5.0 CUMULATIVE IMPACTS

5.1 INTRODUCTION

This chapter of the Environmental Impact Report (EIR) presents the near-term and long-term cumulative impacts of the proposed project.

Numerous scoping comments were received expressing concern regarding the cumulative construction traffic impacts from the concurrent construction of the proposed project and other construction projects in the portions of the cities of Oakland and Berkeley near the project site. The cumulative traffic and noise impacts from construction activities associated with other proposed or planned projects that would be under construction at the same time as the proposed project are analyzed in this section.

5.2 CUMULATIVE IMPACT ANALYSIS

The California Environmental Quality Act (CEQA) requires that EIRs discuss cumulative impacts of the proposed project, and that the analysis reflect the severity of the impacts and the likelihood of their occurrence. The cumulative discussion is guided by the standards identified in Section 15355 of the *CEQA Guidelines*:

> Cumulative impacts refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.
>
> (a) The individual effects may be changed resulting from a single project or a number of separate projects;
>
> (b) The cumulative impact from several projects is the change in the environment, which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future project. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

Furthermore, Section 15130(a) of the *CEQA Guidelines* states that a "cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts." Section 15130 of the *CEQA Guidelines* provides direction regarding cumulative impact analysis as follows:

- An EIR should not discuss cumulative impacts that do not result, in part, from the proposed project;
- A lead agency may determine that an identified cumulative impact is less than significant, and shall briefly identify facts and analysis in the EIR supporting its determination;

- A lead agency may determine a project's incremental effect is not cumulatively considerable and, therefore, is not significant and shall briefly describe in the EIR the basis of its determination; and
- A lead agency may determine a project's cumulatively considerable contribution to a significant cumulative impact may be rendered less than cumulatively considerable and, therefore, residually not significant, if the project implements or funds its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.

Therefore, the discussion of cumulative impacts in this EIR evaluates whether the cumulative impacts of the project will be significant when considered in combination with the effects of past, present, and reasonably foreseeable projects, and whether the project would make a cumulatively considerable contribution to those cumulative impacts that are determined to be significant.

CEQA Guidelines Section 15130(b) presents two possible approaches for considering past, present, and reasonably foreseeable projects. Either of the following approaches may be used:

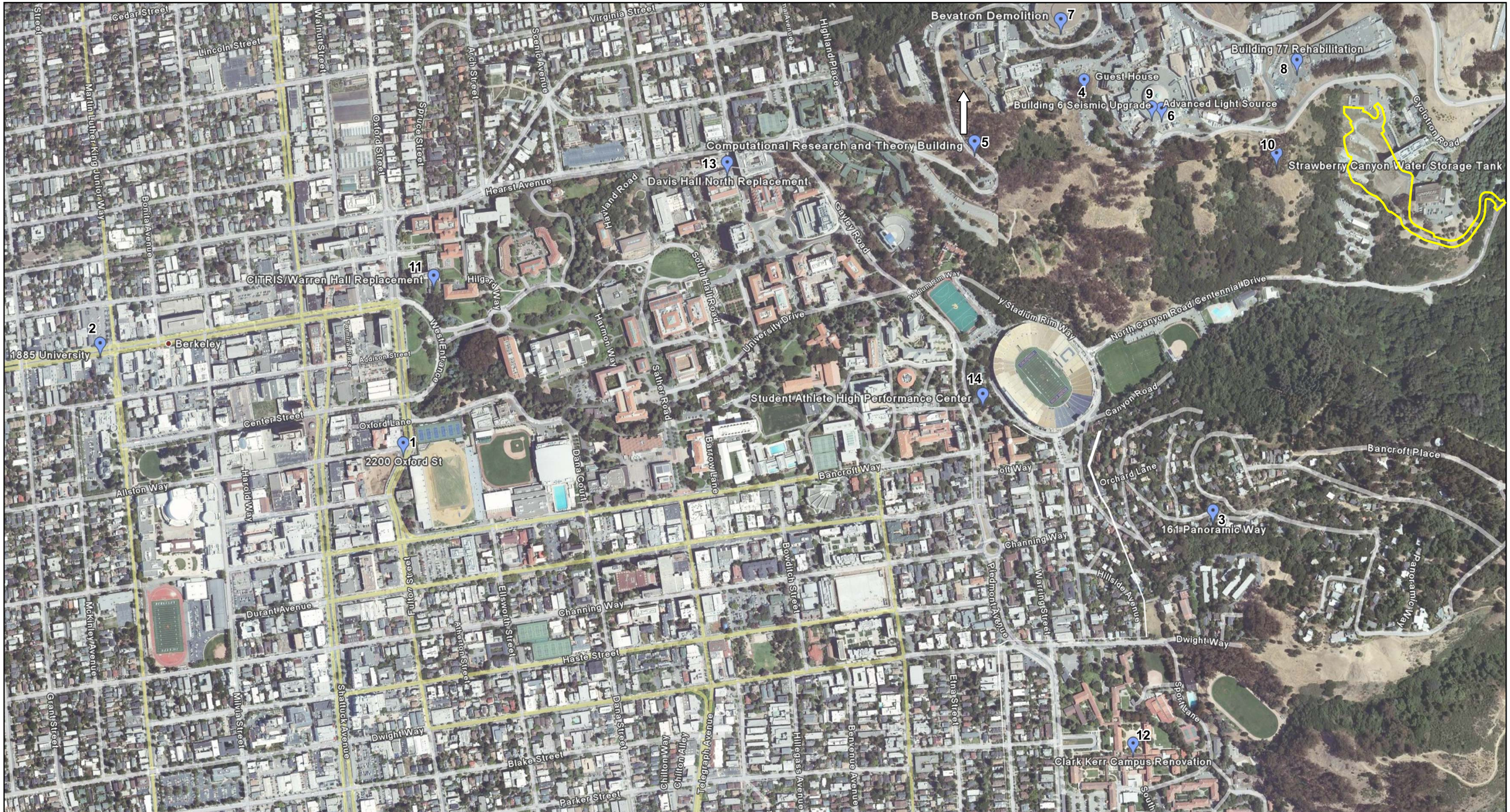
- A list of past, present, and reasonably foreseeable projects; or
- A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which describe or evaluated regional or area-wide conditions contributing to cumulative impacts.

This EIR uses both of these methods. The near-term analysis is based on a list of reasonably foreseeable projects whereas the long-term cumulative analysis is based on anticipated growth at Lawrence Berkeley National Laboratory (LBNL) envisioned under the LBNL 2006 Long Range Development Plan (LRDP), growth of the campus under the University of California (UC) Berkeley 2020 LRDP, and growth under the City of Berkeley General Plan, and the City of Oakland General Plan.

5.3 NEAR-TERM CUMULATIVE PROJECTS

The projects listed in **Table 5.0-1, Near-Term Cumulative Projects,** below were included in the near-term cumulative analysis for the proposed project and are also shown on **Figure 5.0-1, Location of Cumulative Projects**.[1] The near-term analysis focuses on impacts that could occur from planned projects that are expected to be under construction between 2007 through 2012. This period coincides with the construction period of the proposed project, and therefore, the focus of the near-term cumulative impact analysis is potential cumulative impacts from the simultaneous construction of the listed projects, especially impacts related to construction traffic and noise. Note that these near-term projects are also considered in the evaluation of long-term cumulative impacts.

[1] This figure does not include Seismic Upgrade-Phase I as this project involves small improvements at several locations at LBNL.



NOT TO SCALE

3 Cumulative Project Location

Helios Project Location

SOURCE: Google Earth – November 2007

FIGURE **5.0-1**

Location of Cumulative Projects

924-001•11/07

Table 5.0-1
Near-Term Cumulative Projects

Jurisdiction/Lead Agency	Approximate Period of Construction
LBNL	
Helios Energy Research Facility	April/May 2008 – August 2010
Guest House	November 2007-February 2009
Computational Research and Theory Facility	April 2008- November 2010
Seismic Upgrade-Phase I	April 2009-November 2010
Advanced Light Source USB Project	March 2008-September 2009
Building 77 Rehabilitation	September 2007-November 2008
Bevatron Demolition	April 2008-June 2011
Building 6 Seismic Upgrade	February 2007-June 2010
UC Berkeley	
Warren Hall Replacement/Biomedical and Health Sciences Building	January 2007-December 2012
CITRIS Headquarters/Davis Hall North Replacement	August 2004-January 2009
Student Athlete High Performance Center[2]	December 2007-December 2010
Clark Kerr Campus Renovation and Utilities	January 2008- May 2012
City of Berkeley	
1885 University Avenue	2007-2008
2200 Oxford Street	2007-2008
161 Panoramic Way	2007-2008
East Bay Municipal Utility District	
Strawberry Canyon Water Storage Tank[1]	September 2009-September 2011

Source: Personal communication with LBNL Environmental Planning; UC Berkeley Environmental Planning; City of Berkeley Planning Department, August 2007.
[1] EBMUD has indicated that it is considering locating a 2.6 to 5.8 million gallon water reservoir on one of three potential sites in Strawberry Canyon, two of which are on LBNL land and one of which is on UC Berkeley land.
[2] Construction associated with the retrofit of the stadium is not expected to occur during the period when the Helios Project would be under construction.

5.3.1 LBNL Near-Term Projects

The following projects are either currently under construction, approved but pending commencement of construction, or proposed for construction at the Berkeley Lab between 2007 and 2012.

Guest House

The Regents approved the Guest House project in July 2007. LBNL will construct and operate a 25,000 gross-square-foot (gsf) Guest House that will range in height between 2.5 and 4 stories. The proposed Guest House will include 60 guest rooms, common spaces, a reception area, storage areas, an outdoor patio area, and access facilities including stairwells and Americans with Disabilities Act (ADA)-compliant ramps. The project will be located near the center of the LBNL main hill site between Buildings 2 and 54 and accessible via Lawrence Road. The Guest House will address a lack of convenient, affordable, and short-term accommodations on the LBNL campus for faculty, post doctoral associates, students, and other visitors to affiliated UC Berkeley science facilities.

Computational Research and Theory Facility Project

LBNL proposes to construct the Computational Research and Theory (CRT) Facility near the Blackberry Canyon gate. It would provide approximately 140,000 square feet of high-end computing floor space and accompanying office space to support the Lab's National Energy Research Scientific Computing (NERSC) Center, the associated High Performance Computing (HPC) center, and researchers and students from the Berkeley Lab's Computational Research Division and the joint UC Berkeley/Berkeley Lab Computational Science and Engineering program. The proposed 140,000-gross-square-foot building and associated infrastructure building would be constructed on an approximately 2.5-acre site near Buildings 50 and 70.

Seismic Upgrade Phase 1

This is an on-going project to perform seismic upgrades to LBNL structures, including Buildings 50 and 74, in order to improve the structural performance of these buildings in a major seismic event. This project includes making reinforcements to structural bracings and sheer walls. Seismic Phase I activities will take place over approximately 12 months and will involve relatively small numbers of on-site workers and construction trucks.

Advanced Light Source USB Project

The Advanced Light Source building is slated to have a User Support Building (USB) constructed for the benefit of on-site users. This project was approved by The Regents in January 2007. This proposed three-story, approximately 30,000 gsf building will include assembly space, support laboratories, and offices. This building will be located at the site of Building 10, which is obsolete and will be demolished. Demolition and construction would take place between early 2008 and mid 2010.

Building 77 Rehabilitation

The rehabilitation of Buildings 77 and 77A includes replacement of the roof of Building 77; upgrade of various utility systems in both buildings; addition of an interior crane to Building 77A; and construction of a small nearby building to house chillers, a cooling tower, boilers, and associated equipment. The project is expected to be completed by winter 2008.

Bevatron Demolition

The Regents certified the Bevatron Demolition project EIR in July 2007. LBNL will demolish the Bevatron building (Buildings 51 and 51A) due to the age and poor seismic condition of the facility. Currently there are no plans for redevelopment of the site. Demolition activities are expected to extend from 2008 to 2011.

Building 6 Seismic Upgrade

The Building 6 Seismic Upgrade Project will involve the rehabilitation of the Advanced Light Source dome structure to a "good" seismic rating, as defined by the University of California Seismic Safety policy. This project is expected to be completed during the summer of 2010.

5.3.2 UC Berkeley Near-Term Projects

The following projects are either currently under construction or proposed for construction on the UC Berkeley campus between 2007 and 2012.

Warren Hall Replacement/Biomedical and Health Sciences Building

This project would demolish Warren Hall, which is located at the western end of the UC Berkeley campus. The building is approximately 52 years old, was rated as "poor" for seismic safety, and was not seen as suitable for retrofit. Demolition is scheduled to begin in early 2008. In its place, the Li Ka Shing Center for Biomedical and Health Sciences would be constructed. The new facility would maintain the same approximate footprint as Warren Hall and would have five aboveground levels and one underground level.

CITRIS Headquarters/Davis Hall North Replacement

The demolition of Davis Hall North, located in the northeast section of the Berkeley campus near the intersection of Hearst and LeRoy Avenues, began at the end of August 2004 to make way for the headquarters for the Center for Information Technology Research in the Interest of Society (CITRIS), one

of the California Institutes for Science and Innovation. CITRIS was established to sponsor collaborative information technology education and research that will ultimately provide solutions to social and commercial problems affecting the quality of life of all Californians and others around the world. The new building includes flexible teaching and research facilities, a center for distance learning, and a state-of-the-art nanofabrication laboratory. The new building will be located on the same site as Davis Hall North with two floors underground and five floors above.

Student Athlete High Performance Center

Planning and construction of the Student Athlete High Performance Center (SAHPC) facility are the first phase of the project to make seismic corrections and improvements to California Memorial Stadium. The SAHPC would provide approximately 135,000 gross square feet of new program space for the students, staff, and programs currently using California Memorial Stadium daily. Currently in design, the proposed building is a two-story building, set back into the sloping landscape west of California Memorial Stadium; its highest elevation would be approximately 410 feet above sea level, level with the base of the existing west wall of California Memorial Stadium. The project would also create a pedestrian plaza on the new building's roof, at roughly the same elevation as the existing perimeter road at the base of the stadium. The plaza would provide space for game-day and year-round gatherings. The SAHPC begins seismic strengthening of the base of the existing west wall of the stadium, replaces and prunes existing trees on the west side of the stadium, and improves the landscape in the area. The project would also improve pedestrian access and service routes into the stadium. Construction of the SAHPC is planned to take place between December 2007 and December 2010. The stadium retrofit is not expected to begin within this timeframe.

Clark Kerr Campus Renovation and Utilities

A two-phase planned renovation and utility upgrade is planned for the Clark Kerr Campus of UC Berkeley. Both phases of renovation include renewal of sanitary and storm sewers, extension of fire lines and upgrade of water mains, seismic retrofit, electrical repair, telecommunication system repair, and replacement of gas mains. All work is expected to be completed by May 2012.

5.3.3 Other Proposed/Planned Near-Term Projects

Four projects are proposed or planned in the southern portion of the City of Berkeley and northern Oakland in the near term.

1885 University Avenue

The project applicant proposes to construct a residential apartment complex with ground floor commercial uses on an approximately 43,750-square-foot site located at 1885 University Avenue in the city of Berkeley. The site contains an existing 20,375-square-foot single-story commercial building and approximately 45 parking spaces. An auto parts store occupies 10,100 square feet of space in the southern portion of the commercial building. The remainder of the commercial space is vacant. The project would demolish the existing building, parking lot, and other improvements on the property and replace them with a new mixed-use project that would span the entire parcel. The project proposes a total of 156 rental dwelling units and approximately 14,390 square feet of retail floor area in one mixed-use structure comprised of two separate residential buildings built on a common basement and ground floor podium containing commercial uses and two separate parking garages with a total of 157 parking spaces. Construction of the proposed project is anticipated to begin in 2007 and would extend over a period of approximately two years.

2200 Oxford Street

The proposed development project includes three main components: (1) an underground parking garage, (2) an office and conference facility called the David Brower Center, and (3) an affordable housing facility with ground-floor retail called Oxford Plaza. The site has an area of about 1.06 acres (46,300 square feet) and currently is a city-owned parking lot.

161 Panoramic Way

The proposed project is a new wood-frame single-family dwelling with 1,460 square feet of floor area and two stories on a 3,295-square-foot lot. The project site is a steep lot with slopes ranging from 1:1 to 1:1.5. Construction will include drilled cast-in-place pier foundation.

Strawberry Canyon Water Storage Tank

A 2.6 to 5.8 million gallon water storage tank is proposed by East Bay Municipal Utility District (EBMUD) in Strawberry Canyon, to be located at one of three alternative locations. Two of the potential locations are in the southern and eastern portions of LBNL, and the third location is to the southeast of the UC Berkeley Botanical Gardens.

5.4 LONG-TERM CUMULATIVE PROJECTS

The long-term cumulative analysis in this EIR evaluates the cumulative effects of growth of LBNL under the LBNL 2006 LRDP, growth of the campus under the UC Berkeley 2020 LRDP (including the Southeast Campus Integrated Projects), and the Oakland and Berkeley General Plans (primarily growth anticipated by the 2001 City of Berkeley General Plan EIR).

5.4.1 LBNL 2006 LRDP

The Regents certified the LBNL 2006 LRDP EIR and approved the LBNL 2006 LRDP in July 2007.[2] The LBNL 2006 LRDP envisions the construction of approximately 980,000 gross square feet (gsf) of additional research and support space and demolition of up to 320,000 gsf of building space, for a net increase of 660,000 gsf of new research and support space. As a result, the total building space for the Berkeley Lab under the 2006 LRDP is 2,420,000 gsf. The 2006 LRDP projects that, through 2025, the on-site adjusted daily population (ADP) at the Berkeley Lab will increase to approximately 5,375, which is an increase of approximately 1,000 ADP over the 2003 baseline. The Helios and CRT projects are considered elements of the 2006 LRDP and are evaluated in this section for their cumulative impacts, along with impacts from other reasonably foreseeable development in the general vicinity of the project site.

5.4.2 UC Berkeley 2020 LRDP

The Regents certified the 2020 LRDP EIR and approved the UC Berkeley 2020 LRDP on January 20, 2005. The UC Berkeley 2020 LRDP and LRDP EIR project population increases of up to 12 percent (approximately 5,320 "heads") and building space increases of up to 18 percent (approximately 2.2 million gsf) by the year 2020. The environmental analyses assumed that the maximum level of construction that was underway at the time the Existing Setting data were collected in 2002 and 2003 (approximately one million gsf of construction) would be underway at any one time within the Campus Park, Adjacent Blocks, Southside, and Hill Campus land use zones. Thus, the maximum level of construction anticipated under the UC Berkeley 2020 LRDP is reflected in the existing setting of the document.

With respect to new development in the Hill Campus portion of UC Berkeley, the 2020 LRDP EIR notes that a modest amount of development, 100,000 gross square feet of new building space and up to 100 housing units, is planned for the Hill Campus and this development would occur on sites proximate to previously developed Hill Campus facilities. The two areas that have been identified as potential

[2] Although the 2006 LRDP EIR is in litigation at this time, the 2006 LRDP is the land use planning document in effect for the Berkeley Lab and the growth of the Berkeley Lab under the 2006 LRDP is considered in the long term cumulative analysis presented in this EIR.

housing sites consist of a 7.5-acre area near the intersection of Grizzly Peak Boulevard and Centennial Drive and a 5.5-acre area between Lawrence Hall of Science and the Silver Laboratory Addition. Both areas have previously been moderately to extensively disturbed in association with roadway and parking lot construction (UCB 2005).

In October 2006, UC Berkeley completed a Tiered, Focused EIR for the Southeast Campus Integrated Projects (SCIP), which include seismic and program improvements at the California Memorial Stadium, including a 158,000 gsf athletic training center, and 102,000 gsf of additional new academic and support space at the stadium; construction of a parking structure and sports field at the current site of Maxwell Family Field; construction of an 186,000 gsf building linking the Law and Business schools; landscape improvements at the Southeast Campus and Piedmont Avenue; interior improvements at selected buildings at the School of Law and the Haas Business School; and renovation and restoration of the Piedmont Avenue houses (five structures and site environs from 2222 to 2240 Piedmont Avenue).

