intersection, construction traffic would result in minimal effects on city intersections. The study utilized the City’s thresholds for traffic impacts that were amended after the certification of the LRDP EIR. This traffic study is incorporated by reference in this Environmental Assessment.

A Construction Traffic Management Plan (CTMP) will be prepared for the proposed project, which will stipulate internal truck routes within the LBNL site and consider stacked parking or off-site parking for construction workers to minimize parking demand.

Construction Access, Parking, Staging, and Environmental Protections

Construction access to the project site would be via Cyclotron Road, Chu Road, and a new access driveway from Chu Road. Parking for construction workers would be provided off site, and buses would transport construction workers to the project site. As stated above, between one and five bus trips per day would be involved in the transport of construction workers.

Staging areas would be established where feasible on the project site. Due to the project's proximity to the LBNL main entrance at Blackberry Gate, the location of the staging areas would be selected so as not to interfere with or otherwise affect the Blackberry Gate. Staging areas would be fenced and enclosed. LBNL and its contractors will minimize the use of on-site storage and when necessary store building materials and equipment away from public view, and shall keep activity within the project site and laydown areas.

Fencing would be installed 50 feet from the Cafeteria Creek drainage to ensure that construction activities would not inadvertently affect this sensitive area. The root systems of all large oak trees that would not be removed in conjunction with the project but are in close proximity to project construction would also be protected by installing fencing at the drip line, as required by the UC LBNL Capital Projects Procedures Manual (LBNL 2009).

Active management of construction-related stormwater flows from development sites is a standard part of contract specifications on all construction projects undertaken by UC LBNL. UC LBNL's standard construction specifications would apply to the Proposed Action. These would include requirements for:

- installation of erosion control netting and riprap to protect slopes and minimize adverse effects of runoff,
- protection of existing plant materials,
- application and maintenance of hydroseeding (sprayed application of seed and reinforcing fiber on graded slopes),
- not washing out concrete trucks into the storm drain system, and
- proper disposal of wastewater resulting from vehicle washing.

UC LBNL would also implement spill prevention and response programs to minimize pollutants in runoff. Consistent with UC LBNL standard construction specifications, the project site would be

replanted with landscaping as soon as practicable. Given the project would require coverage under the NPDES California General Permit for Storm Water Discharges associated with Construction Site Discharges (Construction General Permit), additional control measures and best management practices might also be implemented, and would be described in the project-specific Storm Water Pollution Prevention Plan (SWPPP) that would be developed for this construction project site, as required by the Construction General Permit.

3.1.10 Building Decommissioning

At the end of the new building's useful life, the building would be vacated and would be either (1) demolished and the site restored to a hillside, or (2) rebuilt to the applicable construction standards. Programs and equipment in the building at that time would be relocated to another appropriate building. If the facility is demolished, it is anticipated that there would be minimal environmental impacts. Prior to demolition, utility systems would be shut off, any potential sources of environmental contamination inside the building would be removed, and the interior contents would be removed and recycled. It is anticipated that there would be no hazardous or radioactive building waste material; conventional demolition methods would be used for demolition, and controls would be implemented to protect the workers and the environment. Prior to demolition of the building, an analysis would be conducted to verify whether environmental impacts would result from building demolition and whether further National Environmental Policy Act (NEPA) review would be appropriate. NERSC equipment that has reached the end of its useful life would be removed from the site by a licensed subcontractor and would be recycled as appropriate.

3.1.11 Site Security

The LBNL site has a perimeter fence with three vehicle entrance points. Access to the site is controlled at the gates by security personnel who check for proper access authorization. Access control for areas within the LBNL site is provided by signage, lock and key, and/or electronic locking systems. A private security provider provides security services including access and traffic control and property protection. The UC Berkeley Police Department provides all patrol, investigation, and law enforcement services to the LBNL site. The proposed CRT building would be inside the perimeter fence of LBNL, close to the Blackberry Canyon gate. A portion of the LBNL perimeter fence intersects the southwestern corner of the proposed building and would be relocated prior to project construction to ensure that the entire facility is enclosed by the perimeter fence.