In addition to seismic retrofit and new construction on the campus, the UC Berkeley 2020 LRDP also considered certain ongoing programs that would continue to be implemented on campus lands that could potentially result in environmental impacts. These include fire fuel reduction projects that are an element of the campus's Fire Management Program. At the present time, three fire fuel reduction projects are proposed on UC Berkeley's Hill Campus: (1) the Strawberry Canyon Fuel Management Project which includes the removal of approximately 10,000 re-sprouted eucalyptus stems in a 58-acre area in Strawberry Canyon above (northeast of) the Berkeley Lab over a period of three years; (2) the Claremont Canyon Fuel Management Project which includes the removal of approximately 12,000 eucalyptus trees in a 40-acre area; and (3) the Frowning Ridge Fuel Management Project which includes the removal of approximately 24,000 re-sprouted eucalyptus stems and pine trees in a 84-acre area located in Strawberry and Claremont canyons (UC Berkeley Office of Emergency Preparedness website 2007). All three projects have applied for federal funding from Federal Emergency Management Agency. All three projects would implement mitigation measures included in the UC Berkeley 2020 LRDP for impacts on biological resources and water quality.

5.4.3 City of Berkeley General Plan

The 2001 City of Berkeley General Plan allows for steady growth and development, but, given a lack of substantial undeveloped land in the city, this is expected to take place at a relatively even pace with an emphasis on infill development. Projections include a population increase of approximately 7,000 people (a roughly 6 percent increase), approximately 3,300 new household units (a roughly 8 percent increase), and approximately 3,700 new jobs (a roughly 5 percent increase) by the year 2020.

5.4.4 City of Oakland General Plan

The City of Oakland General Plan designates the land surrounding the Berkeley Lab as mostly Resource Conservation and a small portion, which encompasses the Panoramic Hill area, as Hillside Residential. Resource Conservation is a land use intended to identify, enhance, and maintain publicly-owned lands for the purposes of conserving and appropriately managing the area. Future development within this land use designation is limited by the City's General Plan policies, and any development must relate to the management of natural resources, public open space, or natural hazards. Buildings are not permitted under this land use designation unless the building is associated with land management. The Hillside Residential land use designation is designed to create, maintain, and enhance residential areas characterized by detached, single unit residential structures.

5.5 TOPICAL IMPACTS

5.5.1 Aesthetics

Helios Cumulative Impact VIS-1: Construction activities associated with the proposed project, in conjunction with other near-term development, would not substantially affect visual resources. (*Less than Significant*)

Construction of the near-term cumulative projects would involve building sites at the Berkeley Lab, UC Berkeley lands, and in the city of Berkeley. While there are no officially designated scenic vistas for the city of Berkeley, the city of Oakland, UC Berkeley, or the Berkeley Lab, the hillside areas of Strawberry Canyon offer extensive views of the San Francisco Bay and present a scenic landscape from lower elevations. As discussed in **Section 4.1, Aesthetics**, under Helios Impact VIS-1, project construction would be visible from locations along public roadways including Grizzly Peak Boulevard and Centennial Drive, from locations on the UC Berkeley Campus and from limited areas in the Panoramic Hill neighborhood. This work would entail the use of heavy equipment and could be most noticeable to local residents. This project-level impact would be potentially significant but reduced to a less than significant level with the proposed mitigation. This potential impact of the proposed project would not cumulate with the impacts from other near-term projects because all of the projects proposed at LBNL (including the CRT project), UC Berkeley, and in the city of Berkeley would not form part of the scenic views that contain the project site. Therefore, there would not be a significant near-term cumulative effect related to construction activities.

Mitigation Measure: No project-level mitigation measure required.

Helios Cumulative Impact VIS-2: The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not substantially affect visual resources. (*Less than Significant*)

Lands northeast of the Berkeley Lab and farther eastward into the East Bay hills are managed by the East Bay Regional Park District (EBRPD). The EBRPD does not have plans to build large facilities. The city of Berkeley extends into the hill area adjacent to and north of the Berkeley Lab. City zoning for the hill area is single-family residential with a maximum floor area ratio of 0.4 for any given lot. In accordance with the City's latest General Plan, no large buildings would be developed in this area, and existing developed areas – which are largely built out – would be limited in the degree of new development that could occur. The areas within Oakland city limits near LBNL are designated Hillside Residential in the Oakland General Plan and zoned either Low Density or Single Family where significant new development is not expected to occur. UC Berkeley does not propose substantial new development on its Hill Campus, and much of the remaining surrounding area is park or open space land. Furthermore, all new development on the Hill Campus would be subject to the design provisions of the 2020 LRDP specific for the Hill Campus area and also to Continuing Best Practices for the Hill Campus included in the 2020 LRDP EIR. The Final EIR for the UC Berkeley SCIP found that the SCIP would result in a significant unavoidable visual impact on the character of Gayley Road due to construction of a new parking structure and on views from Panoramic Hill due to improvements to Memorial Stadium (UC Berkeley 2006). However, due to the projects' location the impact would be specific to the Integrated Projects analyzed in the SCIP EIR.

Given the above, little development beyond that proposed at Berkeley Lab under the 2006 LRDP is anticipated in the Oakland-Berkeley hills in the general area of LBNL in the long-term. Most of the other LBNL projects that are proposed at the present time would involve seismic retrofit and only the Guest House project and CRT project would involve new construction. As discussed in Helios Impact VIS-2, the construction of the proposed project could adversely affect the visual character of the site and its surroundings as seen from a limited area within the Panoramic Hill neighborhood. However, the CRT and Guest House projects, although also located on the LBNL hillside, would not be visible from the same viewpoints as the proposed project. Therefore, a cumulative visual impact on visual character would not occur. Furthermore, the extent of foreseeable development that would be constructed in areas that could be considered part of scenic vistas is considered minimal relative to the amount of open, available land. Therefore, there would be no significant cumulative effect on scenic vistas or visual character in the near-term or the long-term. Finally, there could be increased light and glare sources as a result of cumulative projects at the LBNL site. However, because all projects would comply with the LBNL 2006 LRDP design guidelines such as low-profile lighting, anti-glare coatings, and non-reflective

surfaces, this impact would be reduced to a less than significant level for all projects. Therefore, there would not be a significant cumulative impact related to light and glare.

The fuel management projects proposed by UC Berkeley for the Strawberry and Claremont Canyons would remove non-native vegetation that poses a fire danger. The elimination of approximately 170 acres of predominantly eucalyptus re-sprouted stems and other non-native trees would be noticeable to nearby residents and recreational users in the area, but is not expected to cause a significant visual impact given the extent of surrounding open space and remaining vegetation, and the fact that native vegetation would reestablish. Furthermore, the fuel management projects are not proposed in areas that would be within the same viewshed as the Helios project, and therefore, although the proposed project would also remove some trees, it would not result in a cumulative impact on scenic views as a result of tree removal.

In summary, the proposed project in conjunction with other development in the project area, would not result in a significant cumulative impact.

Mitigation Measure: No project-level mitigation measure required.

5.5.2 Air Quality

Helios Cumulative Impact AIR-1: The proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard. (*Less than Significant*)

According to the *Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines*, any project that would individually have a significant air quality impact would also have a significant cumulative air quality impact. As discussed in **Section 4.2, Air Quality,** under Helios Impact AIR-2, emissions associated with operation of the proposed project would not exceed the BAAQMD-recommended operational thresholds of significance. Therefore, the project would not individually have a significant air quality impact.

For a project that does not individually have a significant air quality impact, the BAAQMD *CEQA Guidelines* recommend that a determination of cumulative impacts be based on an evaluation of the consistency of the project with the local general plan and of the general plan with the regional air quality plan. The latest U.S. EPA-approved regional air quality plan for this area is the *2005 Ozone Strategy*. If a project is proposed in a city or county with a general plan that is consistent with the *2005 Ozone Strategy*

and the project is consistent with that general plan, the project would not have a significant cumulative impact.

To analyze if the proposed project is consistent with the *2005 Ozone Strategy*, the *BAAQMD CEQA Guidelines* recommends evaluating whether (1) the project provides buffer zone for odors and toxics, (2) the extent to which transportation control measures (TCM) are implemented, and (3) the consistency with the CAP's projections for vehicle miles traveled (VMT) and population. The *BAAQMD CEQA Guidelines* considers the development or presence of a buffer zone for odors and toxics as criteria for determining consistency with the *2005 Ozone* Strategy. The proposed project would include a buffer zone between the residential neighborhoods to the north, northwest, and south. The project site is located on the southeast portion of LBNL and the open space areas of the Berkeley Lab and UC Berkeley serve as an adequate buffer from the residential units.

The proposed project is designed with numerous measures that support CAP TCMs. The following discussion includes the applicable TCMs and an analysis of the proposed project's consistency with these measures.

- TCM 1 – Support Voluntary Employer-Based Trip Reduction Programs: The proposed project would be supported by the LBNL shuttle system, which would transport employees from the UC Berkeley campus as well as the city of Berkeley, thereby reducing employee work trips.

- TCM 9 – Improve Bicycle Access and Facilities: The proposed project would include a covered walkway for building access along the southern portion of the project site and a sidewalk along the proposed access road. In addition, the proposed project would provide bicycle racks for employees that bike to work. Bicycle infrastructure such as bike racks would encourage biking as an alternative mode of transportation.

- TCM 12 – Improve Arterial Traffic Management: As part of the proposed project, a new access road along Centennial Drive would lead to the project site. The access road would be upgraded and widened as part of the improvements. These improvements would allow less congestion and idling time.

- TCM 15 – Local Clean Air Plans, Policies and Programs (focus on site design to reduce single-occupancy vehicle trips): The proposed project would provide 50 parking spaces specifically designated for the Helios Facility, with a limited number of additional spaces available in other nearby parking lots for the facility users. The Berkeley Lab would control single-occupancy-vehicle trips by issuing parking permits for only a limited number of persons. The proposed project would employ approximately 500 people; therefore, a number of the new employees would be required to

use alternative modes of transportation, such as the Berkeley Lab and UC Berkeley shuttles, carpooling, bicycling or walking.

- TCM 19 – Pedestrian Travel: The proposed project would include a covered walkway for building access along the southern portion of the project site and a sidewalk to promote walking.

By developing fewer parking spaces than the number of persons associated with the proposed project, on-site parking would remain a limiting factor for driving to work, thereby minimizing VMT in the region.

As discussed above, the proposed project would be consistent with all of the criteria used to determine consistency with the *2005 Ozone Strategy*. In addition, all appropriate control measures would be implemented during construction to minimize the generation of fugitive dust. Long-term operational emissions associated with the proposed project would also be less than all thresholds of significance. Therefore, the proposed project would be considered consistent with the *2005 Ozone Strategy* and would not make a cumulatively considerable contribution to the cumulative impact on air quality in the region. This impact is considered less than significant.

Mitigation Measure: No project-level mitigation measure required.

Helios Cumulative Impact AIR-2: Although the proposed project would result in greenhouse gas emissions, its contribution to the significant cumulative impact associated with greenhouse gas emissions would not be cumulatively considerable. (*Less than Significant*)

The proposed project would generate greenhouse gas (GHG) emissions, which would contribute to potential cumulative impacts of GHG emissions on global climate. The GHG emissions associated with area and mobile sources were estimated using URBEMIS2007. URBEMIS2007 provides estimates of CO_2 emissions for area sources, including natural gas combustion and landscape maintenance. In addition, URBEMIS2007 also provides an estimate of CO_2 emissions from vehicle emissions associated with travel to and from the proposed project. The emissions of CO_2, the primary greenhouse gas associated with mobile and area sources estimated using URBEMIS2007 were adjusted to convert CO_2 emissions to GHG emissions on a carbon dioxide equivalent (CO_2E) basis:

- Motor vehicles: The annual CO_2 emissions associated with motor vehicle trips were multiplied by a factor based on the assumption that CO_2 represents 95 percent of the (CO_2E) emissions associated with passenger vehicles, which account for most of the project-related trips (U.S. EPA 2005).

- Area sources (natural gas combustion): The CO_2 emissions from natural gas consumption for water and space heating were adjusted based on emission factors for CO_2, CH_4, and N_2O for natural gas combustion from the U.S. EPA's *Compilation of Air Pollutant Emission Factors* (U.S. EPA 1998) and the global warming potential for each GHG.

A detailed summary of the greenhouse gas emissions associated with the proposed area and mobile sources is included in **Appendix 4.2**.

CO_2 emissions associated with the proposed emergency generator were calculated using emission factors from U.S. EPA's AP 42 (U.S. EPA 1996). No methane or nitrous oxide emission factors are presented in AP 42 for diesel-fired engines, but these emissions are generally very small from diesel-fired equipment (less than 1 percent on a CO_2 equivalent basis). The GHG emissions from stationary sources were added to the area and mobile source GHG emissions to calculate the annual GHG emissions associated with the operation of the proposed project. The estimated annual GHG emissions associated with the proposed project are shown in **Table 5.0-2**, **Estimated Greenhouse Gas Emissions, Helios Project**.

Table 5.0-2
Estimated Greenhouse Gas Emissions, Helios Project

Emissions Source	GHG Emissions (Metric Tons CO_2E Per Year)
Area and Mobile Sources	714
Stationary Sources	3,277
Total GHG Emissions	3,991

*Source: Impact Sciences, Inc. Emissions calculations are provided in **Appendix 4.2**.*

To date, no quantitative emission thresholds or similar criteria have been established to evaluate the cumulative impact of a single project on global climate. In the absence of quantitative emissions thresholds, consistency with adopted programs and policies is used by many jurisdictions to evaluate the significance of cumulative impacts. However, the project's consistency with the implementing programs and regulations to achieve the statewide GHG emission reduction goals established under Executive Order S-3-05 and AB 32 cannot yet be evaluated because those programs and regulations are still under development.

Individual projects under the 2006 LRDP must implement GHG emission reduction strategies through compliance with the UC Policy on Sustainable Practices and the Guidelines for implementation of this policy. Emission reduction strategies instituted under this policy include practices related to green building design, clean energy, climate protection, transportation, operations, recycling and waste

management, and environmentally preferable procurement. The project would comply with these requirements. These requirements are similar to many of the measures that have been recommended to implement AB 32, and implementation of these sustainable practices will help to meet the goals and emission reduction targets of AB 32.

Numerous provisions are included in the proposed project that will substantially lessen the project's contribution to global climate change. The proposed project would encourage use of transit and alternative transportation modes such as through implementation of LBNL's Transportation Demand Management program and by issuing a limited number of parking permits to Helios Facility users, which could help reduce transportation-related GHG emissions, relative to what would otherwise occur. New construction at the Helios Facility would meet the requirements of UC Policy for Sustainable Practices, and would outperform California Energy Code Title 24 by at least 20 percent. This commitment to energy efficient design would further help reduce future energy demand as well as reduce the project's contribution to regional GHG emissions.

The project also includes the removal of trees, as discussed in **Section 4.3, Biological Resources**. This removal of trees, and vegetation removal associated with the near-term cumulative projects, would result in the loss of some carbon sequestration. The project includes, however, replacement plantings of native plant species to replace the removed trees, and this replacement planting will substantially lessen the project's contribution to any cumulative impact on carbon sequestration.

Moreover, as stated in **Section 3.0, Project Description**, research conducted in the Helios Facility would focus on advanced photovoltaics (solar panels), storage of electrical energy, and development of chemical processes that mimic photosynthesis. The Helios project would involve development of efficient alternative fuel sources such as microscopic solar panels (to harness solar power) and synthetic biofuels. The EBI program would involve research to develop renewable biofuels for transportation and the conversion of heavy hydrocarbons to clean fuels. In addition, the EBI program would also conduct research on fossil fuel bioprocessing and carbon sequestration, including studies of biological processes to improve oil recovery, fossil fuel processing and biological carbon sequestration. Therefore, the Helios Facility as a whole would foster the research and development of technology focused on reducing reliance on fossil fuels and their associated contribution to global climate change.

Based on this analysis, the proposed project would substantially lessen its contribution to GHG emissions and global climate change, as well as foster technological improvements that will assist California in meeting the goals of AB 32 and the Governor's Executive Order S-3-05. Accordingly, the project will substantially lessen its contribution to the cumulative impact of GHG emissions, and the impact would thus not be cumulatively considerable. The impact would be less than significant.

Mitigation Measure: No project-level mitigation measure required.

Helios Cumulative Impact AIR-3: Even though overall cumulative impacts will decrease over time, the proposed project will make some incremental contribution to cumulative cancer risk impacts associated with future development of LBNL and UC Berkeley. (*Significant*; *Significant and Unavoidable*)

According to the *BAAQMD CEQA Guidelines*, any project that would individually have a significant air quality impact would also have a significant cumulative air quality impact. As discussed previously in **Section 4.2**, emissions of carcinogenic toxic air contaminants (TACs) associated with operation of the proposed project would not exceed the BAAQMD-recommended operational threshold of significance of 10 in one million. Therefore, the project would not individually have a significant impact related to human health. When taken into consideration with other carcinogenic TACs associated with planned growth under the LBNL 2006 LRDP and the UC Berkeley 2020 LRDP, the maximum impacts would exceed the 10-in-one-million threshold at some locations both on the LBNL site and in adjacent areas. The incremental risk from the proposed project would not change the calculated cancer risk level in a mathematically-significant sense (i.e., would not change the numbers reported in the 2006 LRDP) at any of the affected locations, but the proposed project would make some very small contribution to this cumulative air quality impact. This is explained in more detail below.

The cancer risks at the maximally exposed on-site and off-site receptors from the proposed project, as shown in **Table 4.2-10**, are 1 in one million and 0.5 in one million, respectively, which are well below the threshold of significance for project impacts.

The cumulative impact, and the proposed project's contribution to the cumulative impact, was evaluated using the cumulative impacts analysis that LBNL prepared and included in its 2006 LRDP EIR, as well as the results from the HHRA prepared for the proposed project. The HHRA prepared for the 2006 LRDP and LBNL's subsequent cumulative impacts analysis in the 2006 LRDP EIR identified on-site and off-site areas where the cumulative risk exceeded the CEQA significance criteria of 10-in-a-million risk. Adding the Helios project's risk values to the results at locations where cumulative risk values were shown to exceed a 10-in-a-million risk would contribute to the cumulative risk in an amount or value that is at least two orders of magnitude smaller than the overall cumulative risk value. A representation of this conclusion is the unoccupied UC land immediately south of the Helios project site where the LBNL cumulative analysis for the 2006 LRDP EIR indicated that the lifetime excess cancer risk in this area peaks at approximately 20-in-a-million (with LBNL activities accounting for more than 90% of this value). The

estimated risk from the Helios project in this same area peaks at less than 0.5-in-a-million, a value that is approximately two orders of magnitude lower.

The cumulative analysis in the 2006 LRDP EIR noted that the overall health risk will decrease over time, and has decreased in the region since 1995. The analysis also noted that LBNL's incremental contribution to total lifetime cancer risk at any location would be small. Nevertheless, because the estimates showed that cumulative cancer risks would exceed the threshold at some locations, the 2006 LRDP EIR concluded that LBNL's contribution would be considerable.

The Helios project would not result in any incremental project-related increases in excess of the risk threshold, and the contribution of the project would be magnitudes smaller than the cumulative risk. However, because the project would result in some TAC emissions that would contribute to the overall cumulative risk, this EIR considers the contribution to be considerable, and therefore the cumulative impact would be significant and unavoidable.

Helios Mitigation Measure Cumulative AIR-3: Because most of the cancer risk from TACs is due to diesel particulate emissions, measures to reduce the risk (beyond regulations already in place that will substantially reduce diesel particulate emissions in the next 20 years) shall include those measures that could reduce vehicle travel to and from the Helios project (LRDP Mitigation Measures TRANS-1d and TRANS-3), and those measures that reduce emissions from construction equipment and the project's backup generator (LRDP Mitigation Measures AQ-1b and AQ-4a).

Significance after Mitigation: Even with implementation of these measures, the Helios project would still result in some incremental emissions that would contribute to the cumulative impact, so the project's contribution to the cumulative impact cannot be reduced to a less-than-significant level.