3.1.12 Emergency Preparedness

LBNL's Master Emergency Program Plan (MEPP) establishes policies, procedures, and an organizational structure for responding to and recovering from a major disaster at LBNL. The LBNL MEPP uses the National Incident Management System (NIMS) as prescribed by Homeland Security Presidential Directive 5, Management of Domestic Incidents, and the standardized Emergency Management System for managing multi-jurisdictional emergencies in California. All personnel assigned to the Emergency Operations Center are trained individually and collectively. The training focuses on the plan to address the credible emergencies at LBNL. The CRT facility would be covered by the LBNL MEPP.

3.2 ALTERNATIVES TO THE PROPOSED ACTION

In accordance with the National Environmental Policy Act (NEPA), Section 102 (2) (E), a range of reasonable alternatives as defined by the specific facts and circumstances of a proposed action must be considered by the decision makers. If alternatives have been eliminated from detailed study, the EA must briefly discuss the reasons for their elimination (40 CFR 1502.14(a)). The "No Action" alternative, which maintains existing conditions and practices on a project site in the absence of a federal action, must be included among the alternatives analyzed (40 CFR 1502.14(d)). The sections that follow present the alternatives that were carried forth for detailed analysis in this EA and those alternatives that were considered but not evaluated in detail as they were found to be infeasible.

3.2.1 Alternative 1: Cafeteria (Building 54) Parking Lot Site

Under this alternative, the proposed three-story CRT building would be located on a parking lot to the northeast of Building 54 (Cafeteria) in the western portion of LBNL site. Due to the size and shape of the parking lot and the need for an HPC floor with an approximately 2,970 gross-square-meter (32,000-gsf) footprint, the building would be constructed either as a cantilever structure or the HPC floor would be redesigned to fit the parking lot configuration. All other attributes of the proposed building at this location would be the same as under the Proposed Action. A central plant with cooling towers, a boiler, and emergency generators would be constructed and the same electrical service improvements would be installed. The same number of persons would be relocated to the new building under this alternative as the Proposed Action. The existing parking spaces at this site would be replaced with the equivalent number of spaces beneath the proposed building so that the parking supply at LBNL is not reduced. Construction at the new facility would therefore require some additional grading activities in order to construct the underground parking spaces. The site is a paved parking lot with about 30 trees in and adjacent to the parking lot. The location of the alternative site is shown on **Figure 3.0-5, Location of Alternative 1 Site**.

3.2.2 Alternative 2: Richmond Field Station Site

Under this alternative, the proposed CRT facility would be located at the UC Berkeley Richmond Field Station (RFS). The RFS is located in Richmond off of Interstate 580 (I-580). The 152-acre academic teaching and research facility consists of about 100 acres of uplands and about 52 acres of marsh and bay lands. The RFS was formerly used for industrial purposes, and there is remnant contamination that has been the subject of environmental investigation and remediation over a number of years.⁸ UC Berkeley is conducting additional investigations of groundwater and soil contamination to determine if more cleanup is required.

The proposed 3.2-acre CRT site at RFS would be bound by Seaver Avenue to the west, South 47th Street to the east, and two unnamed streets to the north and south. The location of the alternative site is shown on **Figure 3.0-6, Location of Alternative 2, RFS Site**. This site is an existing storage area for California Partners for Advanced Transit and Highways research vehicles. Although a building (Building 167) is present on this site, this building would not be displaced by the CRT facility, as adequate undeveloped land area is available to locate the CRT building on the site without removing this building. All attributes of the project program and population at this alternate location would be the same as that of the Proposed Action. The number of researchers, staff, and visitors that would be accommodated in the facility would remain the same as for the Proposed Action (about 300 persons). However, unlike the Proposed Action, which involves the relocation of about 135 persons to the LBNL site, this alternative involves the relocation of all 300 persons to the RFS site. This alternative would include the creation of 300 parking spaces for all researchers, visitors, and guests, unlike the Proposed Action that would provide about four parking spaces for disabled guests only and no general parking.

The RFS is not adequately served by high-speed and high-bandwidth data networking, nor is the electrical service to RFS adequate to serve the proposed building. This alternative would therefore require installation of ESnet infrastructure as well as major improvements to electrical transmission and distribution facilities, including installation of new power lines (using existing electrical poles or spare conduits) and a substation adjacent to the CRT building. In addition to the capital cost of these improvements, the extension of the ESnet infrastructure to RFS would result in an annual operating cost of approximately \$850,000, a cost that would not be incurred under the Proposed Action. Similar to the Proposed Action, the RFS site is secured around all sides by chain link fencing that is at least 6 feet tall. Access to the site is monitored at a guard booth by the main entrance. The site is a grassy lot with no buildings other than one small building on one side of the lot. Construction of the new facility at this site

⁸ A description of the Richmond Field Station, including past industrial activities and ongoing cleanup, can be found online at: <http://rfs.berkeley.edu/about.html#thefacility>.

would require minimal grading since the site is flat. Given the site's bay shore location and the resultant potential for the presence of subsurface archaeological resources, as part of project implementation, an archival search would be completed prior to ground disturbance to determine appropriate locations for archaeological monitoring during site grading. Following removal of top soil, a field inspection would be conducted by a qualified archaeologist who meets the Secretary of the Interior's Standards. The archaeologist would provide recommendations for any additional steps needed to protect archaeological resources.

3.2.3 Alternative 3: Former California Department of Health Services (DHS) Site

Under this alternative, the CRT facility would be located on a University-owned site on the western edge of the UC Berkeley Campus in the City of Berkeley. The approximately 2.4-acre site covers almost the entire block defined by Oxford, Hearst, Shattuck, and Berkeley Way, and was until recently occupied by a vacant 19,974 gross-square-meter (215,000 gsf) building.⁹ The location of the site is shown on **Figure 3.0-7, Location of Alternative 3, Former DHS Site**. The California Department of Health Services (DHS) was the former occupant of the building. The site has been approved by the UC Board of Regents (the Regents) for redevelopment to locate the UC Berkeley Helios Energy Research Facility, a new building that would house an energy research program. The Helios facility would be located in the northeastern quadrant of the city block adjacent to existing apartments. There are no specific projects at this time planned for the western one-half of the DHS site, although UC Berkeley anticipates that it will use the remainder of the DHS site for a community health campus. Under this alternative for the CRT facility, a new three-story CRT building with a footprint of about 2,970 gross square meters (32,000 gsf) and 11,706 gross square meters (126,000 gsf) of space and a central plant would be constructed in the western portion of the DHS site along the Shattuck Avenue frontage. Several aspects of the alternative, such as programs and total population, would be the same as the Proposed Action. However, unlike the Proposed Action, which involves the relocation of about 135 persons to the LBNL site, this alternative involves the relocation of all 300 persons to the DHS site. The alternative would provide no parking spaces, other than the required number of handicap parking spaces, for the users of the facility, as adequate parking and transit services are available in the vicinity of this site. With the exception of ESnet and electricity infrastructure, which would need to be installed, all other utilities that exist at the site are adequate to support the demands of the CRT facility. The facility would not be secured with a fence, though building access would be controlled, and users of the facility would be required to use an identification badge.

⁹ Demolition of this building is approved as part of the UC Berkeley Helios Energy Research Project and began in April 2010.

Construction of the new facility at this site would require minimal grading since the site is flat. The entire site is developed or disturbed in conjunction with its former use and no natural habitat exists on the site. The existing building on the site has been demolished by UC Berkeley in conjunction with the construction of the Helios facility.

3.2.4 Alternative 4: Leased Facility on San Pablo Avenue

Alternative 4 would involve the use of similarly situated existing facilities in and around west Berkeley, Emeryville, and Oakland for the relocation and consolidation of the three programs. For the purposes of this EA, the use of the existing building at 6701 San Pablo Avenue for CRT facility will be analyzed in detail as a representative site; it is expected that environmental impacts from the use of other nearby leased facilities would be similar to those identified in this analysis. Under Alternative 4, the University would lease a portion of the 47,195-gross-square-meter (508,000-gsf) building located at 6701 San Pablo Avenue, in the cities of Berkeley, Emeryville, and Oakland. The location of the site is shown on **Figure 3.0-8, Location of Alternative 4, Leased Facility on San Pablo Avenue**. The building has been leased by the University for other purposes for several years and is a structurally sound building. This alternative would involve interior tenant improvements to provide the needed office space. Each floor of the building includes multiple large columns, which precludes use as an HPC floor. Therefore, a new floor would be added on top of the existing building. To provide adequate cooling, cooling towers and chillers would be constructed on top of the building. In addition, the power supply to the building would need to be increased under the alternative. The alternative would also require installation of ESnet infrastructure.

Unlike the Proposed Action, which involves the relocation of about 135 persons to the LBNL site, this alternative involves the relocation of up to 300 persons to the Alternative 4 site. The site has parking spaces for 100 cars inside the building and 300 outside the building, and there is a potential to increase parking from 400 to 1,200 spaces at the site. The facility would not be secured with a fence, though users of the facility would be required to use identification badges to gain access.