Helios Cumulative Impact AIR-4: The proposed project would not result in a cumulatively considerable contribution to cumulative noncancer health impacts associated with future development of LBNL and UC Berkeley. (*Less than Significant*)

According to the *BAAQMD CEQA Guidelines*, any project that would individually have a significant air quality impact would also have a significant cumulative air quality impact. As discussed previously in **Section 4.2**, emissions of noncarcinogenic TACs associated with operation of the proposed project would not exceed the BAAQMD-recommended operational threshold of significance of a hazard index of 1.0. Therefore, the project would not individually have a significant noncancer human health impact. When taken into consideration with other noncarcinogenic TACs associated with existing operations and planned growth in the area (future development under the LBNL 2006 LRDP and the UC Berkeley

2020 LRDP), the maximum impacts would still not exceed the hazard index threshold of 1.0 as discussed below.

The noncancer chronic hazard indices at the maximally exposed on-site and off-site receptors as a result of the proposed project, as shown in **Table 4.2-12, Summary of Maximum Hourly Laboratory Toxic Air Contaminant (TAC) Emissions (Acute Noncarcinogens)**, are 0.04 and 0.007, respectively, which are well below the threshold of significance. An HHRA was prepared to evaluate the human health impacts of Berkeley Lab growth under the 2006 LRDP. The 2006 LRDP HHRA indicated that the maximum chronic hazard indices at on-site and off-site receptors were 0.36 and 0.25 respectively. The highest chronic hazard index based on UC Berkeley 2020 LRDP growth was 0.13. While the locations of all three maximum impacts differed considerably, even if the maximum impacts were added together, the cumulative chronic health impact would be well below the threshold of 1.0. Thus, the proposed project would not result in a cumulatively considerable contribution to chronic health impacts in the local area.

Mitigation Measure: No project-level mitigation measure required.

5.5.3 Biological Resources

Helios Cumulative Impact BIO-1: The proposed project, in conjunction with other reasonably foreseeable near-term projects and long term development, would not result in a significant cumulative impact on biological resources. (*Less than Significant)*

Near-Term Cumulative Projects

Table 5.0.1 lists near-term projects which, if approved, would be implemented between 2007 and 2012. With the exception of the Helios and CRT projects, all other projects proposed on the Berkeley Lab site involve existing buildings and would not affect sensitive biological resources because the site of each project is already disturbed. Furthermore, all LBNL projects would implement 2006 LRDP mitigation measures to avoid or minimize short-term construction-phase impacts on biological resources. The CRT project would require the removal of approximately 64 blue gum eucalyptus, five coast live oak, two California bay, and one plum tree and depending on intersection option, the Helios project would affect between 104 to 128 trees, mostly oak, redwood, and bay trees. Both projects would be located in areas that are determined to have highly suitable potential habitat for Alameda whipsnake.

With respect to the near-term-projects proposed on the UC Berkeley campus, with the exception of the three fire fuel reduction projects, all of the near-term projects would be located in developed areas where sensitive biological resources would generally not be present. In compliance with the campus'

2020 LRDP, all UC Berkeley projects would be required to implement continuing Best Management Practices that would avoid or minimize impacts on sensitive biological resources. The three fire fuel reduction projects would involve the removal of approximately 44,000 resprouted eucalyptus stems, other non-native trees, and some pine trees over an area of approximately 170 acres located in Strawberry and Claremont canyons. All three projects would be located in areas that are determined to have moderate to highly suitable potential habitat for the Alameda whipsnake.

Near-term projects proposed within the city of Berkeley are within developed urban areas and would not disturb sensitive biological resources.

With respect to the water storage tank proposed by EBMUD, adequate information is not available at this time to characterize the environmental impacts of that project. However, based on preliminary review of the proposed sites under consideration for that project, it is anticipated that the project will likely require removal of existing natural vegetation, including trees.

As discussed in Helios Impact BIO-1, the proposed project would involve the removal of approximately 4.01 acres of existing vegetation, including between 104 to 128 trees. Therefore, the proposed project in conjunction with the CRT project, the three fire fuel reduction projects proposed by UC Berkeley, and the EBMUD water storage tank project would result in the removal of existing vegetation including native and non-native trees, and would entail ground-disturbing activities in areas determined to have moderate to highly suitable potential habitat for Alameda whipsnake. However, the cumulative impact from the implementation of these projects on biological resources would not be significant because each LBNL project would implement appropriate mitigation measures to avoid or minimize its impacts. The fire fuel reduction projects would be implemented generally outside the nesting season and would comply with the UC Berkeley 2020 LRDP which requires nesting bird surveys before tree removal, replacement of specimen trees, and precautions to avoid discharge of sediment and other pollutants into surface water during ground disturbing activities. As these fire fuel reduction projects would be federally funded, they would also implement conservation measures for the protection of Alameda whipsnake (and other federally listed species) as required by the US Fish and Wildlife Service. The fire fuel reduction projects would be beneficial for wildlife species as they would remove non-native species and promote native forests and scrub habitats. Because the EBMUD water storage tank would be located on University land, depending on location, it would also be required to comply with either the UC Berkeley 2020 LRDP or the LBNL 2006 LRDP requirements to minimize biological resource impacts. As discussed in **Section 4.3**, the proposed Helios project would replace any trees removed at a ratio of 1:1, with native trees replaced at a ratio of 2:1 and specimen trees replaced at a ratio of 3:1. Furthermore, all replacement trees would be native trees. The project would also implement 2006 LRDP mitigation measures that would avoid or minimize impacts to Alameda whipsnake. The CRT project would replace

non-native eucalyptus trees with native trees and therefore would be beneficial for the wildlife species in the project region. The CRT project would also implement 2006 LRDP mitigation measures that would avoid or minimize impacts to Alameda whipsnake. In summary, vegetation removal and ground disturbing activities associated with the near-term cumulative projects would not result in a significant cumulative impact on biological resources.

Long Term Cumulative Development

In addition to the near-term projects discussed above, other projects considered under the 2006 LBNL (including the proposed project) and 2020 UC Berkeley LRDPs, as well as future residential development under the Berkeley and Oakland General Plans, would combine to reduce open space and available habitat for both common and special-status wildlife and plants. However, open space currently comprises a significant portion of the geographic context for cumulative impacts analysis in this section. Most of the LBNL hill site and the UC Berkeley Hill Campus are currently in open space, as is the vast majority of Tilden Regional Park. New development occurring under the Berkeley or Oakland general plans in the area would primarily be considered infill in areas zoned as residential and there are no large developments pending in the area under these plans. The East Bay Regional Park District currently has no plans for large facilities development or reductions in open space at Tilden Park. Implementation of the LBNL 2006 LRDP would result in the development of approximately 9.5 acres of available open space and habitat at the site, which includes the loss of open space associated with the proposed Helios Energy Research Facility project as well as the CRT Facility project. Implementation of the UC Berkeley 2020 LRDP could result in the development of less than 5 acres of existing open space in the Hill Campus. Therefore, growth under these plans would not result in a substantial reduction in open space or wildlife habitat and this cumulative impact is considered to be less than significant.

The magnitude of cumulative effects of development on biological resources is in large part determined by the extent to which resources are protected in plans and during specific project implementation. The LBNL and UC Berkeley LRDPs, as well as the East Bay Regional Park District's Master Plan and the City of Oakland and City of Berkeley General Plans, all contain policies and guidelines for protecting natural resources, including special-status species, sensitive natural communities, and jurisdictional waters. All development under the LBNL (including the Helios Energy Research Facility and the CRT projects) and UC Berkeley LRDPs and any development under the East Bay Regional Park District's Master Plan would also take place in a regulatory context of federal, state, and local laws that combine to avoid and minimize impacts to special-status species, sensitive natural communities, jurisdictional waters, and wildlife migratory corridors and nurseries through a variety of tools, including the creation of resource-specific management plans and the application of mitigation measures. Mitigation measures and best management practices applied to specific projects would help to ensure that they would not result in substantial adverse impacts to biological resources. Therefore, the cumulative impact to biological

resources resulting from the proposed Helios project and other considered projects would be less than significant.

Mitigation Measure: No project-level mitigation measure required.

5.5.4 Cultural Resources

Helios Cumulative Impact CUL-1: The proposed project, in conjunction with other reasonably foreseeable near-term and long-term development, would not result in a significant cumulative impact on cultural resources. (*Less than Significant*)

Based on an evaluation of the age and other criteria for determination of the significance of a historic structure, some buildings on the LBNL site are considered historic. Although the proposed project would require the demolition of up to two buildings, neither building qualifies as a historic resource and therefore the project would not contribute to a cumulative impact related to historic resources. With respect to a potential cumulative impact on Strawberry Canyon as a potential cultural landscape, as discussed in **Section 4.4, Cultural Resources**, Strawberry Canyon has not been evaluated nor designated a cultural landscape by the City of Berkeley Landmarks Preservation Commission or the State Historic Preservation Officer at this time. Furthermore, at this time the City does not have an ordinance to designate cultural landscapes, the canyon has not been recorded or nominated to the National Register or California Register as a cultural landscape, and it is not clear that it has characteristics that would warrant such nomination or would make it eligible for listing. Therefore, there is currently no basis for determining that any potential cumulative impact on Strawberry Canyon as a potential cultural landscape is cumulatively considerable.

Concerning potential cumulative impacts on unknown archaeological resources, the areas surrounding LBNL are either built out or would be retained as open space, thus limiting development in undisturbed areas. Furthermore, all projects would be required to halt construction in the event that previously unknown archaeological resources are encountered during ground disturbing activities. Therefore, cumulative impacts on cultural resources would not be considered significant.

Furthermore, as specific projects are proposed in the vicinity and LBNL and in the region, lead agencies would have to determine, on a case-by-case basis, whether the potential for historical or archaeological resources to be disturbed or adversely affected exists at a particular site. Therefore, site-specific research on the presence of historical and/or archaeological resources is frequently one of the first considerations in project planning and CEQA review. Accordingly, implementation of the proposed project, in

conjunction with other reasonably foreseeable development, is not expected to result in a significant cumulative effect on historical or archaeological resources.

Mitigation Measure: No project-level mitigation measure required.

5.5.5 Geology and Soils

Helios Cumulative Impact GEO-1: The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would place new structures and introduce an increased population in a seismically active region. (*Less than Significant*)

Development pursuant to the 2006 LRDP, along with development at UC Berkeley under the campus' 2020 LRDP would increase both the population and employment concentration in the area of northeastern Berkeley and Oakland that is occupied by the UC Berkeley campus and the LBNL hill site. The proposed project would increase the day-use population at the Berkeley Lab site by over 300 people, and at times by as much as 600 people, when the auditorium is in use and at full capacity. It is anticipated that the CRT project would add up to 165 people at the Berkeley Lab site. Other near and long-term Berkeley Lab projects are not expected to cause substantial increases in the day-use population; a maximum increase of 1,000 ADP over the Berkeley Lab's 2003 population is expected. In addition, other cumulative development in the surrounding area could result in population growth of approximately 13 percent in Berkeley and 20 percent or more in northern Alameda County and western Contra Costa County by 2025. Together, this cumulative growth would increase the population in the Bay Area, and particularly in proximity to the Hayward Fault, that would be subject to strong groundshaking in a major earthquake. Additionally, cumulative hillside development, either in the UC Berkeley hill area or on private property in the Oakland-Berkeley hills, would increase the number of persons at risk of seismically induced landslides and other potential slope-related hazards.

It is not possible to eliminate the risk from construction in earthquake-prone areas, nor is it possible to fully avoid all geologic hazards. However, these hazards would be mitigated to the extent practicable through implementation of and compliance with adopted General Plan policies, building codes, and regulations. Building codes and local construction requirements have been established to protect against building collapse and major injury during a seismic event. As discussed in **Section 4.5, Geology and Soils**, The proposed project would implement State seismic construction regulations and would implement additional measures, as described in Helios Impact GEO-3. Construction in conformance with the California Building Code, local building codes, where applicable, and other pertinent regulations and

guidelines would reduce the risks of injury and structural damage from groundshaking, earthquake-induced landslides, and other seismic and geologic hazards to a less-than-significant level.

The EIR for the UC Berkeley SCIP found that the SCIP would result in a significant unavoidable impact due to the presence of the Hayward Fault, which traverses the SCIP site and runs below Memorial Stadium (UC Berkeley 2006). However, that impact is site-specific and the proposed project would not contribute to the site-specific impact.

Mitigation Measure: No project-level mitigation measure required.

5.5.6 Hazards and Hazardous Materials

Helios Cumulative Impact HAZ-1: The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would involve the use of hazardous chemicals that would not pose a significant cumulative risk to the public or the environment. (*Less than Significant*)

Implementation of the proposed project and other projects under the 2006 LRDP would increase storage of hazardous and radioactive materials at LBNL and would increase the generation of hazardous, low-level radioactive, mixed, and medical waste. In the vicinity of LBNL, UC Berkeley would increase the amount of hazardous materials handled and hazardous waste requiring disposal through implementation of its 2020 LRDP. Other changes that could further increase the amount of hazardous materials and waste handled in the area include expansion of biotechnology industry firms in the East Bay and expansion of or changes in the operations of refineries, chemical companies, and other hazardous materials and waste facilities in western Contra Costa County.

Compliance of the proposed project with federal, state, and local regulations, and UC Berkeley policies would reduce potential impacts to a less than significant level. Similar compliance with the regulations of UC Berkeley, LBNL, and other institutions governing hazardous materials and hazardous wastes applicable to the activities and projects for which they are responsible would reduce the potential cumulative impact in the vicinity of LBNL to a less-than-significant level.

Helios Cumulative Impact HAZ-2: The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would result in a cumulative impact related to evacuation along Centennial Drive during emergencies associated with a wildland fire or a major earthquake, but the project's contribution to the cumulative impact would not be considerable. (*Less than Significant*)

The proposed project is located in the Oakland-Berkeley hills, in an area that is at risk of wildland fires. It is also in close proximity to Hayward Fault and has the potential to experience substantial seismic groundshaking as a result of an earthquake on the Hayward or other major Bay Area faults. Although some projects, such as the UC Berkeley SCIP, would actually improve emergency access in the project area, development of other near-term and long-term cumulative projects would add people and structures to a high fire risk area and to an area subject to substantial seismic groundshaking. The proposed project has been designed to minimize any contribution to this potential cumulative impact. As discussed in **Section 4.6, Hazards and Hazardous Materials**, under Helios Impact HAZ-3, the Berkeley Lab in coordination with UC Berkeley is developing an Emergency Response Plan for the proposed project. During an emergency situation, vehicular access to Centennial Drive from the project site would be controlled. Furthermore, to the extent appropriate for the emergency at hand, persons evacuating the Helios Facility would not utilize Centennial Drive as a vehicular or pedestrian evacuation route. All personnel in the building would be directed by LBNL security staff to a designated meeting point on LBNL. Evacuation of personnel from this point would be coordinated with the Berkeley Lab, UC Berkeley, and the City of Berkeley to determine appropriate evacuation routes. The Hill Campus area and Panoramic Hill residents could still access the Jordan fire/recreation trail for pedestrian evacuation purposes. The project would not add further congestion to the trail, and the existing evacuation route along Centennial Drive would not be further congested due to the proposed project. Therefore, the project's contribution to the cumulative impact related to evacuation during emergencies would not be cumulatively considerable.

Mitigation Measure: No project-level mitigation measure required.

5.5.7 Hydrology and Water Quality

Helios Cumulative Impact HYDRO-1: The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not result in a cumulative impact on surface water resources. (*Less than Significant)*

Pursuant to LBNL 2006 LRDP, the Berkeley Lab plans to add a net total of 660,000 square feet of new building space on the LBNL site. However, LBNL has committed under the 2006 LRDP to control stormwater runoff from new development and significant redevelopment to pre-project levels. Both Helios and CRT projects include design features to meet this requirement.

The UC Berkeley 2020 LRDP does not identify any specific projects to be developed on the lands of the sub-watershed of the Upper Strawberry Creek. The UC Berkeley 2020 LRDP projected that approximately 100,000 gsf of building space could be constructed somewhere on the Hill Campus area, but the 2020 LRDP noted that on-site stormwater management features would be incorporated so that there would be no increase in net stormwater runoff flows. Finally, the EIR for the UC Berkeley SCIP found that, with mitigation, the SCIP would neither result in significant hydrological impacts, nor contribute considerably to cumulative hydrologic impacts (UC Berkeley 2006).

The City of Berkeley General Plan indicates that no significant changes to roadways or the residential development in the Upper Strawberry Creek sub-watershed are anticipated.

Implementation of the LBNL 2006 LRDP and UC Berkeley 2020 LRDP would have similar programmatic level results, as projects under both plans would be required to comply with NPDES permit regulations to minimize short-term and long-term degradation of surface water quality from stormwater runoff. Therefore, each project that would be developed under either LRDP would be required to comply with the Statewide NPDES permit for discharges of stormwater from construction sites and comply with Phase II NPDES requirements for stormwater discharges after completion of construction in the case of UC Berkeley and with the site-wide Industrial Storm Water Permit in the case of LBNL. Compliance with NPDES requirements by the two entities would help avoid cumulative water quality impacts from urban runoff to the maximum extent practicable.

Consistent with the 2006 LRDP mitigation measures, all projects on the LBNL site and consistent with its 2020 LRDP, all projects on the UC Berkeley campus would include design features to limit post-development flows to pre-development levels. All of these measures would help avoid significant hydromodification in the Strawberry Canyon and therefore significant erosion of the creek system would be avoided. The cumulative impact on surface water quality would therefore be less than significant.

Mitigation Measure: No project-level mitigation measure required.

5.5.8 Land Use and Planning

Helios Cumulative Impact LU-1: **The proposed project, in conjunction with other reasonably foreseeable near-term and long-term development, would not involve a significant cumulative impact related to land use. (*Less than Significant*)**

As discussed in **Section 4.8, Land Use and Planning**, Helios Impact LU-1, the proposed project would implement land uses that are consistent with the 2006 LRDP designation for the project site and are compatible with surrounding LBNL land uses. Lands designated for development by the LBNL 2006 LRDP, the UC Berkeley LRDP, and the City of Berkeley and Oakland General Plans are generally lower density or are already developed. Both the Berkeley Lab and the UC Berkeley campus would develop consistent with the adopted LRDPs. Cumulative development in the vicinity of the proposed project is not expected to introduce land uses that would be substantially incompatible with the proposed Berkeley Lab development or other adjacent development. Development of the proposed project along with the development of reasonably foreseeable projects in the vicinity of the proposed project would not result in a significant cumulative impact associated with incompatible land uses. Therefore, the cumulative land use impact is considered less than significant.

Mitigation Measure: No project-level mitigation measure required.

5.5.9 Noise

Helios Cumulative Impact NOISE-1: **Near-term development in the vicinity of the project site would increase exterior noise levels during construction. (*Less than Significant)***

Based on the construction schedules of the near-term cumulative projects listed in **Table 5.0-1**, it is anticipated that construction will be underway on a number of other near-term projects at the Berkeley Lab, UC Berkeley, and in the city of Berkeley the same time the proposed project is under construction. Due to the distance between the project site and the sites of most of these projects (including the CRT Facility project), noise from construction activities would not cumulate with that resulting from the construction of the Helios project. The one exception would be the EBMUD water storage tank project, which would be located close to the Helios project in the southern portion of LBNL or near the UC Berkeley Botanical Garden. If construction of the EBMUD water storage tank alternative which is due north of the Helios project site were to occur the same time as the Helios project, construction noise from both projects could affect the same receptors. However, the combined noise is unlikely to exceed the City

of Oakland or the City of Berkeley noise ordinance thresholds at the nearest receptors because of the distance between the noise sources and the sensitive receptors.

Cumulative construction truck traffic associated with the near-term projects listed in **Table 5.0-1** was analyzed to determine whether or not it would cause a substantial temporary increase in noise along the major arterials, namely Hearst Avenue, Shattuck Avenue, and University Avenue, that would be used by the construction trucks associated with the Helios project. Existing noise levels along these roadways are provided in the UC Berkeley LRDP EIR (Table 4.10-4). The baseline noise level along Hearst Avenue and Shattuck Avenue is 69 -70 dBA L_{dn}. The baseline noise level along University Avenue is 70-73 dBA L_{dn}.