The entire site is paved or under the building and no natural habitat exists at the site. There are three ornamental trees in front of the building on San Pablo Avenue. Unlike the Proposed Action, which would require construction of a new three-story facility and improvements, construction activities under this alternative would be limited to the construction of an additional floor, interior modifications, and installation of cooling equipment.



SOURCE: Impact Sciences, Inc. – February 2010

FIGURE 3.0-5

Location of Alternative 1 Site



Legend:

- - - - - Property Boundary
- · - · - Approximate Property Boundary



300 150 0 300

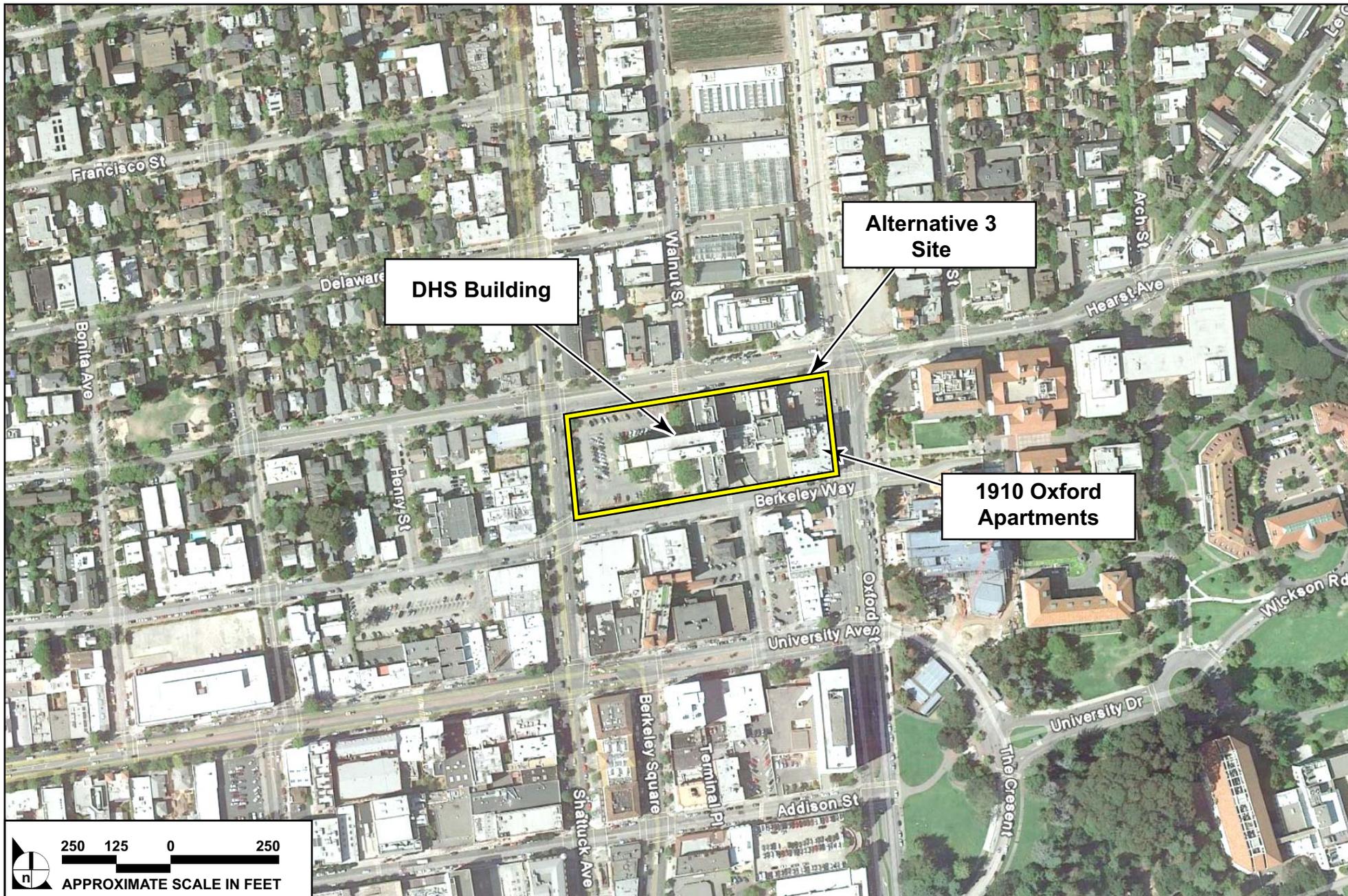
APPROXIMATE SCALE IN FEET

- Notes:
- EBRPD East Bay Regional Parks District
 - EERC Earthquake Engineering Research Center
 - EPA Environmental Protection Agency
 - NRLF Northern Regional Library Facility
 - RFS Richmond Field Station

SOURCE: UC Berkeley – 2008

FIGURE 3.0-6

Location of Alternative 2, RFS Site



SOURCE: Google Earth – August 2009, Impact Sciences, Inc. – February 2010

FIGURE 3.0-7

Location of Alternative 3, Former DHS Site



SOURCE: Google Earth – August 2009, Impact Sciences, Inc. – July 2010

FIGURE 3.0-8

Location of Alternative 4, Leased Facility on San Pablo Avenue

3.2.5 Alternative 5: No Action Alternative

Under the No Action alternative, the DOE would not relocate the ASCR-funded LBNL programs or provide new facilities for the staff and existing research missions. The existing NERSC facility in Oakland would continue to be utilized and a new building would not be constructed. The power and cooling capacity at the site would be expanded in summer 2010. Beyond this expansion, no further growth at the site would be feasible and no new development would occur. As explained in **Section 2.2.2** of this EA, this would place the programs and the continued DOE support for these programs at risk. The location of the facility is shown on **Figure 3.0-9, Location of Oakland Scientific Facility**.

3.3 ALTERNATIVES CONSIDERED BUT ELIMINATED

3.3.1 Expansion of Oakland Scientific Facility

Under this alternative, UC would continue to lease space in downtown Oakland for the OSF. To accommodate CRD, CSE, and future NERSC high performance computers and other data systems and support equipment, the building would need to be expanded by adding an extension to the existing computer room. Such an expansion is not feasible given the lack of space at the site. In addition, provision of adequate power to serve the expanded facility is challenging at this site. Although an ongoing project will increase the OSF power capacity from 6 MW to 9 MW, expanding the electrical power supply to 17 MW is a major limitation for this site as it will involve a very high cost to bring this additional electrical capacity to the OSF. While potential office space for the CRD division staff might be available in the existing building, the NERSC would have to be located elsewhere and therefore this alternative was rejected because it would not meet the project purpose of consolidating all ASCR-funded LBNL programs in one location.

3.3.2 Building 25 and 25A Site

Under this alternative, the new building to house the relocated NERSC and LBNL CRD staff would be constructed at the current site of Buildings 25 and 25A, near the geographical center of the LBNL site. Buildings 25 and 25A and associated ancillary buildings would be demolished. All other attributes of the proposed building at this alternate location would be the same as that of the Proposed Action. Although this site was evaluated as an alternate location for the proposed building in the Computational Research and Theory Facility EIR,¹⁰ this site is likely no longer available for the CRT facility because other projects (the General Purpose Laboratory or [GPL] and the Solar Energy Research Center) are proposed to be built

¹⁰ University of California and LBNL, CRT Final EIR (SCH # 2007072106), certified February 2008.

at the site of Buildings 25 and 25A. Therefore, this alternative was considered infeasible and was eliminated.

3.3.3 Building 51 Site

Under this alternative, the new building to house the relocated NERSC, CRD staff and CSE staff would be constructed at the current site of Building 51, near the center of the LBNL site. Building 51 and the former Bevatron accelerator housed in the building are undergoing demolition. Completion of the building and the accelerator demolition subcontract is scheduled for March 2011. However, the scope of the demolition subcontract does not include complete subsurface remediation of the site. If additional remediation beyond the scope of work for the demolition contract is required, the site could not be built on until remediation has been completed. For these reasons; this alternative was considered infeasible and was eliminated.