Construction truck traffic volumes were added together for eight projects at LBNL including Helios and CRT projects, four projects that would be constructed in the same period at UC Berkeley, and three projects in the city of Berkeley.[3] Assuming all projects are under construction concurrently, and all construction truck traffic is traveling along the same arterials, on a "normal day" the noise level is calculated to increase 1 dBA L_{dn}. On a "peak day" the noise level is calculated to increase from about 2 dBA to less than 3dBA L_{dn}. The second scenario represents the upper estimate of possible noise effects because peak construction truck traffic for <u>all</u> projects is unlikely to overlap. An increase of less than 3 dBA L_{dn} is not substantial and the cumulative noise impact from construction truck traffic would be less than significant. Even if vehicle trips associated with Helios project construction workers traveling to and from the site were added to the cumulative construction truck traffic, the resultant noise from this traffic would not exceed 3 dBA L_{dn}. Therefore, the cumulative noise impact from construction traffic would not be significant.

Mitigation Measure: No project-level mitigation measure required.

Helios Cumulative Impact NOISE-2: **The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not result in a significant cumulative permanent increase in ambient noise levels. (*Less than Significant*)**

As discussed in Helios Impact NOISE-3, four different scenarios were analyzed, including cumulative with project peak hour traffic volumes. These traffic data were used to determine whether there would be a substantial increase in traffic noise on streets serving the project site as a result of cumulative plus project-generated traffic. Project-generated traffic is calculated to make no noticeable or measurable

[3] Truck trips associated with the EBMUD water storage tank project could not be considered in this analysis because specifics of the project are not available at this time in terms of the amount of excavation that would be involved and whether the project would balance cut and fill.

change (less than 0.5 dBA L_{dn}) in noise levels at any of the roadway segments associated with the study intersections. Therefore, project-generated traffic would not make a cumulatively considerable contribution to noise increases that may occur due to other development.

Mitigation Measure: No project-level mitigation measure required.

5.5.10 Population and Housing

Helios Cumulative Impact POP-1: The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not result in a significant cumulative impact on population or housing. (*Less than Significant*)

Helios Impact POP-1 evaluated the impact of project growth in conjunction with other regional growth on population and housing. As noted **Section 4.10, Population and Housing**, LBNL is one of the largest employers in Berkeley, and by far the greatest number of Lab employees live in Berkeley or the immediate vicinity. Accordingly, growth in Berkeley (including at UC Berkeley) is the focus of the cumulative analysis for the proposed project.

In addition to the population growth assumed for the proposed project, other reasonably foreseeable growth could contribute to existing population and housing totals. This growth could be accommodated through new development and through changes in the occupancy rates and use of existing residential and other building space.

As part of its General Plan Update in 2001, the City of Berkeley prepared population estimates for 2000 and projections of growth through 2020. The City projected an increase of approximately 3,200 households between 2000 and 2020 and a total population of about 116,000 in 2020.

Implementation of the UC Berkeley 2020 LRDP could result in an increase of 2,870 faculty and staff working in the Campus Park area and adjacent blocks and an increase of 1,650 students. Many students, faculty, and staff prefer to live close to the campus within the city of Berkeley. A key objective of the UC Berkeley 2020 LRDP is to increase the housing supply near campus for students, faculty, and staff. Under the UC Berkeley 2020 LRDP, there could be an additional 2,600 beds of housing added within 1 mile of the center of campus. It is likely that most of this housing would be developed in the city of Berkeley.

Therefore, the employment and enrollment growth associated with the UC Berkeley 2020 LRDP and the LBNL 2006 LRDP, including the proposed project, could represent substantial cumulative population

growth and a concentration of population in the city of Berkeley. The employee population growth associated with the proposed project would contribute to this cumulative impact. However, increases in population growth associated with the implementation of the proposed project would represent less than one percent of the total number of people projected to be living in the Berkeley and Albany area in 2025. Housing demand associated with implementation of the proposed project would account for less than one percent of the total increase in households projected for most communities where LBNL employees live. These increases represent a less-than-significant impact for population and housing, and would not be considered a cumulatively considerable contribution to potential cumulative population and housing impacts.

Mitigation Measure: No project-level mitigation measure required.

5.5.11 Public Services

Helios Cumulative Impact PUB-1: The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not result in a significant cumulative demand for public services. (*Less than Significant*)

Cumulative conditions related to fire and police protection services are discussed under Helios Impacts PUB-1 and 2 in **Section 4.11, Public Services,** of this EIR. Implementation of the proposed project would contribute to an increase in demand for fire protection services and police services. However, as discussed in **Section 4.11**, this increased demand would not result in the need for new or physically altered facilities, the construction of which could cause significant environmental impacts.

Other reasonably foreseeable development in the East Bay could result in the increased need for new or altered fire protection or police facilities in the region. The City of Berkeley General Plan indicates the need for additional fire protection facilities and the City of Oakland General Plan indicates the need for expanded facilities or the seismic retrofit of existing facilities. However, implementation of the proposed project would not result in the need for new facilities, staff, or equipment to provide adequate fire protection or police services. Accordingly, the proposed project's contribution to cumulative demand would not be cumulatively considerable. Furthermore, planned residential development in local jurisdictions where Berkeley Lab employees might live, such as the cities of Berkeley or Oakland, would be subject to the local agency's zoning ordinance and general plan policies, which would require that environmental impacts associated with new residential development be mitigated to the maximum extent feasible.

Similar to police and fire services, implementation of the proposed project would not result in the need for new or physically altered public school facilities (Helios Impact PUB-3). The proposed project would

include no housing, and therefore any effect on school facilities from the proposed project would be indirect. Any increased demand for school facilities would derive from residential development to accommodate increased daily population from the project. This indirect impact is expected to be minimal given the small number of new employees related to the proposed project compared to existing residential development. Therefore, implementation of the proposed project would not result in a considerable contribution to any cumulative increase in the demand for school facilities that would result in the need for new or physically altered facilities under cumulative conditions. Furthermore, planned residential development in local jurisdictions where new Berkeley Lab employees might live, such as the cities of Berkeley or Oakland, would be subject to the local agency's zoning ordinance and general plan policies. Planned development may also be required to pay school impact fees that, under CEQA, are deemed as full and complete mitigation for effects on schools. Therefore, the proposed project's cumulative effect on public school facilities would not be considerable.

Implementation of the proposed project would not substantially affect the provision of parks and recreation facilities (Helios Impacts PUB-4 and -5). Implementation of the proposed project along with cumulative development could result in an increased demand for parks and recreation facilities in Berkeley and Oakland. The proposed project would include no housing, and therefore the effect on parks and recreation facilities from the proposed project would be indirect. Any increased demand for parks and recreation facilities would derive from residential development to accommodate increased daily population from the project. Planned residential uses in each city (as well as in other local jurisdictions where the Berkeley Lab employees might reside) would be subject to the local agency's zoning ordinance and general plan policies, which would require that environmental impacts associated with the development of parks and recreation facilities are mitigated to the maximum extent feasible. Because the proposed project would result in no direct impact on park and recreation facilities, and because any indirect effect would be minimal, implementation of the proposed project would not result in a considerable contribution to any cumulative increase in the demand for park and recreation facilities.

Mitigation Measure: No project-level mitigation measure required.

5.5.12 Transportation and Traffic

Helios Cumulative Impact TRANS-1: **The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would degrade intersection levels of service. (*Significant; Significant and Unavoidable*)**

Near-Term Cumulative Impacts

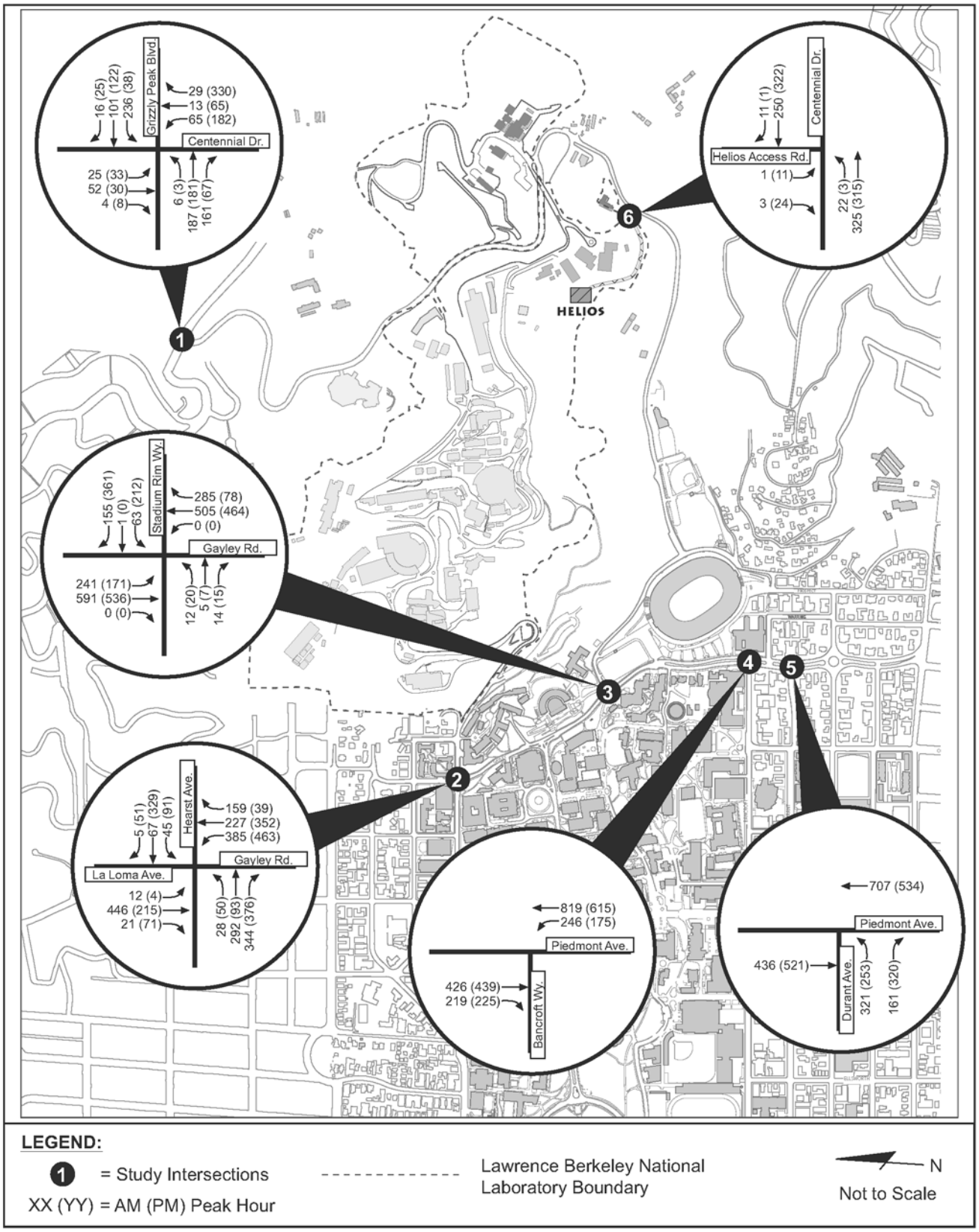
Table 5.0.1 lists near-term projects that, if approved and constructed in the near-term, would contribute to potential cumulative traffic impacts. The near-term analysis presented in **Section 4.12, Transportation and Traffic,** accounts for traffic generated by these near-term projects. As stated in Helios Impact TRANS-1, the proposed project would have a less than significant impact on traffic operations under near-term conditions. Thus, the project's contribution to cumulative impacts on near-term traffic operations would not be considerable.

Long-Term Cumulative Impacts

The cumulative traffic analysis completed for the 2006 LRDP (hereinafter 2006 LRDP Traffic Study)included an intersection operations analysis under year 2025 conditions, which analyzed the impacts of the buildout of the 2006 LRDP combined with the buildout of the UC Berkeley 2020 LRDP and general plans of Berkeley and surrounding communities. To evaluate the proposed project's contribution to the previously evaluated cumulative traffic impacts, an independent impact analysis was conducted for this Helios Project EIR. To determine the consistency of the proposed Helios project with the LBNL 2006 LRDP within the project area, five study intersections were reanalyzed with the more refined information regarding the location, size, and access of Helios and other projects in the area than was available at the time that the 2006 LRDP Traffic Study was conducted. The updated and refined analysis is compared to the cumulative information presented in the 2006 LRDP Traffic Study.

There are no planned roadway improvements within the project area that would be completed by 2025. Thus, no newer more substantial project-specific impacts would result from the Helios project than were analyzed in the 2006 LRDP Traffic Study; therefore, for intersections outside the project area, the data presented in the 2006 LRDP Traffic Study remains valid.

Figure 5.0-2, Cumulative With Project Conditions Peak Hour Traffic Volumes, shows AM and PM peak hour intersection volumes under Year 2025 with Helios project conditions. Intersection volumes under this scenario were estimated by replacing the trip generation and distribution assumptions in the 2006 LRDP Traffic Study for the project area with the more project-specific information now available for the proposed Helios and CRT projects (i.e., the new Helios Access Road is accounted for in the updated analysis). This updated analysis also accounts for the more specific location and number of parking spaces for the SCIP project, which is more refined than analyzed in the 2006 LRDP Traffic Study. **Table 5.0-3, Year 2025 Conditions – Study Intersection LOS Summary**, compares intersection LOS under Year 2025 with LRDP buildout conditions as presented in the 2006 LRDP Traffic Study with the updated analysis. Detailed calculation work sheets are provided in **Appendix 4.8**.



SOURCE: Fehr & Peers - August 2007

FIGURE **5.0-2**

Cumulative With Project Conditions Peak Hour Traffic Volumes

924-01•11/07

Table 5.0-3
Year 2025 Conditions – Study Intersection LOS Summary

Intersection	Control	Peak Hour	Year 2025 with LRDP[1]		Updated Year 2025 with LRDP	
			Delay (Seconds)[2]	LOS [2]	Delay (Seconds) [2]	LOS [2]
Centennial Drive/ Grizzly Peak Boulevard	All-Way Stop-Controlled	AM	11.4	B	11.4	B
		PM	27.3	D	27.9	D
Hearst Avenue/Gayley Road/La Loma Avenue	Signalized	AM	**68.4**	**E**	**76.0**	**E**
		PM	**84.1**	**F**	**85.2**	**F**
Stadium Rim Way/ Gayley Road	All-Way Stop-Controlled	AM	**>60**	**F**	**>60**	**F**
		PM	**>60**	**F**	**>60**	**F**
Bancroft Way/ Piedmont Avenue [3]	All-Way Stop-Controlled	AM	**>60**	**F**	**>60**	**F**
		PM	**>60**	**F**	**>60**	**F**
Durant Avenue/ Piedmont Avenue	All-Way Stop-Controlled	AM	**55.9**	**F**	**>60**	**F**
		PM	**36.8**	**E**	**37.5**	**E**
Centennial Drive/ Helios Access Road	Side-Street Stop-Controlled	AM	N/A	N/A	10.5	B
		PM			11.4	B

Source: Fehr & Peers, August 2007.
N/A = intersection does not exist under this scenario.
[1] *Based on TableIV.L-7 (Revised) in the LBNL LRDP Final EIR (July 2007).*
[2] *Signalized and all-way stop-controlled intersection delay and LOS based on average control delay per vehicle for the intersection, and side-street stop-controlled intersection delay and LOS based on average control delay per vehicle for the worst approach, according to the Highway Capacity Manual, Special Report 209, Transportation Research Board, 2000.*
[2] *Based on the 2000 HCM methodology, the intersection would operate at LOS F during the AM peak hour and LOS E during the PM peak hour under Cumulative with Helios conditions. Based on field observations and measurements, the intersection currently operates at LOS F during both AM and PM peak hours due to the high number of pedestrian crossings, which the 2000 HCM methodology does not account for. Thus, the intersection would continue to operate at LOS F during both AM and PM peak hours under Cumulative with Helios conditions.*
Bold *indicated an intersection operating at unacceptable LOS E or LOS F.*

As shown in **Table 5.0-3**, study intersections would continue to operate at the same LOS under the Updated Year 2025 with LRDP conditions as under the Year 2025 with LRDP conditions presented in the 2006 LRDP Traffic Study. The new side-street stop-controlled Centennial Drive/Helios Access Road intersection would operate at LOS B during both AM and PM peak hours and the all-way stop-controlled Centennial Drive/Grizzly Peak Boulevard intersection would operate at LOS B during the AM peak hour and LOS D during the PM peak hour.

Other study intersections would operate at unacceptable LOS E or LOS F during both AM and PM peak hours. The Hearst Avenue/Gayley Road/La Loma Avenue intersection would operate at LOS E during the AM peak hour and LOS F during the PM peak hour. The Durant Avenue/Piedmont Avenue intersection would operate at LOS E during the AM peak hour and LOS F during the PM peak hour. Both Stadium Rim Way/Gayley Road and Bancroft Way/Piedmont Avenue intersections would operate at LOS F during both AM and PM peak hours.

Based on the Updated Year 2025 with LRDP conditions analysis as summarized in **Table 5.0-3**, these three intersections would continue to operate at unacceptable conditions. The proposed Helios project (by itself or combined with the CRT project) would increase total intersection volume by less than five percent. Thus, the proposed Helios project (by itself or combined with the CRT project) would contribute to this impact but would not trigger this impact. Based on the updated analysis, the proposed project would not make a cumulatively considerable contribution to the three significant and unavoidable impacts identified in the 2006 LRDP EIR; however, this project EIR conservatively concludes that the project's contribution to these intersection impacts would be considerable.

The proposed project already includes LRDP Mitigation Measure TRANS-1d which would minimize trips and LRDP Mitigation Measures TRANS-1a through 1c which would address the significant cumulative intersection impacts. Furthermore, in conjunction with the approval of the 2006 LRDP, the Berkeley Lab has committed to work with the City of Berkeley and UC Berkeley to implement the necessary improvements at the three affected intersections to improve operations. However, even though LBNL has committed to pay its fair share of the cost of the required improvements at the intersections, and this remains a binding mitigation commitment, the impacts would be considered significant and unavoidable because there is not yet an adopted reasonable plan for improvements at these intersections, and as such, it cannot be determined at this time whether the impacts would be mitigated to a less than significant level.

Mitigation Measure: Further mitigation is not feasible.

Significance after Mitigation: Significant and Unavoidable

Helios Cumulative Impact TRANS-2: **Although construction traffic associated with near-term projects could result in temporary periods of traffic congestion on city streets, the project's contribution to the impact would not be cumulatively considerable. (*Less than Significant*)**

The construction of the Helios project may coincide with construction of other LBNL, UC Berkeley, or other projects as listed in **Table 5.0-1.** Typically, each project would generate the most number of truck trips during the excavation phase of construction. It is extremely unlikely that all these projects would be under construction and in the excavation phase simultaneously. However, there may be temporary peaks of excavation-related and other truck activity that would affect vehicle circulation in the vicinity of project sites and on truck routes within the city, and the cumulative impact during those periods could be potentially significant.

However, as discussed in **Section 4.12, Transportation and Traffic**, LRDP BP TRANS-6c is included in the proposed project which requires LBNL to manage project construction schedules to minimize the combined impacts of project construction within LBNL. Furthermore, pursuant to LRDP BP TRANS-6a which is also included in the proposed project, LBNL will meet and coordinate with UC Berkeley and City of Berkeley to schedule the construction of various projects to minimize roadway closures, overlap of excavation and other heavy truck activity periods, and minimize the combined impacts of construction activity on vehicle, bicycle, and pedestrian circulation and parking. Because LRDP BP TRANS-6a through 6c are already included in the proposed project and Helios Mitigation Measure TRANS-6 would also be implemented, the project's contribution to the cumulative impact would not be considerable.

Mitigation Measure: No project-level mitigation measure required.

Helios Cumulative Impact TRANS-3: The proposed project, in conjunction with other reasonably foreseeable near-term and long-term development, would not substantially affect transit, parking, or pedestrian and bicycle circulation. (*Less than Significant*)

As described in Helios Impact TRANS-3 in **Section 4.12**, the project by itself would not have a significant impact on transit ridership. In addition, the project's contribution to transit ridership (except on the LBNL or UC Berkeley shuttle service) would be small. Therefore, the project is not expected to contribute considerably to any future cumulative impact on transit.

Parking demand generated by the proposed project combined with parking demand generated by other planned LBNL projects could potentially exceed the parking supply at LBNL. However, as a result of the ongoing TDM program proposed as part of LRDP Mitigation Measure TRANS-1d which would be implemented as part of the project and Helios Mitigation Measure TRANS-4, the proposed project would not make a cumulatively considerable contribution to a cumulative impact on parking within the LBNL site. Furthermore, since the LBNL hill site is somewhat isolated, and parking supply in the vicinity of the site is limited, the project is not expected to contribute considerably to a potential future cumulative impact on parking outside the LBNL site.