3.3.4 Reduced Size Alternative

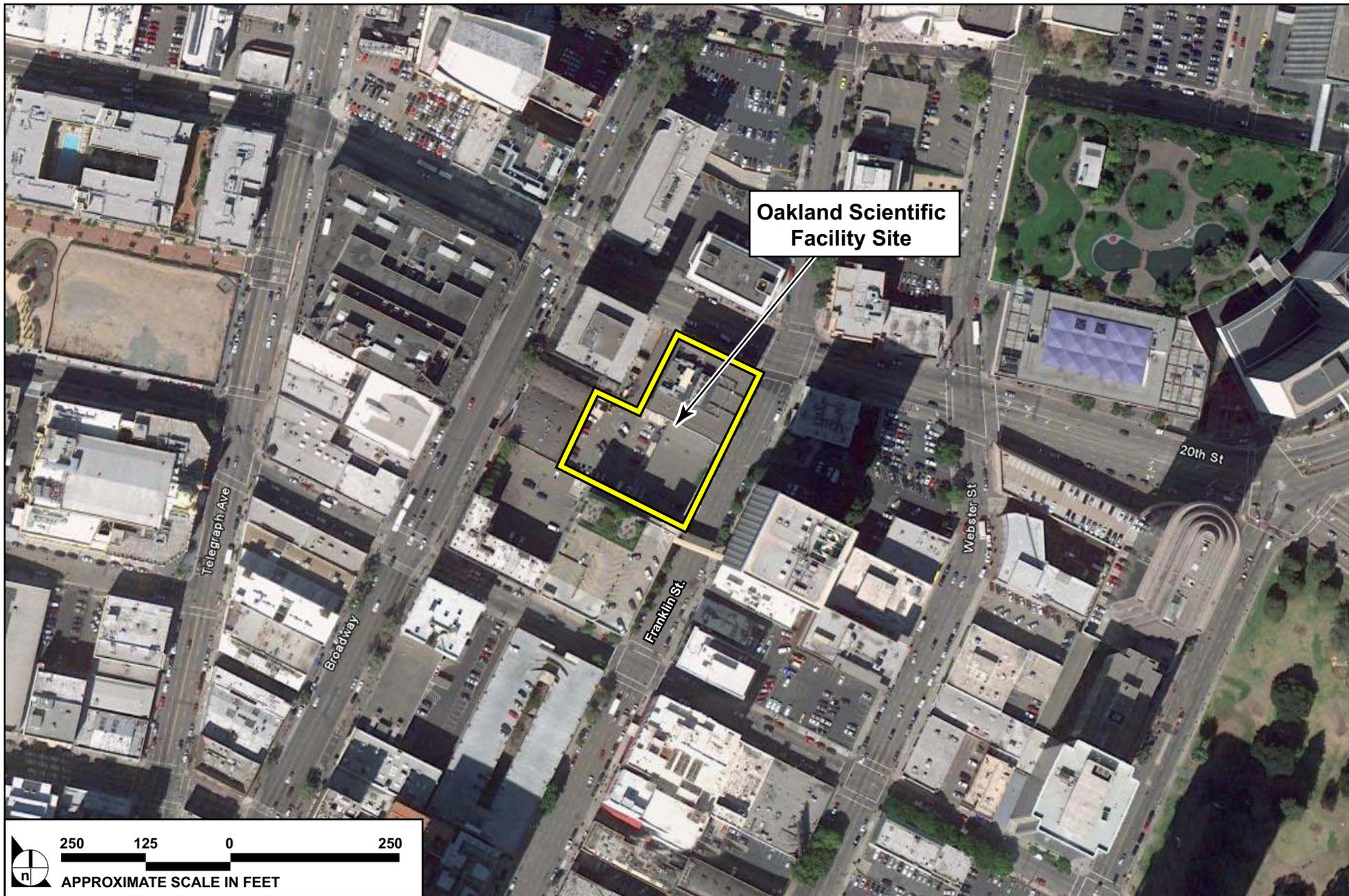
A reduced-size alternative would include the construction of a smaller building at the site of the Proposed Action. Under this alternative, the approximately 2,970 gross-square-meter (32,000-gsf) HPC floor would be constructed. However, there would be only one floor of office space. Therefore, the total size and elevation of the building would be reduced compared to the Proposed Action. This alternative would avoid or reduce only one of the effects of the Proposed Action (visual quality); yet by reducing the office space by one-half, it would not meet the Proposed Action objective of consolidating all ASCR-funded LBNL and key related programs in one location. For these reasons, this alternative was considered infeasible and was eliminated.

3.4 CONTROLS

This section describes the procedures, which would be followed, and the permits and approvals, which would be obtained for the Proposed Action and alternatives.

3.4.1 UC LBNL Standard Operating Procedures, Standard Construction Specifications, and Best Practices

There are standard operating procedures, standard construction specifications, and best practices used by UC LBNL on projects at the LBNL site. The Proposed Action and alternatives would be subject to these procedures and practices. Specific reference to these procedures and practices is made in **Section 5.0** and they are quoted where applicable. These procedures, specifications and best practices are generally intended to ensure the safety of subcontractors, LBNL visitors and staff, and the public during construction projects, and to reduce the overall impact that construction/demolition actions have at LBNL on the surrounding community, and on the environment.



SOURCE: Google Earth – August 2009, Impact Sciences, Inc. – July 2010

FIGURE 3.0-9

Location of Oakland Scientific Facility

3.4.2 Standard Project Features

Standard Project Features (SPFs) were originally identified in the UC LBNL 2006 LRDP EIR¹¹ as environmentally proactive measures that would be incorporated into all LBNL projects. These measures have been adopted as part of the LBNL 2006 LRDP EIR by The Regents. The SPFs pertinent to the CRT facility are set forth in **Appendix 1.0**. For clarity, **Appendix 1.0** lists SPFs as characterized in the 2006 LRDP EIR in Chapter 5, entitled Mitigation Monitoring and Reporting Program. The SPFs described herein are incorporated into and are a part of the project description of the Proposed Action and alternatives.

3.4.3 Plans Applicable to this Project

A variety of plans are applicable to cover the work carried out under the Proposed Action and alternatives. These are referenced in the subsections of **Section 5.0** as appropriate, and are summarized here.

- *Soil Management Plan (SMP)* and *Groundwater Monitoring and Management Plan (GMMP)* must be prepared in accordance with the California Department of Toxic Substances Control -administered Corrective Measures Implementation Workplan. A site-specific SMP is required by the LBNL Capital Project Procedures Manual. This plan describes the requirements for soil and groundwater testing.
- *Asbestos Compliance Work Plan, Lead Compliance Work Plan, and Silica Exposure Controls* must be implemented by the construction contractor to comply with relevant state and federal regulations preventing worker exposure to these materials. The Occupational Safety & Health Administration (OSHA) regulations also include extensive, detailed requirements for worker protection applicable to any activity that could disturb lead- or asbestos-containing materials, including maintenance, renovation, and demolition. For lead, these requirements include respiratory protection, protective clothing, housekeeping, special high-efficiency filtered vacuums, hygiene facilities, medical surveillance, and training.
- *Site-Specific Injury and Illness Prevention Plan* including exposure prevention measures must be implemented by the construction contractor(s).
- *Site-Specific SWPPP* designed to specifically address potential discharges associated with construction must be prepared for the Proposed Action and the alternatives that would disturb more than 1 acre of land. A Notice of Intent must be submitted to the Regional Water Quality Control Board (RWQCB) to comply with the Construction General Permit requirements and conditions.
- *Communications Plan* to ensure that UC LBNL personnel and contractors are informed regarding hazards at the construction site would be developed by the Project Manager. Regular project site evaluations would be performed during project construction by a safety professional and project engineer to monitor the effectiveness of implemented measures.

¹¹ LBNL 2006 Long Range Development Plan Final Environmental Impact Report (SCH No. 2000102046). July 2007.

- *Self-Assessment Summary Report* and a *Site Environmental Report* are prepared by UC LBNL on an annual basis to aid in compliance with environmental laws and regulations governing hazardous materials, and worker safety, emergency response, and environmental protection.

3.4.4 Environmental Permits and Approvals

Several permits and approvals from regulatory agencies would be obtained for the project.

- LBNL is located on land owned by the University of California. The Regents is the University's decision-making body, including for decisions regarding the California Environmental Quality Act (CEQA). The Regents certified an EIR for and approved the construction and operation of the proposed CRT facility in 2008. However, the Proposed Action and alternatives are subject to and conditioned upon completion of the NEPA process.
- State Water Resources Control Board (SWRCB), NPDES California General Permit for Storm Water Discharges associated with Construction Site Discharges (Construction General Permit). For the Proposed Action and alternatives that would disturb more than 1 acre of land area, UC LBNL will be required to file an NOI and obtain coverage under the Construction General Permit.
- Bay Area Air Quality Management District (BAAQMD) Authority to Construct and Permit to Operate. This would be needed from the BAAQMD for the stationary emission sources (boilers and generators) included in the Proposed Action and alternatives.