The project would not contribute considerably to cumulative impacts on pedestrian and bicycle conditions because the effects of the Helios project would be limited to the vicinity of the project site in the LBNL hill site itself. Thus, impacts of the project would not combine with impacts of other development on pedestrian and bicycle conditions.

Mitigation Measure: No project-level mitigation measure required.

5.5.13 Utilities and Service Systems

Helios Cumulative Impact UTILS-1: The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not result in a significant cumulative demand for utilities and service systems. (*Less than Significant*)

The development of the proposed project would not result in significant impacts on utilities and service systems as discussed in **Section 4.13, Utilities and Service Systems**. However, the project, in conjunction with reasonably foreseeable development at UC Berkeley's campus and in nearby communities, could result in increases in demand for utilities and energy. Impacts associated with the cumulative demand are discussed below.

EBMUD provides water to LBNL, UC Berkeley and the cities of Berkeley and Oakland. As noted in **Section 4.13,** the proposed project's demand for water (approximately 4.8 million gallons per year), is within the amount projected for the LBNL site under the 2006 LRDP. Since the adoption of the 2006 LRDP and in conjunction with the development of the design of the CRT project, the Berkeley Lab has determined that additional water would be needed to serve the growth of the Berkeley Lab under the 2006 LRDP. This is on account of water that would be needed to serve the CRT project, approximately 29.3 million gallons per year. The Berkeley Lab has presented its revised estimate of 80 million gallons per year of total water needed by 2025 (compared to about 61 million gallons which was the previous estimate) to EBMUD, and EBMUD has indicated that it can provide this volume of water to LBNL from its existing supply sources (O'Hearn 2007). No improvements to water supply mains are necessary to serve the project. The proposed project would not contribute to the need for any water infrastructure improvements and therefore would not contribute to any environmental impacts from the construction of water infrastructure improvements.

The UC Berkeley SCIP EIR identified a significant impact related to wastewater collection as a result of implementation of the Integrated Projects (UC Berkeley 2006). Specifically, the SCIP EIR notes that the existing sanitary sewer in Bancroft Avenue may not have adequate capacity to accommodate the improvements to Memorial Stadium, and that UC Berkeley would consult with the City of Berkeley about connecting the Integrated Projects to other sewer lines that have adequate capacity. The SCIP EIR also describes the discussions underway among LBNL, UC Berkeley, and the City of Berkeley to address sanitary sewer capacity. As described under Helios Impact UTILS-2 in **Section 4.13**, in compliance with LRDP Mitigation Measure UTILS-2, LBNL proposes sanitary sewer improvements that would be built as part of the Helios project that would avoid adverse effects on constrained wastewater collection facilities

near the Memorial Stadium, and thus implementation of the proposed project would not result in a cumulative impact on wastewater facilities.

Other foreseeable development in the surrounding area could contribute to cumulative increases in utility and energy demand; however, new development would occur within a largely built-out urban area where utilities and service systems generally are provided. Additionally, these increases in demand attributed to other development would be addressed on a site-by-site basis by the service providers prior to approval of new development, and through CEQA review of each development project. Therefore, the effect of this project in combination with other foreseeable development would not be significant, nor would the project's contribution to any cumulative effects be cumulatively considerable.

Mitigation Measure: No project-level mitigation measure required.

5.6 REFERENCES

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6.0 ALTERNATIVES

6.1 INTRODUCTION

The California Environmental Quality Act (CEQA) requires that an EIR contain an analysis describing a range of reasonable alternatives to a project that could feasibly attain most of the basic objectives of the project while avoiding or substantially lessening any significant impacts. The analysis must evaluate the comparative merits of the alternatives (*CEQA Guidelines* Section 15126.6). Alternatives that avoid or substantially reduce significant impacts should be considered, even if these alternatives would impede to some degree the attainment of project objectives or would be more costly to the project proponent (*CEQA Guidelines* Section 15126.6(b)). The alternatives do not need to consider less than significant impacts identified for the proposed project. An EIR need not consider every conceivable alternative to a project, but rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation (*CEQA Guidelines* Section 15126.6(a)).

The analysis in this section is intended to inform the public and decision makers of alternatives to the project and to provide a meaningful evaluation, analysis, and comparison of these alternatives with the proposed project. As required by CEQA, this section also includes an analysis of the No Project Alternative.

In response to the Notice of Preparation for this EIR, several commenters requested that alternative locations for the proposed project with fewer potential impacts related to aesthetics, biological resources, cultural resources, geology and soils, population and housing, and traffic should be considered. Sites specifically identified in the scoping comments include the UC Berkeley Richmond Field Station, Alameda Air Base, Mare Island Shipyard in the city of Vallejo, Merced, and Nevada. All of these scoping comments are addressed in the alternatives analysis presented below.

6.1.1 Objectives of the Helios Project

Key objectives of the proposed project are listed below:

- Provide an integrated and appropriately designed facility for high-level/advanced research in solar and other alternative energy sources and technologies;
- Create a facility that draws upon the intellectual, technological, and material resources of LBNL and UC Berkeley to support and stimulate research in developing sciences and technologies and that encourages the next scientific discovery;

- Co-locate different research programs in one facility to promote cross-pollination of ideas and theories and create a multi-disciplinary collaborative environment;
- Locate the facility such that researchers have convenient access to unique and top-rated scientific facilities and that duplication of facilities is avoided;
- Foster interaction and collaboration between the project, Lawrence Berkeley National Laboratory (LBNL), and UC Berkeley researchers and students by locating the facility near the Laboratory's fence line; and
- Create a facility that becomes a benchmark for energy efficient usage for future similar building types.

6.1.2 Impacts of the Helios Project

To develop project alternatives, the Berkeley Lab considered the project objectives and reviewed the significant impacts of the proposed project, identified those impacts that could substantially be avoided or reduced through an alternative, and determined the appropriate range of alternatives to be analyzed. **Section 4.0, Environmental Setting, Impacts and Mitigation Measures**, of this EIR evaluates the potential for the proposed project to result in significant impacts to the following resource areas: aesthetics, air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, population and housing, public services, transportation and traffic, and public services and utilities. The analysis in **Section 4.0** revealed that with the implementation of Long-Range Development Plan LRDP mitigation measures that are already included in the proposed project, the proposed project would result in potentially significant or significant impacts in six resource areas (aesthetics, biological resources, geology and soils, hazards and hazardous materials, hydrology and water quality, and transportation and traffic) and two significant and unavoidable cumulative impacts. In all other resource areas, the project's impacts would be less than significant. A summary discussion of project impacts under each resource area analyzed in the EIR is presented below. **Table 6.0-1, Summary Comparison of Helios Project Alternatives,** presented at the end of this section, lists all the potentially significant and significant impacts of the proposed project. Alternatives that would meet most of the project objectives and would avoid or reduce the project's significant impacts, especially the project's significant unavoidable impacts, were identified and analyzed in detail.

Aesthetics

Section 4.1, Aesthetics, of this EIR identified potentially significant impacts related to project construction activities (Impact VIS-1) and from new sources of light and glare (Impact VIS-4), which

could be reduced to a less than significant level with project-level mitigation. A significant and unavoidable impact was found related to a substantial change to a scenic vista (Impact VIS-2).

Air Quality

Section 4.2, Air Quality, of this EIR identified less than significant impacts on air quality. No significant and unavoidable air quality impacts were identified.

Biological Resources

Section 4.3, Biological Resources, of this EIR identified a potentially significant impact related to the removal of trees (Impact BIO-1), which would be reduced to a less than significant level with project-specific mitigation. All other impacts on biological resources from project construction and operation would be less than significant. No significant and unavoidable impacts were identified for biological resources.

Cultural Resources

Section 4.4, Cultural Resources, of this EIR, identified less than significant impacts on historic resources, archaeological resources, and human remains. No significant unavoidable impacts were identified related to cultural resources.

Geology and Soils

Section 4.5, Geology and Soils, of this EIR, identified potentially significant and significant impacts related to seismic groundshaking, landslide hazard, expansive soils and unstable geologic units (Helios Impact GEO-2 through GEO-5), with project-specific mitigation measures that would reduce these impacts to less than significant levels. No significant unavoidable impacts were identified related to geology and soils.

Hazards and Hazardous Materials

Section 4.6, Hazards and Hazardous Materials, of this EIR identified a potentially significant impact related to hazards and hazardous materials which would be reduced to a less than significant level with project-specific mitigation. All other impacts would be less than significant. No significant and unavoidable impacts were identified for hazards.

Hydrology and Water Quality

Section 4.7, Hydrology and Water Quality, of this EIR, identified potentially significant impacts related to erosion and sedimentation (Impact HYDRO-1), flooding (Impact HYDRO-2), storm water quality (Impact HYDRO-4), and water quality impact from dewatering operations (Impact HYDRO-5) which would be reduced to a less than significant level with project-specific mitigation. No significant and unavoidable impacts were identified for hydrology and water quality.

Land Use and Planning

Section 4.8, Land Use and Planning, of this EIR, identified less than significant impacts. No significant unavoidable impacts were identified related to land use.

Noise

Section 4.9, Noise, of this EIR identified less than significant impacts related to noise. No significant and unavoidable impacts were identified for noise.

Population and Housing

Section 4.10, Population and Housing, of this EIR identified less than significant impacts. No significant unavoidable impacts were identified related to population and housing.

Public Services

Section 4.11, Public Services, of this EIR identified less than significant impacts. No significant unavoidable impacts were identified related to public services.

Transportation and Traffic

As discussed in **Section 4.12, Transportation and Traffic**, implementation of the proposed project would result in a potentially significant impact related to parking demand at LBNL during special events at the Helios auditorium (Impact TRANS-4). Proposed mitigation measures would reduce the significant project impact to a less than significant level. No significant and unavoidable impacts were identified for transportation and traffic.

Utilities and Service Systems

Section 4.13, Utilities and Service Systems, of this EIR identified less than significant impacts on utility systems. No significant and unavoidable impacts were identified for utilities and service systems.

Cumulative Impacts

Section 5.0, Cumulative Impacts, of this EIR identified less than significant cumulative impacts of the proposed project on all resources areas except traffic and human health risk. Helios Cumulative Impact TRANS-1 shows that long term development in the project area, in conjunction with the proposed project, would significantly affect level of service at three study intersections, and that the impact would be significant and unavoidable because even though LBNL has committed to pay its fair share of the cost of the required improvements at the intersections, and this remains a binding mitigation commitment, the impacts would be considered significant and unavoidable because there is not yet an adopted reasonable plan for improvements at these intersections, and as such, it cannot be determined a this time whether the impacts would be mitigated to a less than significant level.

Helios Cumulative Impact AIR-3 concludes that the Helios project would not result in an incremental project-related increase in human health risk in excess of the significance threshold, and the contribution of the project would be magnitudes smaller than the cumulative risk. However, because the cumulative impact from TAC emissions would be significant, and the project would result in some TAC emissions that would contribute to the overall cumulative risk, the project's contribution would be considerable. Even with implementation of mitigation measures, the Helios project would still result in some incremental TAC emissions that would contribute to the cumulative impact, and the project's contribution to the cumulative impact would not be reduced to a less than significant level.

6.2 ALTERNATIVES TO THE PROJECT

6.2.1 Alternatives Considered But Not Evaluated in Detail

This section discusses alternatives that were considered for the project but were not evaluated in detail because they did not meet project objectives or were found to be infeasible for technical, environmental, or social reasons.

Alternate Off-Site Locations

LBNL considered an off-site alternative location that would involve use of the Richmond Field Station for the location of the proposed project. There would be space at the field station to locate the proposed facility, and if the proposed facility was to be built, it would provide suitable occupiable building space and parking for the Helios project. However, this alternative would not meet the 2006 LRDP and Helios project objectives to expand functionality of Berkeley Lab facilities, provide for cross-disciplinary research, or foster collaborative work environments among researchers, since it would result in a division of resources between locations. Furthermore, if the Helios Facility were located at the Richmond Field Station, it would be too distant to provide convenient access to the unique research facilities at the Berkeley Lab, including the Advanced Light Source, the Molecular Foundry, and the National Center for Electron Microscopy. Proximity to these facilities would be integral to the research programs in the Helios Facility, and if the project were located at a distant location such as the Richmond Field Station, it would not meet the key project objectives to be close to these unique research facilities and to the UC Berkeley campus. Furthermore, most senior Helios scientists would have teaching assignments on the UC Berkeley campus and/or would collaborate on research with other research groups on the campus or LBNL. This would necessitate frequent trips between the campus, LBNL, and this facility for seminars and classes. Siting the proposed building at the Richmond Field Station would greatly increase the travel time between the proposed facility, the UC Berkeley campus, and LBNL, resulting in travel-related air pollutant emissions, traffic impacts, and substantial loss of productive time. For this reason, an off-site location at the Richmond Field Station was rejected from further consideration in this EIR. Locating the proposed project at Mare Island, Alameda Air Base, Merced, or Nevada would not be feasible for the same reasons noted above. Furthermore, siting the proposed project at any of the alternate locations would not be consistent with the adopted LRDP which provides for the location of the proposed project at LBNL.

Locating the EBI portion of the proposed project or the entire Helios project on the UC Berkeley campus was also considered but rejected because the building space and population associated with the proposed project are not included in the UC Berkeley 2020 LRDP. Additionally, the UC Berkeley 2020 LRDP states that projects that do not involve substantial UC Berkeley student engagement and participation should be located in surrounding adjacent areas and not on the UC Berkeley main campus. Locating the proposed facility on the UC Berkeley Hill Campus is also not an option because the 2020 LRDP provides for a modest amount of development (100,000 gross square feet of new building space) for the Hill Campus which is much less than the space needed for the proposed facility. Furthermore, many of the same environmental impacts would still occur if the project were developed on the UC Berkeley Hill Campus

or the main campus. Therefore, locating the Helios and EBI portions of the proposed project on the UC Berkeley campus was not evaluated in detail in this EIR.

6.2.2 Alternatives Considered in Detail

As noted earlier in this section, the proposed project would result in potentially significant or significant impacts in five resource areas: aesthetics; biological resources; geology and soils; hydrology and water quality; and transportation and traffic. In all other resource areas, with the implementation of LRDP mitigation measures or UC Berkeley Continuing Best Practices (in the case of hazardous materials) which are included in the proposed project, the project's impacts would be less than significant. Therefore, the focus of this alternatives analysis is on the ability of the alternatives presented below to avoid or minimize the project-specific, significant and unavoidable impact on visual resources. Note that in the discussion below, resource areas where project impacts would be less than significant are also discussed with the view to determine whether the alternatives would further reduce less than significant impacts of the proposed project and also to determine whether the alternative would result in a significant impact on a resource area where the project would not result in a significant impact.

Alternative 1: No Project Alternative

CEQA requires that a "No Project" alternative be considered. "No Project" is generally considered to be equivalent to a "no development" alternative. With this alternative, the proposed project would not be constructed at the project site and the research programs associated with the Helios project would not be developed. It should be noted that adoption of the No Project Alternative would not necessarily preclude ultimate development of the project site with another use in accordance with the 2006 LRDP. However, should another building be constructed at this site for another research program, it would not involve non-LBNL users and therefore the construction of an alternate access road would not be required for that development project.

Relationship to Project Objectives

Alternative 1 would not achieve any of the project objectives.

Comparative Analysis of Impacts

Aesthetics

There would be no impact related to aesthetics because the project would not be built on the site. However, some development could occur on the project site as the area is identified for development of Research and Academic uses under the 2006 LRDP and there could be similar impacts associated with construction activities, light and glare, and degradation of scenic vistas.

Air Quality

There would be no impact to air quality because the project would not be built on the site. However, under the 2006 LRDP, some development of Research and Academic uses could occur on the project site, and there could be similar air quality impacts during construction of that project with the inclusion of 2006 LRDP mitigation measures.

Biological Resources

Under the No Project Alternative, there would be no impacts to biological resources as the project would not be built. However, some development could occur on the project site as the area is identified for development of Research and Academic uses under the 2006 LRDP and there could be similar impacts on biological resources with the inclusion of 2006 LRDP mitigation measures.

Cultural Resources

Under the No Project Alternative, there would be no impacts to cultural resources as the project would not be built. However, some development could occur on the project site as the area is identified for development of Research and Academic uses under the 2006 LRDP and there could be similar impacts on cultural resources with the inclusion of 2006 LRDP mitigation measures.

Geology and Soils

There would be no impacts related to geology and soils as the project would not be built. However, under the 2006 LRDP, the project site could be developed with Research and Academic uses. Therefore, there could be similar impacts related to geology and soils and mitigation measures would be required

Hazards and Hazardous Materials

Under the No Project Alternative, the proposed project would not be built. Therefore, there would be no impacts related to hazardous material use or other hazards. However, under the 2006 LRDP, the project site could be developed with Research and Academic uses and similar impacts could occur.

Hydrology and Water Quality

The No Project Alternative would avoid impacts related to flooding, storm water quality, and groundwater pumping. However, some development could occur on the project site as the area is identified for development of Research and Academic uses under the 2006 LRDP and there could be similar or slightly reduced impacts on hydrology and water quality from that development.

Noise

Under the No Project Alternative, the proposed project would not be built. Therefore, there would be no impacts related to noise. However, under the 2006 LRDP, the project site could be developed with Research and Academic uses and noise impacts similar to those described for the proposed project could occur.

Population and Housing

Under the No Project Alternative, the proposed project would not be built. Therefore, no new population would be added to LBNL. However, under the 2006 LRDP, the project site could be developed with Research and Academic uses. Therefore, population and housing impacts similar to those described for the proposed project could occur.

Public Services

Under the No Project Alternative, the proposed project would not be built. Therefore, there would be no impacts related to public services. However, under the 2006 LRDP, the project site could be developed with Research and Academic uses. Therefore, impacts on public services similar to those described for the proposed project could occur.

Transportation and Traffic

There would be no near-term impact to transportation and traffic because the project would not be built on the site. However, under the 2006 LRDP, some development could occur on the project site. However

the traffic and parking impacts of this development would likely be less because it would likely not involve an auditorium or non-LBNL population.

Utilities and Service Systems

Under the No Project Alternative, the proposed project would not be built. Therefore, impacts related to utilities and service systems would not occur. However, under the 2006 LRDP, the project site could be developed with Research and Academic uses. Therefore, impacts similar to those described for the proposed project could occur.

Cumulative Impacts

Under the No Project Alternative, the proposed project would not be built. Therefore, all of the cumulative impacts would be avoided, including the significant and unavoidable cumulative traffic and human health risk impacts. However, under the 2006 LRDP, the project site could be developed with Research and Academic uses. Therefore, cumulative impacts similar to those described for the proposed project could occur.

Alternative 2: Reduced Facility Alternative

This alternative would include development of a smaller research facility at the proposed project location by eliminating the Synthetic Biology research program from the Helios portion of the proposed project. Under this alternative, the building would have approximately 132,000 gross square feet of office and laboratory space; the amount of space devoted to the auditorium and other common areas would be the same as for the proposed project. Under the proposed project, the Synthetic Biology program research labs are proposed on two upper floors of the Helios portion (i.e., the low-rise portion) of the proposed building. Because the removal of two floors of the Helios portion would not reduce the visual impact, this alternative would instead retain the two upper floors of the Helios portion for use by the EBI program, and the seventh floor of the EBI portion (the high-rise portion of the facility) would be removed. Therefore, the profile of the overall building would be one story lower than the proposed project. The number of researchers, staff and visitors that would be accommodated in this reduced facility would be approximately 410. However, because the Synthetic Biology research program is critical to the other proposed research programs in the Helios Facility, it is assumed for this alternative that this program would be located in another existing facility at LBNL. Therefore, under this alternative, the population of the Berkeley Lab would still increase by about 500 persons. Access road improvements, parking, and improvements to utilities would be the same as for the proposed project.

Relationship to Project Objectives

Alternative 2 would achieve some project objectives related to integration of different research programs in one facility and integration of the facility into the existing Berkeley Lab and UC Berkeley campus. It would not fully achieve the objectives of providing adequate space for the planned research functions and for interaction and collaboration among research scientists. By eliminating the Synthetic Biology component, a shared research area for Helios and EBI would be eliminated. Because this research program is critical to the other proposed research programs in the Helios Facility, this program would need to be located at another existing facility at LBNL.

Comparative Analysis of Impacts

Aesthetics

This alternative implements a reduced design of the Helios project at the project site by eliminating a shared laboratory component. Therefore, less construction activity would be involved for this alternative. However, construction activity at the proposed project site on the Berkeley Lab hillside would still occur under this alternative and may be visible from public viewpoints. Mitigation measures similar to the ones identified for the proposed project would be implemented and would reduce this impact to a less than significant level. The reduction of one story in building height would somewhat reduce the proposed project's significant impact on scenic vistas and resources but would not reduce it enough to render it less than significant. No new or increased visual resource impacts are anticipated under this alternative.

Air Quality

This alternative would implement a reduced design of the Helios project. Therefore, marginally less construction activity would be involved for this alternative. However, LRDP mitigation measures to control construction emissions similar to the ones identified for the proposed project would still be required. The operational impacts of this alternative would be similar to those of the proposed project because the alternative would require similar stationary equipment to produce chilled and hot water. There would not be a reduction in vehicle emissions on account of the smaller population associated with this alternative because as noted above, the Synthetic Biology program would be located elsewhere on LBNL and the approximately 90 persons associated with that program would still travel to the site. No new or increased air quality impacts are anticipated under this alternative.

Biological Resources

Under this alternative, the elevation of the building would be reduced by one floor. However, the footprint impacts of the proposed project would remain unchanged. Therefore, this alternative would not reduce the potentially significant impact related to the removal of trees or any of the less than significant impacts of the proposed project on biological resources.

Cultural Resources

Under this alternative, the elevation of the building would be reduced by one floor. However, the footprint impacts of the proposed project would remain unchanged. Therefore, this alternative would not reduce any of the less than significant impacts of the proposed project on cultural resources.

Geology and Soils

Under this alternative, the elevation of the building would be reduced by one floor. However, the footprint impacts of the proposed project would remain unchanged. Therefore, this alternative would not reduce the potentially significant impacts of the proposed project related to geology and soils, including potentially significant impacts related to seismic groundshaking, landslides, and other geologic instability; similar mitigation measures similar to those for the proposed project would be required.

Hazards and Hazardous Materials

The reduction in the research programs at the Helios project site would not appreciably change the less than significant impacts of the proposed project or the projects potentially significant impact related to hazards and hazardous materials. Furthermore, as noted above, the Synthetic Biology program would be located elsewhere on LBNL. Therefore, this alternative would result in hazards and hazardous materials impacts similar to those of the proposed project.

Hydrology and Water Quality

Under this alternative, the elevation of the building would be reduced by one floor. However, the footprint impacts of the proposed project would remain unchanged. Therefore, this alternative would not reduce any of the impacts of the proposed project on hydrology and water quality, including the potentially significant impacts related to erosion and sedimentation, flooding, storm water quality, and dewatering operations; mitigation measures similar to those for the proposed project would be required.

Land Use and Planning

Under this alternative, the elevation of the building would be reduced by one floor. However, the footprint impacts of the proposed project would remain unchanged and the uses within the building would also remain unchanged. Therefore, this alternative would not alter the proposed project's less than significant impact related to land use and planning.

Noise

This alternative would implement a reduced design of the Helios project. Therefore, marginally less construction activity at the project site would be involved in this alternative. The operational noise impacts of this alternative would be similar to the less than significant impacts of the proposed project because the alternative would require similar on-site stationary equipment to produce chilled and hot water. There would not be a reduction in vehicular noise on account of the smaller population associated with this alternative because as noted above, the Synthetic Biology program would be located elsewhere on LBNL and the approximately 90 persons associated with that program would still travel to the site. No new or increased noise impacts are anticipated under this alternative.

Population and Housing

This alternative would implement a reduced design of the Helios project by eliminating a shared laboratory component. However, because the LBNL on-site population would increase by the same number under this alternative, the project's less than significant impacts on population and housing would remain unchanged.

Public Services

This alternative would implement a reduced design of the Helios project by eliminating a shared laboratory component. However, because the LBNL on-site population would increase by the same number under this alternative, the project's less than significant impacts on public services would remain unchanged.

Transportation and Traffic

This alternative would implement a reduced design of the Helios project by eliminating a shared laboratory component. This alternative would have a similar parking demand, as the proposed project and a potentially significant impact related to parking demand during special events would still occur under this alternative. Implementation of appropriate mitigation measures would still be required. No new or increased transportation and traffic impacts are anticipated under this alternative.

Utilities and Service Systems

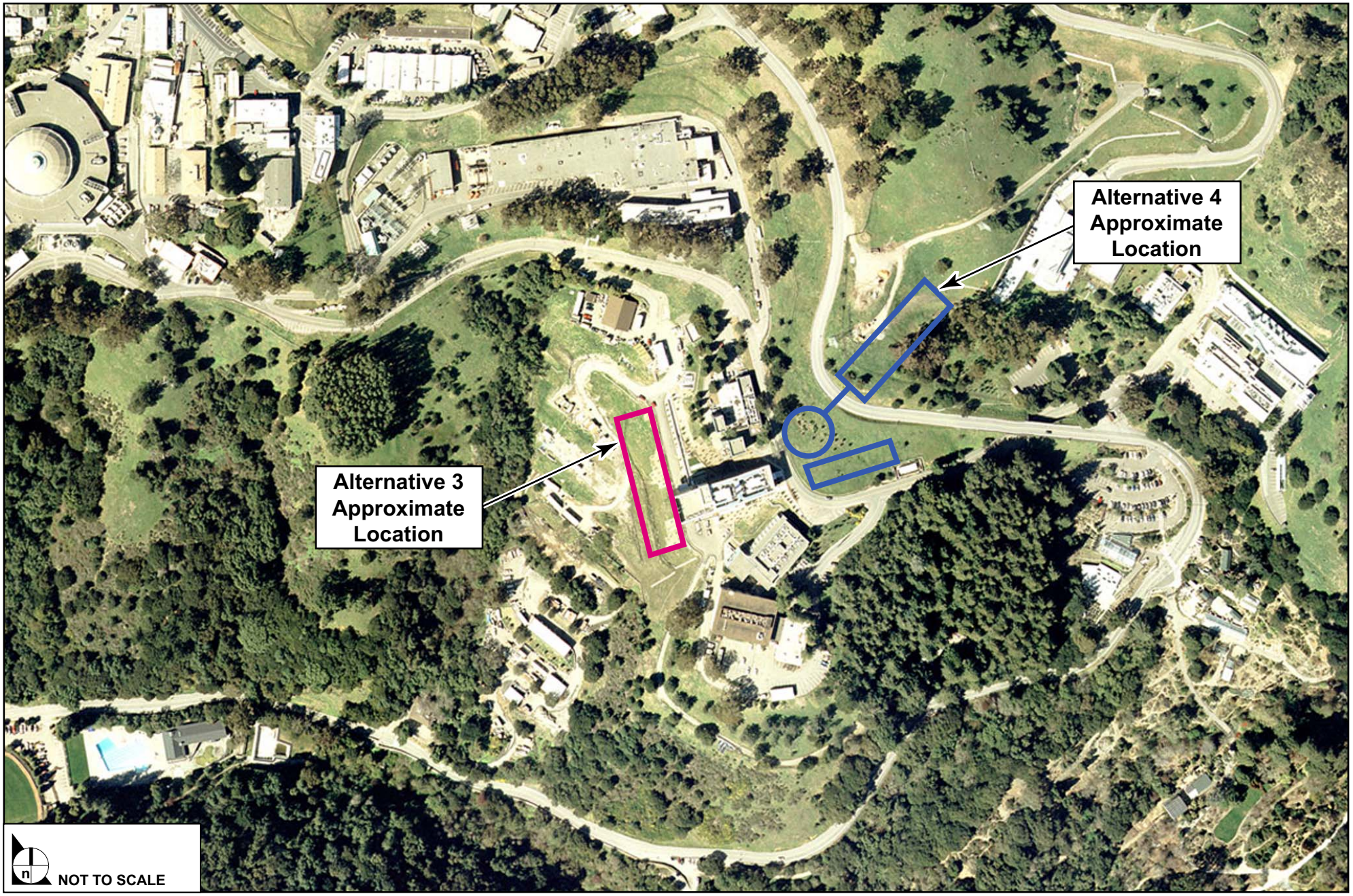
Because the size of the proposed facility under this alternative would not be appreciably smaller and the LBNL on-site population would increase by the same number under this alternative, the project's less than significant impacts on utilities and service systems would remain unchanged.

Cumulative Impacts

Because the LBNL population increase and therefore traffic increase under this alternative would be the same as that for the proposed project, the project's contribution to the significant cumulative 2025 traffic impact would remain unchanged. The laboratory space and related TAC sources at the project site would be reduced under this alternative. However, because the Synthetic Biology program would be accommodated in some other existing space at LBNL, the overall TAC emissions would be similar. Therefore the alternative's contribution to the significant cumulative human health risk impact would be similar to that of the proposed project and the impact would remain unchanged.

Alternative 3: Split Site Design Alternative

This alternative would separate the Helios and EBI portions of the project into two separate, rectangular buildings that would be located adjacent to each other in approximately the same location as the proposed project (See **Figure 6.0-1, Location of Alternatives 3 and 4**). The purpose of this design would be to reduce bulk and visibility of the EBI portion of the proposed project. Both buildings would include the same below-grade floor levels as the proposed project. However, instead of three floors above grade for the Helios portion and five floors above grade for the EBI portion, this alternative would have four floors above grade for both buildings. As a result, some of the programs that are planned to be in the EBI portion of the proposed project would be located in the Helios building under this alternative. The two buildings would be constructed about 50 feet apart with corridor connections between them. The total square footage for the buildings combined would be approximately 170,000 gross square feet, larger than the proposed project. The additional square footage would be associated with additional restrooms, elevators, stairs and lobbies that both buildings would require. Under this alternative, each building would have its own rooftop mechanical equipment. This would eliminate the green roofs proposed for the southern portion of the proposed project. This alternative would maintain the auditorium, parking area and access road at the same locations as the proposed project. Similar to the proposed project, about 500 researchers, staff, and visitors would be associated with this alternative.



SOURCE: SMITHGROUP 2007, Impact Sciences, Inc. - August 2007

FIGURE **6.0-1**

Location of Alternatives 3 and 4

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Relationship to Project Objectives

Alternative 3 would achieve the project objectives related to providing adequate space for the planned research functions and integration of the facility into the existing Berkeley Lab and the UC Berkeley campus. It would not fully achieve the objectives of integration of different research programs in one facility and facilitating interaction and collaboration among research scientists. It would involve wasteful duplication of some common facilities.

Comparative Analysis of Impacts

Aesthetics

This alternative would place two buildings on the Berkeley Lab hillside adjacent to each other. Therefore, a slightly increased level of construction would occur to prepare two adjacent but separate sites for the project. Construction activity on the Berkeley Lab hillside would occur under this alternative and may be visible from public viewpoints. Mitigation measures similar to the ones identified for the proposed project would be required. The proposed building under this alternative would occupy the same location as the proposed project. The two buildings would be of roughly the same height, and therefore the Helios portion under this alternative would be higher by one floor level, and the EBI portion of the alternative would be lower by one floor level than as proposed under the project. The building heights would be more evenly distributed, but overall the tandem placement of the two buildings would appear more massive than the proposed project. **Figure 6.0-2** shows a conceptual simulation of this alternative as viewed from Panoramic Way. In this perspective, only the EBI portion of the proposed alternative is visible, and because this portion of the alternative would be only one floor level less in elevation than the EBI portion under the proposed project, the visual impact of this alternative from this perspective would be very similar to that of the proposed project (see **Figure 4.1-6** in **Section 4.1, Aesthetics**). Therefore, this alternative would not decrease the proposed project's significant and unavoidable impact on scenic vistas. The light and glare impact of this alternative would be similar to that of the proposed project and would also be significant. Therefore, the reduction in the size of the proposed facility would slightly decrease but not reduce the project's significant and unavoidable visual impacts to a less than significant level.

Air Quality

As stated above, the overall square footage would increase due to duplication of common facilities such as restrooms, elevators, and stairwells. Therefore, more construction activity would be involved for this

alternative than the proposed project. Mitigation measures similar to the ones identified for the proposed project would be required. The operational air quality impacts of this alternative on air quality would be similar to or slightly greater than those of the proposed project because the alternative would require similar stationary equipment to produce chilled and hot water. In addition, parking spaces would be the same as under the proposed project, and thus vehicle emissions would also be similar. No new or substantially increased air quality impacts are anticipated under this alternative.

Biological Resources

Under this alternative, the footprint of the proposed project would slightly larger. Therefore, this alternative would not reduce the potentially significant impact related to the removal of trees or any of the less than significant impacts of the proposed project on biological resources.

Cultural Resources

Under this alternative, the footprint of the proposed project would be slightly larger. Therefore, this alternative will not reduce any of the less than significant impacts of the proposed project on cultural resources.

Geology and Soils

Under this alternative, the location of the proposed project would remain unchanged. Therefore, this alternative would not reduce the potentially significant impacts of the proposed project related to geology and soils, including potentially significant impacts related to seismic groundshaking, landslides, and other geologic instability. Mitigation measures similar to those for the proposed project would be required.

Hazards and Hazardous Materials

There would be no reduction in the research programs at the Helios project site under this alternative. Therefore, this alternative would result in hazards and hazardous materials impacts similar to those of the proposed project.

Existing view from Panoramic Way (VP 7)

Conceptual simulation of project alternative (ALT-3)

SOURCE: Environmental Vision - September 2007

FIGURE **6.0–2**

Conceptual Simulation - Alternative 3

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Hydrology and Water Quality

Under this alternative, the footprint of the proposed project would be slightly larger. Furthermore, the green roofs on top of the Helios portion of the proposed project would be eliminated under this alternative. Therefore, this alternative would generate more storm water runoff than the proposed project. This could increase the hydrology and water quality impacts of the proposed project, including the potentially significant impacts related to flooding, storm water quality, and dewatering operations. The project's potentially significant impact related to erosion and sedimentation, which is related only to the access road, would remain unchanged. Mitigation measures similar to those for the proposed project would be required.

Land Use and Planning

Under this alternative, the footprint impacts of the proposed project would remain unchanged and the uses within the building would also remain unchanged. Therefore, this alternative would not alter the proposed project's less than significant impact related to land use and planning.

Noise

This alternative would implement a split building design of the Helios project. Therefore, more construction activity at the project site would be involved, which would result in higher and/or prolonged construction noise levels. The operational noise impacts of this alternative would be similar to the less than significant impacts of the proposed project because the alternative would require similar on-site stationary equipment to produce chilled and hot water. Even though both buildings would have rooftop equipment and the amount of such equipment would be greater than under the proposed project, because of intervening distance, noise from the operation of the equipment would not result in significant impacts at the nearest receptors. There would not be a reduction in vehicular noise because the same number of vehicles would access the site as under the proposed project. No new or increased noise impacts are anticipated under this alternative.

Population and Housing

This alternative would implement a split building design of the Helios project. However, because the LBNL on-site population increase would be the same as under the proposed project, the project's less than significant impacts on population and housing would remain unchanged.

Public Services

This alternative would implement a split building design of the Helios project. However, because the LBNL on-site population increase would be the same as under the proposed project, the project's less than significant impacts on public services would remain unchanged.

Transportation and Traffic

This alternative would implement a split building design of the Helios project. This alternative would have a parking demand similar to the proposed project. Therefore, a potentially significant impact related to parking demand during special events at the auditorium would still occur under this alternative. Implementation of appropriate mitigation measures would still be required. No new or increased transportation and traffic impacts are anticipated under this alternative.

Utilities and Service Systems

Because the size of the proposed facility under this alternative would not be appreciably greater and the LBNL on-site population would increase by the same number of persons under this alternative, the project's less than significant impacts on utilities and service systems would remain unchanged.

Cumulative Impacts

Because the LBNL population increase and therefore traffic increase under this alternative would be the same as that for the proposed project, the project's contribution to the cumulative 2025 traffic impact would remain unchanged. The laboratory space and other TAC sources under this alternative would be the same as the proposed project, and therefore the alternative's contribution to the significant cumulative human health risk impact would be similar to that of the proposed project and the impact would remain unchanged.

Alternative 4: Alternate LBNL Location Alternative

This alternative would use another site within the LBNL hill site boundaries for development of the proposed project. This location is approximately 500 feet northeast of the proposed project site, immediately east of the Molecular Foundry building, and straddling both sides of Centennial Drive (see **Figure 6.0-1**). Under this alternative, two buildings would be constructed on either side of Centennial Drive. The first building would be between Centennial Drive and Lawrence Road. Because the area available is limited, in order to accommodate the Helios program, this would be a six-story, 90-foot-high

building with a footprint of 200 by 70 feet. The auditorium would also be located between the two roadways, north of the Helios building. The second building to accommodate the EBI program would be to the east of Centennial Drive and would be a five-story, 75-foot-high building with a footprint of 270 by 70 feet. Because the site is served by both Lawrence Road and Centennial Drive, construction of a new access road would not be required. However, a pedestrian walkway bridging the gap between the EBI building and the auditorium and crossing over Centennial Drive would be needed to allow researchers to safely cross Centennial Drive, which has vehicular traffic traveling on a relatively steep incline in this area. Parking would be provided to the north of the EBI building and would be accessible via a driveway off of Centennial Drive underneath the overhead power lines that are located north of this alternate site. Similar to the proposed project, about 500 researchers, staff, and visitors would be associated with this alternative.

Relationship to Project Objectives

Alternative 4 would achieve some project objectives related to providing adequate space needed for the research programs, convenient access to other unique facilities at LBNL, and easy access (although via a controlled entry) from and proximity to UC Berkeley to foster interaction among the researchers in the proposed facility and UC Berkeley and LBNL. However, the design of the project would not assist in the integration of the Helios and EBI programs as effectively as the proposed project because the two programs would be housed in buildings separated by a busy roadway.

Comparative Analysis of Impacts

Aesthetics

This alternative would place the Helios project in a relatively high elevation within the LBNL site. Construction activity under this alternative would be more visible from many public viewpoints (although less visible from other viewpoints, as noted below). Mitigation measures similar to the ones identified for the proposed project would be required. This alternative consists of five to six-story-tall buildings on a hilltop location. Also the buildings would be separated, creating additional mass compared to the proposed project. Due to its location on a more exposed elevation rather than lower along the east canyon hillside, the project facilities would be more visible from public viewpoints. **Figure 6.0-3** shows a conceptual simulation of this alternative as viewed from a location along the Jordan fire trail. This viewpoint was used to prepare this simulation rather than the viewpoint along Panoramic Way (which is used for the proposed project in **Section 4.1**), because a view of this alternate site is not available from that location on Panoramic Way. The Jordan fire trail viewpoint is considered

representative of public views of the alternative from the south. As the figure shows, this alternative would increase the project's impact related to degradation of scenic vistas. The impact related to light and glare could also be potentially increased due to the alternative's more prominent location, and the same mitigation measures would be required.

Air Quality

More construction activity would be involved for this alternative than the proposed project because two separate buildings instead of one would be constructed. Mitigation measures similar to the ones identified for the proposed project would be required. The operational impacts of this alternative would be similar to those of the proposed project because the alternative would require similar stationary equipment to produce chilled and hot water. Because the parking spaces included in the alternative would be the same as under the proposed project, vehicle emissions would also be similar. No new or substantially increased air quality impacts are anticipated under this alternative.

Biological Resources

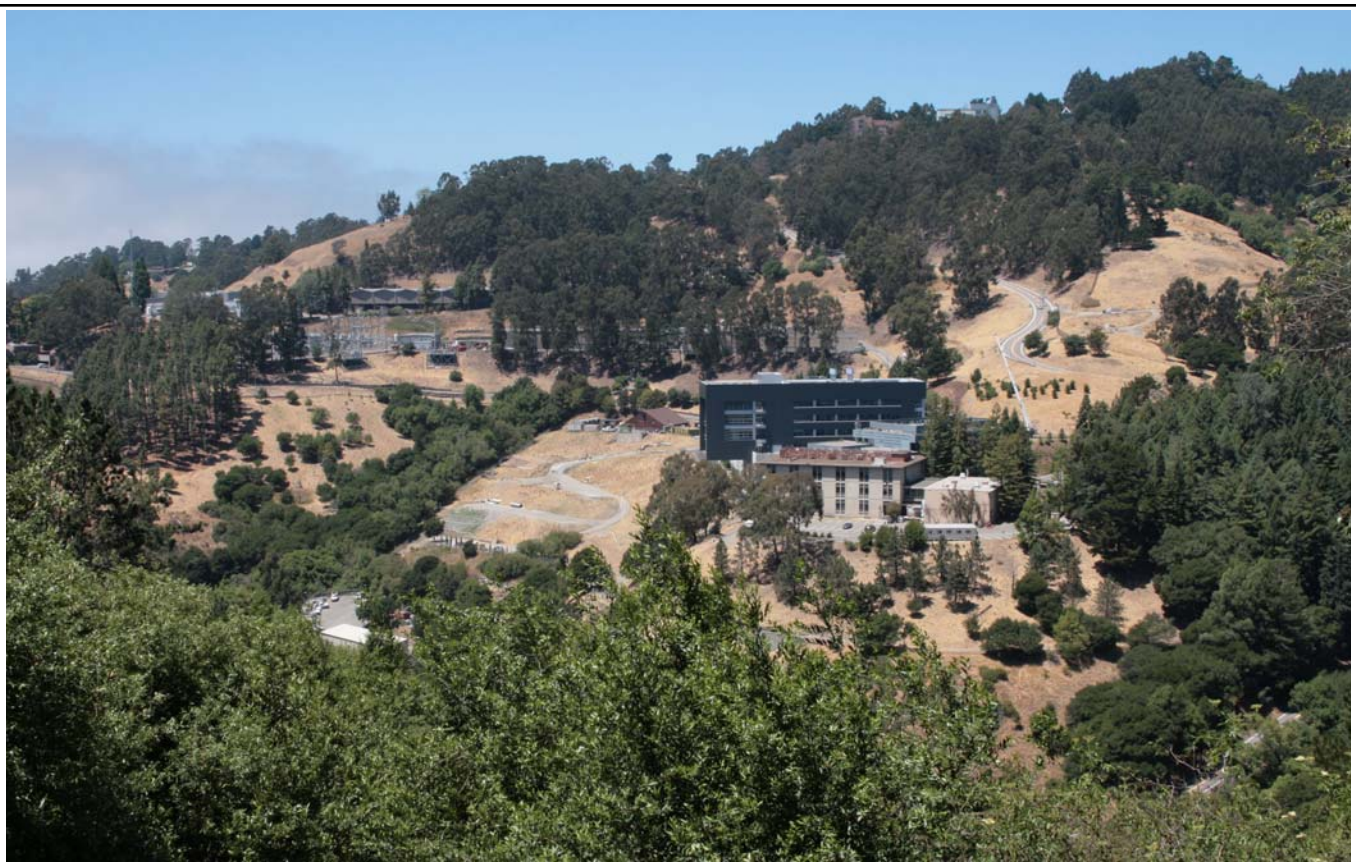
The biological resources impacts of this alternative would be somewhat reduced compared to the proposed project, because not only would the project footprint be smaller by approximately 35 percent, but the Helios building would be located in an area that does not support sensitive habitat. Similar to the proposed project but with a smaller footprint, the EBI building would be located in an area that is indicated in the 2006 LRDP to have highly suitable potential habitat for Alameda whipsnake. The proposed project's potentially significant impact associated with tree removal would be substantially reduced under this alternative as fewer trees are present on this site and no new access road would be needed. The project's impact on wetlands would be avoided.

Cultural Resources

The impacts of this alternative on cultural resources would be reduced compared to the proposed project because the project footprint at this site would be smaller by about 35 percent.

Geology and Soils

Geologic conditions at this site have not been characterized but are generally expected to be similar to the geologic conditions underlying the Molecular Foundry building. Therefore, this alternative would have generally similar or reduced impacts related to geology and soils as compared to the proposed project.



Existing view from Jordan Fire Trail (VP 8)

Conceptual simulation of project alternative (ALT-4)

SOURCE: Environmental Vision - September 2007

FIGURE **6.0-3**

Conceptual Simulation - Alternative 4

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Hazards and Hazardous Materials

The same research programs and the same amount of research space would be included in this alternative. Therefore, overall, this alternative would result in similar impacts related to hazards and hazardous materials as the proposed project.

Hydrology and Water Quality

The project footprint under this alternative would be approximately 35 percent smaller than under the proposed project. Therefore, this alternative would generate less storm water runoff than the proposed project. Nevertheless, this stormwater runoff reduction would not substantially reduce any of the proposed project's hydrology and water quality impacts, including the potentially significant impacts related to flooding and stormwater quality. The same mitigation measures as proposed for the project would be required. The alternative site is distant from the tritium contaminated groundwater plume and therefore to the extent that groundwater dewatering is required at this site, it would not affect the plume and would avoid the potentially significant impact. Also because no access road is required, this alternative would avoid the potentially significant impact related to erosion and sedimentation associated with the runoff from a portion of the Helios Access Road.

Land Use and Planning

Under this alternative, the footprint impacts of the proposed project would be reduced but the uses within the two buildings would be the same as for the proposed project. Therefore, this alternative would not alter the proposed project's less than significant impact related to land use and planning.

Noise

This alternative would implement a two-building design of the Helios project. Therefore, more construction activity would be involved with this alternative, in which would result in higher and/or prolonged construction noise. The operational noise impacts of this alternative would be similar to the less than significant impacts of the proposed project because the alternative would require similar on-site stationary equipment to produce chilled and hot water. Even though both buildings would have rooftop equipment and the amount of such equipment would be greater than under the proposed project, because of intervening distance, noise from the operation of the equipment would not result in significant impacts at the nearest receptors. There would be no change in vehicular noise because the same number of vehicles would access the site as under the proposed project. No new or increased noise impacts are anticipated under this alternative.

Population and Housing

This alternative would implement the Helios project at this alternate site within LBNL. However, because the LBNL on-site population increase would be the same as under the proposed project, the project's less than significant impacts on population and housing would remain unchanged.

Public Services

This alternative would implement the Helios project at this alternate location within LBNL. However, because the LBNL on-site population increase would be the same as under the proposed project, the project's less than significant impacts on public services would remain unchanged.

Transportation and Traffic

Access to the parking area under this alternative would be via a driveway on Centennial Drive north of the EBI building. Although, vehicle speeds in the uphill direction on Centennial Drive near this site are low due to the steep incline, vehicle speeds on in the downhill direction are often higher than posted due to the long decline and the relatively straight stretch of roadway starting just south of the Lawrence Hall of Science. Therefore, there could be a potentially significant impact related to the proposed driveway requiring traffic controls under this alternative. This alternative would have a similar parking demand as the proposed project and the potentially significant impact related to special event parking demand would still occur under this alternative. Implementation of appropriate mitigation measures that would reduce this impact would still be required.

Utilities and Service Systems

Because the size of the proposed facility under this alternative would be comparable to the proposed project and the LBNL on-site population would increase by the same number of persons under this alternative, the project's less than significant impacts on utilities and service systems would remain unchanged under this alternative.

Cumulative Impacts

The cumulative impact from project traffic in conjunction with other area traffic would still occur and would be significant and unavoidable. The laboratory space and other TAC sources under this alternative would be the same as the proposed project, and therefore the alternative's contribution to the

significant cumulative human health risk impact would be similar to that of the proposed project and the impact would remain unchanged. All other cumulative impacts would also remain unchanged.

Alternative 5: Proposed Project with Alternate Access Road Alignment

This alternative would construct the Helios building as envisioned under the proposed project but the new access road would be constructed along a different alignment than the proposed project (see **Figure 6.0-4, Alternative 5: Alternate Roadway Alignment Location**). Under this alternative, the proposed access road would be located south of the access road included in the proposed project, avoiding Buildings 73 and 73A, and would intersect with Centennial Drive approximately 400 feet southwest of the project's proposed intersection. Similar to the proposed project, advanced flashing lights would be installed on Centennial Drive alerting motorists that there is an intersection ahead. This roadway would include a turnaround area approximately 50 feet from Centennial Drive. The turnaround is designed to provide an exit for motorists wishing to return to Centennial Drive, ease vehicle queues, and provide safe turning movements for larger delivery and emergency vehicles. The security gate would be located just past the turnaround area. Construction of this roadway would remove approximately 150 trees and relocate 20 trees. The trees to be removed include approximately 63 oak, 45 bay, two Mexican elderberry, 10 Italian cypress, two juniper, three pine, two plum, 20 pepper trees, and one other tree. The 20 trees that would be relocated are the 2- and 3-inch redwood trees that were planted at the project site as part of the Molecular Foundry project. For the majority of its length, the access road under this alternative would be located on UC Berkeley land. All other aspects of the Helios Facility would remain essentially the same as the proposed project under this alternative.

Relationship to Project Objectives

Alternative 5 would achieve all of the project objectives.

Aesthetics

This alternative implements an alternate roadway alignment for the access road connection to Centennial Drive. The roadway would be approximately 300 feet shorter than the proposed project's access road. Therefore, a similar level of construction activity would occur under this alternative, and due its hillside location and the absence of intervening vegetation, project construction activities would be visible from public viewpoints as well as from viewpoints along Centennial Drive. Mitigation measures similar to the ones identified for the proposed project would be implemented and would reduce this impact to a less than significant level. Additionally, retaining walls for the alternate roadway would be required to stabilize the hillside. These walls would be substantial and would be visible from Centennial Drive because of the location of the access road lower down on the hillside closer to Centennial Drive and

absence of intervening vegetation. The visual impact from the proposed roadway would be greater than under the proposed project, but would not be significant. Mitigation would be employed, as appropriate, to further reduce this less than significant impact. For example, muted colors, screening tree plantings, and/or plant cover may be used to obscure or hide the retaining walls from sight. Any color choices and landscaping would be made in consultation with the Berkeley Lab's Design Guidelines and a qualified landscape designer or plant specialist, as appropriate.

Air Quality

This alternative would construct a shorter access roadway to serve the proposed facility. Therefore, a slightly shorter duration or intensity of construction activity would be involved for this alternative. However, mitigation measures to control construction emissions similar to the ones identified for the proposed project would still be required. The operational impacts of this alternative would be similar to those of the proposed project because the alternative would require similar stationary equipment to produce chilled and hot water. The vehicle emissions produced under this alternative would be similar, as the alignment would not affect the population, parking spaces, or services required of the Helios facility. No new or increased air quality impacts are anticipated under this alternative.

Biological Resources

Under this alternative, the footprint impacts of the proposed building would remain unchanged. However, with the changed roadway alignment, this alternative would remove approximately 150 trees, which are more than approximately 110 trees that would be removed for the proposed project under the base case (Intersection Option B) and also more than the trees that would be removed under the other options that would range from 104 to 128 trees). This alternative would, however, not remove any redwood trees adjacent to or associated with the Mather Grove. Therefore, this alternative would avoid the project's potentially significant impact related to tree removal.

This alternative would have a similar impact on potential jurisdictional wetlands as the proposed project. However, this alternative has a greater likelihood to disturb special-status plant species than the proposed project. The disturbance area associated with the alternative access road contains coastal scrub habitat and provides potentially suitable habitat for locally occurring special-status plant species. Focused surveys would be required to determine if any special-status plant species occur within the disturbance boundary, but based on the observed habitat, there is a possibility that special-status plants may occur within the area of disturbance. However, with the inclusion of LRDP mitigation measures in this alternative, the impact to special-status plant species under this alternative would be less than significant.

SOURCE: SMITHGROUP 2007, Impact Sciences - November 2007

FIGURE **6.0-4**

Alternative 5: Alternate Roadway Alignment Location

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This alternative would result in somewhat greater impacts on habitat potentially suitable for Alameda whipsnake. The alignment of the roadway under this alternative would cross an area of coastal scrub habitat and therefore this alternative would also affect an area that is considered highly suitable potential habitat for Alameda whipsnake (although not part of the UCFWS designated critical habitat for Alameda whipsnake). Similar to the proposed project, construction activities could affect the snake but the impact would be less than significant with the implementation of the same LRDP mitigation measures that are included in the proposed project. However, because a larger portion of the roadway alignment would be located in an area with coastal scrub habitat, this alternative would result in the loss of more coastal scrub than the proposed project. Therefore, this alternative would increase the magnitude of the proposed project's less than significant impact on the Alameda whipsnake related to loss of core habitat, and the impact could be potentially significant. Additional mitigation measures may be required to reduce this potentially significant impact to a less than significant level. The impact related the loss of individual whipsnakes from the vehicular use of the proposed access road would be somewhat greater but still less than significant because of the low traffic volumes and speed control included in the project.

Cultural Resources

Under this alternative, the footprint impacts of the proposed building area would remain unchanged. The new roadway alignment proposed for this alternative does not follow an existing roadway alignment (as does the proposed Helios Access Road) and therefore, there is a greater potential for roadway construction to encounter previously undisturbed archaeological resources. Similar LRDP mitigation measures would be required to address this impact. Therefore, this alternative would not reduce any of the less than significant impacts of the proposed project on cultural resources and may slightly increase the magnitude of one impact.

Geology and Soils

The change in roadway alignment under this alternative would not avoid areas where some soil instability may be present. Therefore, similar construction techniques would be implemented to stabilize the hillside from possible soil instability, landslide, and other geotechnical issues. This alternative would not reduce the potentially significant geology and soils impacts of the proposed project, including potentially significant impacts related to seismic groundshaking, landslide and other geologic instability. Similar mitigation measures would be required.

Hazards and Hazardous Materials

The impacts associated with the use of hazardous materials on site would remain the same under this alternative as all other features of the Helios Facility would remain the same as the proposed project. The access road could improve access for emergency vehicles compared to the proposed project. The turnaround that would be constructed would allow for improved turning movements during an emergency response situation. Therefore, this alternative would result in similar hazards and hazardous materials impacts related to as the proposed project.

Hydrology and Water Quality

Under this alternative, the Helios building would remain the same, and the access road would be aligned differently, connecting to Centennial Drive approximately 400 feet south of the proposed project's access road. The new access road includes a turnaround area to accommodate vehicle queues and provides an area for motorists who enter the roadway in error to turn around and return to Centennial Drive. The footprint impacts of the proposed building would remain unchanged. The roadway construction and impervious surface increase would be slightly less than the proposed project. Similar to the proposed project, the runoff from the alternate roadway alignment would be discharged into the mid-canyon detention basin. Therefore, this alternative would not reduce any of the impacts of the proposed project, including the potentially significant impacts related to erosion and sedimentation, flooding, storm water quality, and dewatering operations, and the same mitigation measures as proposed for the project would be required. It would not result in any additional hydrology and water quality impacts.

Land Use and Planning

Under this alternative, the footprint impacts of the proposed Helios project would remain unchanged and the uses within the building would also remain unchanged. The majority of alternate roadway alignment would be located on UC Berkeley Hill Campus land that is designated Botanical Garden in the UC Berkeley 2020 LRDP. This area is a small portion of the total land designation for the Botanical Garden and is in an area that is south of Centennial Drive and separated from the majority of the Botanical Garden lands. The conversion of a small portion of the land in this area to a roadway would not result a substantial reduction in the land available for the Botanical Garden expansion programs. Therefore, a new significant impact related to land use and planning would not occur under this alternative. This alternative would not alter the proposed project's less than significant impact related to land use and planning.

Noise

This alternative would construct a roadway for the Helios project which would be slightly shorter than the proposed Helios Access Road and with a different alignment. Therefore, slightly less construction activity at the project site would be involved in this alternative. The operational noise impacts of this alternative would be similar to the less than significant impacts of the proposed project because the alternative would require similar on-site stationary equipment to produce chilled and hot water. There would be no reduction in vehicular noise because, as noted above, the new roadway alignment would not affect the overall population, parking spaces available, or services required by the facility. No new or increased noise impacts are anticipated under this alternative.

Population and Housing

This alternative would construct an alternate roadway connection to Centennial Drive. However, because the LBNL on-site population would increase by the same number under this alternative, the project's less than significant impacts on population and housing would remain unchanged.

Public Services

This alternative would construct an alternate roadway connection to Centennial Drive. However, because the LBNL on-site population would increase by the same number under this alternative, the project's less than significant impacts on public services would remain unchanged.

Transportation and Traffic

This alternative would construct an alternate roadway alignment along the LBNL hillside. This alternative would have the same parking demand as the proposed project and a potentially significant impact related to parking demand during special events would still occur under this alternative. Implementation of appropriate mitigation measures would still be required. The location of the intersection with Centennial Drive would be approximately 400 feet further south compared to the proposed project. At this location, the drivers on the access road approaching Centennial Drive would not have a clear line of sight of vehicles coming from the north. Therefore, this alternative could result in a safety impact that is not associated with the proposed project, and a new mitigation measure might be required. This mitigation measure would involve the cutting of the hillside and removal of vegetation north of the intersection on the west side of Centennial Drive.

Utilities and Service Systems

Because the size of the proposed facility under this alternative would be the same as the proposed project, and the alternative roadway alignment would have no effect on utilities needed for the project, the project's less than significant impacts on utilities and service systems would remain unchanged.

Cumulative Impacts

Because the LBNL population and parking increase and therefore traffic increase under this alternative would be the same as that for the proposed project, the project's contribution to the significant cumulative 2025 traffic impact would remain unchanged. The cumulative impact from project traffic in conjunction with other area traffic would still occur and would be significant and unavoidable. The laboratory space and other TAC sources under this alternative would be the same as the proposed project, and therefore the alternative's contribution to the significant cumulative human health risk impact would be similar to that of the proposed project and the impact would remain unchanged. All other cumulative impacts would also remain unchanged.

6.3 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Table 6.0-1 presents a summary comparison of the alternatives with the proposed project with the purpose of highlighting whether the alternative would result in similar, greater, or lesser environmental impacts than the proposed project.

The No Project Alternative would avoid all of the significant environmental impacts of the proposed project. This alternative would therefore be the environmentally superior alternative. It would, however, not meet any of the proposed project's objectives.

If the No Project Alternative is the environmentally superior alternative, *CEQA Guidelines* Section 15126(d) (2) requires that an EIR identify an environmentally superior alternative from amongst the other alternatives evaluated in the EIR.

Of the other alternatives evaluated in this EIR, the Split Design alternative (Alternative 3) would have similar significant impacts as the proposed project and would have greater impacts than the project with respect to hydrology and water quality because of a greater footprint and the loss of the green roof on the Helios portion of the building.

The location of the proposed project at an alternate LBNL location (Alternative 4) would reduce or avoid some of the project's potentially significant impacts, including the impact on trees, impact related to dewatering operations, and the impact related to erosion and sedimentation associated with the Helios Access Road, but would result in a greater visual impact, and may introduce a new potentially significant impact related to road safety associated with the proposed driveway for the alternative.

Alternative 5, Proposed Project with Alternate Access Road Alignment, would have similar impacts as the proposed project in all resource areas except for biological resource and traffic impacts. This alternative would avoid the project's potentially significant impact related to removal of trees adjacent to Mather Grove; however, the alternative's impact on Alameda whipsnake potential habitat would be greater and potentially significant. Furthermore, this alternative would involve a potentially significant impact related to traffic safety.

Therefore, the Reduced Facility alternative (Alternative 2) is considered the environmentally superior alternative because it would slightly reduce the significant and unavoidable visual impact of the proposed project, although all other significant impacts would remain unchanged. This alternative would meet most of the objectives of the proposed project but would place an important program element (the Synthetic Biology program) at some other location at LBNL and therefore would inconvenience the Helios researchers who would need to travel within the LBNL site to use the synthetic biology labs.

Table 6.0-1
Summary Comparison of Helios Project Alternatives

Helios Project Impact		Proposed Helios Project (Before Mitigation)	No Project Alternative	Reduced Facility Alternative	Split Design Alternative	Alternate LBNL Location Alternative	Proposed Project with Alternate Roadway Alignment
VIS-1	Construction activities associated with the project would create temporary aesthetic nuisances for adjacent land uses.	PS (Less than Significant with Mitigation)	NI*	=/-	=	+	=
VIS-2	The proposed project would alter views of the LBNL site and would result in a substantial adverse effect to a scenic vista or substantially damage scenic resources.	S (Significant and Unavoidable)	NI*	=	=	+	=
VIS-4	The proposed project would create a new source of substantial light or glare that would not adversely affect day or nighttime views in the area.	PS (Less than Significant with Mitigation)	NI*	=/-	=	+	=

Helios Project Impact		Proposed Helios Project (Before Mitigation)	No Project Alternative	Reduced Facility Alternative	Split Design Alternative	Alternate LBNL Location Alternative	Proposed Project with Alternate Roadway Alignment
BIO-1	Construction of the proposed project would result in the permanent removal of 4.01 acres of vegetation.	PS (Less than Significant with Mitigation)	NI	=	=	-	-
GEO-2	The proposed project would not expose people to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic ground-shaking hazards although some structures could sustain damage.	PS; (Less than Significant with Mitigation)	NI*	=	=	=	=
GEO-3	The proposed project could expose people and structures to seismic landslide hazards.	PS; (Less than Significant with Mitigation)	NI*	=	=	=/-	=
GEO-4	The proposed project is located in an area of expansive soils that could create substantial risk to life or property.	PS; (Less than Significant with Mitigation)	NI*	=	=	=/-	=
GEO-5	The proposed project is located on a geologic unit that may be unstable or could become unstable as a result of the project.	PS; (Less than Significant with Mitigation)	NI*	=	=	=/-	=

Helios Project Impact		Proposed Helios Project (Before Mitigation)	No Project Alternative	Reduced Facility Alternative	Split Design Alternative	Alternate LBNL Location Alternative	Proposed Project with Alternate Roadway Alignment
HAZ-2	The proposed project would not be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, but some project components would be located in areas where contamination may be present and as a result, could create a potentially significant hazard to the public or the environment.	PS; (Less than Significant with Mitigation)	NI*	=	=	=	=
HYDRO-1	Development of the project site would increase the area of impervious surfaces that would result in increased volume of stormwater runoff that could contribute to erosion and/or siltation in Strawberry Creek.	PS; (Less than Significant with Mitigation)	NI*	=	+	-	-

Helios Project Impact		Proposed Helios Project (Before Mitigation)	No Project Alternative	Reduced Facility Alternative	Split Design Alternative	Alternate LBNL Location Alternative	Proposed Project with Alternate Roadway Alignment
HYDRO-2	Development of the site would alter surface drainage patterns on the site which could result in increased peak flows and induce flooding in downstream reaches.	PS (Less than Significant with Mitigation)	NI*	=	+	-	=
HYDRO-4	Stormwater runoff from the proposed parking area, access road and other impervious surfaces could potentially contribute to long-term pollutant discharges to surface waters, including on-site streams and downstream to Strawberry Creek and the Bay.	PS (Less than Significant with Mitigation)	NI*	=	+	-	=
HYDRO-5	Discharge of groundwater pumped or drained as part of construction-phase or post-construction-phase dewatering activities could adversely affect surface water quality.	PS (Less than Significant with Mitigation)	NI*	=	=	-	=

Helios Project Impact		Proposed Helios Project (Before Mitigation)	No Project Alternative	Reduced Facility Alternative	Split Design Alternative	Alternate LBNL Location Alternative	Proposed Project with Alternate Roadway Alignment
TRANS-4	The proposed Helios project would result in increased parking demand that may exceed the available parking supply.	PS (Less than Significant with Mitigation)	NI*	=	=	=	=
Cumulative TRANS-1	Implementation of the proposed Helios project, in conjunction with Berkeley Lab growth under the 2006 LRDP, and other regional growth would degrade the level of service at certain local intersections under 2025 conditions.	S (Significant and Unavoidable)	NI*	=	=	=	=
Cumulative AIR-3	Even though overall cumulative impacts will decrease, the proposed project will make some incremental contribution to cumulative cancer risk impacts associated with future development of LBNL and UC Berkeley.	S (Significant and Unavoidable)	NI	=	=	=	=

Helios Project Impact		Proposed Helios Project (Before Mitigation)	No Project Alternative	Reduced Facility Alternative	Split Design Alternative	Alternate LBNL Location Alternative	Proposed Project with Alternate Roadway Alignment
New Impact (related to Alternatives 4 and 5)	Project driveway/roadway connection to Centennial Drive could be unsafe.	LS	NI*	=	=	+ (PS)	+ (PS)

KEY

S *Significant impact*
LTS *Less than significant impact*
NI *No Impact*
= *Impact similar to proposed project*
-- *Impact less than proposed project*
+ *Impact greater than proposed project*

Source:

[1] *NI* There would be environmental impacts from the development of another project at the proposed site, pursuant to the 2006 LRDP.*

7.0 OTHER CEQA CONSIDERATIONS

Section 15126 of the *California Environmental Quality Act (CEQA) Guidelines* states that an EIR must include a discussion of the following three topics:

- Significant environmental effects which cannot be avoided if the proposed project is implemented
- Growth-inducing impacts of the proposed project

In addition, Section 15128 of the *CEQA Guidelines* requires a brief statement of the reasons that various possible effects of a project have been determined not to be significant and therefore, are not evaluated in the Environmental Impact Report (EIR).

The following sections address each of these types of impacts based on the analyses included in **Section 4.0, Environmental Setting, Impacts, and Mitigation Measures**.

7.1 SIGNIFICANT UNAVOIDABLE EFFECTS

This section identifies significant impacts associated with implementation of the Helios project that could not be mitigated to a less-than-significant level. As part of the certification process, The Regents of the University of California will make a final decision as to the significance of impacts and the feasibility of mitigation measures in this EIR. As detailed in **Section 4.0**, implementation of the Helios project would result in the following significant impacts that could not be mitigated to a less than significant level:

Helios Impact VIS-2: The proposed project would alter views of the LBNL site and would result in a substantial adverse effect to a scenic vista or substantially damage scenic resources.

Helios Cumulative Impact AIR-3: Even though overall cumulative impacts will decrease over time, the proposed project will make some incremental contribution to cumulative cancer risk impacts associated with future development of LBNL and UC Berkeley.

Helios Cumulative Impact TRANS-1: The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would degrade intersection levels of service.

7.2 GROWTH-INDUCING IMPACTS

This section evaluates the potential for growth inducement as a result of the proposed project implementation. Section 15126.2(d) of the *CEQA Guidelines* requires that an EIR include a discussion of

the potential for a proposed project to foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment.

The *CEQA Guidelines* do not provide specific criteria for evaluating growth inducement and state that it must not be assumed that growth in an area is necessarily beneficial, detrimental, or of little significance to the environment. Growth inducement is generally not quantified, but is instead evaluated as either occurring, or not occurring, with implementation of a project. The identification of growth-inducing impacts is generally informational, and mitigation of growth inducement is not required by CEQA. It must be emphasized that the *CEQA Guidelines* require that an EIR to "discuss the ways" a project could be growth-inducing and to "discuss the characteristics of some projects that may encourage…activities that could significantly affect the environment." However, the *CEQA Guidelines* do not require that an EIR predict or speculate specifically where such growth would occur, in what form it would occur, or when it would occur.

For the purposes of this analysis, the proposed project would be considered growth inducing if it meets either of the following criteria:

- The project removes an obstacle to population growth (for example, through the expansion of public services or utilities into an area that does not presently receive these services), or through the provision of new access to an area, or a change in a restrictive zoning or General Plan land use designation.
- The project causes economic expansion and population growth through employment expansion, and/or the construction of new housing.

Generally, growth inducing projects are either located in isolated, undeveloped, or underdeveloped areas, necessitating the extension of major infrastructure such as sewer and water facilities or roadways, or are projects that encourage premature or unplanned growth. An evaluation of the Helios Energy Research Facility project and how it is related to these growth-inducing criteria is provided below.

Removal of an Obstacle to Population Growth

Population growth in an area may result from the removal of physical impediments (non-existent or inadequate access to an area or the lack of essential public services and utilities (e.g., water supply),or restrictions to growth, as well as the removal of planning impediments resulting from land use plans and policies, including restrictive zoning and/or general plan designations.

The Helios Energy Research Facility project is not expected to remove any obstacle to growth within Lawrence Berkeley National Laboratory (LBNL). The proposed project site is located on the LBNL hill site, which is already fully served by infrastructure, including utilities, public services and pedestrian and

vehicular access. As described in **Section 4.13, Utilities and Service Systems**, and in the Initial Study prepared for this EIR, implementation of the project would not require an expansion of East Bay Municipal Utility District's (EBMUD's) wastewater treatment or conveyance facilities, water supply, solid waste, or other infrastructure facilities that would provide capacity for future projects surrounding the project site. The proposed utilities and infrastructure upgrades would serve only the project and existing buildings. Therefore, the proposed utilities would enable growth in Berkeley Lab population, but would not induce growth beyond that planned under the proposed project. Therefore, implementation of the project would not directly remove an obstacle to population growth.

Direct and Indirect Population and Employment Growth

Section 4.10, Population and Housing, includes an analysis of the population and housing impacts of the proposed project. That analysis concludes that the project would increase the number of people working within the LBNL hill site but would not induce substantial population growth in the city of Berkeley or elsewhere in the region, either directly or indirectly.

The proposed project would generate incidental, short-term construction employment that would be filled by the labor force available in the greater Bay Area. Once operational, the project would accommodate up to 500 people (employees, graduate students, and visitors). Of the total projected Helios adjusted daily population, it is estimated that 132 employees would come from existing laboratories and offices within LBNL or UC Berkeley. The remaining 368 persons that would be "new" to the Berkeley Lab site are within the anticipated 2006 Long Range Development Plan (LRDP) direct employment growth.

The population growth and housing demand associated with the proposed project would be dispersed over a number of communities in the region, similar to the pattern of residence of existing Berkeley Lab employees. The additional 368 persons new to the Berkeley Lab site would not be concentrated in any one community and would be dispersed and therefore would not result in a substantial increase in the population of any one community. Furthermore, the housing demand of the new households could be accommodated by the available resources in the greater Bay Area. In summary, the proposed project would not result in growth inducing impacts in any one community.

7.3 EFFECTS FOUND NOT TO BE SIGNIFICANT

Section 15128 of the *California Environmental Quality Act (CEQA) Guidelines* requires an EIR to briefly describe any potential environmental effects that were determined not to be significant during the Initial Study and EIR scoping process and were, therefore, not discussed in detail in the EIR. A discussion of the effects of the proposed project on agricultural resources and minerals that were found not to be

significant is presented below. Other impacts found to be less than significant in the EIR are discussed in detail in **Section 4.0, Environmental Setting, Impacts, and Mitigation Measures,** and summarized in **Section 2.0, Executive Summary**.

Agricultural Resources

Would the project:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?
- Conflict with existing zoning for agricultural use, or a Williamson Act contract?
- Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?

The project site is located in a developed area. There are no Williamson Act Contracts within its boundaries. The project would not result in the conversion of farmland to a non-agricultural use.

Mineral Resources

Would the project:

- Result in the loss of availability of a known mineral resource that would be of future value to the region and the residents of the state?
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

According to the State of California Department of Mines and Geology, Mineral Resource Zones and Resource Sectors map, the project site is located in an area designated as MRZ-1. This designation refers to an area "where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence." Therefore, implementation of the project would not impact mineral resources.

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10.0 ACRONYMS AND ABBREVIATIONS

ug/M3	Micro grams per cubic meter
AB	Assembly Bill
ABAG	Association of Bay Area Governments. The regional planning agency in the San Francisco Bay area working to help solve problems in areas such as land use, housing, environmental quality, and economic development.
ACCWP	Alameda Countywide Clean Water Program
ACOE	Army Corps of Engineers
AC Transit	Alameda-Contra Costa Transit
ADA	Americans with Disabilities Act
ADP	Adjusted Daily Population
ADT	Average Daily Traffic
ALUC	Airport Land Use Commission
AMSL	Above Mean Sea Level
ANSI	American National Standards Institute
APCD	Air Pollution Control District
AQMD	Air Quality Management District
ARB	California Air Resources Board
asf	assignable square feet
ASTM	American Society for Testing and Materials
BAAQMD	Bay Area Air Quality Management District. A nine-county regional air district created under the provisions of the California Health and Safety Code Section 40200. It consists of nine member counties: all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties, and the southern portions of Solano and Sonoma counties. The BAAQMD is responsible for the developing the overall attainment strategy for its respective geographic area (see SFBAB above) and has the authority to regulate stationary sources, some area sources, and some aspects of mobile sources.
BART	Bay Area Rapid Transit
BAT	Best Available Technology
BCDC	San Francisco Bay Conservation and Development Commission
BCT	Best Conventional Pollutant Control Technology
Bear Transit	UC Berkeley Shuttle Service
bgs	below ground surface
BMPs	Best Management Practices
BP	British Petroleum
BRT	Bus Rapid Transit
BSL	Biosafety Level
BTU	British thermal unit

C_2H_3Cl	Vinyl Chloride
CAA	Clean Air Act. The basic federal air pollution control statute first passed in 1963, following a 1955 federal statute authorizing research and technical assistance. The 1965 and 1967 amendments began automobile and stationary source standards. The most recent amendments of the CAA were passed in 1990.
CAAQS	California Ambient Air Quality Standards
CAP	Clean Air Plan
CARB or ARB	California Air Resources Board. The state's lead air quality agency consisting of an eleven-member board appointed by the Governor. CARB is responsible for attainment and maintenance of the state and federal air quality standards, and is fully responsible for motor vehicle pollution control. It oversees county and regional air pollution management programs.
Cal/EPA	California Environmental Protection Agency. The state agency established in 1991 for unifying environmental activities related to public health protection in the State of California. The Cal/EPA boards, departments, and offices are directly responsible for implementing California environmental laws, or play a cooperative role with other regulatory agencies at regional, local, state, and federal levels. There are six boards, departments, and offices under the organization of Cal/EPA including the California Air Resources Board (ARB), California Integrated Waste Management Board (IWMB), State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCB), Department of Pesticide Regulation (DPR), Department of Toxic Substances Control (DTSC), and Office of Environmental Health Hazard Assessment (OEHHA).
Cal/OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CBC	California Building Code
CCAA	California Clean Air Act. The state law that was passed in 1988 to provide the basis for air quality planning and regulation independent of federal regulations. A major element of the CCAA is the requirement that local air districts in violation of the CAAQS must prepare attainment plans that identify air quality problems, causes, trends, and actions to be taken to attain and maintain California's air quality standards by the earliest practicable date.
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Responsibility, Compensation, and Liability Act
CESA	California Endangered Species Act
CFCs	Chlorofluorocarbons
CFR	Code of Federal Regulations

CGS	California Geological Survey
CH_4	Methane
CHP	California Highway Patrol
CIWMB	California Integrated Waste Management Board
CMP	Congestion Management Plan
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COD	Chemical Oxygen Demand
CRHR	California Register of Historical Resources
CRT	Computational Research and Theory
CTMP	Construction Traffic Management Plan
CTR	California Toxics Rule
CUPA	Certified Unified Program Agency
CVC	California Vehicle Code
CWA	Clean Water Act
CY	Cubic Yard
dB	Decibels
dBA	A-Weighted Decibels (Level of Noise Measurement)
DBH	Diameter at Breast Height
DEIR	Draft Environmental Impact Report
DHS	Department of Health Services (California)
DOE	United States Department of Energy
DOT	Department of Transportation
DPM	Diesel Particulate Matter
DTSC	Department of Toxic Substances Control (California)
DWR	Department of Water Resources (California)
EBI	Energy Biosciences Institute
EBMUD	East Bay Municipal Utility District
EBRPD	East Bay Regional Park District
EH&S	LBNL Environment, Health, and Safety (Division)
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Environmentally Sensitive Area
ESL	Environmental Screening Level

FAA	Federal Aviation Administration
FDA	United States Food and Drug Administration
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
GHGs	Greenhouse Gases
GMO	Genetically-Modified Organisms
gpd	gallons per day
gsf	gross square feet
GWP	Global Warming Potential
H_2O	Water Vapor
H_2S	hydrogen sulfide
HAP	Hazardous Air Pollutant. Chemicals that cause serious health and environmental effects. Health effects include cancer, birth defects, nervous system problems, and death due to massive accidental releases. Hazardous air pollutants are released by sources such as chemical plants, dry cleaners, printing plants, and motor vehicles (cars, trucks, buses, etc.).
HCFCs	Hydrochlorofluorocarbons
HCM	Highway Capacity Manual
HFCs	Hydrofluorocarbons
HMMP	Hazardous Materials Management Plan
HMP	Hydrograph Modification Management Plan
HOV	High-Occupancy Vehicle
HVAC	Heating Ventilation Air Conditioning
HWHF	Hazardous Waste Handling Facility
IBC	Institutional Biosafety Committee
IPCC	Intergovernmental Panel on Climate Change
ISM	Integrated Safety Management
kv	Kilovolts
kVA	Kilovolt (Annual)
kW	Kilowatts
lb/day	Pounds per day
LBNL	Lawrence Berkeley National Laboratory
LCFS	Low Carbon Fuel Standards
LEED	Leadership in Energy & Environmental Design
Leq	Energy-Equivalent Noise Level

LHS	Lawrence Hall of Science
LOS	Level of Service
LRDP	Long Range Development Plan
LUST	Leaking Underground Storage Tank
MACT	Maximum Achievable Control Technology
MEI	Maximally Exposed Individual
MEPP	Master Emergency Program Plan
MGD	Million Gallons per Day
MMBtu	Million British Thermal Units
$MMTCO_2E$	CO_2 Equivalent Million Metric Tons
MOA	Memorandum of Agreement
mph	miles per hour
MPO	Metropolitan Planning Organization
MS4s	Municipal Separate Storm Sewer Systems
MTC	Metropolitan Transportation Commission
MVA	Mega-Volt-Amperes
MWh	Megawatt hours
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NIOSH	National Institute for Occupational Safety and Health
NNI	National Nanotechnology Initiative
NO_2	nitrogen dioxide
NOC	Notice of Completion
NOD	Notice of Determination
NOI	Notice of Intent
NOP	Notice of Preparation
NOx	Oxides of Nitrogen
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NPS	National Parks Service
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historical Places
NTIG	Nanotechnology Interest Group
O_3	Ozone
OEHHA	Office of Environmental Health Hazard Assessment (California)
OSCAR	Open Space, Conservation, and Recreation
OSHA	Occupational Safety & Health Administration

Pb	Lead
PCBs	Polychlorinated Biphenyls
PFCs	Perfluorocarbons
PG&E	Pacific Gas & Electric Company
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter – 2.5 microns or smaller
PM_{10}	Particulate Matter – 10 microns or smaller
ppb	parts per billion
ppd	pounds per day
PPE	Personal Protective Equipment
pphm	parts per hundred million
ppm	parts per million
PRC	Public Resources Code
psi	pounds per square inch
PV	Photovoltaic
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
ROG	Reactive Organic Gases
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SB	Senate Bill
SCH	California State Clearinghouse
SCIP	Southwest Campus Integrated Projects
Sf	Square feet
SF_6	Sulfur Hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SHMA	Seismic Hazards Mapping Act
SIP	State Implementation Plan
SLM	Sound Level Meter
SLR	Single Lens Reflex
SO_2	Sulfur Dioxide
SO_4	Sulfates
SOx	Sulfur Oxide
SPCC	Spill Prevention Control and Countermeasure
SWMP	Storm Water Monitoring Plan
SWMU	Solid Waste Management Unit
SWPPP	Storm Water Pollution Prevention Plan

SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminant
TCM	Transportation Control Measure
TDM	Transportation Demand Management
The Regents	The Board of Regents of the University of California
TIA	Traffic Impact Analysis
TLV	Threshold Limit Value
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TPH-g	Total Petroleum Hydrocarbons as Gasoline
TRAFFIX	Transportation Modeling Program
TSCA	Toxic Substances Control Act
TSS	Total Suspended Solids
UBC	Uniform Building Code
UC	University of California
UCOP	University of California, Office of the President
UCPD	UC Berkeley Police Department
UIUC	University of Illinois, Urbana Champaign
UNFCCC	United Nations Framework Convention on Climate Change
URBEMIS	Air Quality Modeling Software
URF	Unit Risk Factor
USDA	United States Department of Agriculture
US EPA	Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
UV	Ultraviolet
UWMP	Urban Water Management Plan
VMT	Vehicle-Miles Traveled
VOCs	Volatile Organic Compounds
WGCEP	Working Group on California Earthquake Probabilities